



**NATIONAL HEALTH  
LABORATORY SERVICE**

NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH

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## **Pathology Division Surveillance Report**

### **Demographic Data and Disease Rates for January to December 1990**

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**NIOH Report 23/2011**

[http://www.nioh.ac.za/publications/publications\\_pathaut\\_reports.htm](http://www.nioh.ac.za/publications/publications_pathaut_reports.htm)

## **ACKNOWLEDGEMENTS**

We thank all the staff members of the NIOH Pathology Department, for their invaluable contribution to the autopsy service.

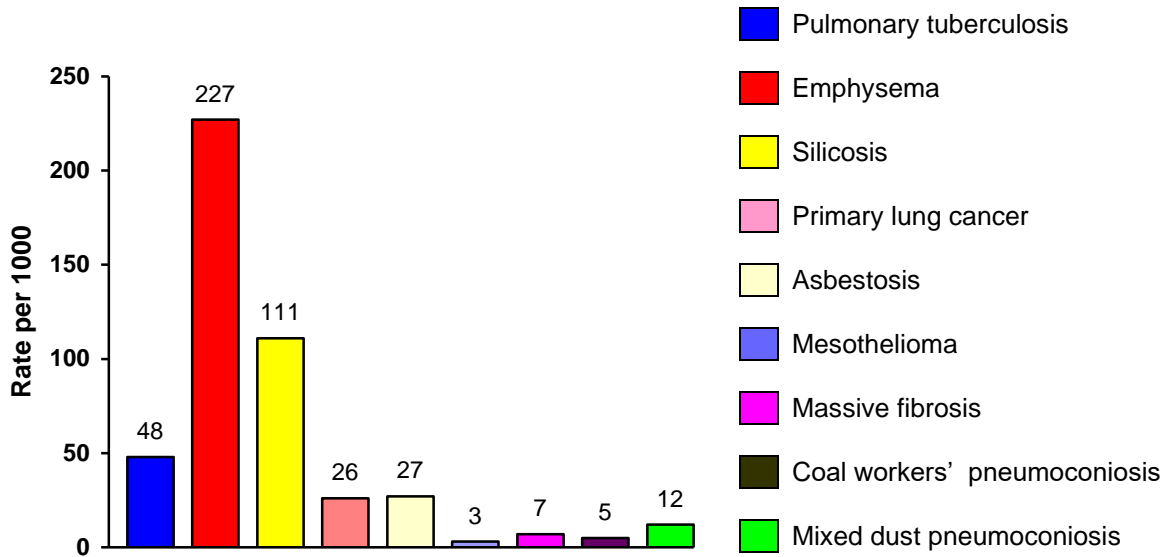
We also thank Lizet Vermaak for collating and Prof Tony Davies for editing the manuscript.

## EXECUTIVE SUMMARY

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During 1990, 3 378 cases came to autopsy at the NIOH. Of these, 64.3% were black men, 34.2% were white and 1.5% were coloured.

Overall disease rates (per 1000 autopsies) for 1990 are shown in Figure 1.



**FIG 1 OVERALL DISEASE RATES FOR 1990**

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## GLOSSARY

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

## SECTION 1 – BACKGROUND

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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 1990. This and other annual reports can be accessed at [www.nioh.ac.za](http://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 1975 is presented in Table 2-1.

**TABLE 2-1 DISTRIBUTION OF AUTOPSIES BY YEAR AND POPULATION GROUP (1975 - 1990)**

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
1984	1 966	64	1 098	36	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
<b>Total</b>	<b>36 313</b>	<b>66</b>	<b>17 884</b>	<b>33</b>	<b>738</b>	<b>1</b>	<b>1</b>		<b>54 936</b>

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 1990. Autopsies of only the cardio-respiratory organs comprised 85.1% of all examinations.

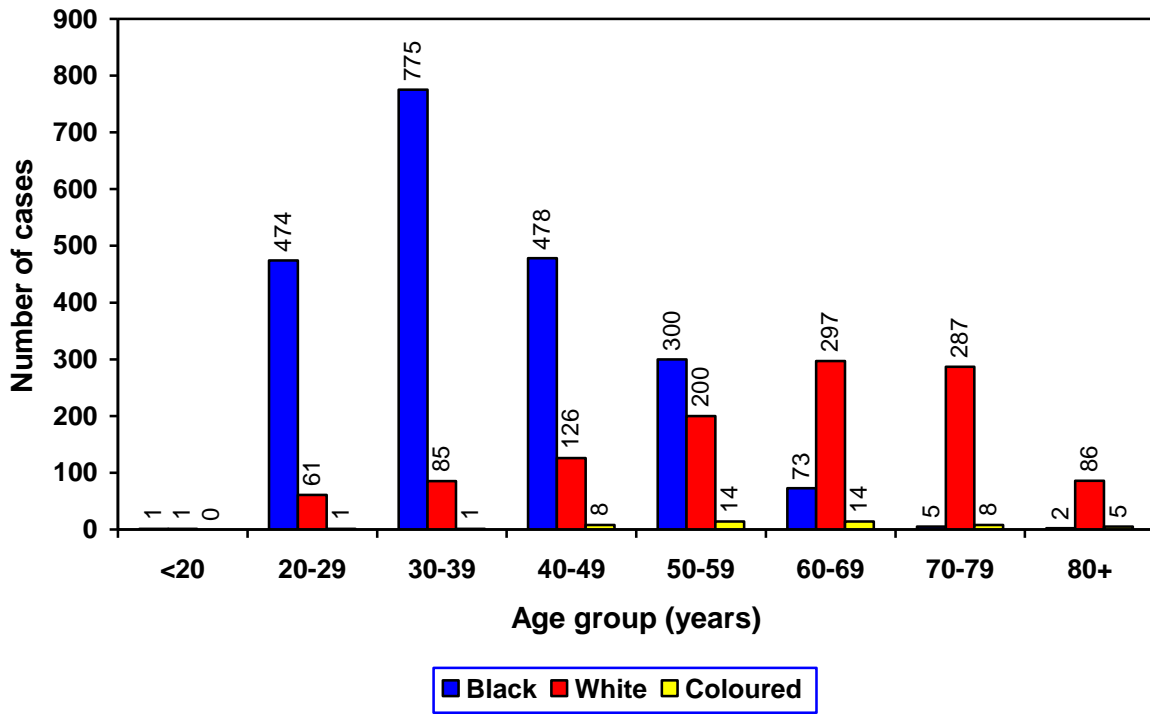
**TABLE 2-2 NUMBER AND PROPORTION OF AUTOPSIES BY TYPE AND POPULATION GROUP (1990)**

Autopsy type	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
Cardiorespiratory organs only	2 039	93.9	785	68.0	51	100.0	2 875	85.1
Full autopsy	129	5.9	365	31.6	0	-	494	14.6
Not stated	4	0.2	5	0.4	0	-	9	0.3
Total	2 172		1 155		51		3 378	

The age distribution of autopsies for 1990 is shown in Table 2-3 and Figure 2-1. The mean age at autopsy of black men was 37.3 years. The mean age of white men at autopsy was 59.6 years and for coloured men 60.6 years

**TABLE 2-3 NUMBER AND PROPORTION OF AUTOPSIES BY AGE AND POPULATION GROUP (1990)**

Age group (years)	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
<20	1	0.1	1	0.1	0	-	2	0.1
20-29	474	21.8	61	5.3	1	2.0	536	15.9
30-39	775	35.7	85	7.4	1	2.0	861	25.5
40-49	478	22.0	126	10.9	8	15.7	612	18.1
50-59	300	13.8	200	17.3	14	27.5	514	15.2
60-69	73	3.4	297	25.7	14	27.5	384	11.4
70-79	5	0.2	287	24.8	8	15.7	300	8.9
80+	2	0.1	86	7.4	5	9.8	93	2.8
Unknown	64	2.9	12	1.0	0	-	76	2.2
Total	2 172		1 155		51		3 378	



**FIG 2-1 DISTRIBUTION OF AUTOPSIES BY AGE AND POPULATION GROUP (1990)**

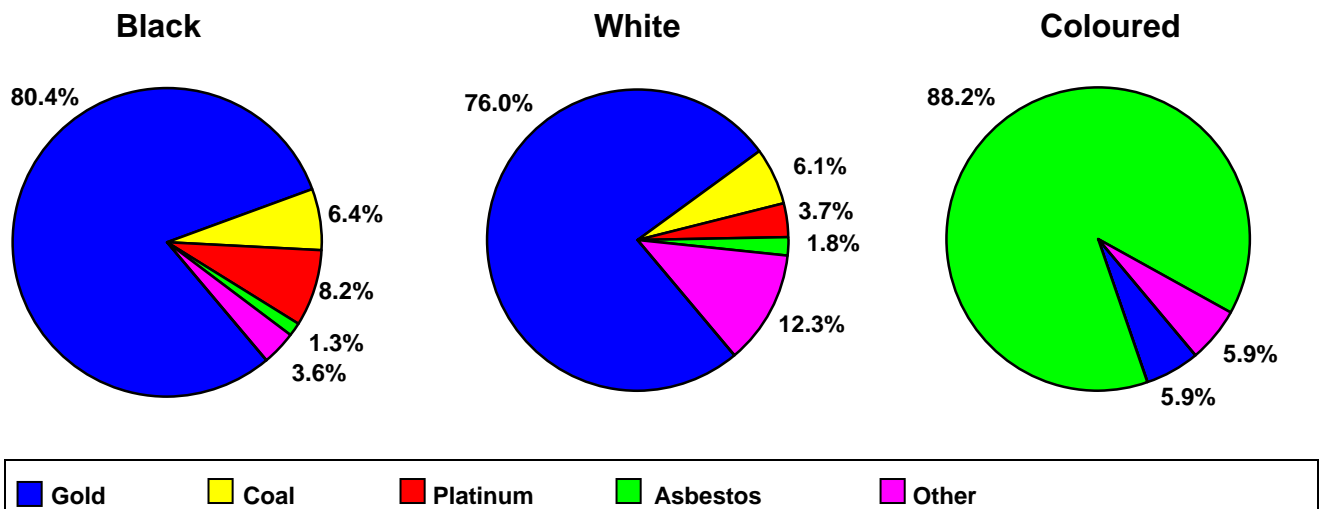
Cases were placed in categories according to the commodity in which they had worked for the longest duration (most exposure). Many men worked in a number of different mining commodities during their lifetimes and had “mixed” exposures. This was not taken into account in the analysis of exposure type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

Table 2-4 and Figure 2-2 show the distribution of autopsies by commodity and population group for 1990.

**TABLE 2-4 NUMBER AND PROPORTION OF AUTOPSIES BY COMMODITY AND POPULATION GROUP (1990)**

Commodity	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
Gold	1 747	80.4	878	76.0	3	5.9	2 628	77.8
Platinum	178	8.2	43	3.7	0	-	221	6.5
Coal	140	6.4	71	6.1	0	-	211	6.2
Asbestos	29	1.3	21	1.8	45	88.2	95	2.8
Iscor	3	0.1	69	6.0	1	2.0	73	2.2
Diamond	19	0.9	15	1.3	0	-	34	1.0
Copper	2	0.1	11	1.0	1	2.0	14	0.4
Other	9	0.4	7	0.6	0	-	16	0.5
Unknown	45	2.1	40	3.5	1	2.0	86	2.5
<b>Total</b>	<b>2 172</b>		<b>1 155</b>		<b>51</b>		<b>3 378</b>	

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

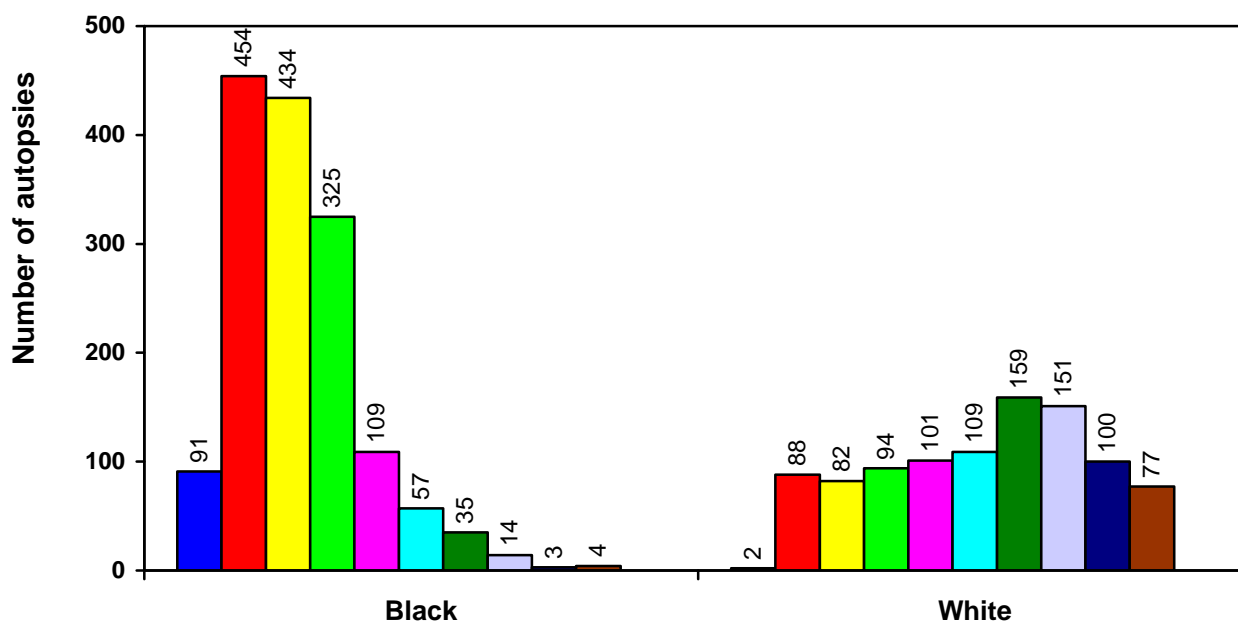


**FIG 2-2 DISTRIBUTION OF AUTOPSIES BY COMMODITY AND POPULATION GROUP (1990)**

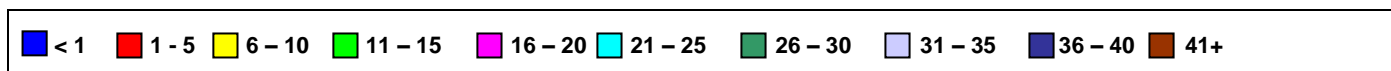
Detailed information about the years in mining service by population group is presented in Table 2-5 and Figure 2-3.

**TABLE 2-5 NUMBER AND PROPORTION OF AUTOPSIES BY YEARS OF SERVICE AND POPULATION GROUP (1990)**

Years of service	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
<1	91	4.3	2	0.2	0	-	93	2.8
1-5	454	20.9	88	7.6	14	27.5	556	16.5
6-10	434	20.0	82	7.1	8	15.7	524	15.5
11-15	325	15.0	94	8.1	4	7.8	423	12.5
16-20	109	5.0	101	8.7	8	15.7	218	6.5
21-25	57	2.6	109	9.4	2	3.9	168	5.0
26-30	35	1.6	159	13.8	2	3.9	196	5.8
31-35	14	0.6	151	13.1	4	7.8	169	5.0
36-40	3	0.1	100	8.7	0	-	103	3.0
41+	4	0.2	77	6.7	0	-	81	2.4
Unknown	646	29.7	192	16.6	9	17.6	847	25.1
Total	2 172		1 155		51		3 378	



Years of service:



**FIG 2-3 DISTRIBUTION OF AUTOPSIES BY YEARS OF SERVICE AND POPULATION GROUP (1990)**

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 (1990)**

Commodity	Black			White		
	N	Mean (years)	SD*	N	Mean (years)	SD*
Gold	1 702	37.9	10.1	876	61.1	15.8
Platinum	169	37.4	10.4	42	55.0	16.0
Coal	135	41.5	12.2	70	56.9	17.4
Asbestos	28	46.5	14.6	21	62.5	14.7
Iscor	3	49.0	10.5	69	57.4	15.6
Diamond	19	44.3	9.2	15	58.7	12.8
Copper	2	49.0	15.6	11	62.0	10.8
Other	9	56.2	3.6	7	59.6	15.8
Unknown	41	45.3	11.8	32	56.2	14.8
Total	2 108	38.5	10.6	1 143	60.3	15.8

\* Standard deviation

**TABLE 2-7 MEAN DURATION OF SERVICE BY COMMODITY AND POPULATION GROUP (1990)**

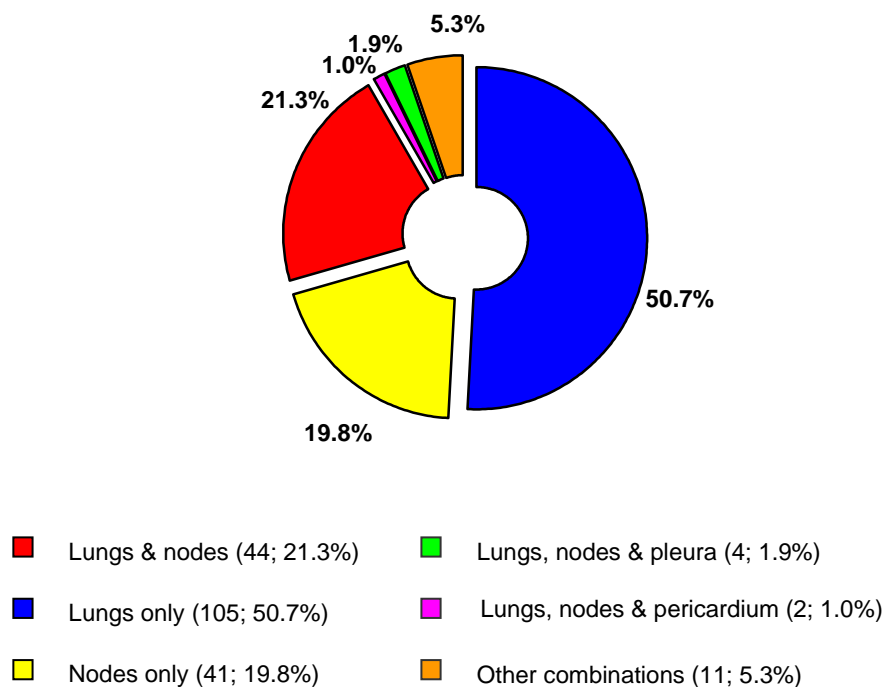
Commodity	Black			White		
	N	Mean (years)	SD*	N	Mean (years)	SD*
Gold	1 278	9.4	6.8	760	25.9	11.8
Platinum	121	7.5	4.5	40	15.6	9.5
Coal	76	11.2	10.0	57	20.4	12.5
Asbestos	12	14.1	11.5	15	12.4	8.6
Iscor	1	11.0	-	47	17.6	11.8
Diamond	15	17.9	10.7	12	21.8	11.8
Copper	0	-	-	9	18.6	6.8
Other	6	16.5	8.9	7	17.4	12.4
Unknown	17	9.7	9.0	16	17.1	9.7
Total	1 526	9.5	7.1	963	24.2	12.1

\* Standard deviation

## SECTION 3 – ACTIVE TUBERCULOSIS

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The distribution of active tuberculosis (TB) by anatomical site is presented in Figure 3-1 (n=207). Active pulmonary TB (PTB) was diagnosed in 4.8% (161) of all cases autopsied in 1990. Most of the men with PTB were black (80.7%; 130 cases), 14.9% (24 cases) were white and in 4.3% (7 cases) the population group was unknown.



**FIG 3-1 DISTRIBUTION OF ACTIVE TB BY SITE (1990)**

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 (84.5%) came from the gold mining industry (77.8% of all autopsy cases came from that commodity).

**TABLE 3-1 NUMBER OF CASES AND PREVALENCE OF ACTIVE PTB BY COMMODITY AND POPULATION GROUP (1990)**

Commodity	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	115	66	21	24	0	-	136	52
Platinum	4	22	0	-	0	-	4	18
Coal	2	14	1	14	0	-	3	14
Asbestos	3	103	0	-	7	156	10	105
Diamond	4	211	1	67	0	-	5	147
Unknown	2	44	1	25	0	-	3	35
<b>Total</b>	<b>130</b>	<b>60</b>	<b>24</b>	<b>21</b>	<b>7</b>	<b>137</b>	<b>161</b>	<b>48</b>

The age distribution of cases with active PTB is shown in Table 3-2. Most of the cases were between 30-49 years (87 cases=54%)

**TABLE 3-2 NUMBER OF CASES AND PREVALENCE OF ACTIVE PTB BY AGE AND POPULATION GROUP (1990)**

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
20-29	11	23	1	16	0	-	12	22
30-39	44	57	0	-	0	-	44	51
40-49	40	84	2	16	1	125	43	70
50-59	28	93	6	30	2	143	36	70
60-69	3	41	4	13	1	71	8	21
70-79	0	-	4	14	3	375	7	23
80+	0	-	7	81	0	-	7	75
Unknown	4	63	0	-	0	-	4	53
<b>Total</b>	<b>130</b>	<b>60</b>	<b>24</b>	<b>21</b>	<b>7</b>	<b>137</b>	<b>161</b>	<b>48</b>

## SECTION 4 – SILICOSIS

Silicotic nodules were found in the lungs of 377 cases (11% of all autopsies), 94.2% of which came from the gold mining industry. Of all cases of silicosis, occasional silicotic nodules were found in 43.6% of cases, a few in 19.5%, a moderate number in 22.4% and a large number in 14.5%.

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 (1990)**

Commodity	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	170	97	185	211	0	-	355	135
Platinum	0	-	2	47	0	-	2	9
Coal	3	21	4	56	0	-	7	33
Asbestos	2	69	1	48	1	22	4	42
Diamond	1	53	2	133	0	-	3	88
Copper	0	-	2	182	0	-	2	143
Other	1	111	2	286	0	-	3	188
Unknown	1	22	0	-	0	-	1	12
<b>Total</b>	<b>178</b>	<b>82</b>	<b>198</b>	<b>171</b>	<b>1</b>	<b>20</b>	<b>377</b>	<b>111</b>

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 (1990)**

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
20-29	3	8	1	20	0	-	4	9
30-39	28	44	1	18	0	-	29	41
40-49	61	155	7	84	0	-	68	142
50-59	60	283	28	181	0	-	88	239
60-69	12	226	52	225	0	-	64	225
70-79	0	-	68	294	0	-	68	292
80+	0	-	28	389	0	-	28	389
Unknown	6	133	0	-	0	-	6	128
<b>Total</b>	<b>170</b>	<b>97</b>	<b>185</b>	<b>211</b>	<b>0</b>		<b>355</b>	<b>135</b>



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 (1990)**

Years of service	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
<1	3	37	0	-	0	-	3	36
1-5	10	27	0	-	0	-	10	24
6-10	20	55	1	18	0	-	21	50
11-15	44	154	7	123	0	-	51	149
16-20	21	239	16	216	0	-	37	228
21-25	12	250	19	244	0	-	31	246
26-30	11	393	38	266	0	-	49	287
31-35	3	429	51	375	0	-	54	378
36-40	1	333	28	301	0	-	29	302
41+	0	-	18	261	0	-	18	254
Unknown	45	96	7	59	0	-	52	88
Total	170	97	185	211	0		355	135

## SECTION 5 – OTHER PNEUMOCONIOSES

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### MASSIVE FIBROSIS

There were 23 (0.7%) cases of massive fibrosis (12 black, 11 white). Twenty two cases were from the gold and one case was from the asbestos mining industry.

### COAL WORKERS' PNEUMOCONIOSIS

There were 18 (0.5%) cases of coal workers' pneumoconiosis of which 17 cases were from the coal mining industry. For one case the commodity was not stated.

### MIXED DUST PNEUMOCONIOSIS

There were 39 (1.2%) cases of mixed dust pneumoconiosis. These cases came from the gold (n=31), coal (n=1), platinum (n=3) and diamond (n=1) mining industries, as well as from Iscor (n=1). In two cases the industry was not stated.

### ASBESTOSIS AND PLEURAL PLAQUES

There were 92 cases of asbestosis of which 52.2% (n=48) had slight, 37.0% (n=34) moderate and 10.9% (n=10) marked fibrosis. Of these, 57 (62.0%) had worked in the asbestos mining industry at some time in their lives. There were 29 cases that had asbestos plaques and 13 (44.8%) of these had asbestosis. Fourteen (48.3%) had worked in the asbestos mining industry. 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 (1990)**

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
30-39	7	9	0	-	0	-	7	8
40-49	12	25	2	16	3	375	17	28
50-59	15	50	4	20	5	357	24	47
60-69	4	55	7	24	9	643	20	52
70-79	0	-	7	24	7	875	14	47
80+	2	1000	2	23	3	600	7	75
Unknown	2	31	1	83	0	-	3	39
<b>Total</b>	<b>42</b>	<b>19</b>	<b>23</b>	<b>20</b>	<b>27</b>	<b>529</b>	<b>92</b>	<b>27</b>

## SECTION 6 – EMPHYSEMA

There were 767 cases of emphysema, the extent of which was mild in 67.1% (n=515), moderate in 27.5% (n=211) and marked in 5.4% (n=41). 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 (1990)**

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
20-29	4	8	1	16	0	-	5	9
30-39	54	70	4	47	0	-	58	67
40-49	87	182	20	159	5	625	112	183
50-59	66	220	79	395	8	571	153	298
60-69	29	397	164	552	8	571	201	523
70-79	3	600	172	599	3	375	178	593
80+	2	1000	50	581	1	200	53	570
Unknown	6	94	1	83	0	-	7	92
<b>Total</b>	<b>251</b>	<b>116</b>	<b>491</b>	<b>425</b>	<b>25</b>	<b>490</b>	<b>767</b>	<b>227</b>

The majority of black and white men with emphysema were from the gold mining industry (73.0%, n=560) (Table 6-2).

**TABLE 6-2 NUMBER OF CASES AND PREVALENCE OF EMPHYSEMA BY COMMODITY AND POPULATION GROUP (1990)**

Commodity	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	171	98	388	442	1	333	560	213
Platinum	18	101	12	279	0	-	30	136
Coal	34	243	27	380	0	-	61	289
Asbestos	9	310	9	429	24	533	42	442
Diamond	6	316	7	467	0	-	13	382
Copper	0	-	5	455	0	-	5	357
Iscor	1	333	31	449	0	-	32	438
Other	5	556	2	286	0	-	7	438
Unknown	7	156	10	250	0	-	17	198
<b>Total</b>	<b>251</b>	<b>116</b>	<b>491</b>	<b>425</b>	<b>25</b>	<b>490</b>	<b>767</b>	<b>227</b>

**TABLE 6-3 NUMBER OF CASES AND PREVALENCE OF EMPHYSEMA BY YEARS OF SERVICE AND POPULATION GROUP (1990)**

Years of service	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
<1	4	44	0	-	0	-	4	43
1 – 5	33	73	16	182	8	571	57	103
6-10	46	106	29	354	5	625	80	153
11-15	35	108	35	372	2	500	72	170
16-20	17	156	51	505	3	375	71	326
21-25	13	228	50	459	1	500	64	381
26-30	12	343	85	535	2	1000	99	505
31-35	4	286	76	503	1	250	81	479
36-40	1	333	57	570	0	-	58	563
41+	3	750	46	597	0	-	49	605
Unknown	83	128	46	240	3	333	132	156
<b>Total</b>	<b>251</b>	<b>116</b>	<b>491</b>	<b>425</b>	<b>25</b>	<b>490</b>	<b>767</b>	<b>227</b>

## SECTION 7 – MESOTHELIOMA

There were 11 cases of mesothelioma in 1990.

**TABLE 7-1 NUMBER AND PROPORTION OF MESOTHELIOMA CASES BY AGE AND POPULATION GROUP (1990)**

Age group (years)	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
40-49	1	33.3	2	40.0	1	33.3	4	36.4
50-59	2	66.7	2	40.0	0	-	4	36.4
60-69	0	-	0	-	1	33.3	1	9.1
70-79	0	-	1	20.0	0	-	1	9.1
80+	0	-	0	-	1	33.3	1	9.1
Total	3		5		3		11	

The distribution of mesothelioma by commodity and population group is presented in Table 7.2. Seven (63.6%) had worked in the asbestos mining industry.

**TABLE 7-2 NUMBER AND PROPORTION OF MESOTHELIOMA CASES BY COMMODITY AND POPULATION GROUP (1990)**

Commodity	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
Asbestos	2	66.7	1	20.0	3	100.0	6	54.5
Gold	1	33.3	1	20.0	0	-	2	18.2
Unknown	0	-	3	60.0	0	-	3	27.3
Total	3		5		3		11	

## SECTION 8 – PRIMARY LUNG CANCER

Eighty eight cases of primary lung cancer were found at autopsy, 21.6% of which were in black, 70.5% in white and 8.0% in coloured men. Most of the cases were squamous lung carcinomas (37.5%; n=33), followed by small cell lung carcinoma (22.7%; n=20), adeno carcinoma (17.0%; n=15), large cell lung carcinoma (14.8%; n=13) and broncho-alveolar carcinoma (8.0%; n=7)

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 (1990)**

Age group (years)	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
30-39	1	1	0	-	0	-	1	1
40-49	4	8	2	16	0	-	6	10
50-59	7	23	12	60	3	214	22	43
60-69	6	82	24	81	4	286	34	89
70-79	0	-	19	66	0	-	19	63
80+	0	-	5	58	0	-	5	54
Unknown	1	16	0	-	0	-	1	13
<b>Total</b>	<b>19</b>	<b>9</b>	<b>62</b>	<b>54</b>	<b>7</b>	<b>137</b>	<b>88</b>	<b>26</b>

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 (1990)**

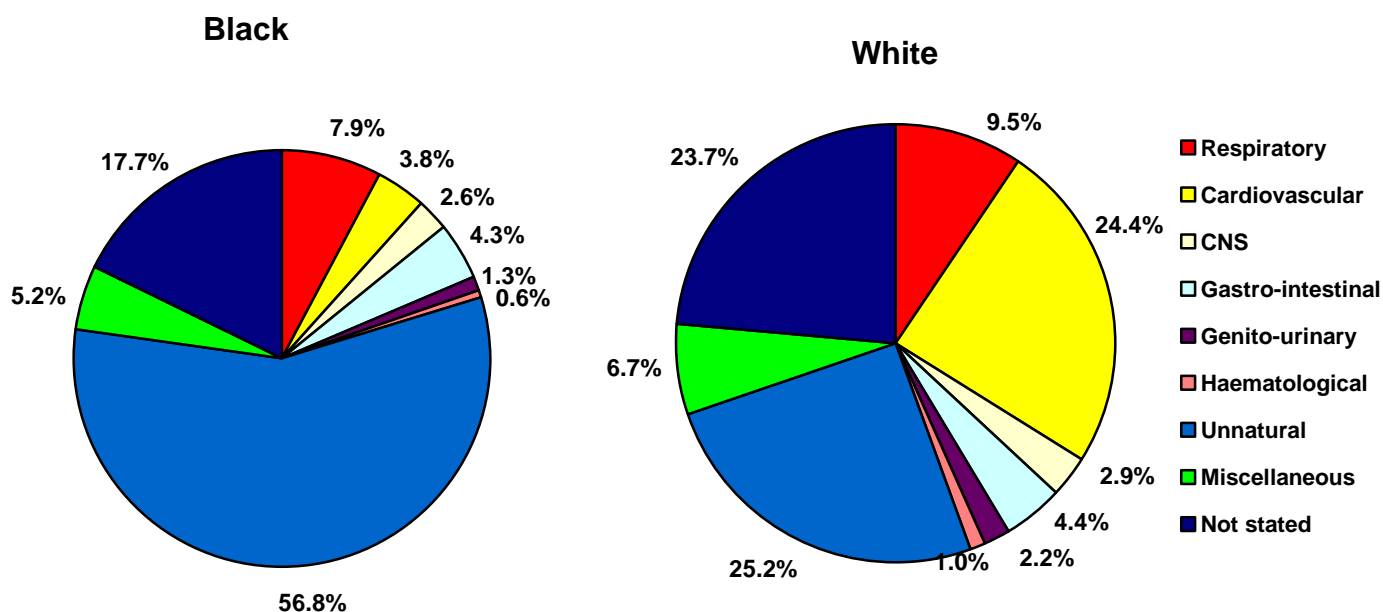
Commodity	Black		White		Coloured		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Gold	13	7	41	47	0	-	54	21
Platinum	2	11	1	23	0	-	3	14
Coal	1	7	6	85	0	-	7	33
Asbestos	1	34	2	95	6	133	9	95
Diamond	0	-	3	200	0	-	3	88
Copper	1	500	2	182	1	1000	4	286
Iscor	0	-	6	87	0	-	6	82
Unknown	1	22	1	25	0	-	2	23
<b>Total</b>	<b>19</b>	<b>9</b>	<b>62</b>	<b>54</b>	<b>7</b>	<b>137</b>	<b>88</b>	<b>26</b>

## 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 (11.2%) overall. Black men had the highest proportion of unnatural causes of death (56.8%). In 19.7% of all cases, the cause of death was not stated.

**TABLE 9-1 CLINICAL CAUSES OF DEATH BY POPULATION GROUP (1990)**

System	Black		White		Coloured		Total	
	N	%	N	%	N	%	N	%
Respiratory	171	7.9	110	9.5	10	19.6	291	8.6
Cardio-vascular	83	3.8	282	24.4	15	29.4	380	11.2
Central Nervous System	56	2.6	34	2.9	5	9.8	95	2.8
Gastro-intestinal	93	4.3	51	4.4	1	2.0	145	4.3
Genito-urinary	28	1.3	25	2.2	0	-	53	1.6
Haematological	12	0.6	11	1.0	0	-	23	0.7
Unnatural	1 233	56.8	291	25.2	10	19.6	1 534	45.4
Miscellaneous	112	5.2	77	6.7	2	3.9	191	5.7
Not stated	384	17.7	274	23.7	8	15.7	666	19.7
<b>Total</b>	<b>2 172</b>		<b>1 155</b>		<b>51</b>		<b>3 378</b>	



**FIGURE 9-1 CLINICAL CAUSE OF DEATH AS STATED BY THE CLINICIANS WHO SUBMIT THE ORGANS OF THE DECEASED TO THE NIOH (1990)**