

# OCCUPATION AND MORTALITY

## Oesophageal Cancer Mortality in South Africa, 2011-2015

National Institute for Occupational Health

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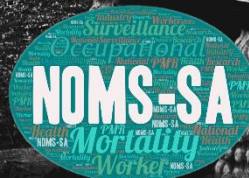
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Released: 31 March 2025



**NATIONAL INSTITUTE FOR  
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Division of the National Health Laboratory Service

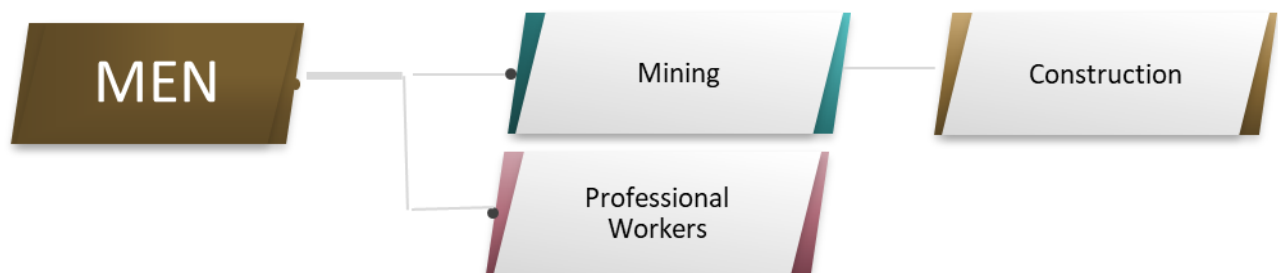


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## Main points

- From 2011 to 2015, there were 3,001 reported deaths among females and 5,987 reported deaths among males due to oesophageal cancer in the 15-69 age group. The main industry with significantly elevated proportionate mortality ratios (PMRs) for oesophageal cancer deaths among men was mining and construction, and none among women.
- The major occupation group with significantly elevated PMRs for oesophageal cancer deaths among men was professional workers.



# 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.

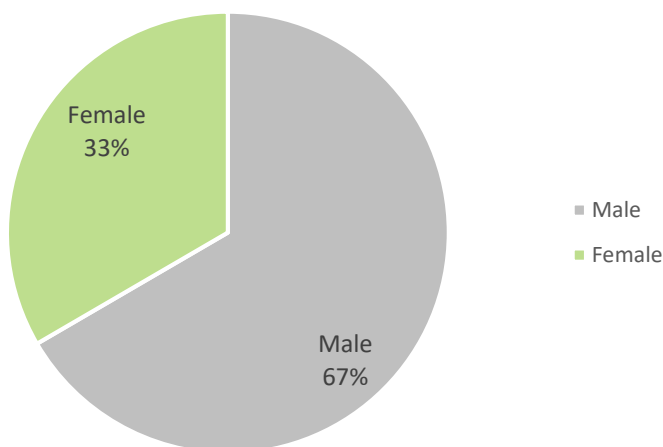
This report presents the analysis of deaths involving oesophageal cancer in different occupation groups and industries among those aged 15 to 69 years in South Africa. This analysis includes deaths that were registered from 2011 to 2015 by the Statistics South Africa.

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.

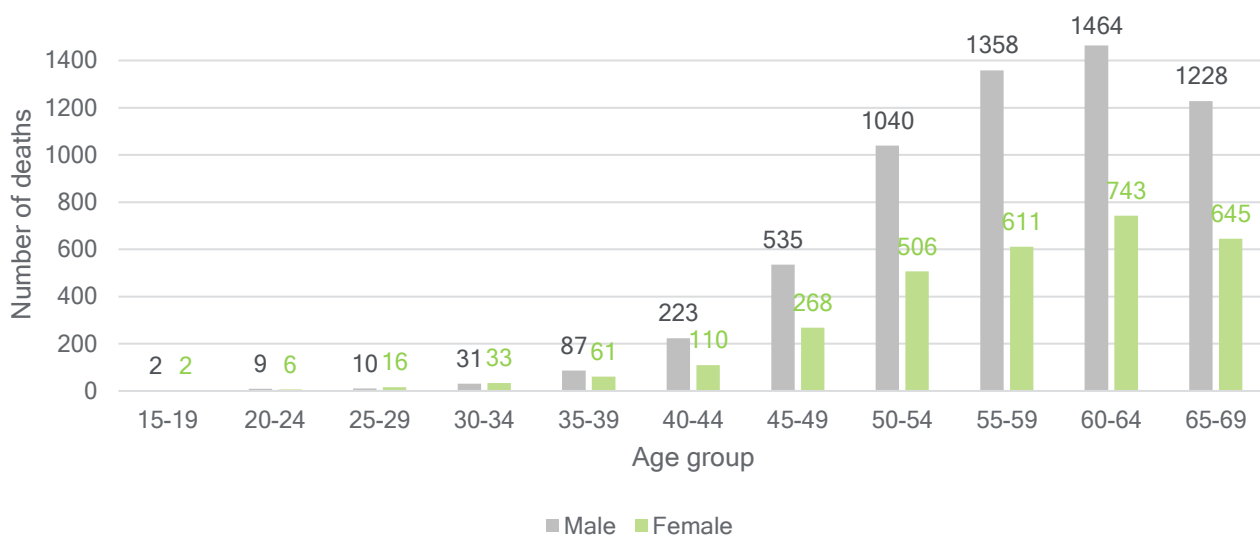
We calculated proportional mortality ratios for the population at risk of dying from oesophageal cancer. The results of the analysis do not prove that the observed proportions of deaths involving oesophageal cancer are caused by occupational exposure. The findings presented here should be interpreted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

# Oesophageal cancer mortality by sex and age

- There were 8,995 reported deaths due to oesophageal cancer from 2011-2015 among 15 to 69-year-olds.
- Number of reported deaths due to oesophageal cancer by sex:
  - Men (5,987), Women (3,001), and Unspecified (7).



- Mean age of death due to oesophageal cancer: men (57.5 years), women (57.2 years).





## Oesophageal cancer mortality by sex and main industry

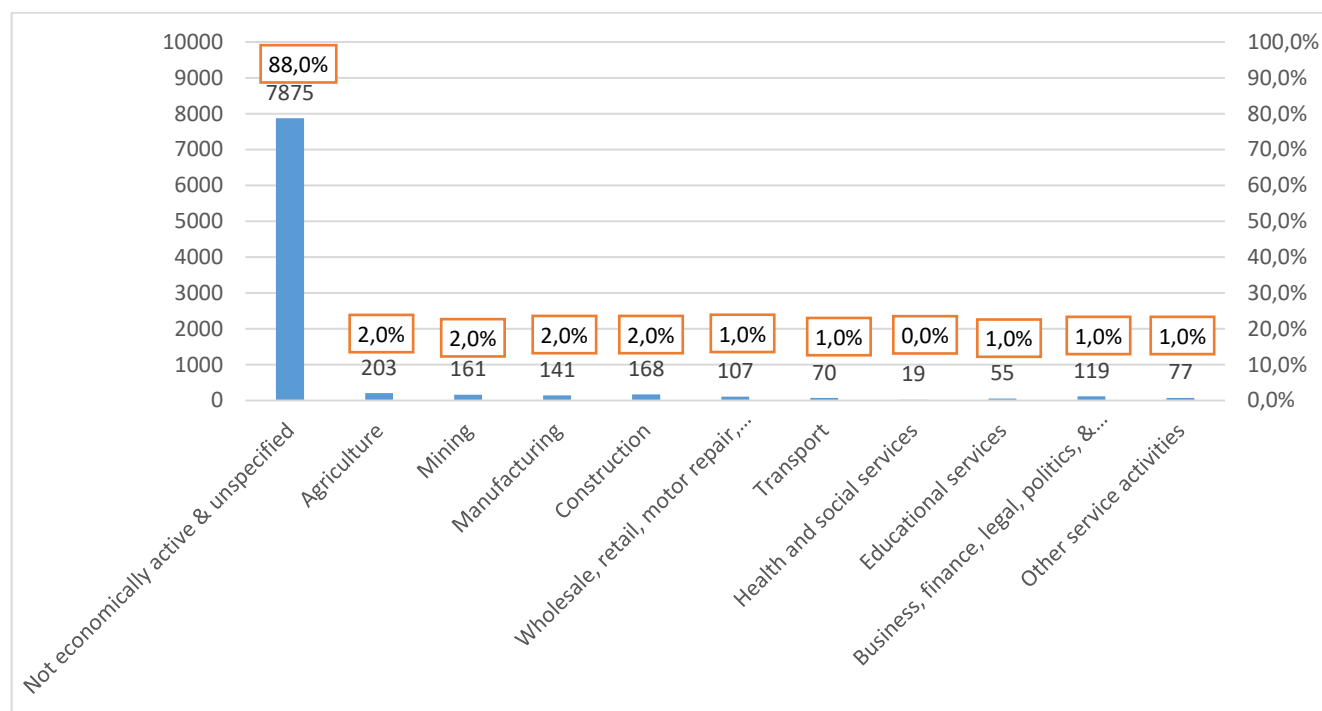


Figure 1. Percentage of oesophageal cancer-related deaths by main industry.

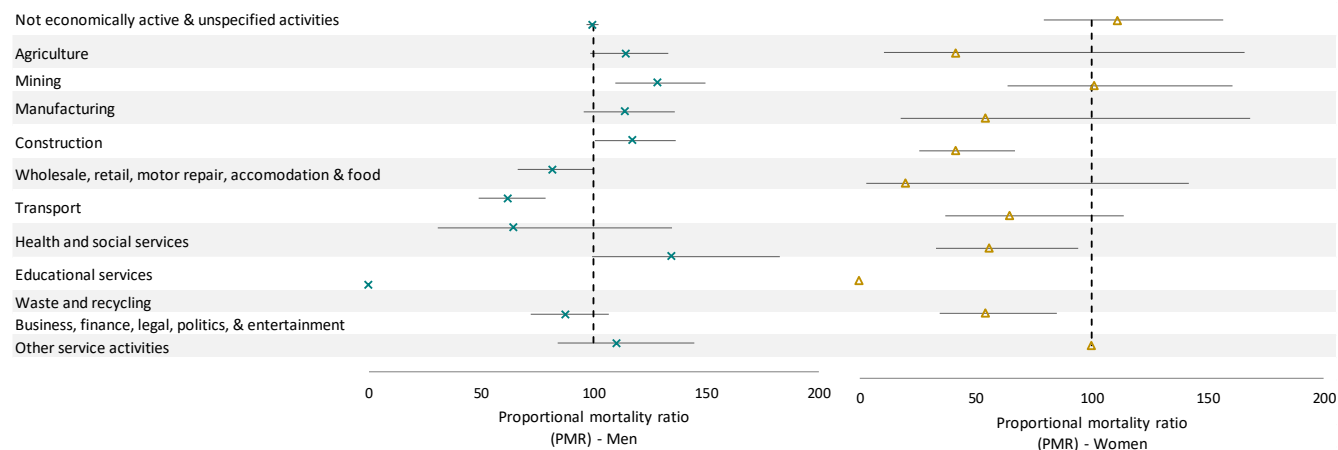
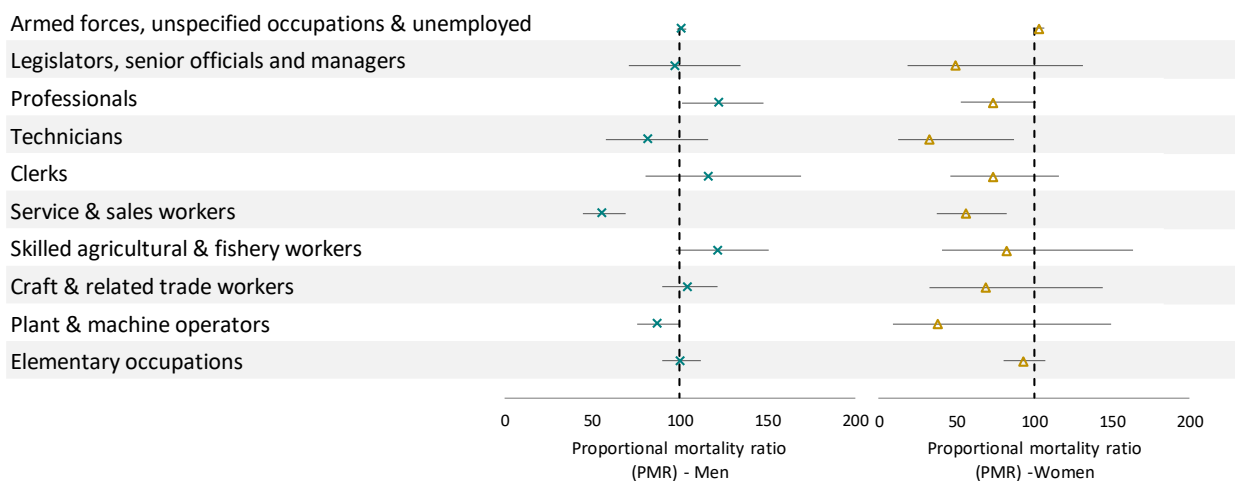


Figure 2. Oesophageal cancer-related mortality by sex and main industry. Source: Statistics South Africa (See Appendix Tables 1 and 2)

- The main industries with significantly elevated PMRs for oesophageal cancer-related deaths were mining and construction in men; and none in women compared to the general population. The transport industry appears protective in men. Among women, the i) wholesale, retail, motor repair, accomodation and food, ii) education services, and iii) business, finance, legal, politics, and entertainment appear protective.

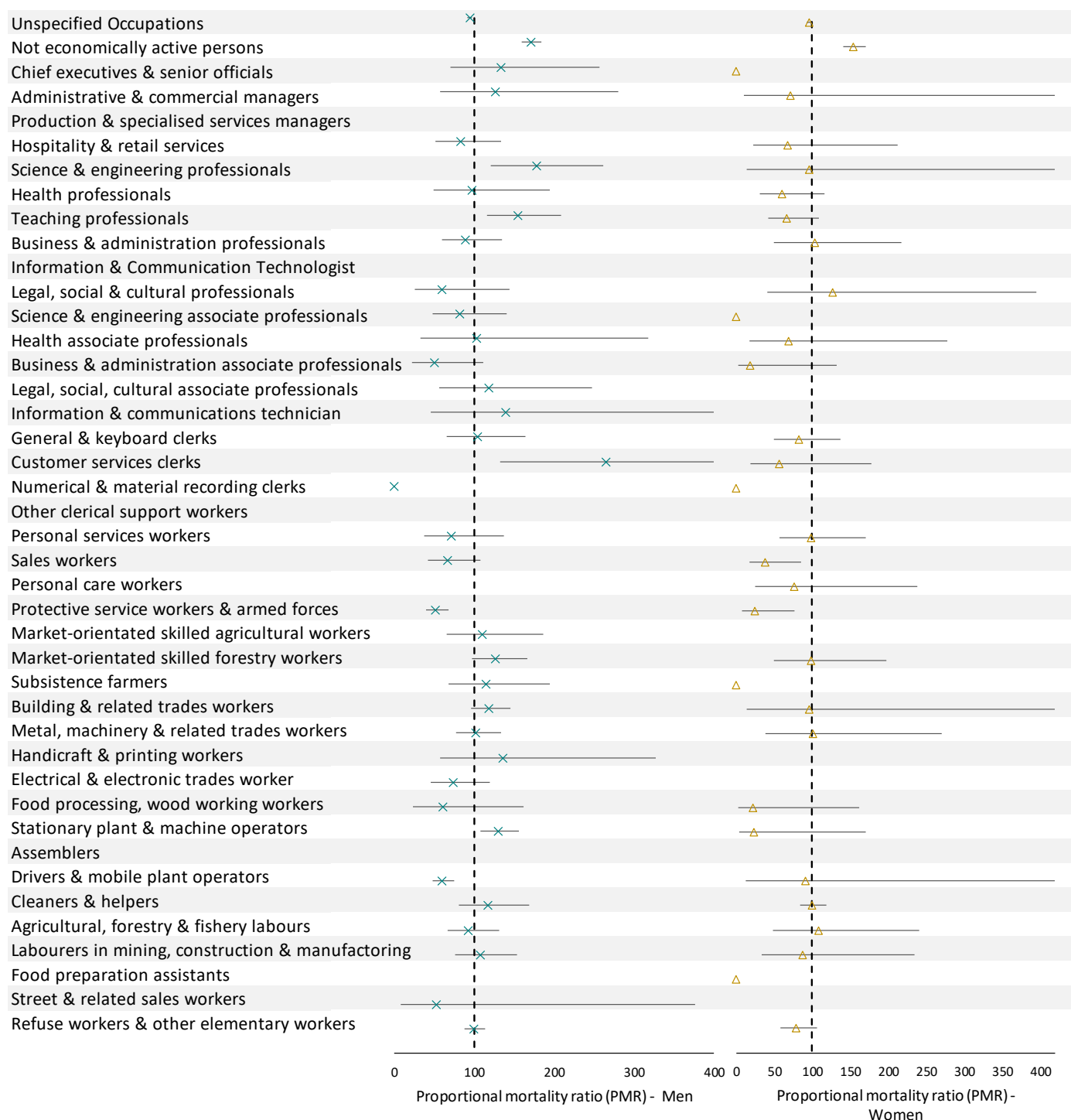
# Oesophageal cancer-related mortality by sex and major occupation



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

- Men working as professionals had significant excess mortality due to oesophageal cancer compared to the general population. Working as service and sales workers was protective amongst men.
- Among women, working as technicians or service and sales workers was protective of oesophageal cancer compared to the general population.

# Oesophageal cancer-related mortality by sex and sub-major occupation



**Figure 4.** Oesophageal 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 oesophageal cancer compared to the general population.
  - Science and engineering professionals
  - Teaching professionals
  - Customer service clerks
  - Stationary plant and machine operators
- Women employed in all sub-major occupation groups, except for those who were not economically active, did not have significant excess mortality due to oesophageal 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, 10<sup>th</sup> Revision (ICD-10). Deaths due to oesophageal cancer disease include the following underlying cause of death code: C15.
- 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 Oesophageal cancer-related deaths by industry (men)

<b>Men</b>					
<b>Occupation</b>	<b>n</b>	<b>Total deaths</b>	<b>PMR</b>	<b>95% CI LL</b>	<b>95% CI UL</b>
Not economically active & unspecified activities	5011	733993	99.41628	96.70	102.21
Agriculture	170	21634	114.4293	98.46	132.99
Mining	159	18064	128.1765	109.72	149.73
Manufacturing	123	15710	114.0129	95.54	136.05
Construction	165	20531	117.0305	100.47	136.32
Wholesale, retail, motor repair, accomodation & food	90	16078	81.51462	66.30	100.22
Transport	69	16215	61.96653	48.94	78.46
Health and social services	7	1588	64.19077	30.60	134.65
Educational services	41	4439	134.5005	99.03	182.67
Waste and recycling	0	105	0	-	-
Business, finance, legal, politics, & entertainment	100	16612	87.66033	72.06	106.64
Other service activities	52	6866	110.2871	84.04	144.73
<b>Total</b>	<b>5987</b>	<b>871835</b>			

Table 2 Oesophageal cancer-related deaths by industry (women)

<b>Women</b>					
<b>Occupation</b>	<b>n</b>	<b>Total deaths</b>	<b>PMR</b>	<b>95% CI LL</b>	<b>95% CI UL</b>
Not economically active & unspecified activities	2857	618321	102.2804	98.59782299	106.1005788
Agriculture	33	6557	111.4051	79.20036075	156.7050326
Mining	2	1067	41.49176	10.37672789	165.9064671
Manufacturing	18	3936	101.231	63.77932176	160.6747103
Construction	3	1223	54.29891	17.51219654	168.3610261
Wholesale, retail, motor repair, accomodation & food	17	9064	41.51694	25.80921695	66.7845205
Transport	1	1106	20.01434	2.81918765	142.0883115
Health and social services	12	4108	64.6617	36.72162333	113.8603048
Educational services	14	5550	55.83819	33.06998412	94.2819834
Waste and recycling	0	88	0	-	-
Business, finance, legal, politics, & entertainment	19	7748	54.28256	34.62403432	85.10261394
Other service activities	25	5529	100.0898	67.63107297	148.1266331
<b>Total</b>	<b>3001</b>	<b>664297</b>			

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

<b>Men</b>					
<b>Occupation</b>	<b>n</b>	<b>Total deaths</b>	<b>PMR</b>	<b>95% CI LL</b>	<b>95% CI UL</b>
Armed forces, unspecified occupations & unemployed	4,933	710203	101.0825	98.30	103.94
Legislators, senior officials and managers	37	5520	97.54615	70.68	134.63
Professionals	106	12601	122.4189	101.20	148.09
Technicians and Associate professionals	32	5678	82.01666	58.00	115.98
Clerks	28	3488	116.8232	80.66	169.20
Service & sales workers	78	20458	55.48543	44.44	69.27
Skilled agricultural & fishery workers	82	9812	121.6197	97.95	151.01
Craft & related trade workers	166	23116	104.5064	89.76	121.68
Plant & machine operators	196	32749	87.09747	75.72	100.19
Elementary occupations	329	47653	100.4739	90.18	111.94
<b>Total</b>	<b>5,987</b>	<b>871278</b>			

Table 4 Oesophageal cancer related deaths by major occupation (women)

<b>Women</b>					
<b>Occupation</b>	<b>n</b>	<b>Total deaths</b>	<b>PMR</b>	<b>95% CI LL</b>	<b>95% CI UL</b>
Armed forces, unspecified occupations & unemployed	2715	584122	102.8156	99.01996	106.7568
Legislators, senior officials and managers	4	1797	49.23849	18.47975	131.1938
Professionals	37	11172	73.25945	53.0792	101.112
Technicians and Associate professionals	4	2714	32.60191	12.23586	86.86635
Clerks	18	5438	73.2194	46.13094	116.2144
Service & sales workers	25	9915	55.77507	37.68745	82.54363
Skilled agricultural & fishery workers	8	2163	81.81375	40.91434	163.5976
Craft & related trade workers	7	2255	68.66641	32.73516	144.037
Plant & machine operators	2	1183	37.39711	9.352692	149.5339
Elementary occupations	181	43074	92.95146	80.34997	107.5293
<b>Total</b>	<b>3001</b>	<b>663833</b>			

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

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	4193	647593	94.28342	91.47234	97.18088
Not economically active persons	740	63166	170.5929	158.7339	183.3379
Chief executives & senior officials	9	981	133.5937	69.50996	256.7587
Administrative & commercial managers	6	693	126.0755	56.63992	280.6329
Production & specialised services managers	5	863	84.36684	35.11526	202.6972
Hospitality & retail services	17	2983	82.98665	51.58908	133.4931
Science & engineering professionals	26	2132	177.5819	120.9097	260.8172
Health professionals	8	1198	97.24018	48.62897	194.4449
Teaching professionals	44	4136	154.9119	115.2813	208.1664
Business & administration professionals	23	3753	89.24047	59.3022	134.2929
Information & Communication Professionals	0	169	0	-	-
Legal, social & cultural professionals	5	1213	60.02357	24.98308	144.2108
Science & engineering associate professionals	13	2325	81.42035	47.27677	140.2226
Health associate professionals	3	426	102.5473	33.07301	317.9616
Business & administration associate professionals	6	1748	49.98301	22.45507	111.2578
Legal, social, cultural associate professionals	7	865	117.8405	56.17779	247.1863
Information & communications technician	3	314	139.1247	44.86976	431.3747
General & keyboard clerks	18	2530	103.6011	65.27258	164.4366
Customer services clerks	8	440	264.7585	132.4034	529.4203
Numerical & material recording clerks	0	360	0	-	-
Other clerical support workers	2	158	184.3255	46.09821	737.033
Personal services workers	9	1845	71.03277	36.95895	136.5205
Sales workers	17	3715	66.63504	41.42402	107.1897
Personal care workers	0	180	0	-	-
Protective service workers & armed forces	52	14718	51.44784	39.20347	67.51647
Market-orientated skilled agricultural workers	14	1846	110.4356	65.40509	186.4688
Market-orientated skilled forestry workers	54	6196	126.9097	97.19836	165.7032
Subsistence farmers	14	1770	115.1774	68.21345	194.4754
Building & related trades workers	89	11006	117.7533	95.66305	144.9446
Metal, machinery & related trades workers	52	7441	101.7618	77.5429	133.5449
Handicraft & printing workers	5	534	136.3457	56.74994	327.5799
Electrical & electronic trades worker	16	3175	73.38188	44.95568	119.7824
Food processing, wood working workers	4	960	60.67382	22.77156	161.6627
Stationary plant & machine operators	113	12707	129.4935	107.6892	155.7126
Assemblers	1	69	211.0394	29.72667	1498.238
Drivers & mobile plant operators	82	19973	59.78375	48.14841	74.23084
Cleaners & helpers	28	3492	116.7606	80.6179	169.1069
Agricultural, forestry & fishery labours	33	5176	92.83939	66.00159	130.5901
Labourers in mining, construction & manufacturing	31	4177	108.0712	76.00229	153.6714
Food preparation assistants	0	29	0	-	-
Street & related sales workers	1	275	52.9517	7.458693	375.9214
Refuse workers & other elementary workers	236	34480	99.66836	87.72994	113.2314
<b>Total</b>	<b>5987</b>	<b>871810</b>			



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

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	2283	522883	96.6486348	92.7642544	100.695668
Not economically active persons	432	61703	154.978624	141.031977	170.304454
Chief executives & senior officials	0	340	0	-	-
Administrative & commercial managers	1	307	72.1034357	10.1563761	511.885872
Production & specialised services managers	0	183	0	-	-
Hospitality & retail services	3	967	68.6734894	22.1482106	212.931339
Science & engineering professionals	1	230	96.2424119	13.5565542	683.25636
Health professionals	9	3301	60.3519518	31.4016348	115.992626
Teaching professionals	17	5590	67.3180377	41.8486021	108.288401
Business & administration professionals	7	1496	103.576393	49.3777079	217.265433
Information & Communication Technologist	0	34	0	-	-
Legal, social & cultural professionals	3	521	127.46116	41.1080991	395.210374
Science & engineering associate professionals	0	251	0	-	-
Health associate professionals	2	638	69.3910807	17.3541045	277.463011
Business & administration associate professionals	1	1189	18.6171192	2.62237801	132.169018
Legal, social, cultural associate professionals	0	601	0	-	-
Information & communications technician	1	35	632.450136	89.0859274	4489.97037
General & keyboard clerks	15	4006	82.8847532	49.9679252	137.485843
Customer services clerks	3	1157	57.3960797	18.5110801	177.964222
Numerical & material recording clerks	0	136	0	-	-
Other clerical support workers	0	139	0	-	-
Personal services workers	13	2904	99.092566	57.5381515	170.65784
Sales workers	6	3472	38.2530324	17.1853313	85.1478779
Personal care workers	3	864	76.8602595	24.7885644	238.315515
Protective service workers & armed forces	3	2675	24.8251455	8.00647464	76.9736841
Market-orientated skilled agricultural workers	0	135	0	-	-
Market-orientated skilled forestry workers	8	1796	98.6002439	49.3091218	197.164495
Subsistence farmers	0	232	0	-	-
Building & related trades workers	1	230	96.2424119	13.5565542	683.25636
Metal, machinery & related trades workers	4	874	101.307802	38.0219425	269.930206
Handicraft & printing workers	0	100	0	-	-
Electrical & electronic trades workers	1	79	280.199427	39.4684489	1989.22738
Food processing, wood working workers	1	972	22.7734102	3.2078266	161.675888
Stationary plant & machine operators	1	925	23.9305457	3.37081888	169.890771
Assemblers	0	17	0	-	-
Drivers & mobile plant operators	1	241	91.8496048	12.9377903	652.070385
Cleaners & helpers	129	28641	99.7001628	83.8977615	118.478995
Agricultural, forestry & fishery labours	6	1225	108.420023	48.7081389	241.333414
Labourers in mining, construction & manufacturing	4	1006	88.0149294	33.0329799	234.511928
Food preparation assistants	0	77	0	-	-
Street & related sales workers	0	347	0	-	-

Refuse workers & other elementary workers	42	11775	78.9555583	58.3494875	106.838645
<b>Total</b>	<b>3001</b>	<b>664294</b>			