



DEPARTMENT OF HEALTH
Republic of South Africa

DEPARTMENT OF HEALTH

**Pathology Division
Report:
Demographic Data and
Disease Rates for
January - December
2001**

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**NATIONAL CENTRE FOR
OCCUPATIONAL HEALTH**

NCOH Report

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EXECUTIVE SUMMARY

South African law requires the examination of the cardiorespiratory organs of deceased miners and ex-miners for compensation purposes, provided the next of kin agrees. These examinations are performed at the National Centre for Occupational Health (NCOH) and the findings are recorded on a computerized database (PATHAUT). This database is unique and provides an important resource for surveillance and research.

During 2001, 2 529 cases came to autopsy at the NCOH. Of these, 66.8% were black, 32.2% were white, 0.5% were coloured and 0.5% were submitted without information on ethnic group. No autopsies were received from Asians. Overall disease rates (per 1000 autopsies) for 2001 are shown in figure 1.

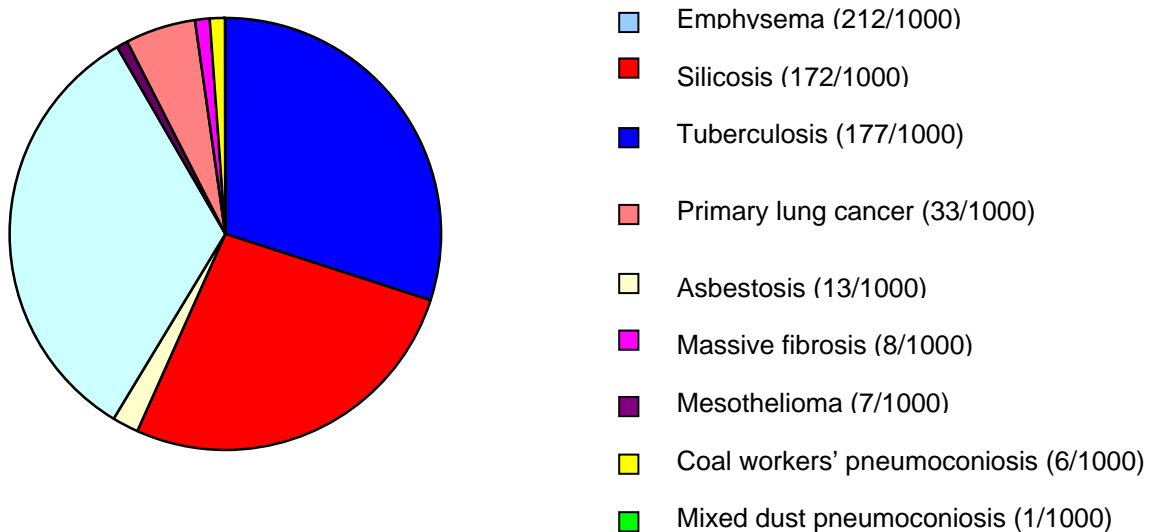


FIG. 1 OVERALL DISEASE RATES FOR 2001

SECTION 1 – INTRODUCTION

The Pathology Department of the National Centre for Occupational Health (NCOH) provides an autopsy service for miners and ex-miners to determine the presence of occupational lung disease. Under the Occupational Diseases in Mines and Works Act (ODMWA, 1973) it is obligatory for the last attending doctor to remove the cardiorespiratory organs and send them for examination, provided the next of kin agrees. A detailed report of each case is sent to the Medical Bureau for Occupational Diseases (MBOD). Cases certified as having a compensatable disease are then referred to the Compensation Commissioner's office, where payment of compensation is managed.

Since 1975 the pathological findings from autopsy examinations have been recorded on the PATHAUT database, a unique computerized source of information for research and surveillance. PATHAUT comprises data from autopsy summary sheets and clinical files (including occupational histories). The structure of this database was changed in 1995/1996 and new programs were written, upgrading and enhancing the existing database by improving the quality of the system and making better use of existing data (SIMRAC Project GEN509).

This is the fifth of the new format reports and describes autopsy cases examined during the year 2001.

Data from PATHAUT are exported into the Statistical Analysis System (SAS System) where programs have been written using Structured Query Language (SQL), permitting the user to analyze data related to any aspect of the PATHAUT database.

SECTION 2 – DATA DESCRIPTION

The number of autopsies performed since 1975 is presented in Table 2-1.

TABLE 2-1 DISTRIBUTION OF AUTOPSIES BY YEAR AND ETHNIC GROUP (1975-2001)

Year of autopsy	Black		White		Coloured		Indian		Unknown		Total N
	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					3 658
1983	2 096	65	1 109	34	41	1					3 246
1984	1 966	64	1 098	35	28	1					3 092
1985	2 275	64	1 200	34	66	2					3 541
1986	2 456	68	1 125	31	45	1					3 626
1987	2 594	68	1 168	30	78	2					3 840
1988	2 518	67	1 165	31	77	2					3 760
1989	2 138	65	1 090	33	60	2					3 288
1990	2 172	64	1 155	34	51	2					3 378
1991	2 143	65	1 080	33	66	2					3 289
1992	2 144	66	1 049	32	70	2					3 263
1993	1 863	65	956	33	65	2					2 884
1994	1 737	61	1 021	36	94	3					2 852
1995	2 830	71	1 059	27	99	2					3 988
1996*	766	68	329	29	19	2			14	1	1 128
1997	2 223	69	897	28	70	2			18	1	3 208
1998	1 977	68	836	29	49	2	1	0.03	17	1	2 880
1999	1 656	65	832	32	29	2			12	1	2 529
2000	1 798	69	761	29	41	2			8	0.3	2 608
2001	1 690	67	813	32	13	0.5			12	0.5	2 529
Total	57 140	67.2	27 517	32.3	1 353	1.6	1	0.001	61	0.1	85 093

* Data for only ± 6 months are available for this year

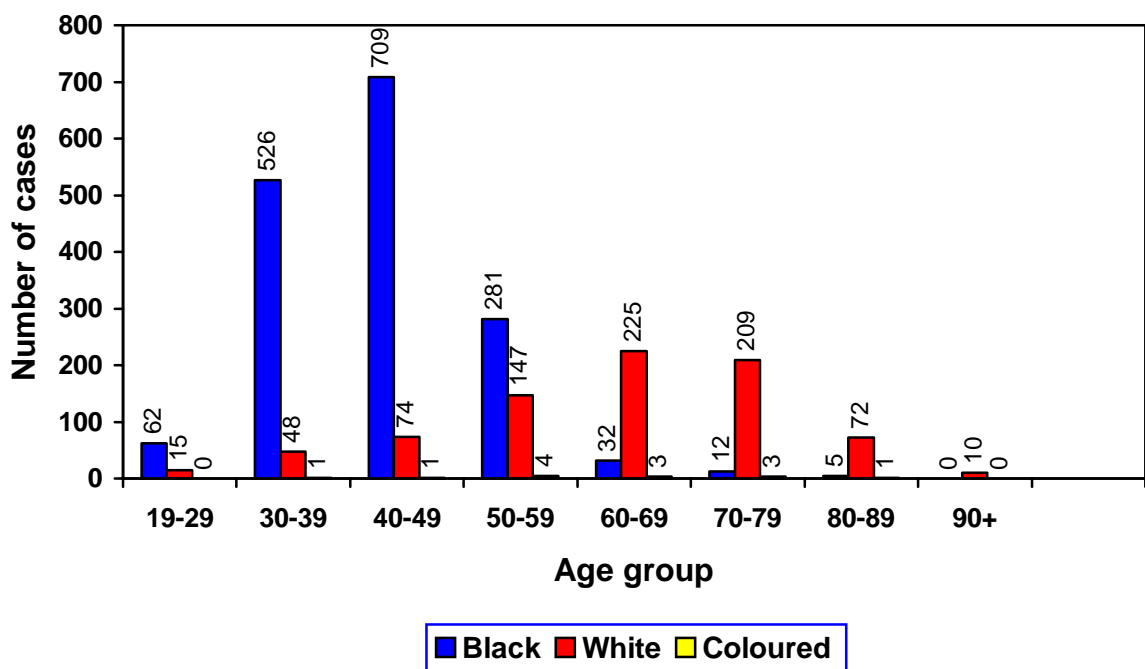
It is important to note that a referral bias exists, in that black men are infrequently autopsied after leaving employment in the mines, whereas the majority of whites come to autopsy after retirement.

The age distribution of autopsies for 2001 is shown in Table 2-2 and Fig 2-1. The mean age at autopsy for black miners has increased slightly from 37.9 years in 1998, to 40.1 years in 1999, to 40.8 years in 2000, to 42.9 years in 2001. The age of white miners at autopsy has remained essentially unchanged (61.8 years in 1999; 63.3 years in 2000; 60.3 years in 2001).

TABLE 2-2 NUMBERS AND PROPORTION OF AUTOPSIES BY AGE AND ETHNIC GROUP (2001)

Age group (years)	Black		White		Coloured		Unknown		All races	
	N	%	N	%	N	%	N	%	N	%
19-29	62	3.7	15	1.8	0	0.0	0	0.0	77	3.0
30-39	526	31.1	48	5.9	1	7.7	0	0.0	575	22.7
40-49	709	42.0	74	9.1	1	7.7	0	0.0	784	31.0
50-59	281	16.6	147	18.1	4	30.8	0	0.0	432	17.1
60-69	32	1.9	225	27.7	3	23.1	0	0.0	260	10.3
70-79	12	0.7	209	25.7	3	23.1	0	0.0	224	8.9
80-89	5	0.3	72	8.9	1	7.7	0	0.0	78	3.1
90+	0	0.0	10	1.2	0	0.0	0	0.0	10	0.4
Unknown	63	3.7	13	1.6	0	0.0	13	100.0	89	3.5
Total	1 690		813		13		13		2 529	

FIG 2-1 DISTRIBUTION OF AUTOPSIES BY AGE AND ETHNIC GROUP (2001)



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

Table 2-3 shows the distribution of autopsies by ethnic group for 2001. As for 2000, autopsies of only cardio-respiratory organs comprised 93.5% of all examinations.

TABLE 2-3 NUMBER AND PROPORTION OF AUTOPSIES BY TYPE AND ETHNIC GROUP (2001)

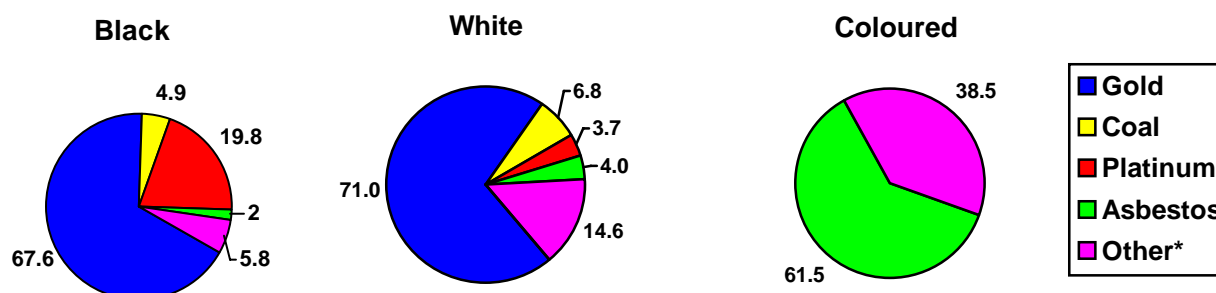
Autopsy type	Black		White		Coloured		Unknown		TOTAL	
	N	%	N	%	N	%	N	%	N	%
Cardiorespiratory organs only	1 684	99.6	656	80.7	13	100	11	91.7	2 365	93.5
Full autopsy	6	0.4	157	19.3	0	0	1	8.3	164	6.5
Total	1 694		831		13		12		2 529	

Table 2-4 and Figure 2-4 show the distribution of autopsies by industry and ethnic group for 2001. The percentage of autopsies received from the gold mining industry has continued to decline from 75.8% in 1999, to 70.7% in 2000, to 68.0% in 2001. In contrast, the percentage of autopsies from platinum miners has continued to increase from 173 (10.4% of autopsies from blacks) in 1999, to 343 (19.1%) in 2000, to 363 (19.8%) in 2001. As in 1999 and 2000, the majority of autopsies (61.5%) on coloured miners came from asbestos mines.

TABLE 2-4 NUMBER AND PROPORTION OF AUTOPSIES BY INDUSTRY AND ETHNIC GROUP (2001)

Industry	Black		White		Coloured		Unknown		TOTAL	
	N	%	N	%	N	%	N	%	N	%
Gold	1 139	67.6	575	71.0	0	0.0	0	0.0	1 714	68.0
Coal	82	4.9	55	6.8	0	0.0	0	0.0	137	5.4
Platinum	333	19.8	30	3.7	0	0.0	0	0.0	363	14.4
Asbestos	33	2.0	32	4.0	8	61.5	0	0.0	73	2.9
Diamond	20	1.2	10	1.2	0	0.0	0	0.0	30	1.2
Copper	6	0.4	12	1.5	2	15.4	0	0.0	20	0.8
Isacor	1	0.1	20	2.5	0	0.0	0	0.0	21	0.8
Other	20	1.2	27	3.3	0	0.0	0	0.0	47	1.9
Unknown	51	3.0	49	6.1	3	23.1	12	100.0	115	4.6
Total	1 685		810		13		12		2 520	

FIG 2-4 DISTRIBUTION OF AUTOPSIES BY INDUSTRY AND ETHNIC GROUP (2001)



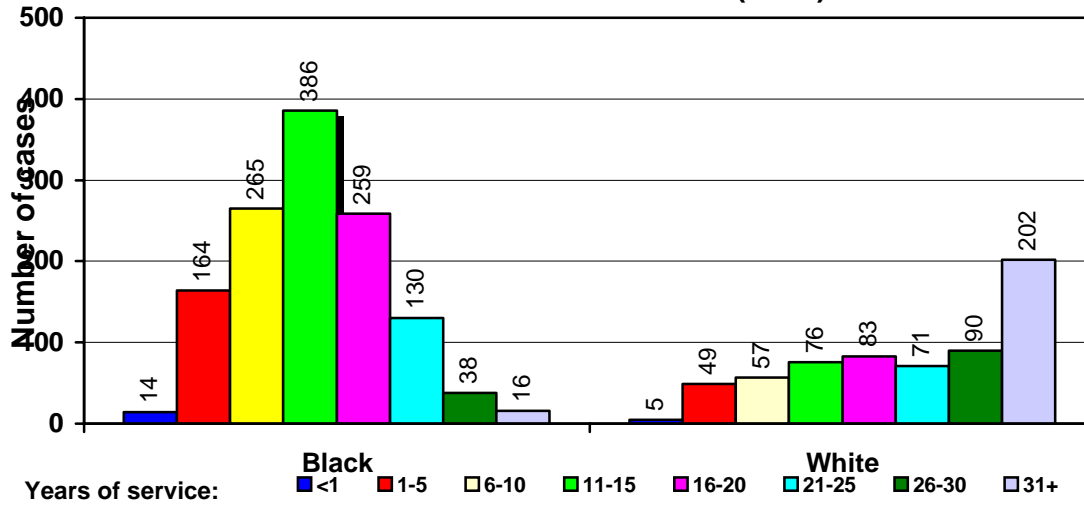
* Includes copper, diamond, quarry, silica (silicon smelters), manganese, tin, zinc, minerals, chrome and iron, as well as cases where information about type of mining is missing

Detailed information about the years in mining service by ethnic group is given in Table 2-5. This is also presented in Fig 2-5. Cases were categorized according to the industry in which most years of service had occurred. It is important to note the large proportion of cases with missing information about the duration of service (24.4%). This is a reflection of the poor quality of the data provided by the mines. This proportion is similar to that found in 2000 (22.6%) and 1999 (22.7%) but considerably lower than the figure for 1998 (43%).

TABLE 2-5 NUMBER AND PROPORTION OF AUTOPSIES BY YEARS OF SERVICE AND ETHNIC GROUP (2001)

Years of service	Black		White		Coloured		Unknown		TOTAL	
	N	%	N	%	N	%	N	%	N	%
<1	14	0.8	5	0.6	0	0.0	0	0.0	19	0.8
1 - 5	164	9.7	49	6.0	1	7.7	0	0.0	214	8.5
6-10	265	15.7	57	7.0	1	7.7	0	0.0	323	12.8
11-15	386	22.8	76	9.4	2	15.4	0	0.0	464	18.3
16-20	259	15.3	83	10.2	1	7.7	0	0.0	343	13.6
21-25	130	7.7	71	8.7	1	7.7	0	0.0	202	8.0
26-30	38	2.3	90	11.1	1	7.7	0	0.0	129	5.1
31+	16	1.0	202	22.1	1	7.7	0	0.0	219	8.7
Missing	418	24.7	180	38.5	5	38.5	13	100.0	616	24.4
Total	1 690		813		13		13		2 529	

FIG 2-5 DISTRIBUTION OF AUTOPSIES BY YEARS OF SERVICE AND ETHNIC GROUP (2001)



The mean duration of service and age by industry type and ethnic group for those cases for which information was available are shown in Table 2-6.

TABLE 2-6: MEAN DURATION OF SERVICE AND MEAN AGE BY INDUSTRY AND ETHNIC GROUP (2001)

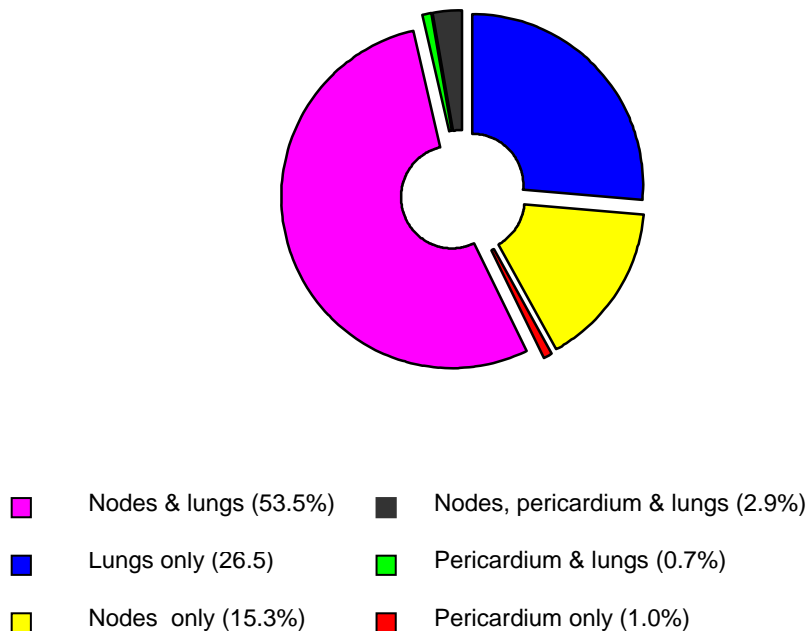
Industry	Black					White				
	N	Age		Service		N	Age		Service	
		Mean	SD	Mean	SD		Mean	SD	Mean	SD
Gold	967	42	8	14	7	487	64	14	25	12
Coal	63	45	8	17	7	46	61	13	20	9
Platinum	181	44	8	12	6	23	57	12	17	8
Asbestos	15	60	14	10	7	24	64	14	15	12
Diamond	13	51	13	21	12	8	67	7	29	10
Copper	4	51	8	23	7	10	66	7	15	10
Iscor	1	42	-	16	-	15	63	11	18	12
Other	17	52	13	13	8	19	62	15	19	10
Unknown	0	-	-	-	-	1	68	-	32	-
Total	1 261					633				

SECTION 3 – ACTIVE TUBERCULOSIS

The distribution of active tuberculosis (TB) by anatomical site is presented in Fig 3-1. Active TB was diagnosed in 19.2% (486) of all the cases autopsied in 2001, in comparison with 416 (16.4%) cases diagnosed in 2000; 83.6% of TB cases had active pulmonary tuberculosis (PTB). Of the PTB cases, 87.5% involved the lungs extensively. 92.8% (451 cases) of PTB cases were black, 6.4% (31 cases) were white, 0.4% (2 cases) were coloured, and in 0.4% (2 cases) the ethnic group was unknown. 63% (307 cases) of all PTB cases came from the gold mines and 23.9% (116 cases) from platinum mines. Most (72%) of the PTB cases were in the age group 40-59 years.

The overall rate of TB (192/1000) increased considerably, from 159/1000 in 2000 and 123/1000 in 1999. This is attributed to the increase in the PTB rate in black miners to 267/1000, from 206/1000 in 1998, 174/1000 in 1999, and 217/1000 in 2000. The rate of PTB increased particularly in black platinum miners from 179/1000 in 1999, to 251/1000 in 2000, to 345/1000 in 2001. Comparable rates for gold miners were 171/1000 in 1999, 219/1000 in 2000), and 251/1000 in 2001.

FIG 3-1 DISTRIBUTION OF ACTIVE TB BY SITE (2001)



The age distribution of cases with active PTB is shown in Table 3-1.

Rates in this and the following tables are expressed per 1000. In all tables, the denominators used are all autopsies in a specific industry and ethnic group. Consequently, where the denominators are small, the rates may not be reliable.

TABLE 3-1 NUMBER OF CASES AND PREVALENCE OF ACTIVE PTB BY AGE AND ETHNIC GROUP (2001)

Age group (years)	Black		White		Coloured		Unknown		Total	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
20-29	12	194	0	0	0	0	0	-	12	156
30-39	160	304	7	146	1	1000	0	-	168	292
40-49	181	257	2	27	0	0	0	-	184	235
50-59	72	256	5	34	0	0	0	-	77	178
60-69	10	313	9	40	0	0	0	-	19	73
70-79	1	83	5	24	1	333	0	-	7	31
80-89	0	0	1	14	0	0	0	-	1	13
90+	0	0	1	0	0	0	0	-	1	100
Missing	14	222	1	77	0	0	2	154	17	191
Total	451	267	31	38	2	151	2	154	486	192

The distribution of active PTB cases by industry is shown in Table 3-2. 63.6% of active PTB cases came from the gold mining industry (68% of all autopsy cases came from that industry).

TABLE 3-2 NUMBER OF CASES AND PREVALENCE OF ACTIVE PTB BY INDUSTRY AND ETHNIC GROUP (2001)

Industry	Black		White		Coloured		Unknown		Total	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Gold	286	251	21	37	0	0	0	0	307	179
Coal	19	232	0	0	0	0	0	0	19	139
Platinum	115	345	1	33	0	0	0	0	116	320
Asbestos	10	303	4	125	1	125	0	0	15	205
Diamond	5	833	0	0	0	0	0	0	5	250
Copper	1	50	0	0	0	0	0	0	1	33
Other	4	200	0	0	0	0	0	0	4	85
Unknown	10	196	5	102	1	0	2	167	18	157
Total	450	267	31	38	2	122	2	167	485	192

Table 3-3 shows the number of active PTB cases by years of service and ethnic group.

TABLE 3-3 NUMBER OF CASES AND PREVALENCE OF ACTIVE PTB BY YEARS OF SERVICE AND ETHNIC GROUP (2001)

Years of service	Black		White		Coloured		Unknown		Total	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
<1	5	357	0	0	0	0	0	0	5	263
1 - 5	34	207	5	102	0	0	0	0	39	182
6-10	73	275	4	70	0	0	0	0	77	238
11-15	109	282	2	26	0	0	0	0	111	239
16-20	64	247	2	24	0	0	0	0	66	192
21-25	33	254	4	56	1	1000	0	0	38	188
26-30	11	289	2	22	0	0	0	0	13	101
31+	2	125	4	20	0	0	0	0	6	27
Missing	120	287	8	44	1	200	2	154	131	213
Total	451	267	31	38	2	154	2	154	486	192

SECTION 4 – SILICOSIS

Silicotic nodules were found in the lungs of 436 cases (17.2% of all autopsies); 89.4% of these cases came from the gold mining industry. Of all cases of silicosis, occasional silicotic nodules were found in 72%, a few in 22.6%, and a moderate number in 4.9% of cases. No cases with a large number of nodules were reported.

The age distribution of cases with silicosis (Table 4-1) differed between ethnic groups. No clear trend was evident for age and rates of silicosis in black miners. One explanation is that relatively few older black miners who have retired came to autopsy. There is, however, a trend in white miners.

TABLE 4-1 NUMBER OF CASES AND PREVALENCE OF SILICOSIS BY AGE AND ETHNIC GROUP (2001)

Age group (years)	Black		White		Coloured		Unknown		Total	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
20-29	2	32	0	0	0	0	0	0	2	26
30-39	51	97	2	42	0	0	0	0	53	92
40-49	148	209	3	41	0	0	0	0	151	193
50-59	68	242	19	129	0	0	0	0	87	201
60-69	5	156	37	164	0	0	0	0	42	162
70-79	0	0	54	258	0	0	0	0	54	241
80-89	1	200	26	361	0	0	0	0	27	346
90+	0	0	4	400	0	0	0	0	4	400
Missing	16	175	4	308	0	0	1	77	16	180
Total	266	169	149	183	0	0	1	77	436	172

The distribution of cases with silicosis by industry and ethnic group is presented in Table 4-2. As indicated previously, cases are categorized according to the industry in which the most years of service occurred. Cases from the platinum mining industry with silicosis might be explained by unstated previous service in gold mines.

TABLE 4-2 NUMBER OF CASES AND PREVALENCE OF SILICOSIS BY INDUSTRY AND ETHNIC GROUP (2001)

Industry	Black		White		Coloured		Unknown		Total	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Gold	260	228	130	226	0	0	0	0	390	228
Platinum	14	42	2	67	0	0	0	0	16	44
Coal	5	61	5	91	0	0	0	0	10	73
Asbestos	0	0	1	31	0	0	0	0	1	14
Diamond	1	167	0	0	0	0	0	0	1	50
Copper	1	50	1	100	0	0	0	0	2	67
Iscor	0	0	1	37	0	0	0	0	1	21
Other	0	0	2	100	0	0	0	0	2	95
Unknown	5	98	7	143	0	0	1	83	13	113
Total	286	170	149	184	0	0	1	83	436	173

TABLE 4-3 NUMBER OF SILICOTIC ISLETS IN THE LUNGS BY YEARS OF SERVICE AND ETHNIC GROUP (2001)

Years of service	Black		White		Coloured		Unknown		Total	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
<1	1	71	0	0	0	-	0	-	1	53
1 - 5	14	85	3	61	0	0	0	-	17	79
6-10	35	132	3	53	0	0	0	-	38	118
11-15	67	174	7	92	0	0	0	-	74	159
16-20	77	297	17	205	0	0	0	-	94	274
21-25	37	285	11	155	0	0	0	-	48	238
26-30	5	132	29	322	0	0	0	-	34	264
31+	4	250	56	277	0	0	0	-	60	274
Missing	46	110	23	128	0	0	1	77	70	114
Total	286	169	149	183	0	0	1	77	436	172

SECTION 5 – MASSIVE FIBROSIS, COALWORKER’S PNEUMOCONIOSIS, MIXED DUST FIBROSIS AND ASBESTOSIS

MASSIVE FIBROSIS

There were 21 (0.8%) cases of massive fibrosis (14 black, 7 white). Nineteen were from the gold mining industry and 18 were miners with more than 11 years mining experience.

COAL WORKERS’ PNEUMOCONIOSIS

There were 15 cases of coal workers’ pneumoconiosis; 10 were older than 40 years.

MIXED DUST FIBROSIS

There were 4 (0.2%) cases of mixed dust fibrosis. All were from the gold mining industry.

ASBESTOSIS

There were 37 cases of asbestosis of which 41% (n=15) had slight, 46% (n=17) moderate and 14% marked fibrosis. None of the cases submitted with a history of asbestos exposure had asbestos plaques. However, the parietal pleura, the site usually affected by plaque formation, is seldom submitted with the lungs.

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

TABLE 5-1 NUMBER OF CASES AND PREVALENCE OF ASBESTOSIS BY AGE AND ETHNIC GROUP (2001)

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
30-39	0	0	1	21	0	-	1	2
40-49	3	4	0	-	0	-	3	5
50-59	9	32	2	14	0	-	11	25
60-69	6	188	4	18	1	333	11	42
70-79	4	333	2	10	1	333	7	31
80-89	3	600	0	-	0	-	3	38
Missing	0	-	1	77	0	-	1	11
Total	25	11	10	12	2	154	37	15

SECTION 6 – EMPHYSEMA

There were 537 cases of emphysema, the extent of which was mild in 71.7%, moderate in 23.3% and marked in 3.0%. The distribution of emphysema by age and ethnic group is presented in Table 6-1.

TABLE 6-1 NUMBER OF CASES AND PREVALENCE OF EMPHYSEMA BY AGE AND ETHNIC GROUP (2001)

Age group (years)	Black		White		Coloured		Unknown		TOTAL	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
20-29	1	16	0	-	0	-	0	-	1	13
30-39	22	42	5	104	0	-	0	-	27	47
40-49	84	118	13	176	0	-	0	-	97	124
50-59	52	185	58	395	2	500	0	-	112	259
60-69	10	313	103	458	2	667	0	-	115	442
70-79	3	250	113	541	2	667	0	-	118	527
80-89	3	600	41	569	1	1000	0	-	45	577
90+	0	0	5	500	0	-	0	-	5	500
Missing	8	127	8	615	0	-	1	77	17	191
Total	183	108	346	426	7	538	0	77	537	212

The majority of black and white miners with emphysema (65.9%) were from the gold mining industry (Table 6-2).

TABLE 6-2 NUMBER OF CASES AND PREVALENCE OF EMPHYSEMA BY INDUSTRY AND ETHNIC GROUP (2001)

Industry	Black		White		Coloured		TOTAL	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	116	102	238	414	0	-	354	207
Platinum	25	75	11	367	0	-	36	99
Coal	21	256	26	472	0	-	47	343
Asbestos	6	182	18	563	4	500	28	384
Isacor	0	0	8	400	0	-	8	381
Copper	3	150	6	600	2	1000	11	367
Diamond	3	500	6	500	0	-	9	450
Other	6	300	14	519	0	-	20	426
Unknown	2	39	19	388	1	333	23	200
Total	182	108	346	427	7	538	535	212

TABLE 6-3 NUMBER OF CASES AND PREVALENCE OF EMPHYSEMA BY YEARS OF SERVICE AND ETHNIC GROUP (2001)

Years of service	Black		White		Coloured		Unknown		Total	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
<1	0	-	2	400	0	-	0	-	2	105
1 - 5	14	85	10	204	0	-	0	-	24	112
6-10	20	75	19	333	1	1000	0	-	40	124
11-15	38	98	31	408	2	1000	0	-	71	153
16-20	43	166	29	349	0	-	0	-	72	210
21-25	22	169	38	535	0	-	0	-	60	297
26-30	3	79	49	544	1	1000	0	-	53	411
31+	3	188	99	490	1	1000	0	-	103	470
Missing	40	96	69	383	2	400	1	77	112	182
Total	183	108	346	426	7	538	1	77	537	212

SECTION 7 – MESOTHELIOMA

The number of cases of mesothelioma in 2001 (n=18) was similar to that in previous years (19 in 1998, 24 in 1999, 17 in 2000). The majority of cases were in whites (n=9; 50%) (Table 7-1).

TABLE 7-1 NUMBER AND PROPORTION OF MESOTHELIOMA CASES BY AGE AND ETHNIC GROUP (2001)

Age group (years)	Black		White		Coloured		TOTAL	
	N	%	N	%	N	%	N	%
30-39	0	0.0	1	11.1	0	0.0	1	5.5
40-49	3	50.0	0	0.0	1	33.3	4	22.2
50-59	2	33.3	2	22.2	2	66.7	6	33.3
60-69	1	16.7	3	33.3	0	0.0	4	22.2
70-79	0	0.0	1	11.1	0	0.0	1	5.5
80-89	0	0.0	2	22.2	0	0.0	2	11.1
Total	6		9		3		18	

The distribution of mesothelioma by industry and ethnic group is presented in Table 7-2. The highest proportion of mesothelioma cases was found in asbestos miners.

TABLE 7-2 NUMBER AND PROPORTION OF MESOTHELIOMA CASES BY INDUSTRY AND ETHNIC GROUP (2001)

Industry	Black		White		Coloured		TOTAL	
	N	%	N	%	N	%	N	%
Asbestos	3	50.0	5	55.6	2	66.7	10	55.6
Gold	1	16.7	1	11.1	0	0.0	2	11.1
Other	0	0.0	1	11.1	0	0.0	1	5.5
Iscor	1	16.7	2	22.2	1	33.3	4	22.2
Unknown	1	16.7	0	0.0	0	0.0	1	5.5
Total	6		9		3		18	

*2 February 2006. In an earlier print run of this report, total number of mesothelioma cases was given as 17. Changes have been made to the text and tables.

SECTION 8 – PRIMARY LUNG CANCER

Fifty six cases of primary lung cancer were found at autopsy, 19.6% of which were in black, 78.6% in white, and 1.8% in coloured miners. Most of the cases were of the large cell type (43%), followed by squamous cell type (23%), lung adenocarcinoma (20%) and small cell type (14%). No cases of bronchoalveolar carcinoma were seen in 2001.

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

TABLE 8-1 NUMBER OF CASES AND PREVALENCE OF PRIMARY LUNG CANCER BY AGE AND ETHNIC GROUP (2001)

Age group (years)	Black		White		Coloured		TOTAL	
	N	Rate	N	Rate	N	Rate	N	Rate
30-39	2	4	0	0	0	-	2	4
40-49	4	6	0	0	0	-	4	5
50-59	2	7	5	34	0	-	7	16
60-69	2	63	14	62	1	333	17	65
70-79	1	83	21	101	0	-	22	98
80-89	0	-	4	56	0	-	4	51
Total	11	7	44	57	1	77	56	24

The distribution of primary lung cancer by industry and ethnic group is presented in Table 8-2. For white miners, the majority of cases came from the gold mining industry.

TABLE 8-2 NUMBER OF CASES AND PREVALENCE OF PRIMARY LUNG CANCER BY INDUSTRY AND ETHNIC GROUP (2000)

Industry	Black		White		Coloured		TOTAL	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	2	2	35	61	0	0	37	22
Coal	1	12	2	36	0	0	3	22
Asbestos	3	91	0	0	1	125	4	55
Platinum	4	12	1	33	0	0	5	14
Copper	0	0	1	100	0	0	1	33
Diamond	1	167	1	83	0	0	2	100
Other	0	0	4	148	0	0	4	85
Total	11	7	44	59	1	100	56	24

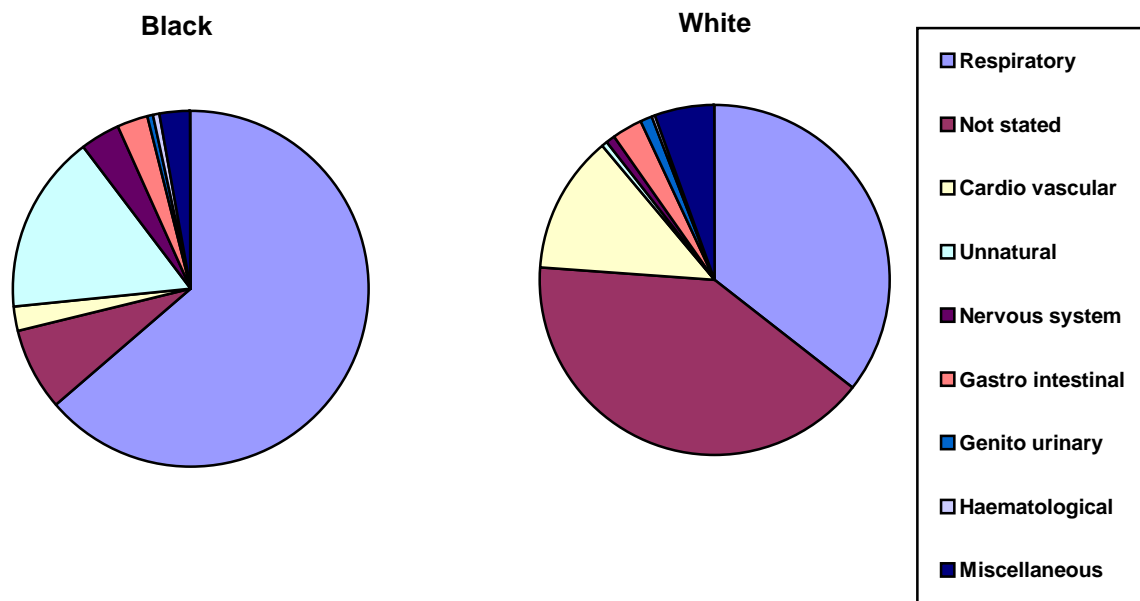
SECTION 9 – CLINICAL CAUSES OF DEATH

Table 9-1 and Figure 9-1 show the clinical cause of death that accompanied the cardiorespiratory organs, by ethnic group. Diseases of the respiratory system were the most frequent (59.2%) overall. The rate in black miners increased from 50.9% in 1998, to 57.6% in 1999, to 64.5% in 2000, to 69.9% in 2001. Black miners had the highest proportion of unnatural causes of death (11.2%). There has been a steady decline in the proportion of unnatural deaths in black miners (19.2% in 1998, 16.8% in 1999, 13.3% in 2000). The proportion of respiratory deaths is, however, increasing. In 19.1% of cases the cause of death was not stated.

TABLE 9-1 CAUSES OF DEATH BY ETHNIC GROUP (2001)

System	Black		White		Coloured		Unknown		TOTAL	
	N	%	N	%	N	%	N	%	N	%
Respiratory	1181	69.9	306	37.6	10	76.9	0	0	1479	59.2
Unnatural	189	11.2	44	5.4	0	0	0	0	233	9.2
Cardiovascular	34	2.0	99	12.2	0	0	0	0	133	5.3
Nervous system	43	2.5	7	0.9	0	0	0	0	50	2.0
GI tract	30	1.8	12	1.5	0	0	0	0	42	1.7
Genito urinary	7	0.4	3	0.4	0	0	0	0	10	0.4
Haematological	8	0.5	1	0.1	0	0	0	0	9	0.4
Miscellaneous	28	1.7	45	5.5	0	0	0	0	73	2.9
Not stated	170	10.1	296	36.4	3	23.1	13	100.0	482	19.1
Total	1 690		813		13		13		2 529	

FIG 9-1 CAUSE OF DEATH AS GIVEN BY THE CLINICIANS WHO SUBMIT THE ORGANS TO THE NCOH



**APPENDIX: DISTRIBUTION OF AUTOPSIES ACCORDING TO THE LAST MINE
WHERE THE DECEASED WORKED**

MINETYPE	LAST MINE WORKED AT	BLACK	WHITE	COL- OURED	UN- KNOWN	TOTAL	
Asbestos	African Chrysolite asbestos	2	0	0	0	2	
	Asbestos Mine	1	2	0	0	3	
	Black Rock Asbestos mine	1	1	0	0	2	
	Blackrich Asbestos	0	1	0	0	1	
	Cape Blue	2	3	1	0	6	
	Danielskuil Asbestos mine	1	0	1	0	2	
	Elandsfontein Asbestos mine	1	0	0	0	1	
	Everite	0	3	0	0	3	
	Gefco	18	4	1	0	23	
	Glen Allen Asbestos mine	0	1	1	0	2	
	Groenwater Asbestos	0	1	0	0	1	
	Koegas	0	6	4	0	10	
	Lydenburg Asbestos	2	0	0	0	2	
	OME Asbestos Plant	0	1	0	0	1	
	Penge Asbestos	0	3	0	0	3	
	Pomfret Asbestos Mine	4	1	1	0	6	
	Voorspoed Asbestos Mine	1	0	0	0	1	
	Wandrag Asbestos Mine	1	0	0	0	1	
	Total from asbestos mines						69
	Cementation	Cementation	0	3	0	0	3
Ulco Cement		1	0	0	0	1	
Total from cementation mines						4	
Chrome	Chrome Mine	0	2	0	0	2	
	Marble Lime Chrome	1	1	0	0	2	
	Swartkop Chrome	0	1	0	0	1	
	Tweefontein	0	1	0	0	1	
Total from chrome mines						6	
Coal	Arnot Colliery	1	0	0	0	1	
	Bank Colliery	1	2	0	0	3	
	Black Wattle Colliery	1	0	0	0	1	
	Blesbok Colliery	1	0	0	0	1	
	Blinkpan Colliery	0	2	0	0	2	
	Bosjesspruit Colliery	3	1	0	0	4	
	Brandspruit Colliery	7	1	0	0	8	
	Coalbrook Colliery	0	1	0	0	1	
	Delmas Colliery	0	1	0	0	1	
	Dorstfontein colliery	1	0	0	0	1	
	Douglas Colliery	0	2	0	0	2	
	Driehoek Collieries	0	1	0	0	1	
	Duiker Colliery	0	1	0	0	1	
	Durnacol Mine	1	0	0	0	1	
	Duvha Opencast	1	0	0	0	1	
	Forzando Colliery	1	2	0	0	3	
	Goedehoop Colliery	1	0	0	0	1	
	Greenside Colliery	0	1	0	0	1	
	Grootgeluk	1	3	0	0	4	
	Hlobane Colliery	1	0	0	0	1	
	Khutala Colliery	0	2	0	0	2	
	Kleinkopje Colliery	0	1	0	0	1	
	Klippoortjie Colliery	0	3	0	0	3	
	Koornfontein Coal	10	1	0	0	11	
	Kriel Colliery	1	1	0	0	2	

MINETYPE	LAST MINE WORKED AT	BLACK	WHITE	COL- OURED	UN- KNOWN	TOTAL
Coal (continued)	Landau Colliery	1	1	0	0	2
	Leeufontein Colliery	1	0	0	0	1
	Matla Coal	5	2	0	0	7
	Middelbult	3	0	0	0	3
	New Denmark	5	3	0	0	8
	New Clydesdale	3	0	0	0	3
	New Vaal Colliery	1	0	0	0	1
	Newcastle Coal Mine	0	1	0	0	1
	Optimum Colliery	1	1	0	0	2
	Phoenix Colliery	1	0	0	0	1
	Rietspruit Colliery	1	0	0	0	1
	S A Coal Estates	1	2	0	0	3
	Sasol Coal Mine	10	1	0	0	11
	Savemore Colliery	3	0	0	0	3
	Secunda Colliery	9	1	0	0	10
	Sigma Colliery	1	1	0	0	2
	Slater Coal Mine	0	1	0	0	1
	Springfield Colliery	0	5	0	0	5
	Springlake Colliery	1	0	0	0	1
	Syferfontein Coal	1	0	0	0	1
	Tavistok Colliery	1	1	0	0	2
	Transvaal Navigation Colliery	0	1	0	0	1
	Twistdraai	4	0	0	0	4
	Van Dyk's Drift	0	2	0	0	2
	Vierfontein Colliery	0	2	0	0	2
	Welgedacht	0	1	0	0	1
	Witbank Collieries	1	3	0	0	4
	Witcons Colliery	1	1	0	0	2
Total from coal mines						142
Copper	Copper Mine	0	1	0	0	1
	O'Kiep Copper	0	3	2	0	5
	Phalaborwa	5	0	0	0	5
	Tsumeb Copper Mine	0	1	0	0	1
Total from copper mines						12
Diamond	Bellsbank Diamond	2	0			2
	Cullinan Diamond	1	4			5
	De Beers Consolidated	5	4			9
	Finch Diamond Mine	1	0			1
	Good Hope Diamond	1	0			1
	Loxton Exploration	3	2			5
	Premier Diamond	7	3			10
Total from diamond mines						33
Gold	African Rainbow Minerals & Exploration	9	1	0	0	10
	Anglo Power GM	0	2	0	0	2
	Bayer GM	0	1	0	0	1
	Beatrix Gold	41	8	0	0	49
	Beisa GM	1	0	0	0	1
	Blyvoorquizicht	0	14	0	0	14
	Bracken Mines	0	5	0	0	5
	Buffelsfontein Gold	23	15	0	0	38
	City Deep	0	1	0	0	1
	Consolidated Main Reef	0	1	0	0	1
	Consolidated Mod	0	1	0	0	1
	Consolidated Mur	0	1	0	0	1

MINETYPE	LAST MINE WORKED AT	BLACK	WHITE	COL- OURED	UN- KNOWN	TOTAL
Gold (continued)	Crown Mines	0	1	0	0	1
	Daggasfontein	0	2	0	0	2
	Deelkraal	6	2	0	0	8
	Doornfontein	0	10	0	0	10
	Durban Roodepoort Deep	1	10	0	0	11
	East Driefontein	60	20	0	0	80
	East Geduld	0	5	0	0	5
	East Rand Prop	3	22	0	0	25
	Eastern Transvaal Consol.	0	1	0	0	1
	Elandsrand	18	1	0	0	19
	Ellaton GM	0	1	0	0	1
	Elsburg GM	0	1	0	0	1
	Evander GM	42	4	0	0	46
	Freddies Gold	23	2	0	0	25
	Free State Geduld	3	12	0	0	15
	Free State Saaiplaas	4	3	0	0	7
	Geldenhuis Gold Mine	0	1	0	0	1
	Gold mine	0	1	0	0	1
	Goldfields	0	3	0	0	3
	Grootvlei Prop	1	7	0	0	8
	Harmony	108	17	0	0	125
	Hartebeesfontein	72	23	0	0	95
	J.I.C. Gold Mine	9	2	0	0	11
	Joel	17	2	0	0	19
	Kalahari Goldridge mine	0	1	0	0	1
	Kinross	15	1	0	0	16
	Kloof	82	19	0	0	101
	Leeudoorn	15	7	0	0	22
	Leslie	3	2	0	0	5
	Libanon	18	12	0	0	30
	Loraine	2	4	0	0	6
	Luipaardsvlei Estate GM	0	4	0	0	4
	Marievale	0	2	0	0	2
	Masimong Gold Mine	7	1	0	0	8
	Middelburg Gold Mine	0	1	0	0	1
	New Consort	0	1	0	0	1
	Oryx	19	3	0	0	22
	Placer Dome GM	0	1	0	0	1
	President Brand	3	8	0	0	11
	President Steyn	43	18	0	0	61
	Primrose GM	0	3	0	0	3
	Rand Mines	0	3	0	0	3
	Randfontein	8	23	0	0	31
	S A Land	0	2	0	0	2
	Saaiplaas GM	0	1	0	0	1
	Sallies	0	1	0	0	1
	SAMAT GM	1	0	0	0	1
	Sheba	0	1	0	0	1
	South Roodepoort	2	2	0	0	4
	Springs GM	1	0	0	0	1
	St Helena	45	8	0	0	53
	State GM	1	2	0	0	3
	Stilfontein	1	16	0	0	17
	Target Gold Mine	0	1	0	0	1
	Tshepone GM	0	1	0	0	1

MINETYPE	LAST MINE WORKED AT	BLACK	WHITE	COL- OURED	UN- KNOWN	TOTAL
Gold (continued)	Ubuntu Small Scale GM	0	1	0	0	1
	Unisel GM	1	1	0	0	2
	Vaal Reefs	237	50	0	0	287
	Ventersport	0	10	0	0	10
	Village Main Reef	0	1	0	0	1
	Virginia GM	0	1	0	0	1
	Vlakfontein	0	4	0	0	4
	Waterpan GM	0	1	0	0	1
	Welkom GM	0	5	0	0	5
	West Driefontein	50	28	0	0	78
	West Rand Consolidation	0	10	0	0	10
	West Witwatersrand	0	1	0	0	1
	Western Areas	30	21	0	0	51
	Western Deep Levels	65	26	0	0	91
	Western Holdings	36	22	0	0	58
	Winkelhaak	2	4	0	0	6
	Wit Nigel GM	0	2	0	0	2
Total from gold mines						1 666
Platinum	Amadelbult Platinum (Rustenburg)	19	0	0	0	19
	Atok Platinum	5	1	0	0	6
	Bafokeng	0	2	0	0	2
	Concor Platinum Mine	0	1	0	0	1
	Eastern Platinum	0	1	0	0	1
	Impala Platinum	79	12	0	0	91
	Karee Platinum	1	0	0	0	1
	Lebowa Platinum	1	0	0	0	1
	Northam Platinum	8	4	0	0	12
	Rustenburg Platinum	200	27	0	0	227
	Swartklip Platinum	2	2	0	0	4
	Western Platinum	2	2	0	0	4
	Wildebeestfontein	7	0	0	0	7
	Zondereinde Platinum	7	0	0	0	7
Total from platinum mines						383
Iron	Sishen Iron Mine	1	0	0	0	1
	Thabazimbi Iron Mine	0	1	0	0	1
Iron & Manganese	Associated Manganese	4	5	0	0	9
Lead & Minerals	Blackmountain	1	0	0	0	1
Lime						1
Manganese	S A Manganese	4	3	0	0	7
	Manganese mine	0	2	0	0	2
Non Miner	Industry	2	2	1	0	5
	Non Miner	1	7	0	0	8
Phosphate	Foskor Beperk	1	0	0	0	1
Quarries	Hippo Quarries	1	0	0	0	1
	Marikana Granite	0	1	0	0	1
	Van Dyk	0	1	0	0	1
Shaft Sinkers	Shaft Sinkers	1	0	0	0	1
Silica	Silicon Smelters	3	1	0	0	4
Steel	Highveld Steel and Vanadium	2	0	0	0	2
	Middelburg Steel and Alloys	0	1	0	0	1

MINETYPE	LAST MINE WORKED AT	BLACK	WHITE	COL- OURED	UN- KNOWN	TOTAL
Steel & Iron	Iskor	1	28	0	0	29
Tin	Rooiberg Mineral Division	0	1	0	0	1
Vanadium	Rand Carbide Vanadium Mine	0	1	0	0	1
Zinc	Zinc Corporation	1	2	0	0	3
Unknown	Unknown	53	46	2	12	113
TOTALS		1 690	813	13	13	2 529