

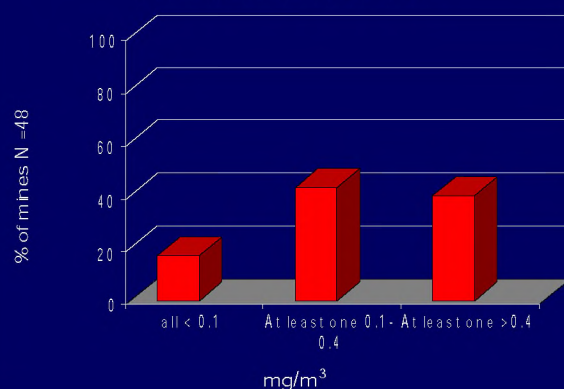


Silicosis elimination in South Africa

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% of mines by estimated crystalline silica
measurements 1995-1997

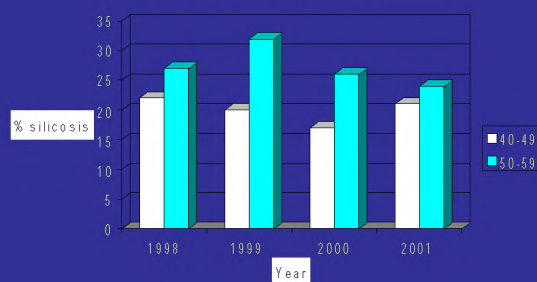


Risk of silicosis in 2 235 white South African gold miners (1993)

- Historical cohort study
- First employed 1940-1970
→ 1991 or death
- Estimated mean resp dust: 0.29 mg/m³
- Silicosis in 14%
- Highest risk group: silicosis risk = 77%

Hnizdo 1993 AJIM

Silicosis prevalence at autopsy in black miners by age group



NCOH Pathology Division
Dorinda Murray

Silicosis rates in former southern African gold miners

Libode, Eastern Cape

Former miners: prevalence 22 – 37%
480 000 cases in southern Africa
Trapido, 1999

Thamanga, Botswana

Former miners: prevalence 26 – 31%
Steen, 1998

Silicosis prevalence in SA goldminers

- 520 black mineworkers returning from leave
- > 37 years
- Mean length of service 21.8 years
- Chest x-rays - read by two readers using ILO Classification

Churchyard et al.
Occup Envir Med 2004

Results

Silicosis prevalence (= or > 1/1)

Reader 1: 18.3 % (95% CI 15.0 - 21.9)

Reader 2: 19.9 % (95% CI 16.5 - 23.6)

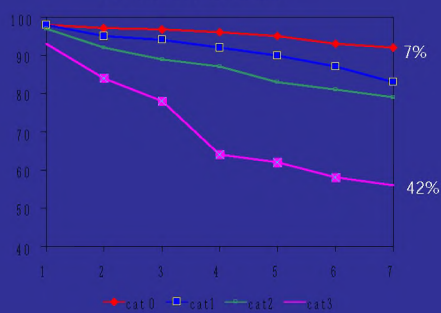
Silicosis in # sectional surveys of foundries

Silicosis by work years

	Years	%
1984	>10-20	7
	>20	24
1987	>15	38
1992	>15	4
2003	>10	7

INCIDENCE OF TB BY SEVERITY OF SILICOSIS IN BLACK GOLD MINERS

7 year follow-up period



Cowie RL. Am J Respir Crit Care Med. 1994

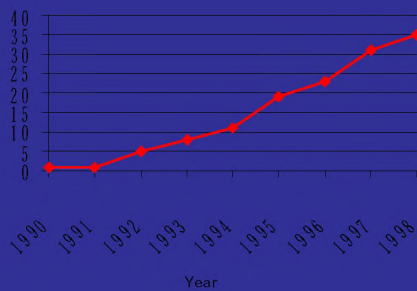
RISK OF TB RELATIVE TO SILICOSIS AND SILICA DUST EXPOSURE IN SOUTH AFRICAN WHITE GOLD MINERS

Silicosis	Cumulated dust quartiles (mg/m ³ yrs)	OR
Absent	<=9	1.0
	10-13	4.1
	14-17	2.8
	18+	4.5
Present	<=9	4.5
	10-13	4.4
	14-17	8.4
	18+	11.2

Hnizdo and Murray. Occup Environ Med 1998

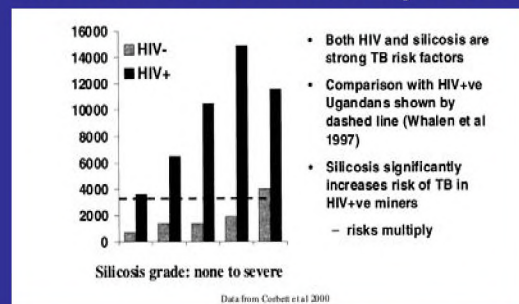
HIV PREVALENCE IN A COHORT OF BLACK MINERS

% HIV positive



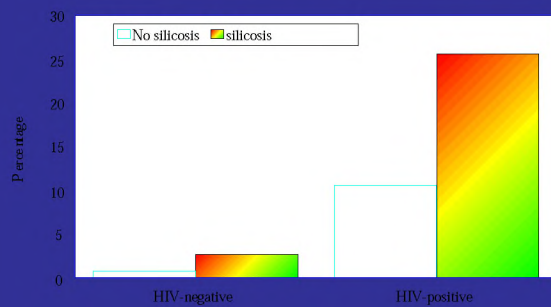
Gold Fields Ltd. Unpublished data

Occupational Risk of tuberculosis modified by HIV.



Source: SMRAC Handbook of Occupational Health Practice in the SA Mining Industry. Ch 6. Tuberculosis and Associated Diseases. Churchyard GJ, Corbett L.

Silicosis and TB mortality



Chabrowski GJ. Risk factors for mortality within first 6 months of TB treatment, 2000-2001. Unpublished Data.

How many South Africans exposed and where?

Census 2001

Usual silica industries

20% 50% and 80%

Estimates of occupational silica exposure in South Africa

Major industrial division	Number employed	20%	50%	80%
Mining & quarrying	356 000	71 000	178 000	285 000
Manufacture	287 000	57 000	143 000	229 000
Construction	352 000	70 000	176 000	281 000
Total	995 500	200 000	500 000	800 000

Agriculture?

Dismiss?

Maybe not

NIOH Clinic no cases since 1975

Quartz % in respirable fraction North Carolina sandy-loam soils: 9.1-21.3%

Respirable silica 5 sweet potato transplanters: mean 3.91 mg/m³

Case reports: tractor drivers' silicosis

Archer et al. AIHA 2002

National Programme for the Elimination of Silicosis



Elimination of Silicosis Programme: scope, focus areas and deliverables

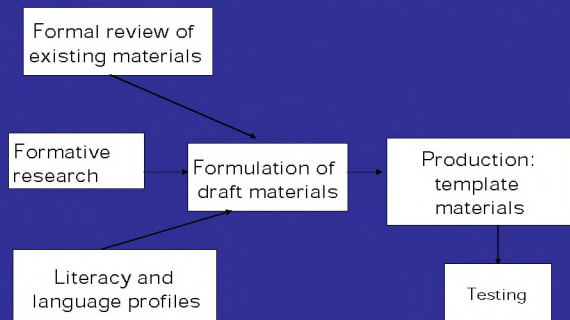
	Track A	Track B	Track C
Focus	Dust measurement and reporting	Environmental dust control	Technology transfer and promotion
Outputs	Sampling, analysis, best practice guides	Prioritise dust control, filtration of dust, practice guides	Multimedia T/T products, programmes for prevention
Facilities	Dust measurement, XRD, IR, instrumentation, laboratories	Dust measurement, analysis, XRD and VR	Multimedia production, pilot demonstration
Expertise	Occupational hygiene, analysis, XRD, instrumentation and current practices, PM, T/T	Occupational hygiene, analysis, XRD, instrumentation and current practices, PM, T/T	Occupational hygiene, analysis, XRD, instrumentation and current practices, PM, T/T
Funding	R8m over 5 years	R6.5m over 5 years	R8m over 5 years

Measure and analyse

Minimise and control

Communicate

Template training materials



Work and Health Southern Africa (WAHSA)

Sida – sponsored NIWL NIPH NIOH

Project 7 Action on silica, silicosis and tuberculosis
12 years

Objectives: Reduction of silica dust in key industries
Improved prevention of PTB in silica exposed workers

Considerations

Occupational exposure limit

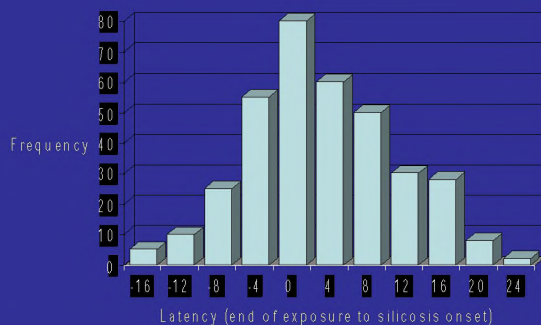
OEL 0.1 mg/m³

Prevent silicosis?
Prevent PTB?

but

Practicable to lower OEL?

Onset of silicosis



Sectoral prioritisation

Clay example

Quartz in Grahamstown deposits: up to 30% common
60% recorded

but

Worker exposure?

Modification of risk?

Good case for simple silicosis and quartz surveys of sectors with poorly defined risk (former workers)

Innovative activities

Biomarkers project

evaluation of 10 contenders
risk assessment tool

NIOH Gulumian, Downs, Murray

Non-mining industry: Foundries



Awareness x
Targets x
Research x

Reasons?
Less well organised and
resourced
Incidence low
Threat of litigation "absent"