



DEPARTMENT OF HEALTH

**Pathology Division Report:
Demographic Data and
Disease Rates**

SIMRAC project GEN 509

**NATIONAL CENTRE FOR
OCCUPATIONAL HEALTH**

**Dr Jill Murray
Dr Eva Hnizdo
Lizet Coetzee**

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**PO BOX 4788
JOHANNESBURG
2000
murray@health.gov.za**

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SECTION 1 - INTRODUCTION

By South African law examination of the cardiorespiratory organs of deceased miners and ex-miners is required for compensation purposes provided the next of kin agrees. The autopsy examinations are performed in a standardised manner (Appendix A) by pathologists at the National Centre for Occupational Health (NCOH) in Johannesburg. A detailed report (Appendix B) is sent to the Medical Bureau for Occupational Diseases (MBOD). Since 1975 the findings have been recorded in a computerised database: known as PATHAUT. The system also stores information regarding the type and duration of mining service which is sent with the organs from the mines and obtained from review of the MBOD files.

PATHAUT is a source of material for research which is unique in the world and since 1975 some 70 scientific papers have been published. PATHAUT provides an important resource for surveillance, between 1988 and 1992 short annual reports were produced on disease prevalence. Important information for workers health and the economic and health policies of the mining industry is contained within this huge database.

The structure PATHAUT was updated during 1995/1996 and funding was received from SIMRAC (project GEN 509 - 1998) to improve the quality of the clinical information and exposure data received from the mines, to facilitate systems for exchange of clinico-pathological data with the mine medical officers and to write computer programmes which would permit ongoing annual analysis of data for disease surveillance.

This is the first of the new format surveillance reports and describes autopsy cases examined in 1997. The information is provided for the organisations utilising the NCOH service and other interested parties. Confidentiality of individual records is strictly ensured.

STRUCTURE OF THE PATHAUT DATABASE

The updated PATHAUT database is maintained at NCOH under the auspices of the Management Advisory Services of the Department of Health (Division: Information Technology). Data is exported from PATHAUT into the **Statistical Analysis System** (known as the SAS system), where the software for producing annual analysis of data was developed (see appendix A). Programmes have also been written using the Structured Query Language (SQL), permitting the user to perform queries on the SAS system, concerning any aspect of the PATHAUT database. This will allow for ongoing exchange of specific data with the mine medical services and other interested parties.

DEVELOPMENT OF METHODS OF INFORMATION FLOW BETWEEN NCOH AND THE MINING MEDICAL SERVICES

Analysis of the PATHAUT database during 1998 revealed that the medical & exposure information accompanying the cardio-respiratory organs was often suboptimal, largely because the form requesting such data was outdated. After discussions with various medical services, the director of the MBOD and the Chief Medical Inspector of Mines, it was decided to maintain a paper-based system for data coming from the mines. The original form used for information flow between the NCOH and the mine medical services was amended (Appendix C, D, old and new forms respectively).

SECTION 2 - DATA DESCRIPTION

A referral bias operates in this autopsy series due to the fact that black men are infrequently autopsied after leaving employment in the mines, whereas the majority of whites come to autopsy after retirement. The autopsy rate for white miners and ex-miners is around 85%. The referral for black men who die while in employment is also around 85%.

The number of autopsies performed since 1975 is presented in Table 2-1. The data by ethnic group for 1993-1996 is not available but the total number of autopsies performed over the years is fairly consistent. The distribution of autopsies according to the last mine the deceased worked on is shown in Appendix E.

TABLE 2-1: DISTRIBUTION OF AUTOPSIES BY YEAR & ETHNIC GROUP

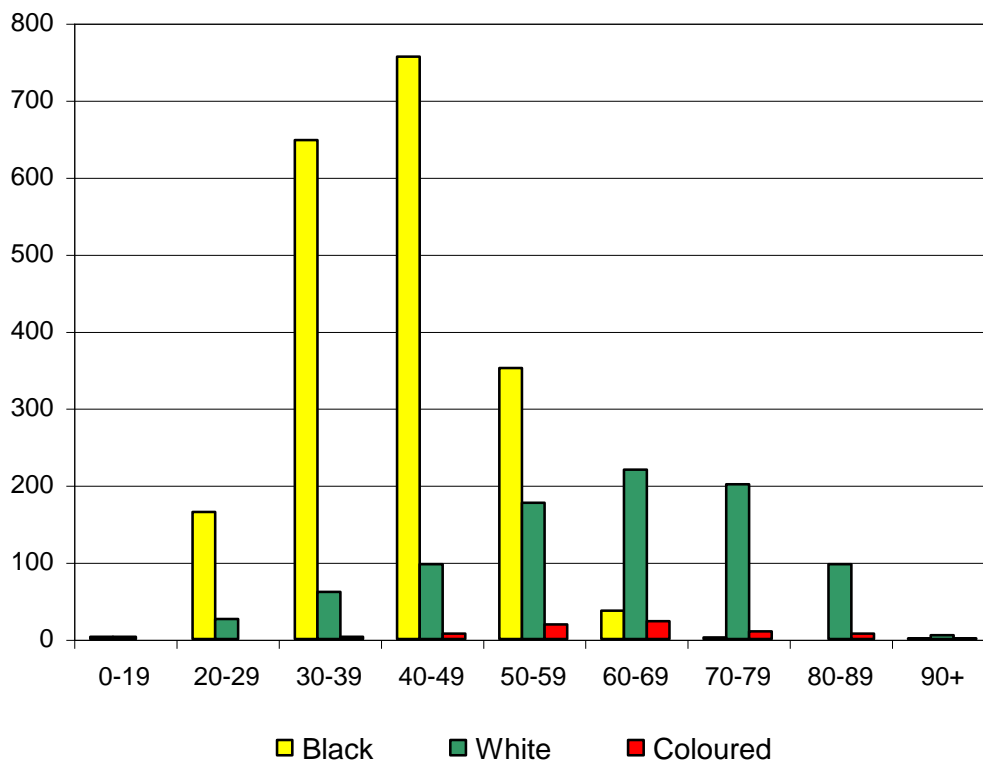
YEAR OF AUTOPSY	BLACK		WHITE		COLOURED		UNKNOWN		TOTAL N
	N	%	N	%	N	%	N	%	
1975	2 189	71.2	854	27.8	32	1.0			3 075
1976	2 335	68.0	1071	31.2	27	0.8			3 433
1977	2 351	68.7	1039	30.4	33	1.0			3 423
1978	2 245	66.7	1088	32.3	32	1.0			3 365
1979	2 118	66.4	1025	32.2	45	1.4			3 188
1980	2 338	63.9	1274	34.8	46	1.3			3 658
1981	2 209	65.8	1117	33.3	33	1.0			3 359
1982	2 312	63.2	1302	35.6	44	1.2			3 658
1983	2 096	64.6	1107	34.1	41	1.3			3 244
1984	1 966	63.6	1099	35.5	28	0.9			3 093
1985	2 275	64.3	1199	33.9	66	1.9			3 540
1986	2 456	67.7	1125	31.0	45	1.2			3 626
1987	2 594	67.6	1168	30.4	78	2.0			3 840
1988	2 518	67.0	1165	31.0	77	2.1			3 760
1989	2 138	65.0	1091	33.2	59	1.8			3 288
1990	2 172	64.3	1155	34.1	51	1.5			3 378
1991	2 131	65.0	1075	32.8	65	2.0			3 271
1992	2 138	65.7	1045	32.1	70	2.1			3 253
1993									2 890
1994									2 860
1995									4 073
1996									3 346
1997	2 223	69.3	897	28.0	70	2.2	18	0.6	3 208
TOTAL	42 804	66.2	20 896	32.3	942	1.5	18	0.03	77 829

The age distribution of cases is shown in Table 2-2 and Fig 2-1. The mean age for black men was 36.9 years (sd 15.9) and for whites 61.2 years (sd 16.2). The difference in the age distribution between blacks and whites is attributable to the referral bias mentioned previously (page 2-1). Nevertheless over the years, the age of black miners coming to autopsy has increased. In 1988, 58% were between the ages of 20-29 years, in 1991 19.3%, and in 1997 only 7.4%.

TABLE 2-2: DISTRIBUTION OF AUTOPSIES BY AGE & ETHNIC GROUP (1997)

AGEGROUP	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	%	N	%	N	%	N	%	N	%
0-19	3	0.1	3	0.3	0	0.0	0	0.0	6	0.2
20-29	165	7.4	26	2.9	0	0.0	0	0.0	191	6.0
30-39	648	29.1	61	6.8	3	4.3	0	0.0	712	22.2
40-49	756	34.0	97	10.8	7	10.0	0	0.0	860	26.8
50-59	352	15.8	177	19.7	19	27.1	0	0.0	548	17.1
60-69	37	1.7	220	24.5	23	32.9	0	0.0	280	8.7
70-79	2	0.1	201	22.4	10	14.3	0	0.0	213	6.6
80-89	0	0.0	97	10.8	7	10.0	0	0.0	104	3.2
90+	1	0.0	5	0.6	1	1.4	0	0.0	7	0.2
Missing	259	11.7	10	1.1	0	0.0	18	100	287	9.0
TOTAL	2223		897		70		18		3 208	100.0

FIGURE 2-1: DISTRIBUTION OF AUTOSPIES BY AGE & ETHNIC GROUP



At the NCOH two types of examinations are performed. For men dying distant from Johannesburg, only the cardiorespiratory organs, which are removed locally, preserved in formalin and sent to the NCOH are examined. Full autopsies are undertaken on men who die close to Johannesburg. Unnatural causes of death are examined in the Government Mortuary and the cardiorespiratory organs are sent to the NCOH.

In Table 2-3 this distribution of autopsies is presented by ethnic group. Autopsies of cardiorespiratory organs only, comprise 90% of examinations.

TABLE 2-3: DISTRIBUTION OF AUTOPSIES BY TYPE & ETHNIC GROUP (1997)

	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	%	N	%	N	%	N	%	N	%
Cardio-respiratory Organs only	2137	96.1	644	71.8	69	98.6	18	100	2868	90.0
Full autopsy	86	3.9	253	28.2	1	1.4	0	0.0	340	10.0
TOTAL	2223		897		70		18		3208	100.0

The majority of black and white cases (75.6%) come from the gold mines (Table 2-4), 80% of coloureds come from the asbestos mines.

TABLE 2-4: DISTRIBUTION OF AUTOPSIES BY MINE TYPE & ETHNIC GROUP (1997)

MINETYPE	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	%	N	%	N	%	N	%	N	%
Gold	1751	78.8	672	74.9	1	1.4	0	0.0	2424	75.6
Platinum	242	10.9	32	3.6	0	0.0	0	0.0	274	8.5
Coal	87	3.9	55	6.1	0	0.0	1	5.6	143	4.5
Asbestos	18	0.8	18	2.0	56	80.0	0	0.0	92	2.9
Isacor	5	0.2	42	4.7	0	0.0	0	0.0	47	1.5
Copper	7	0.3	20	2.2	13	18.6	0	0.0	40	1.2
Diamond	13	0.6	9	1.0	0	0.0	0	0.0	22	0.7
Other	9	0.4	22	2.5	0	0.0	0	0.0	31	1.0
Unknown	91	4.1	27	3.0	0	0.0	17	94.4	135	4.2
TOTAL	2223		897		70		18		3208	100.0

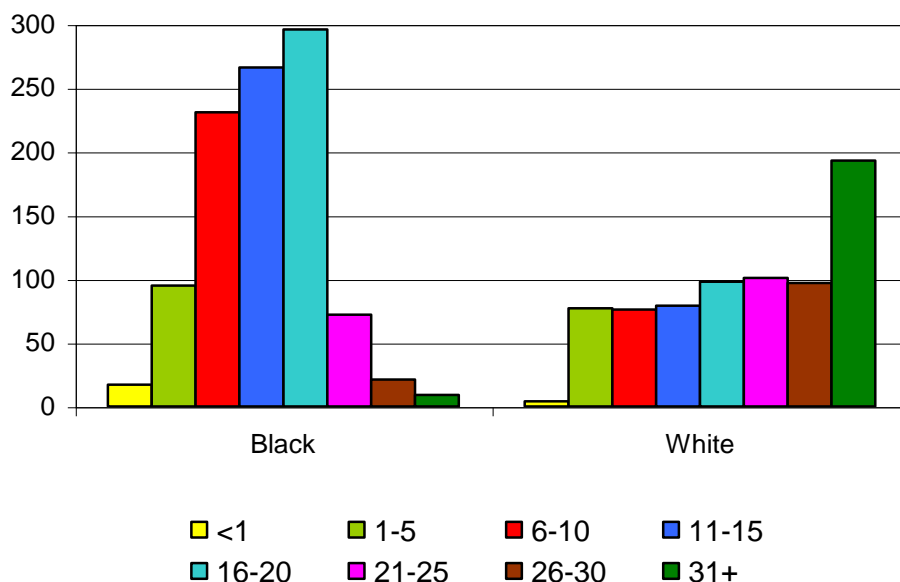
Other mine types include quarry, silica (silicon smelters), manganese, steel, tin, zinc, minerals, chrome and iron. A few autopsies were received from the non-mining sector, namely construction and SA Railways.

Detailed information on years of mine service is presented in Table 2-5. Overall blacks had less service than whites: only 29.6% had more than 10 years service versus 63.3% for whites. It is however important to note the large percentage of missing information on the duration of service. The figure of 54.7% for black men is a reflection of the poor quality of the data provided by the mines.

TABLE 2-5: DISTRIBUTION OF AUTOPSIES BY YEARS OF SERVICE & ETHNIC GROUP (1997)

SERVICE (YEARS)	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	%	N	%	N	%	N	%	N	%
<1	17	0.8	4	0.4	0	0.0	0	0.0	21	0.7
1-5	95	4.3	77	8.6	13	18.6	0	0.0	185	5.8
6-10	231	10.4	76	8.5	14	20.0	0	0.0	321	10.0
11-15	266	12.0	79	8.8	7	10.0	0	0.0	352	11.0
16-20	296	13.3	98	10.9	5	7.1	0	0.0	399	12.4
21-25	72	3.2	101	11.3	6	8.6	0	0.0	179	5.6
26-30	21	0.9	97	10.8	2	2.9	0	0.0	120	3.7
31+	9	0.4	193	21.5	8	11.4	0	0.0	210	6.5
Missing	1216	54.7	172	19.2	15	21.4	18	100.0	1421	44.3
TOTAL	2223		897		70		18		3208	100.0

FIGURE 2-2: DISTRIBUTION OF AUTOPSIES BY YEARS OF SERVICE



In Figure 2-2 it is clear that the majority of blacks had between 6-20 years of service while the majority of whites had between 16-31+ years of service.

Mean duration of service & age by minetype and ethnic group is presented in Table 2-6. In all of the different types of mining black men had a shorter mean duration of service as well as a lower mean age. Miners for whom the exposure types were unknown, were excluded from this table.

TABLE 2-6: DURATION OF SERVICE AND AGE BY MINETYPE & ETHNIC GROUP (1997)

MINETYPE	BLACK					WHITE				
	N	AGE MEAN	SD	YEARS OF SERVICE MEAN	SD	N	AGE MEAN	SD	YEARS OF SERVICE MEAN	SD
Gold	1751	37.0	15.2	7.3	8.3	672	62.2	15.5	20.1	16.6
Platinum	242	40.3	12.8	2.5	5.1	32	51.3	18.8	8.9	8.5
Coal	87	40.6	15.5	1.5	5.1	55	55.3	15.0	12.2	13.0
Asbestos	18	46.8	13.9	7.6	7.2	18	66.3	11.1	14.6	10.2
Diamond	13	38.5	15.1	6.2	11.9	9	57.1	15.1	14.6	9.7
Copper	7	45.4	23.1	5.2	11.2	20	60.4	13.0	17.3	14.5
Iscor	5	29.0	16.8	0.0	0.0	42	56.7	14.9	13.2	11.7
Other	9	41.7	18.8	2.3	7.0	22	64.3	14.0	12.2	10.8
TOTAL	2223					897				

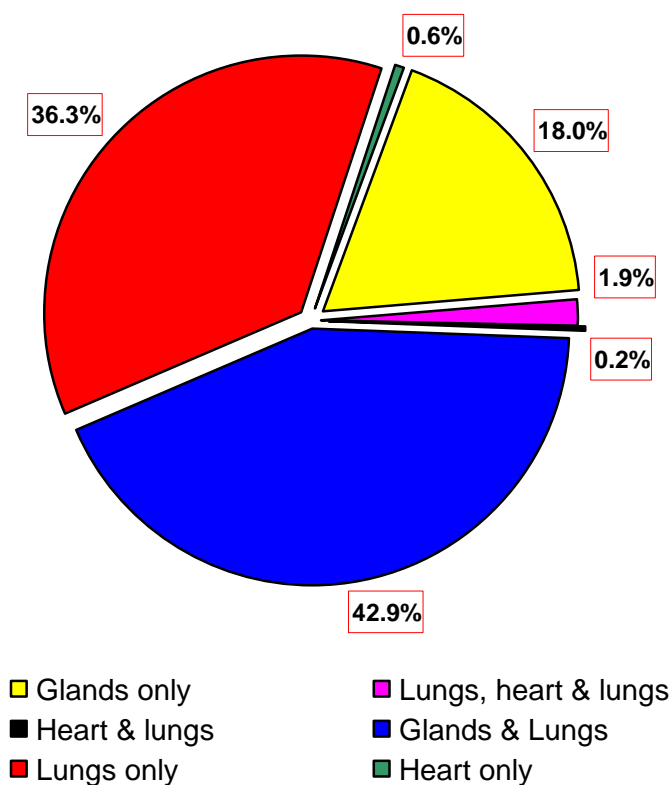
SECTION 3 - ACTIVE TUBERCULOSIS

The incidence of active TB was 14.5% (466 cases). This is double the number in 1992, which was only 7% (227 cases). Of these 466 cases:

- 81.3% were active **pulmonary** tuberculosis
- Of the PTB cases, 10% involved the lungs focally, whereas the remainder showed more extensive involvement of the lungs.
- 94.5% (439 cases) of PTB cases were blacks, 3.4% (17 cases) whites, 16% (7 cases) coloureds and in 0.5% (3 cases) the ethnic group was unknown.
- 83.9% of all PTB cases came from the goldmines.

The distribution of TB anatomical site is shown in table 3-1. In summary the lungs were involved in 81.3%, the pericardium in 2.8% and isolated TB glands only in 18%. In 36.3% the lesion was in the lungs only; in 42.9% the lesion was present in both the lungs and the glands.

FIGURE 3-1: DISTRIBUTION OF ACTIVE PTB BY SITE



In approximately two thirds of the cases of PTB the clinicians failed to ascribe this as the cause of death (Figure 3-2a). In a further 166 cases where TB was mentioned clinically, the pathologist did not confirm the presence thereof.

Of the TB cases that were not mentioned clinically but found by the pathologist, 12.5% were found to be slight cases of TB, 39% moderate and 48.1% marked pulmonary tuberculosis (Figure 3-2b).

FIGURE 3-2A: CLINICO-PATHOLOGICAL CORRELATION IN 379 CASES OF PULMONARY TUBERCULOSIS

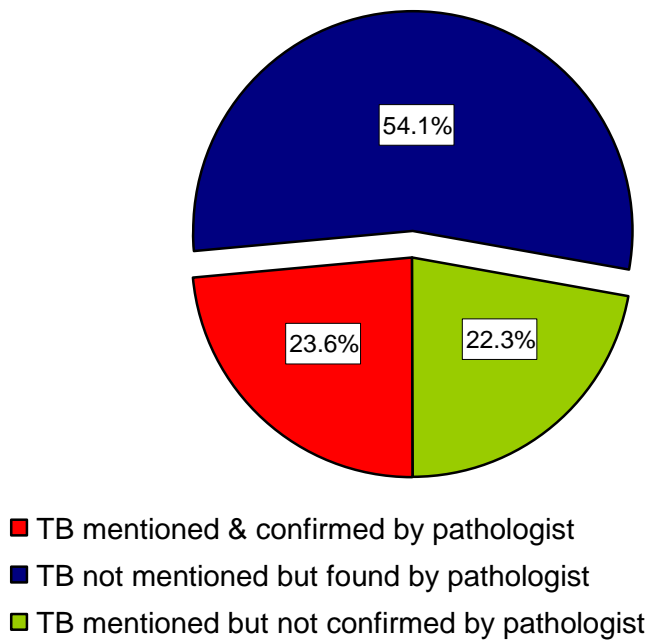
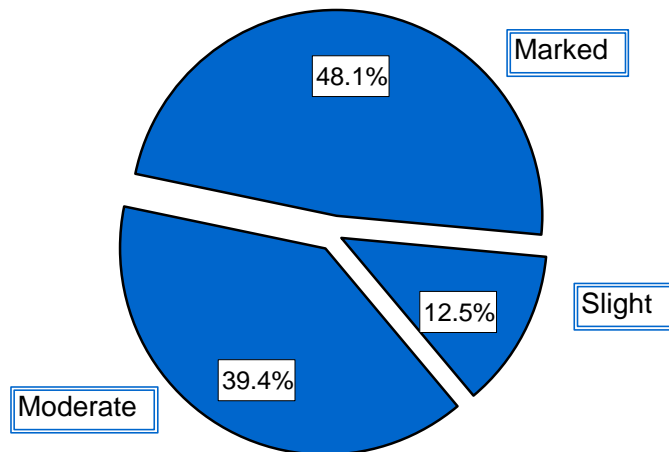


FIGURE 3-2B: SEVERITY OF TB FOUND AT AUTOPSY (NOT MENTIONED CLINICALLY)



The age distribution of cases with active tuberculosis is shown in Table 3-1. Most black men were under 60 years of age (87.4%), most whites were over 50 years of age (92.2%). These figures may not reflect the true disease distribution by age for these groups, as very few retired black miners come to autopsy.

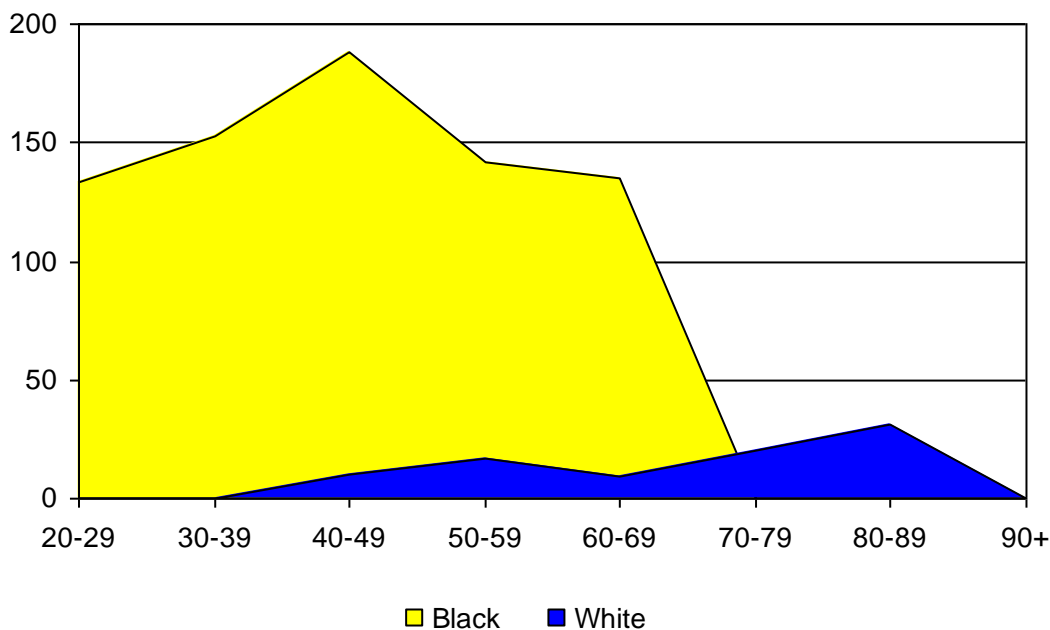
This would also affect prevalence rates of PTB.

TABLE 3-1: DISTRIBUTION AND PREVALENCE RATES OF ACTIVE PULMONARY TUBERCULOSIS BY AGE & ETHNIC GROUP (1997)

AGEGROUP	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	RATE	N	RATE	N	RATE	N	%	N	RATE
20-29	22	133.3	0	0.0	0	0.0	0	0.0	22	115.2
30-39	99	152.8	0	0.0	1	333.3	0	0.0	100	140.4
40-49	142	187.8	1	10.3	1	142.9	0	0.0	144	167.4
50-59	50	142.0	3	16.9	2	105.3	0	0.0	55	100.4
60-69	5	135.1	2	9.1	0	0.0	0	0.0	7	25.0
70-79	0	0.0	4	19.9	0	0.0	0	0.0	4	18.8
80-89	0	0.0	3	30.9	1	142.9	0	0.0	4	38.5
90+	0	0.0	0	0.0	1	1000.0*	0	0.0	1	142.9
Missing	40	154.4	0	0.0	0	0.0	2	111.1	42	146.3
TOTAL	358	161.0	13	14.5	6	85.7	2	111.1	379	118.1

Rate per 1000; *only 1 case examined; Denominator: All autopsies in specific age group

FIGURE 3-3: Prevalence rates of active PTB by age



The distribution of cases and the prevalence rates by industry, are shown in Tables 3-2. Although 83.9% of all cases with active PTB came from the gold mines, 75.6% of all autopsy cases came from that industry. Black gold miners have the highest prevalence of PTB: 175.3.

TABLE 3-2: DISTRIBUTION OF ACTIVE PULMONARY TUBERCULOSIS BY INDUSTRY & ETHNIC GROUP (1997)

	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	%	N	%	N	%	N	%	N	%
Gold	307	175.3	11	16.4	0	0.0	0	0.0	318	131.2
Platinum	27	111.6	0	0.0	0	0.0	0	0.0	27	98.5
Coal	7	80.5	1	18.2	0	0.0	0	0.0	8	55.9
Asbestos	0	0.0	0	0.0	5	89.3	0	0.0	5	54.3
Copper	0	0.0	1	76.9	1	76.9	0	0.0	2	50.0
Unknown	17	186.8	0	0.0	0	0.0	2	100.0	19	140.7
TOTAL	358	161.0	13	14.5	6	85.7	2	117.6	379	118.1

Rate per 1000

Denominator: All autopsies in specific industries

SECTION 4 – SILICOSIS

In Tables 4-1(A) & 4-1(B) the number of silicotics by type of industry and race are shown. As indicated previously, cases were categorized according to the industry in which most years of service occurred, thus the occurrence of silicosis in industries such as asbestos, platinum and copper is indicative of mixed service. The gold industry provided 92.9% of the silicosis in this series and the remainder came from the platinum, copper and coal industries.

TABLE 4-1(A): DISTRIBUTION OF SILICOTIC ISLETS BY INDUSTRY & ETHNIC GROUP

	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE
Gold	329	94.0	118	92.9	0	0.0	0	0.0	447	92.9
Coal	1	0.3	0	0.0	0	0.0	0	0.0	1	0.2
Copper	0	0.0	3	2.4	1	100.0	0	0.0	4	0.8
Platinum	7	2.0	1	0.8	0	0.0	0	0.0	8	1.7
Other	1	0.3	1	0.8	0	0.0	0	0.0	2	0.4
Unknown	12	3.4	4	3.1	0	0.0	3	100.0	19	4.0
TOTAL	350		127		1		3		481	100.0

Similarly the prevalence rate is highest in gold miners (184.4), followed by copper (100), platinum (29.2) and coal (17).

TABLE 4-1(B): PREVALENCE RATES OF SILICOSIS BY INDUSTRY & ETHNIC GROUP

INDUSTRY	BLACK RATE	WHITE RATE	COLOURED RATE	UNKNOWN RATE	TOTAL RATE
Gold	187.9	175.6	0.0	0.0	184.4
Coal	11.5	0.0	0.0	0.0	17.0
Copper	0.0	150.0	76.9	0.0	100.0
Platinum	28.9	31.3	0.0	0.0	29.2
Other	111.1	45.5	0.0	0.0	64.5
Unknown	131.9	148.1	0.0	176.5	140.7
TOTAL	157.4	141.6	14.3	166.7	149.9

Rate per 1000

Denominator: All autopsies in specific industries

The age distribution of all cases with silicosis is shown in Table 4-2. Only one black miner over the age of 70 years was autopsied, he did not have silicosis.

TABLE 4-2: DISTRIBUTION & PREVELENCE RATES OF PULMONARY SILICOSIS BY AGE & ETHNIC GROUP (1997)

AGEGROUP	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE
20-29	1	6.1	0	0.0	0	0.0	0	0.0	1	5.2
30-39	47	72.5	1	16.4	0	0.0	0	0.0	48	67.4
40-49	153	202.4	5	51.5	0	0.0	0	0.0	158	183.7
50-59	99	281.3	17	96.0	1	52.6	0	0.0	117	213.5
60-69	11	297.3	37	168.2	0	0.0	0	0.0	48	171.4
70-79	0	0.0	40	199.0	0	0.0	0	0.0	40	187.8
80-89	0	0.0	26	268.0	0	0.0	0	0.0	26	250.0
Missing	39	150.6	1	100.0	0	0.0	3	166.7	43	149.8
TOTAL	350	157.4	127	141.6	1	14.3	3	166.7	481	100.0%

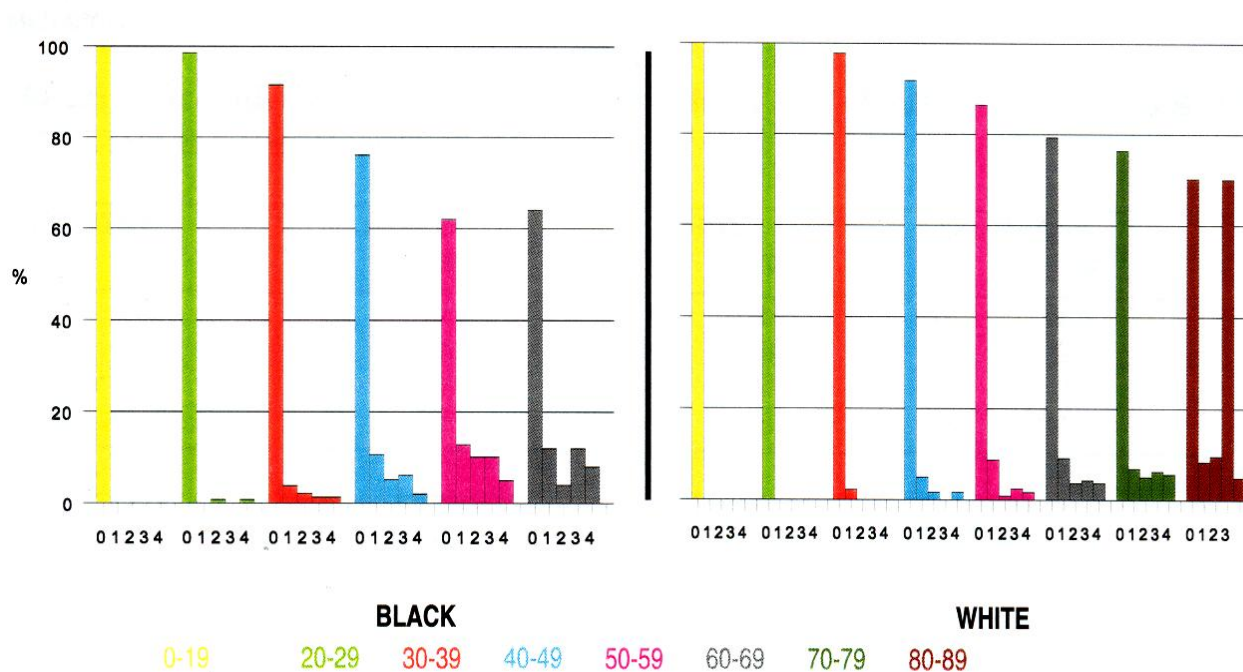
Rate per 1000

Denominator: All autopsies in certain age group

The distribution of the severity of silicosis in black and white goldminers is shown in Figure 4-1. The prevalence of silicosis is much higher for black gold miners than for white gold miners.

TABLE 4-1: DISTRIBUTION OF THE SEVERITY OF SILICOSIS IN BLACK & WHITE GOLD MINERS

0=No silicosis 1=Occasional nodules 2=Few nodules 3=Moderate number of nodules 4=Large number of nodules



SECTION 5 - MASSIVE FIBROSIS

The age distribution of cases with massive fibrosis (Table 5-1) differs between ethnic groups, with the highest proportion in blacks found in the 40-59 years age group and in the whites in the 60-89 years age group. No massive fibrosis was found in coloured people.

TABLE 5-1: DISTRIBUTION & PREVALENCE OF MASSIVE FIBROSIS BY AGE & ETHNIC GROUPS (1997)

AGEGROUP	BLACK		WHITE		ALL RACES	
	N	RATE	N	RATE	N	RATE
40-49	6	7.9	1	10.3	7	8.1
50-59	8	22.7	1	5.6	9	16.4
60-69	1	27.0	5	22.7	6	21.4
70-79	0	0.0	6	29.9	6	28.2
80-89	0	0.0	3	30.9	3	59.7
Missing	5	77.5	1	100.0	6	20.9
TOTAL	20	9.0	17	19.0	37	11.5

Rate per 1000

Denominator: all autopsies in certain age group

The distribution of cases, and the prevalence rates of massive fibrosis, by industry are shown in Tables 5-2. The gold industry provided 83.8% of all massive fibrosis cases while the copper and coal industries each provided 2.7%.

TABLE 5-2: DISTRIBUTION & PREVALENCE OF MASSIVE FIBROSIS BY INDUSTRY & ETHNIC GROUP (1997)

INDUSTRY	BLACK		WHITE		ALL RACES	
	N	RATE	N	RATE	N	RATE
Gold	18	10.3	13	76.5	31	83.8
Coal	0	0.0	1	5.9	1	2.7
Copper	0	0.0	1	5.9	1	2.7
Unknown	2	10.0	2	11.8	4	10.8
TOTAL	20		17		37	100.0

Rate per 1000

Denominator: All autopsies in specific industry

SECTION 6 – COALWORKER’S PNEUMOCONIOSIS, MIXED DUST FIBROSIS & ASBESTOS RELATED DISEASE

COALWORKERS PNEUMOCONIOSIS

There were 6 cases of coalworker’s pneumoconiosis all of which were in black coal miners. The cases with coalworker’s pneumoconiosis all come from coal mines with a prevalence rate of 69.

MIXED DUST FIBROSIS

There were 31 cases of mixed dust fibrosis (21 black, 10 whites) and most of them (84%) were from gold mines. The prevalence was 10.7 in gold and 14.0 in the coal workers.

ASBESTOS RELATED DISEASE

There were 51 cases of asbestosis. Of these cases, 45% were in the coloured people (45%), followed by blacks (39.2%) and lastly whites (15.7%) and in all groups, slight & moderate interstitial fibrosis were found most, while marked interstitial fibrosis was not as prevalent. Only six cases of asbestotic pleural plaques were present in 1997. However, the parietal pleura which is usually the site affected by plaque formation, is hardly ever submitted with the lungs.

All the coloureds with asbestosis came from asbestos mines, which explains the high prevalence rates of asbestosis (Table 6.1). The highest proportion of blacks (40%) and whites (37.5%), however, came from gold mines, and only two of these cases (whites) had previous occupational asbestos exposure. The overall prevalence rate for the asbestos mines was 315.2 (blacks 222.2, whites 111.1 & coloureds 410.7)

TABLE 6-1: DISTRIBUTION & PREVALENCE RATES OF ASBESTOSIS BY INDUSTRY & ETHNIC GROUP

INDUSTRY	BLACK		WHITE		COLOURED		ALL RACES	
	N	RATE	N	RATE	N	RATE	N	RATE
Gold	8	2.3	3	4.5	0	0.0	11	4.5
Platinum	3	12.4	0	0.0	0	0.0	3	10.9
Coal	1	11.5	0	0.0	0	0.0	1	7.0
Asbestos	4	222.2	2	111.1	23	410.7	29	315.2
Copper	1	142.9	1	142.9	0	0.0	2	50.0
Iscor	0	0.0	2	47.6	0	0.0	2	42.6
Other	1	111.1	0	0.0	0	0.0	1	32.3
Unknown	2	22.0	0	0.0	0	0.0	2	14.8
TOTAL	20	9.0	8	8.9	23	328.6	51	16.8

Denominator: All autopsies in specific industries

Malignant mesothelioma and lung cancer, which are also associated with asbestos exposure, are dealt with Sections 9 and 10.

SECTION 7 – EMPHYSEMA

At autopsy emphysema is categorised according to the percentage of lung tissue affected, into slight (up to 35%), moderate (up to 65%) and marked. There were 600 cases with emphysema of which 74.2% were insignificant cases of emphysema, 1.8% were moderate and the remaining 24% had a marked degree of emphysema.

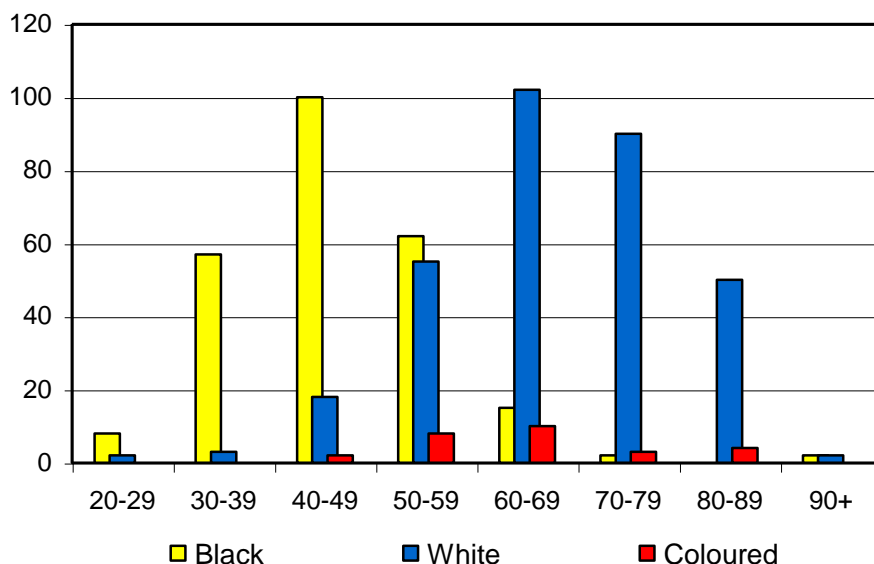
Most case of emphysema were found in white gold miners (Table 7-1). The age and prevalence rates for emphysema can be seen in Figure 7-1. From this figure it is clear that for black men, the highest number with emphysema, was in the age group 40-49, while for the whites, it increased from age 40-49, with the highest point at age group 60-69.

TABLE 7-1: DISTRIBUTION AND PREVALENCE RATES OF EMPHYSEMA BY INDUSTRY & ETHNIC GROUP

INDUSTRY	BLACK		WHITE		COLOURED		ALL RACES	
	N	RATE	N	RATE	N	RATE	N	RATE
Gold	197	112.5	243	361.6	0	0.0	440	181.5
Platinum	30	124.0	8	250.0	0	0.0	38	138.7
Coal	13	149.4	14	254.5	0	0.0	27	7.0
Asbestos	3	166.7	3	166.7	22	392.9	28	315.2
Iscor	1	200.0	16	381.0	0	0.0	17	42.6
Copper	0	0.0	8	400.0	0	153.8	10	50.0
Diamond	1	76.9	4	444.4	0	0.0	5	227.3
Other	0	0.0	9	409.1	0	0.0	9	32.3
Unknown	14	153.4	12	444.4	0	0.0	26	14.8
TOTAL	259	116.5	317	353.4	24	342.9	600	187.0

Denominator: All autopsies in specific industries

Figure 7-1: DISTRIBUTION OF EMPHYSEMA BY AGE & ETHNIC GROUP



SECTION 8 – MESOTHELIOMA

There were 11 cases of malignant pleural mesothelioma (Table 8-1).

TABLE 8-1: DISTRIBUTION OF MESOTHELIOMA BY AGE & ETHNIC GROUP (1997)

AGEGROUP	BLACK		WHITE		COLOURED		ALL RACES	
	N	%	N	%	N	%	N	%
40-49	2	100.0	0	0.0	0	0.0	2	18.1
50-59	0	0.0	2	40.0	1	25.0	3	27.3
60-69	0	0.0	2	40.0	1	25.0	3	27.3
70-79	0	0.0	1	20.0	0	0.0	1	9.1
80-89	0	0.0	0	0.0	2	50.0	2	18.1
TOTAL	2		5		4		11	

The distribution of cases and the prevalence rates of mesothelioma, by industry, are shown in Table 8-2. 45.5% of cases came from asbestos mines.

TABLE 8-2: DISTRIBUTION OF MESOTHELIOMA BY INDUSTRY & ETHNIC GROUP (1997)

INDUSTRY	BLACK		WHITE		COLOURED		ALL RACES	
	N	RATE	N	RATE	N	RATE	N	RATE
Gold	0	0.0	1	0.6	0	0.0	1	0.4
Platinum	1	4.1	0	0.0	0	0.0	1	3.6
Asbestos	0	0.0	1	55.6	4	71.4	5	54.3
Diamond	1	76.9	0	0.0	0	0.0	1	45.5
Other	0	0.0	1	45.5	0	0.0	1	14.8
Unknown	0	0.0	2	22.0	0	0.0	2	14.8
TOTAL	2	0.9	5	5.6	4	57.1	11	3.4

Rate per 1000

Denominator: All autopsies in specific industries

*2 February 2006. In an earlier print run of this report, total number of mesothelioma cases was given as 9.

SECTION 9 - PRIMARY LUNG CANCER

Primary lung cancer was diagnosed in 88 cases of which most were of the squamous (28.4%) and small cell (26.2%) types (Table 9-1).

TABLE 9-1: DISTRIBUTION & PREVALENCE RATES OF PRIMARY LUNG CANCER BY AGE & ETHNIC GROUP (1997)

AGEGROUP	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE
30-39	1	1.5	0	0.0	0	0.0	0	0.0	1	1.4
40-49	11	14.6	5	51.5	2	285.7	0	0.0	18	20.9
50-59	11	31.3	6	33.9	2	105.3	0	0.0	19	34.7
60-69	2	54.1	14	63.6	3	130.4	0	0.0	19	67.9
70-79	0	0.0	16	79.6	0	0.0	0	0.0	16	75.1
80-89	0	0.0	9	92.8	0	0.0	0	0.0	9	86.5
Missing	5	19.3	0	0.0	0	0.0	1	55.6	6	20.9
TOTAL	30	13.5	50	55.7	7	100.0	1	55.6	88	27.4

Rate per 1000

Denominator: All autopsies at certain age groups

In Table 9-2 the distribution & prevalence rates of primary lung cancer by industry are shown. But, in view of the small number of cases examined, the prevalence rates should be treated with caution.

TABLE 9-2: DISTRIBUTION OF PRIMARY LUNG CANCER BY INDUSTRY & ETHNIC GROUP (1997)

INDUSTRY	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE
Gold	20	11.4	34	50.6	0	0.0	0	0.0	54	22.3
Platinum	6	24.8	0	0.0	0	0.0	0	0.0	6	21.9
Coal	1	11.5	2	36.4	0	0.0	0	0.0	3	21.0
Asbestos	0	0.0	2	111.1	5	89.3	0	0.0	7	76.1
Diamond	0	0.0	1	111.1	0	0.0	0	0.0	1	45.5
Copper	0	0.0	1	50.0	2	153.8	0	0.0	3	75.0
Isacor	0	0.0	6	142.9	0	0.0	0	0.0	6	127.7
Other	1	111.1	2	90.0	0	0.0	0	0.0	3	96.8
Unknown	2	22.0	2	74.1	0	0.0	1	58.8	5	37.0
TOTAL	30	13.5	50	55.7	7	100.0	1	55.6	88	27.4

Rate per 1000

Denominator: All autopsies in specific industries

SECTION 10 – CAUSES OF DEATH

Table 10-1 shows the causes of death based on clinical findings, except where amended by the pathologist after autopsy examination. Diseases of the respiratory system were the most frequent for all groups (31.4%). Amongst blacks this was followed by unnatural causes of death (26.4%) and for whites and coloureds by disease of the cardio vascular system (22.4% & 12.9% respectively). In 18.1% of all cases, the causes of death was not stated.

TABLE 10-1: DISTRIBUTION OF DISEASES BY ETHNIC GROUP (1997)

DISEASES OF:	BLACK		WHITE		COLOURED		UNKNOWN		ALL RACES	
	N	%	N	%	N	%	N	%	N	%
The respiratory system	757	34.1	211	23.5	38	54.3	1	5.6	1007	31.4
Cause of death not stated	381	17.1	180	20.1	7	10.0	13	72.2	581	18.1
The cardiovascular system	60	2.7	201	22.4	9	12.9	0	0.0	270	8.4
Unnatural causes of death	586	26.4	131	14.6	3	4.3	4	22.2	724	2.6
The central nervous system	144	6.5	37	4.1	4	5.7	0	0.0	185	5.8
The gastro-intestinal tract	75	3.4	39	4.3	6	8.6	0	0.0	120	3.7
The genito urinary system	32	1.4	30	3.3	0	0.0	0	0.0	62	1.9
The haematological system	20	0.9	10	1.1	0	0.0	0	0.0	30	0.9
The metabolic system	2	0.1	0	0.0	1	1.4	0	0.0	3	0.1
Miscellaneous	166	7.5	58	6.5	2	2.9	0	0.0	226	7.0
TOTAL	2223		897		70		18		3208	100

Figure 10-1: Distribution of causes of death by ethnic group

