



**NATIONAL HEALTH
LABORATORY SERVICE**

NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH

Pathology Division Surveillance Report

Demographic Data and Disease Rates for January to December 1983

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EXECUTIVE SUMMARY

During 1983, 3 246 cases came to autopsy at the NIOH. Of these, 64.6% were black men, 34.2% were white and 1.3% were coloured.

Overall disease rates (per 1000 autopsies) for 1983 are shown in Figure 1.

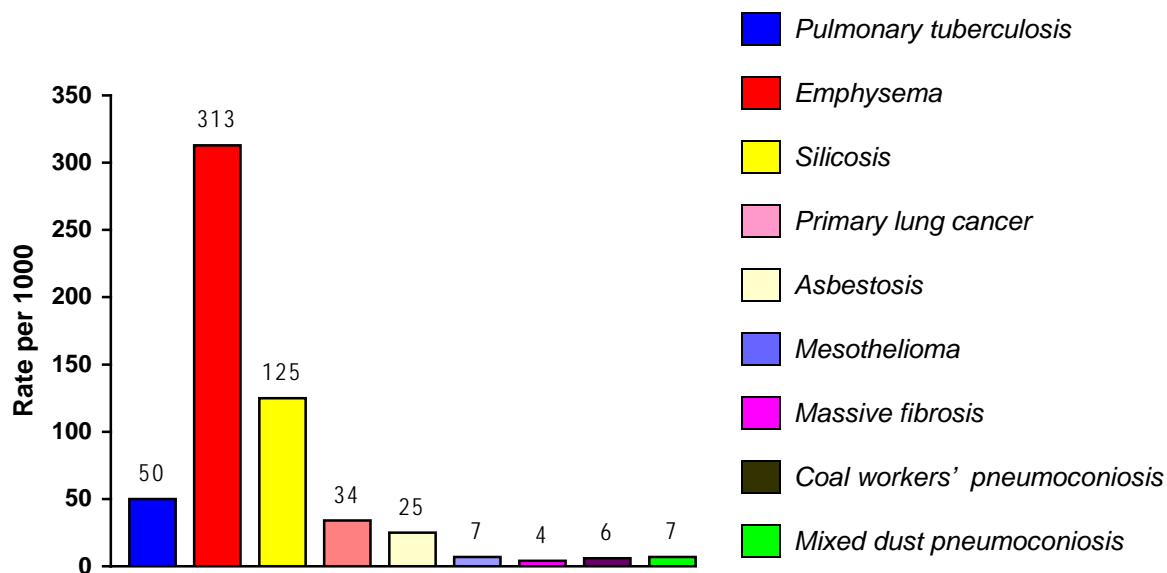


FIG 1 OVERALL DISEASE RATES FOR 1983

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GLOSSARY

Asbestosis	<i>Lung fibrosis caused by asbestos fibres</i>
Coal workers' pneumoconiosis	<i>Lung fibrosis caused by exposure to coal dust</i>
Emphysema	<i>Lung disease caused by the destruction of the alveolar walls</i>
Massive fibrosis	<i>Lung fibrosis caused by exposure to dust and measuring more than 1 cm in diameter</i>
Mesothelioma	<i>A malignant tumour of the pleural cavity of the lungs</i>
Miner	<i>A person who has worked in a controlled mine or works</i>
Mixed exposures	<i>The multiple dust types to which a miner may be exposed, having worked in several mining commodities in his lifetime</i>
Prevalence	<i>The number of cases in a defined population at a given time</i>
Silicosis	<i>Lung fibrosis caused by inhalation of silica dust; detected by the presence of silicotic nodules in the lung tissue</i>
Surveillance	<i>The ongoing and systematic collection, analysis and interpretation of data related to adverse health outcomes</i>

SECTION 1 – BACKGROUND

The Occupational Diseases in Mines and Works Act, 1973 (Act 78 of 1973) requires that the cardio-respiratory organs of a deceased person who has worked at a controlled mine or a controlled works be examined for the presence of occupational disease, regardless of the clinical cause of death and provided that the next of kin agrees. These examinations are performed by pathologists at the National Institute for Occupational Health (NIOH). A detailed report on each case examined is sent to the Medical Bureau for Occupational Diseases (MBOD). Cases certified as having a compensable disease are then referred to the Compensation Commissioner's office, where the payment for compensation is managed.

Since 1975, the pathological findings from the autopsy examinations have been recorded on the computerised PATHAUT database. PATHAUT comprises data from autopsy examinations and clinical files which include occupational histories. The database is unique and provides an important resource for both surveillance and research. These data are the only comprehensive surveillance data on occupational lung disease in the South African mining industry.

The data presented in this report summarise the PATHAUT system surveillance results, i.e. the results of the systematic collection, collation, and analysis of the pathology findings in the cardio-respiratory organs of mine workers. Data from PATHAUT are exported into, and analysed, using SAS v9.1.

This report describes autopsy cases examined during the year 1983. This and other annual reports can be accessed at www.nioh.ac.za.

Many of the cases had "mixed" exposures in that they had been employed in more than one commodity. For simplicity, cases are categorised according to the commodity in which most years of service were recorded, i.e. the commodity in which the miners had worked for the longest period.

All disease rates reported in this document are expressed per 1000. In all calculations, the denominators used are the total numbers of autopsies in specific commodities, age groups or population groups. Some of these rates must be viewed with caution, as the denominators are very small. This applies, for example, to those commodities where few workers are employed (such as manganese mining), and to the older age groups in some instances.

SECTION 2 – DEMOGRAPHIC DATA

The number of autopsies performed since 1983 is presented in Table 2-1.

TABLE 2-1 DISTRIBUTION OF AUTOPSIES BY YEAR AND POPULATION GROUP (1975 - 1983)

Year of autopsy	Black		White		Coloured		Unknown		Total N
	N	%	N	%	N	%	N	%	
1975	2 190	71	854	28	32	1			3 076
1976	2 335	68	1 072	31	27	1			3 434
1977	2 351	69	1 039	30	33	1			3 423
1978	2 245	67	1 090	32	32	1			3 367
1979	2 118	66	1 026	33	45	1			3 189
1980	2 338	64	1 274	35	46	1			3 658
1981	2 209	66	1 117	33	33	1			3 359
1982	2 312	63	1 302	36	44	1	1		3 659
1983	2 096	65	1 109	34	41	1			3 246
Total	20 194	66	9 883	32	333	1	1		30 411

It is important to note that a referral bias exists: there is a low autopsy rate for black men who have left employment at the mines, whereas the majority of white retired miners come to autopsy.

The pathologists at the NIOH perform two types of autopsy examinations. For men dying distant from Johannesburg, the cardio-respiratory organs are removed locally, preserved in formalin and sent to the NIOH. Full autopsies are undertaken on men who die close to Johannesburg.

Table 2-2 shows the distribution of autopsies by population group for 1983. Autopsies of only the cardio-respiratory organs comprised 80.9% of all examinations.

TABLE 2-2 NUMBER AND PROPORTION OF AUTOPSIES BY TYPE AND POPULATION GROUP (1983)

Autopsy type	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
Cardio-respiratory organs only	1 937	92.4	651	58.7	38	92.7	2 626	80.9
Full autopsy	129	6.2	438	39.5	2	4.9	569	17.5
Not stated	30	1.4	20	1.8	1	2.4	51	1.6
Total	2 096		1 109		41		3 246	

The age distribution of autopsies for 1983 is shown in Table 2-3 and Figure 2-1. The mean age at autopsy of black men was 35.1 years. The mean age of white men at autopsy was 57.8 years and for coloured men 62.0 years

TABLE 2-3 NUMBER AND PROPORTION OF AUTOPSIES BY AGE AND POPULATION GROUP (1983)

Age group (years)	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
<20	20	1.0	4	0.4	0	-	24	0.7
20-29	712	34.0	69	6.2	1	2.4	782	24.1
30-39	579	27.6	60	5.4	1	2.4	640	19.7
40-49	403	19.2	141	12.7	4	9.8	548	16.9
50-59	238	11.4	240	21.6	6	14.6	484	14.9
60-69	70	3.3	335	30.2	15	36.6	420	12.9
70-79	10	0.5	209	18.8	10	24.4	229	7.1
80+	2	0.1	44	4.0	3	7.3	49	1.5
Unknown	62	3.0	7	0.6	1	2.4	70	2.2
Total	2 096		1 109		41		3 246	

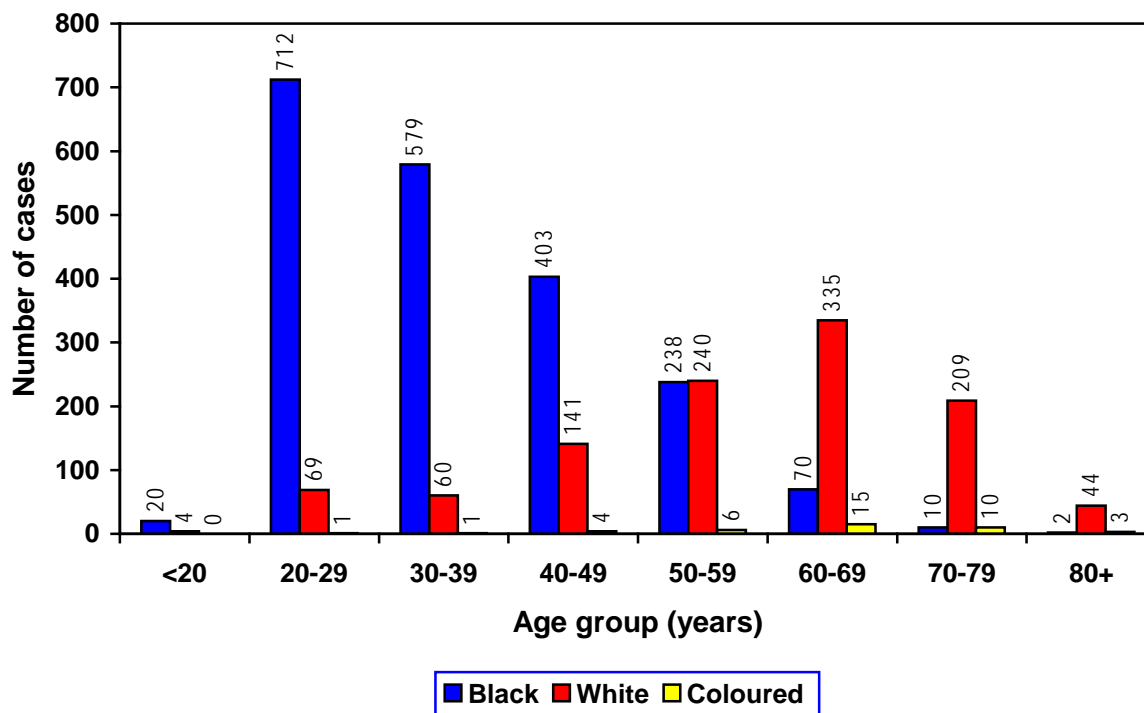


FIG 2-1 DISTRIBUTION OF AUTOPSIES BY AGE AND POPULATION GROUP (1983)

Cases were placed in categories according to the commodity in which they had worked for the longest duration (most exposure). Many men worked in a number of different mining commodities during their lifetimes and had “mixed” exposures. This was not taken into account in the analysis of exposure type (commodity).

Table 2-4 and Figure 2-2 show the distribution of autopsies by commodity and population group for 1983.

TABLE 2-4 NUMBER AND PROPORTION OF AUTOPSIES BY COMMODITY AND POPULATION GROUP (1983)

Commodity	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
Gold	1 559	74.4	831	74.9	2	4.9	2 392	73.7
Platinum	127	6.1	28	2.5	0	-	155	4.8
Coal	275	13.1	66	6.0	0	-	341	10.5
Asbestos	31	1.5	27	2.4	36	87.8	94	2.9
Iscor	5	0.2	72	6.5	1	2.4	78	2.4
Diamond	9	0.4	15	1.4	0	-	24	0.7
Copper	24	1.1	18	1.6	2	4.9	44	1.4
Other	1	-	5	0.5	0	-	6	0.2
Unknown	65	3.1	47	4.2	0	-	112	3.5
Total	2 096		1 109		41		3 246	

NOTE: This table shows only those commodities where a total of 10 or more cases were received

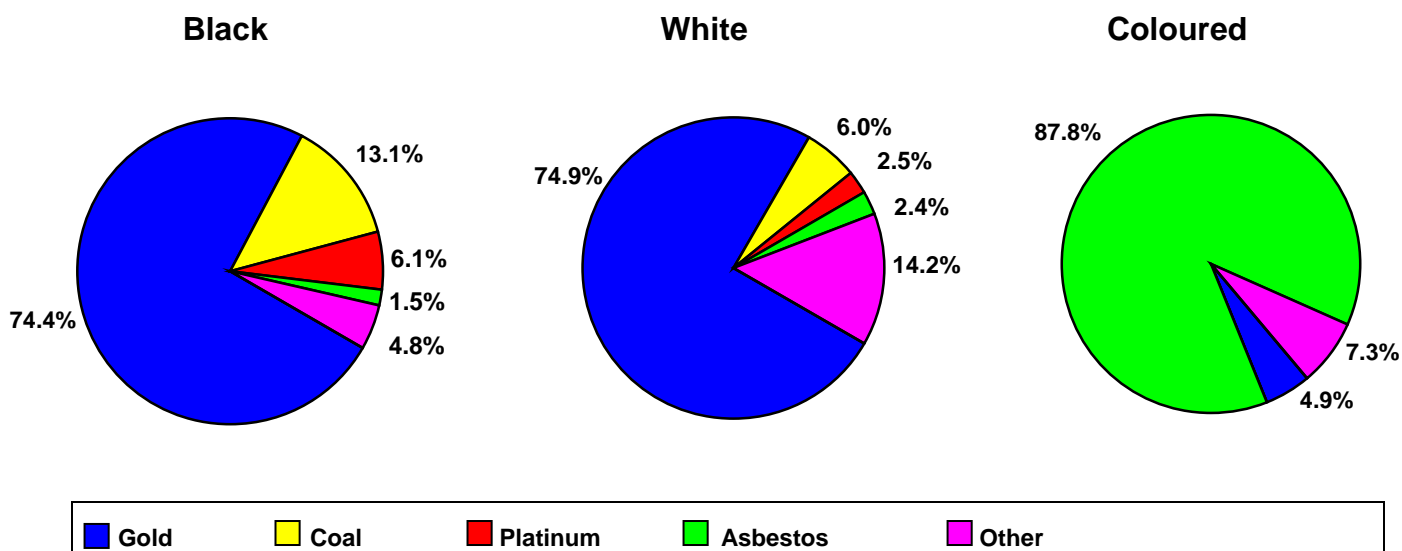
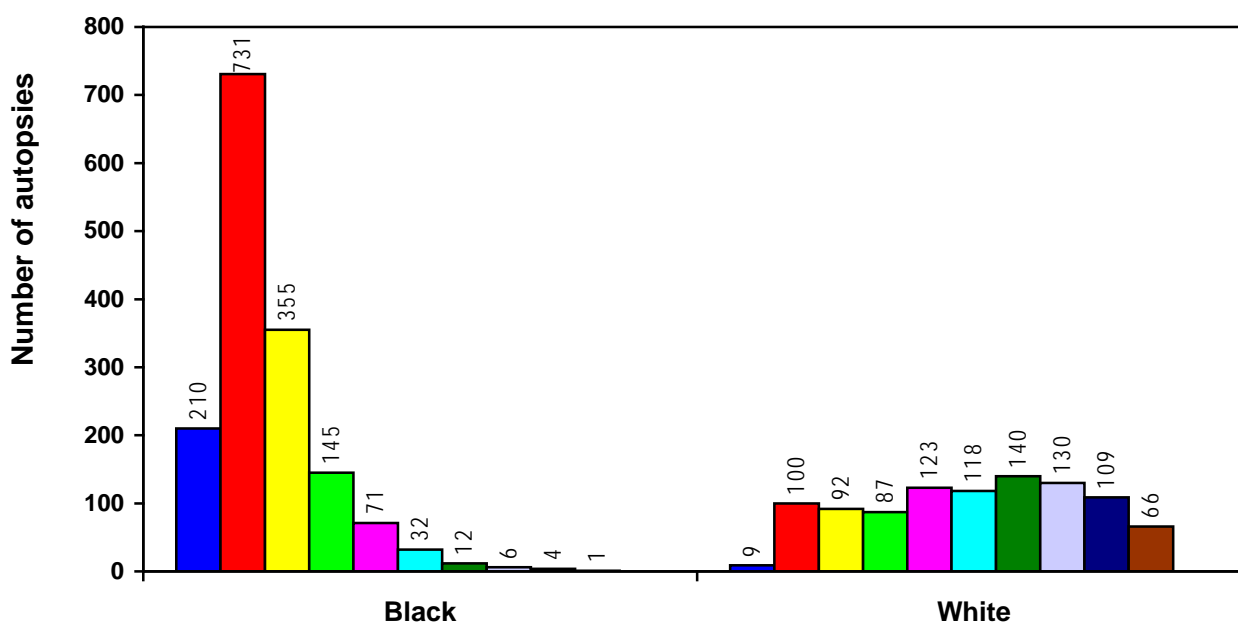


FIG 2-2 DISTRIBUTION OF AUTOPSIES BY COMMODITY AND POPULATION GROUP (1983)

Detailed information about the years in mining service by population group is presented in Table 2-5 and Figure 2-3.

TABLE 2-5 NUMBER AND PROPORTION OF AUTOPSIES BY YEARS OF SERVICE AND POPULATION GROUP (1983)

Years of service	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
<1	210	10.0	9	0.8	0	-	219	6.7
1-5	731	34.9	100	9.0	4	9.8	835	25.7
6-10	355	16.9	92	8.3	7	17.1	454	14.0
11-15	145	6.9	87	7.8	9	22.0	241	7.4
16-20	71	3.4	123	11.1	2	4.9	196	6.0
21-25	32	1.5	118	10.6	4	9.8	154	4.7
26-30	12	0.6	140	12.6	5	12.2	157	4.8
31-35	6	0.3	130	11.7	0	-	136	4.2
36-40	4	0.2	109	9.8	1	2.4	114	3.5
41+	1	-	66	6.0	1	2.4	68	2.1
Unknown	529	25.2	135	12.2	8	19.5	672	20.7
Total	2 096		1 109		41		3 246	



Years of service:

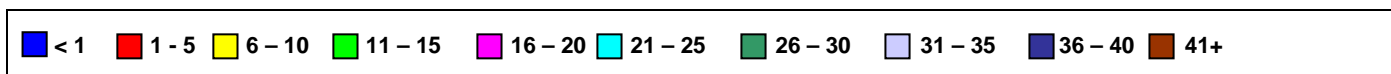


FIG 2-3 DISTRIBUTION OF AUTOPSIES BY YEARS OF SERVICE AND POPULATION GROUP (1983)

The mean age and duration of service by commodity type and population group for those cases for which information was available are shown in Tables 2-6 and 2-7.

TABLE 2-6 MEAN AGE BY COMMODITY AND POPULATION GROUP (1983)

Commodity	Black			White		
	N	Mean (years)	SD*	N	Mean (years)	SD*
Gold	1 518	35	11	831	60	15
Platinum	125	36	12	28	50	14
Coal	266	36	12	66	53	15
Asbestos	30	49	10	26	56	13
Iscor	3	35	9	72	55	15
Diamond	9	41	12	15	60	10
Copper	24	46	13	18	57	11
Other	1	24	-	5	61	12
Unknown	58	44	13	41	51	17
Total	2 034	36	12	1 102	58	15

* Standard deviation

TABLE 2-7 MEAN DURATION OF SERVICE BY COMMODITY AND POPULATION GROUP (1983)

Commodity	Black			White		
	N	Mean (years)	SD*	N	Mean (years)	SD*
Gold	1 212	6	6	672	26	11
Platinum	103	5	4	13	11	9
Coal	183	7	6	42	23	12
Asbestos	24	8	8	17	17	11
Iscor	2	2	6	11	21	10
Diamond	6	10	7	9	17	10
Copper	6	8	6	16	16	9
Other	1	5	-	5	14	12
Unknown	30	8	6	12	14	8
Total	1 567	6	6	797	23	12

* Standard deviation

SECTION 3 – ACTIVE TUBERCULOSIS

The distribution of active tuberculosis (TB) by anatomical site is presented in Figure 3-1 (n=217). Active pulmonary TB (PTB) was diagnosed in 5.0% (162) of all cases autopsied in 1983. Most of the men with PTB were black (82.7%; 134 cases), 14.2% (23 cases) were white and in 3.1% (5 cases) the population group was unknown.

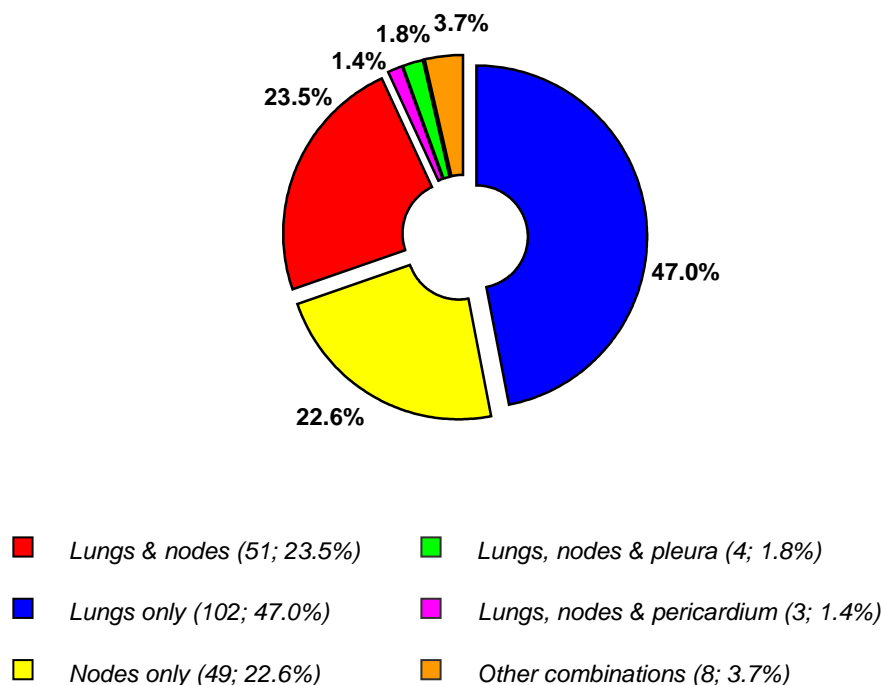


FIG 3-1 DISTRIBUTION OF ACTIVE TB BY SITE (1983)

The distribution of active PTB cases by commodity is shown in Table 3-1. The rates in this and subsequent tables and figures are expressed per 1000. The majority of active PTB cases (78.4%) came from the gold mining industry (73.7% of all autopsy cases came from that commodity).

TABLE 3-1 NUMBER OF CASES AND PREVALENCE OF ACTIVE PTB BY COMMODITY AND POPULATION GROUP (1983)

Commodity	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	104	67	23	28	0	-	127	53
Platinum	8	63	0	-	0	-	8	52
Coal	11	40	0	-	0	-	11	32
Asbestos	3	97	0	-	4	111	7	74
Diamond	2		0		0		2	
Copper	1		0		1		2	
Unknown	5		0		0		5	
Total	134	64	23	21	5	122	162	50

Note: rates have not been calculated where numbers are small

The age distribution of cases with active PTB is shown in Table 3-2. Most of the cases were between 30-49 years (84 cases=51.9%)

TABLE 3-2 NUMBER OF CASES AND PREVALENCE OF ACTIVE PTB BY AGE AND POPULATION GROUP (1983)

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
20-29	23	32	0	-	0	-	23	29
30-39	40	69	0	-	0	-	40	63
40-49	43	107	1	7	0	-	44	80
50-59	18	76	4	17	1	167	23	48
60-69	5	71	8	24	2	133	15	36
70-79	2	200	8	38	1	100	11	48
80+	0	-	2	45	1	333	3	61
Unknown	3	48	0	-	0	-	3	43
Total	134	64	23	21	5	122	162	50

SECTION 4 – SILICOSIS

Silicotic nodules were found in the lungs of 406 cases (12.5% of all autopsies), 89.4% of which came from the gold mining industry. Of all cases of silicosis, occasional silicotic nodules were found in 45.1% of cases, a few in 28.3%, a moderate number in 18.5% and a large number in 8.1%.

The distribution of cases with silicosis by commodity and population group is presented in Table 4-1.

TABLE 4-1 NUMBER OF CASES AND PREVALENCE OF SILICOSIS BY COMMODITY AND POPULATION GROUP (1983)

Commodity	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	123	79	239	288	1	500	363	152
Platinum	2	16	2	71	0	-	4	26
Coal	5	18	6	91	0	-	11	32
Asbestos	1	32	4	148	4	111	9	96
Diamond	2	222	2	133	0	-	4	167
Copper	0	-	2	111	0	-	2	45
Iscor	0	-	6	83	0	-	6	77
Unknown	4	62	3	64	0	-	7	63
Total	137	65	264	238	5	122	406	125

Although the silicosis rates increased with increasing age in both black and white men, the age distribution of cases with silicosis differed between the two population groups (Table 4-2).

TABLE 4-2 NUMBER OF CASES AND PREVALENCE OF SILICOSIS IN THE GOLD MINING INDUSTRY, BY AGE AND POPULATION GROUP (1983)

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
20-29	3	6	0	-	0	-	3	5
30-39	25	55	1	26	0	-	26	52
40-49	51	173	8	82	0	-	59	151
50-59	32	206	35	213	0	-	67	210
60-69	4	93	90	341	0	-	94	305
70-79	2	333	83	472	1	1000	86	473
80+	0	-	22	524	0	-	22	512
Unknown	6	146	0	-	0	-	6	316
Total	123	79	239	288	1	500	363	152

Silicosis was diagnosed in men who were young (<40 years) and in men who were exposed to silica for a few years (< 10 years) (Table 4-3).

TABLE 4-3 NUMBER OF CASES AND PREVALENCE OF SILICOSIS IN THE GOLD MINING INDUSTRY, BY YEARS OF SERVICE AND POPULATION GROUP (1983)

Years of service	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
<1	6	32	1	167	0	-	7	36
1-5	11	21	1	17	0	-	12	20
6-10	22	79	6	102	0	-	28	83
11-15	28	230	10	172	0	-	38	211
16-20	11	212	19	204	1	1000	31	212
21-25	11	440	27	276	0	-	38	309
26-30	1	111	50	427	0	-	51	405
31-35	0	-	52	448	0	-	52	437
36-40	0	-	43	448	0	-	43	426
41+	0	-	25	403	0	-	25	397
Unknown	33	95	5	75	0	-	38	92
<i>Total</i>	123	79	239	288	1	500	363	152

SECTION 5 – OTHER PNEUMOCONIOSES

MASSIVE FIBROSIS

There were 12 (0.4%) cases of massive fibrosis (1 black, 11 white). Nine cases of massive fibrosis were from the gold and 2 were from the coal mining industry. There was one case from Iscor.

COAL WORKERS' PNEUMOCONIOSIS

There were 18 (0.6%) cases of coal workers' pneumoconiosis of which 17 cases were from the coal and one was from the gold mining industry.

MIXED DUST PNEUMOCONIOSIS

There were 22 (0.7%) cases of mixed dust pneumoconiosis. These cases came from the gold (n=19) and platinum (n=1) mining industries and two cases were from Iscor.

ASBESTOSIS AND PLEURAL PLAQUES

There were 82 cases of asbestosis of which 57.3% (n=47) had slight, 35.4% (n=29) moderate and 7.3% (n=6) marked fibrosis. Of these, 62 (75.6%) had worked in the asbestos mining industry at some time in their lives. There were 17 cases that had asbestos plaques and 14 (82.4%) of these had asbestosis. Note that the parietal pleura (the site where plaque formation usually occurs) is seldom submitted with the lungs.

The distribution of asbestosis by age and population group is shown in Table 5-1.

TABLE 5-1 NUMBER OF CASES AND PREVALENCE OF ASBESTOSIS BY AGE AND POPULATION GROUP (1983)

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
30-39	2	3	0	-	0	-	2	3
40-49	12	30	1	7	2	500	15	27
50-59	12	50	7	29	6	1000	25	52
60-69	4	57	4	12	9	600	17	40
70-79	2	200	6	29	7	700	15	66
80+	1	500	0	-	2	667	3	61
Unknown	4	65	0	-	1	1000	5	71
Total	37	18	18	16	27	659	82	25

SECTION 6 – EMPHYSEMA

There were 1016 cases of emphysema, the extent of which was mild in 78.3% (n=796), moderate in 20.2% (n=205) and marked in 1.5% (n=15). The distribution of emphysema by age and population group is presented in Table 6-1.

TABLE 6-1 NUMBER OF CASES AND PREVALENCE OF EMPHYSEMA BY AGE AND POPULATION GROUP (1983)

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
20-29	10	14	2	29	0	-	12	15
30-39	60	104	9	150	0	-	69	108
40-49	103	256	71	504	1	250	175	319
50-59	86	361	154	642	2	333	242	500
60-69	32	457	255	761	9	600	296	705
70-79	3	300	159	761	6	600	168	734
80+	0	-	39	886	3	1000	42	857
Unknown	9	145	2	286	1	1000	12	171
Total	303	145	691	623	22	537	1 016	313

The majority of men with emphysema were from the gold mining industry (72.2%, n=734) (Table 6-2).

TABLE 6-2 NUMBER OF CASES AND PREVALENCE OF EMPHYSEMA BY COMMODITY AND POPULATION GROUP (1983)

Commodity	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	189	121	543	653	2	1000	734	307
Platinum	17	134	12	429	0	-	29	187
Coal	59	215	40	606	0	-	99	290
Asbestos	10	323	13	481	19	528	42	447
Diamond	4	444	9	600	0	-	13	542
Copper	8	333	10	556	1	500	19	432
Iscor	0	-	41	569	0	-	41	547
Other	0	-	2	400	0	-	2	333
Unknown	16	246	21	447	0	-	37	330
Total	303	145	691	623	22	537	1 016	313

TABLE 6-3 NUMBER OF CASES AND PREVALENCE OF EMPHYSEMA BY YEARS OF SERVICE AND POPULATION GROUP (1983)

Years of service	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
<1	8	38	3	333	0	-	11	50
1-5	60	82	31	310	0	-	91	109
6-10	57	161	45	489	4	571	106	233
11-15	27	186	56	644	4	444	87	361
16-20	24	338	77	626	2	1000	103	526
21-25	7	219	77	653	3	750	87	565
26-30	2	167	103	736	2	400	107	682
31-35	5	833	101	777	0	-	106	779
36-40	2	500	77	706	1	1000	80	702
41+	0	-	52	788	0	-	52	765
Unknown	111	210	69	511	6	750	186	277
<i>Total</i>	303	145	691	623	22	537	1 016	313

SECTION 7 – MESOTHELIOMA

There were 23 cases of mesothelioma in 1983.

TABLE 7-1 NUMBER AND PROPORTION OF MESOTHELIOMA CASES BY AGE AND POPULATION GROUP (1983)

Age group (years)	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
20-29	1	25.0	1	7.1	1	20.0	3	13.0
30-39	0	-	1	7.1	1	20.0	2	8.7
40-49	1	25.0	4	28.6	1	20.0	6	26.1
50-59	1	25.0	2	14.3	1	20.0	4	17.4
60-69	1	25.0	4	28.6	0	-	5	21.7
70-79	0	-	2	14.3	0	-	2	8.7
80+	0	-	0	-	1	20.0	1	4.3
<i>Total</i>	4		14		5		23	

The distribution of mesothelioma by commodity and population group is presented in Table 7.2. Seven (30.4%) had worked in the asbestos mining industry.

TABLE 7-2 NUMBER AND PROPORTION OF MESOTHELIOMA CASES BY COMMODITY AND POPULATION GROUP (1983)

Commodity	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
<i>Gold</i>	0	-	3	21.4	0	-	3	13.0
<i>Platinum</i>	2	50.0	0	-	0	-	2	8.7
<i>Coal</i>	0	-	2	14.3	0	-	2	8.7
<i>Asbestos</i>	0	-	2	14.3	5	100.0	7	30.4
<i>Copper</i>	1	25.0	1	7.1	0	-	2	8.7
<i>Iscor</i>	0	-	3	21.4	0	-	3	13.0
<i>Unknown</i>	1	25.0	3	21.4	0	-	4	17.4
<i>Total</i>	4		14		5		23	

SECTION 8 – PRIMARY LUNG CANCER

One hundred and eleven cases of primary lung cancer were found at autopsy, 26.1% of which were in black, 71.2% in white and 2.7% in coloured men. Most of the cases were small cell lung carcinomas (43.2%; n=48) followed by squamous lung carcinomas (32.4%; n=36), adenocarcinomas (15.3%; n=17) and large cell lung carcinomas (9.0%; n=10).

The distribution of primary lung cancer by age and population group is presented in Table 8-1.

TABLE 8-1 NUMBERS OF CASES AND PREVALENCE OF PRIMARY LUNG CANCER BY AGE AND POPULATION GROUP (1983)

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
20-29	1	1	0	-	0	-	1	1
30-39	4	7	0	-	0	-	4	6
40-49	7	17	5	35	0	-	12	22
50-59	12	50	14	58	0	-	26	54
60-69	3	43	37	110	1	67	41	98
70-79	0	-	22	105	1	100	23	100
80+	0	-	1	23	1	333	2	41
Unknown	2	32	0	-	0	-	2	29
Total	29	14	79	71	3	73	111	34

The distribution of primary lung cancer by commodity and population group is presented in Table 8-2. The majority of cases came from the gold mining industry.

TABLE 8-2 NUMBER OF CASES AND PREVALENCE OF PRIMARY LUNG CANCER BY COMMODITY AND POPULATION GROUP (1983)

Commodity	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	19	12	63	76	1	500	83	35
Platinum	2	16	3	107	0	-	5	32
Coal	3	11	1	15	0	-	4	12
Asbestos	0	-	5	185	2	56	7	74
Copper	1		0		0		1	
Isacor	0		5		0		5	
Other	0		1		0		1	
Unknown	4		1		0		5	
Total	29	14	79	71	3	73	111	34

SECTION 9 – CLINICAL CAUSES OF DEATH

Table 9-1 and Figure 9-1 show the clinical causes of death as stated in the accompanying documents submitted with the cardio-respiratory organs, by population group. Diseases of the cardio-vascular system were the most frequent (15.8%) overall. Black men had the highest proportion of unnatural causes of death (63.1%). In 3.9% of all cases, the cause of death was not stated.

TABLE 9-1 CLINICAL CAUSES OF DEATH BY POPULATION GROUP (1983)

System	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
Respiratory	219	10.4	189	17.0	20	48.8	428	13.2
Cardio-vascular	76	3.6	434	39.1	4	9.8	514	15.8
Central Nervous System	103	4.9	53	4.8	2	4.9	158	4.9
Gastro-intestinal	147	7.0	79	7.1	0	-	226	7.0
Genito-urinary	34	1.6	28	2.5	1	2.4	63	1.9
Haematological	19	0.9	10	0.9	0	-	29	0.9
Unnatural	1 323	63.1	174	15.7	3	7.3	1 500	46.2
Miscellaneous	115	5.5	81	7.3	6	14.6	202	6.2
Not stated	60	2.9	61	5.5	5	12.2	126	3.9
Total	2 096		1 109		41		3 246	

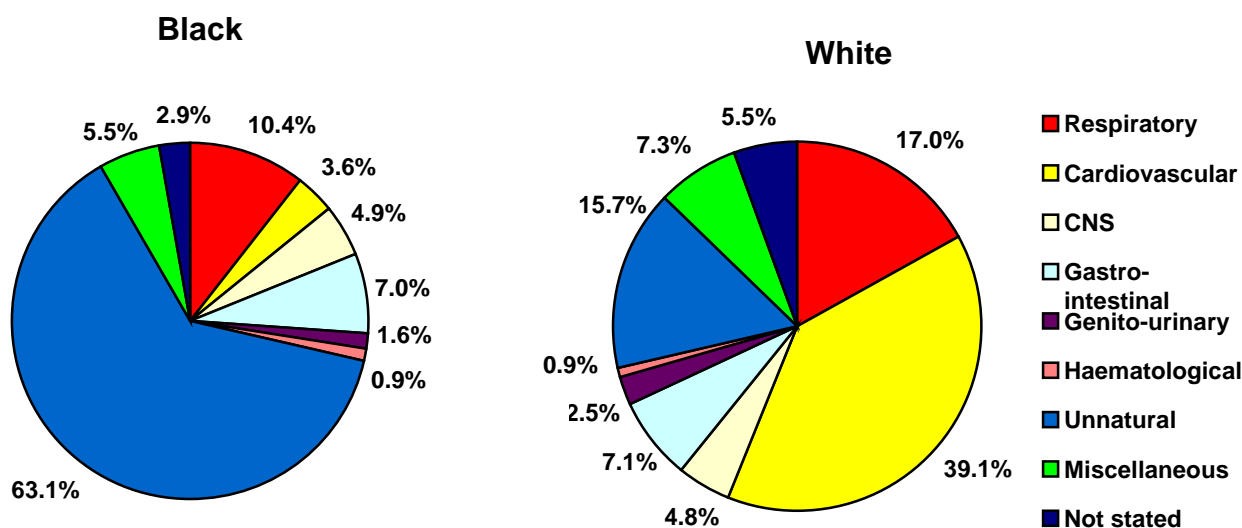


FIGURE 9-1 CLINICAL CAUSE OF DEATH AS STATED BY THE CLINICIANS WHO SUBMIT THE ORGANS OF THE DECEASED TO THE NIOH (1983)