Silicosis in Mining Sector & Impact on Ex-mineworkers

Jameson Malemela,
SVP Health And Wellness

Date: 24 July 2019

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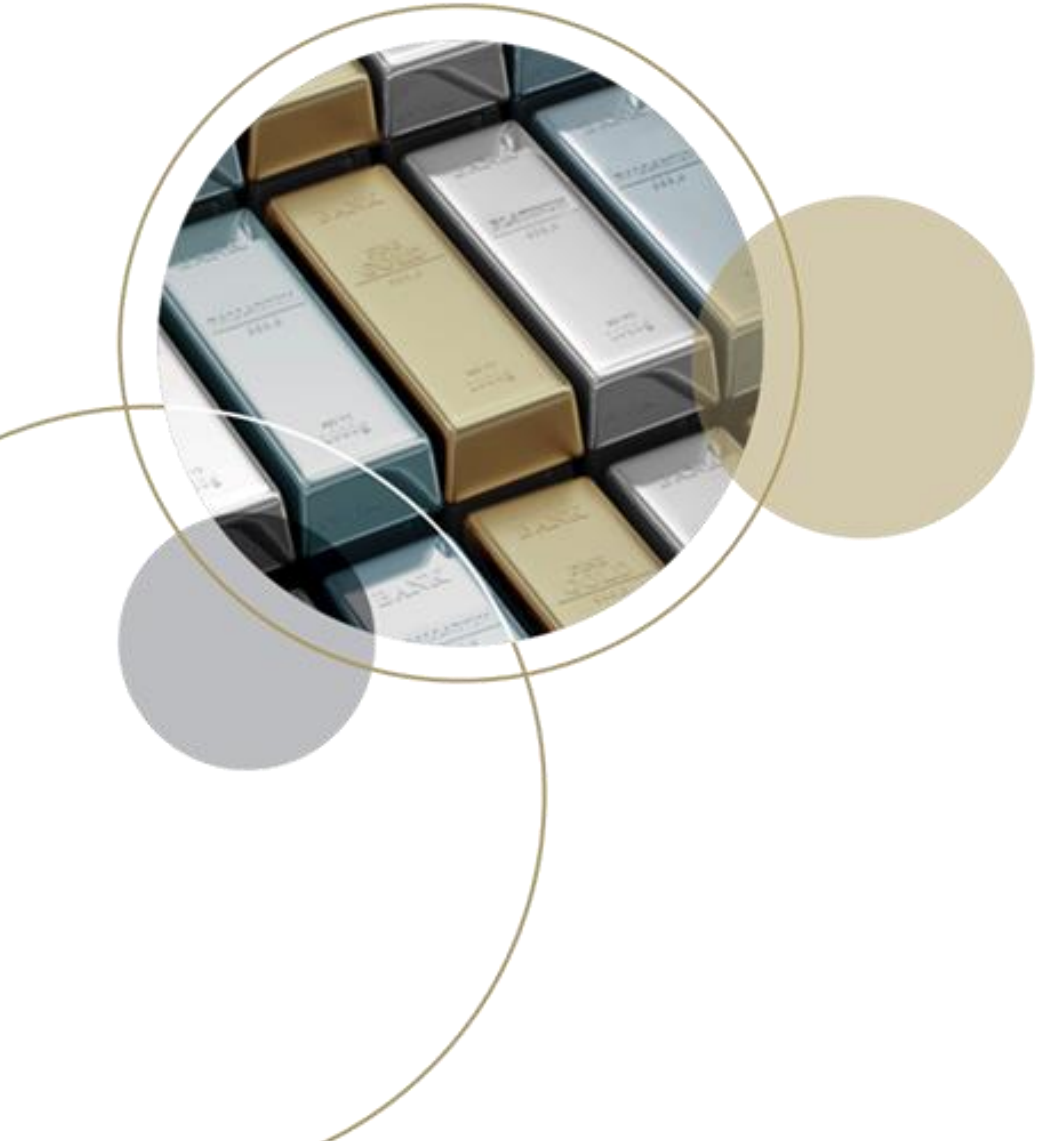
Talking Points

- Acknowledgement
- What is silicosis
- History of Silicosis in Mining
- Occupational Hygiene
- Medical Surveillance
- Ex-Mine Worker Services
- Conclusion

Acknowledgement

- SSL Team
- MCSA
- GWG
- MBOD/ CCOD
- MHSC & DMR



What Is Silicosis

"Silicosis is a **potentially fatal**, **irreversible**, **fibrotic pulmonary disease** that may develop subsequent to the **inhalation of large amounts of silica dust over time**." **Curtis, 2007.**

Three types of Silicosis

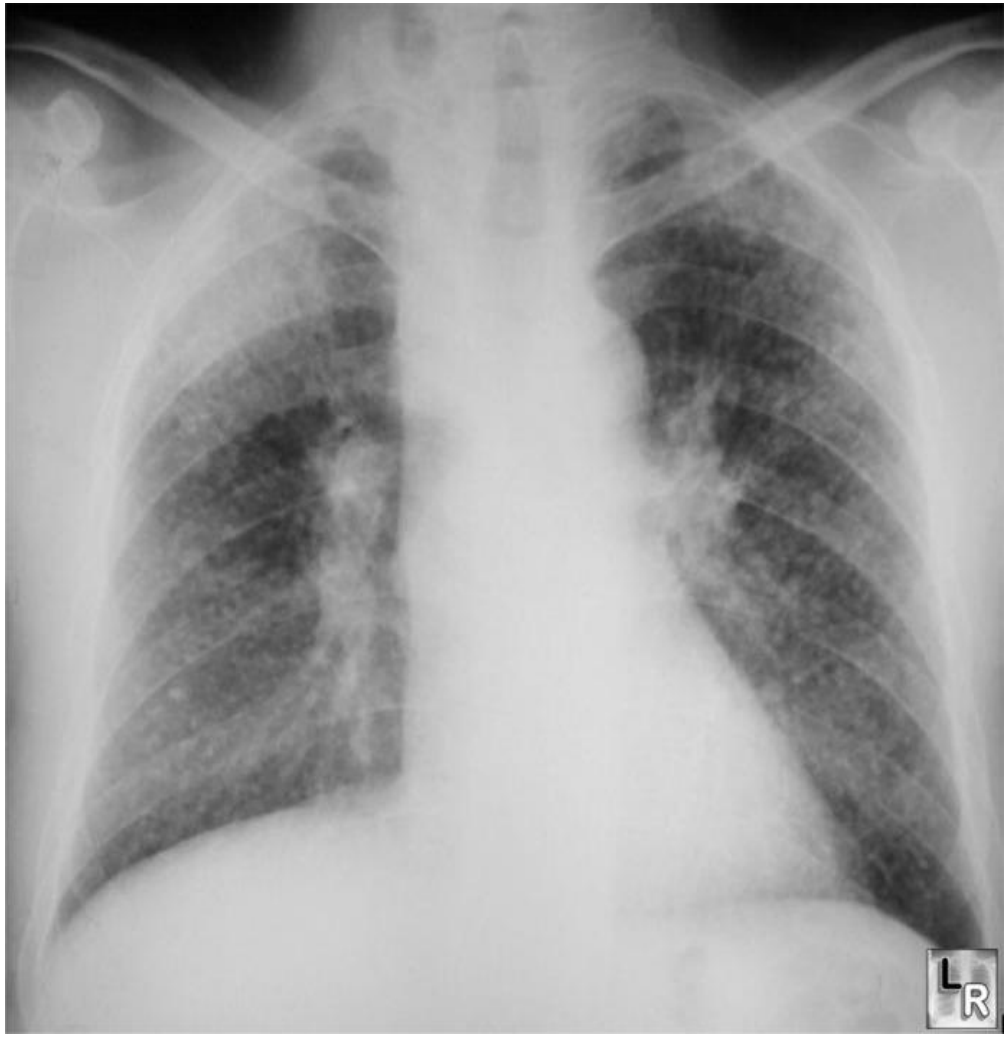
- Chronic:>10 years
- Accelerated: between 5 & 10 years
- Acute: less than 5 years

1860: Peacock and Greenhow reported silica in lungs of miners
1870: Viscouti: coined the term silicosis
1930: Hawk's Nest Tunnel over 700 workers. 400 died

Crystalline silica

Source:www.cdc.com

X-Rays



Source: www.learningradiology.com

Prevalence

- **Prevalence Study Prevalence Rate: Silicosis**
  - Libode (South African former miners) 22.0% - 36.0%
  - Thamaga (Batswana former miners) 26.6% - 31.0%
  - SIMRAC Health 606 (Current Miners) 23.9%
  - Lesotho (former miners) 24.6%
  - NIOH Autopsy Data 2007 22.9%

History of Silicosis in Mining

History of Silicosis in South African Mines

- **SIMRAC Report 020603**, 2002
  - Ignorance (Before 1902)
  - Awareness (1902)
  - Investigation (1902 onwards)
  - Control and Prevention (1911-1919)
  - Commissions and legislation
    - **Weldon 1902-1903**
    - **Krause Commission 1907-1910**
    - **ODMWA 1973 (1993 blacks subjected to equalisation)**
    - Leon Commission 1995
    - Benjamin and Greef Committee (1997),
    - 1995 - Establishment of the ILO/WHO International Programme on the Global Elimination of Silicosis
    - **The Mine Health and Safety Act** (1996)

- *The White Death. Silicosis on the Witwatersrand Gold Mines 1886 – 1910* (1994) by Elaine Katz, (1994)26
  - 85% of miners were British
  - 58% Cornwall, Redruth
  - Between 1892 and 1910 almost entire miners died of acute silicosis
  - For 100 years the fate of black miners was not recorded (J Roberts, 2009)

Occupational Hygiene

Design

Exploration

Construction

Rehabilitation

Mining Life Cycle

Extraction

Closure

Processing

Engineering services & maintenance

Trade

Manufacture

Minerals Life Cycle

Disposal

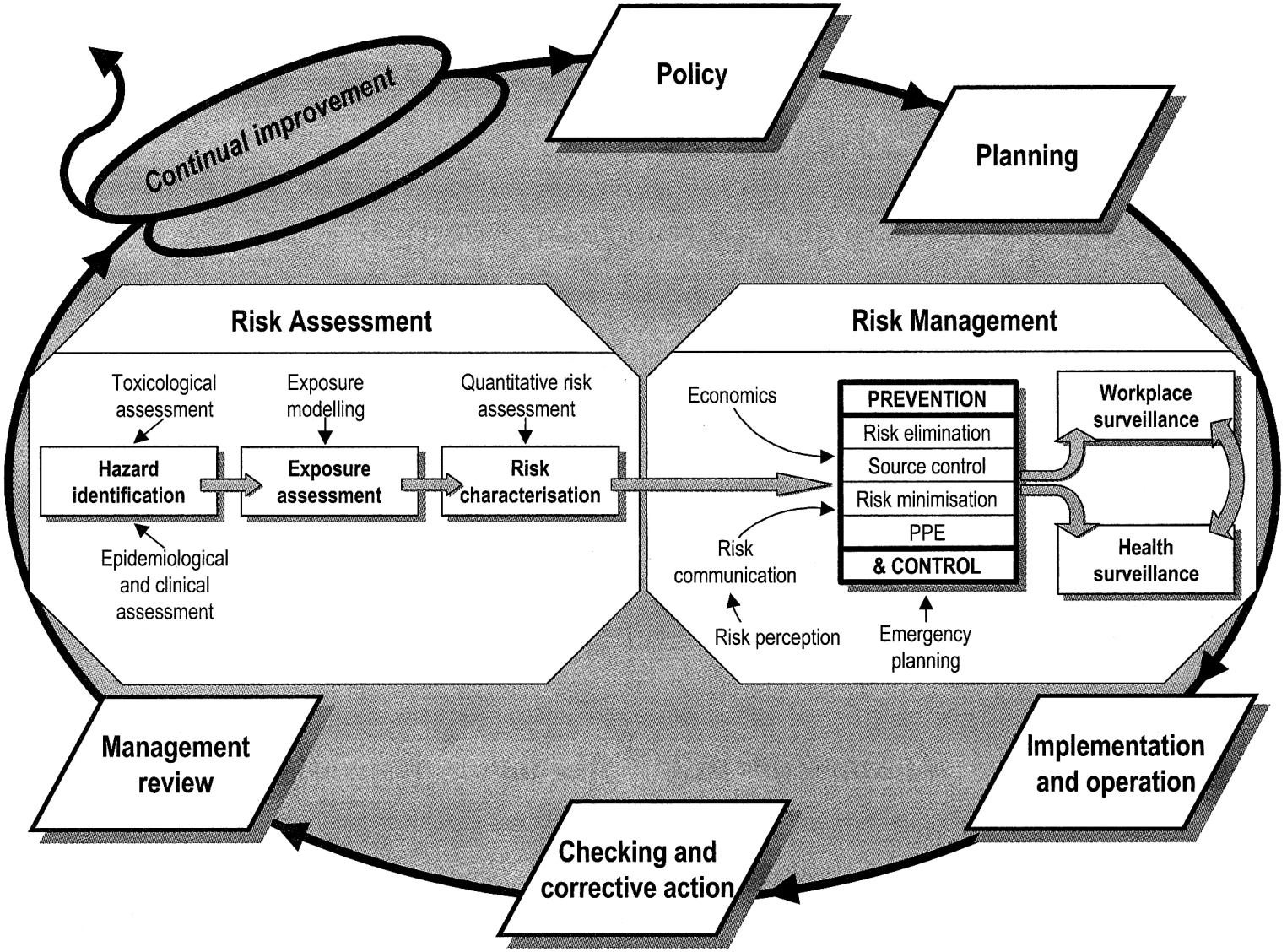
Use

Recycling

Regulatory Framework
Mine Health and Safety Act (Act 29 of 1996)

Requirement in the Mine Health and Safety Act (MHSA)	Brief Description
MHSA - Section 2	Employer To Ensure Safety
MHSA - Section 5	Employer To Maintain Healthy and Safe Mine Environment
MHSA - Section 6 (3)	Employer to ensure adequate supply of health and safety equipment
MHSA - Section 7 (1) (e)	Employer to staff mine with due regard to health and safety
MHSA - Section 9	Codes of practice (e.g. Airborne Pollutants / Noise / Thermal Stress, Falls of Ground, Rail bound and Trackless equipment, prevention of fires and explosions)
MHSA - Section 10	Employer to provide health and safety training
MHSA – Section 11	Employer to conduct Risk Assessment
MHSA - Section 12	Employer to conduct occupational hygiene measurements
MHSA - Section 13	Linkage of occupational Hygiene measurements and medical surveillance
MHSA - Section 14	Record of hazardous work
MHSA - Section 19 (1)	Employees' right to information
MHSA - Section 21	Manufacturer's and supplier's duty for health and safety
MHSA - Section 23	Employees' right to leave dangerous working place
MHSA - Section 52	Duty to assist inspector and answer questions
MHSA - Section 53	Duty to produce documents required by inspector

Risk Management in Mining



Hierarchy of Controls

MHSC Milestones – Silica Exposure

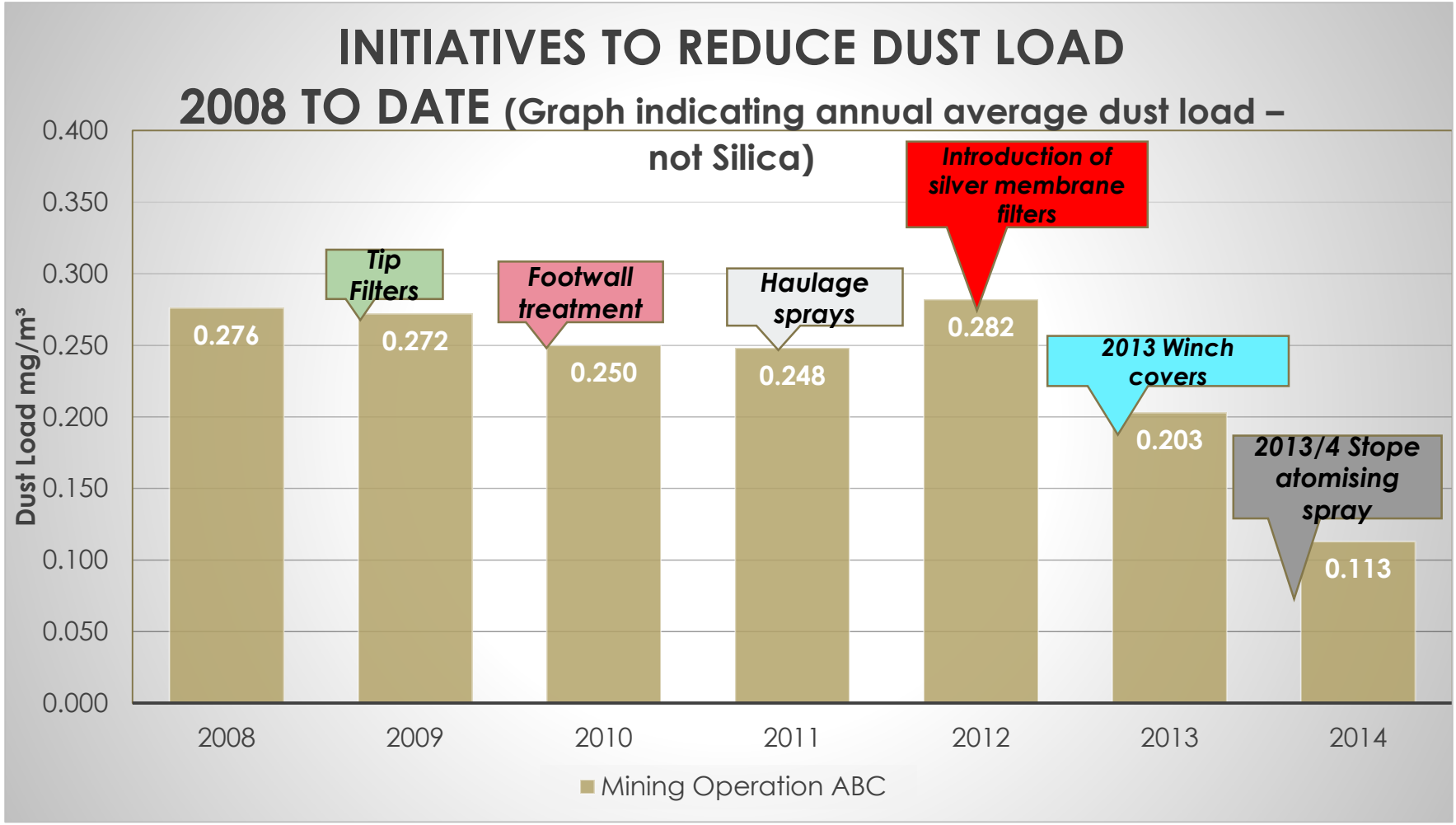
- The Mine Health and Safety Council (MHSC) has set targets for exposure to respirable crystalline silica and silicosis is as follows:

- By December 2024, 95% of all exposure measurement results will be below the milestone occupational exposure limit for Respirable Crystalline Silica of 0.05mg/m^3 (these results are individual readings and not average results)
- Using present diagnostic techniques, no new cases of silicosis will occur amongst previously unexposed individuals ("previously unexposed individual" are those unexposed to mining dust prior to December 2008 i.e. equivalent to a new person who entered the industry in 2009)

Silicosis prevention interventions

- Footwall treatment
- Haulage sprays
- Protection at main ore passes
- Winch covers
- Health rooms
- Silver membrane filters
- Stope atomising sprays
- Re-energised development water blasts

Effect of Initiatives to reduce dust load,



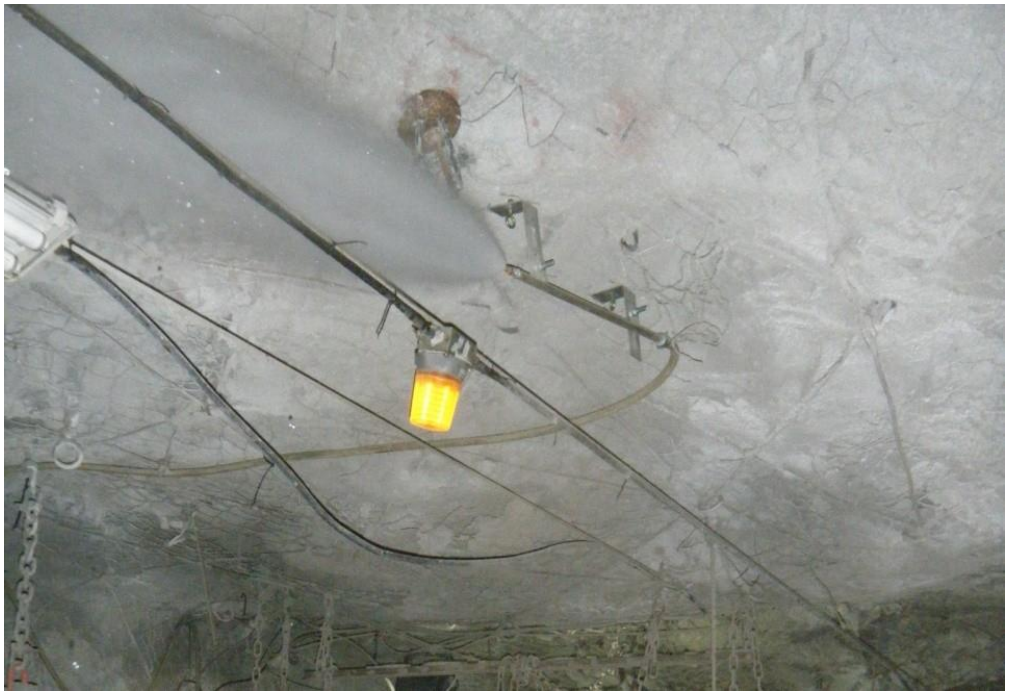
Footwall treatment

- The importance of footwall treatment must not be under estimated

Activity:	Before Footwall Treatment (Aerosols <10µ)	After Footwall Treatment (Aerosols <10µ)	Percentage reduction
Hoppers with rock to station	442µg/m³	355µg/m³	19.7

Haulage sprays

- Various spray systems installed across the Sibanye Gold operations
- Risk based installed mostly in intake airways



Protection at main ore pass systems

- Up casting tips are problematic in some areas.
- Tip covers complementing filtration systems, to further reduce dust exposure

Winch covers

- Winch covers were rolled out across all operations
  - Protect winch operators
  - Perform compliance checks

Stope atomising sprays

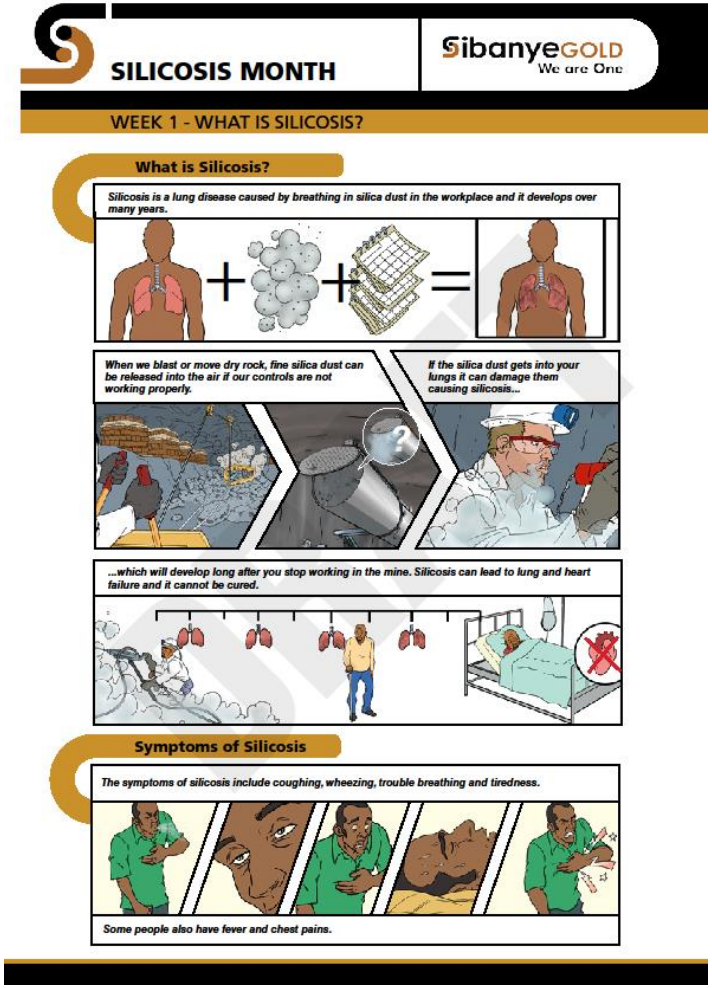
- Effective for wetting complete panels

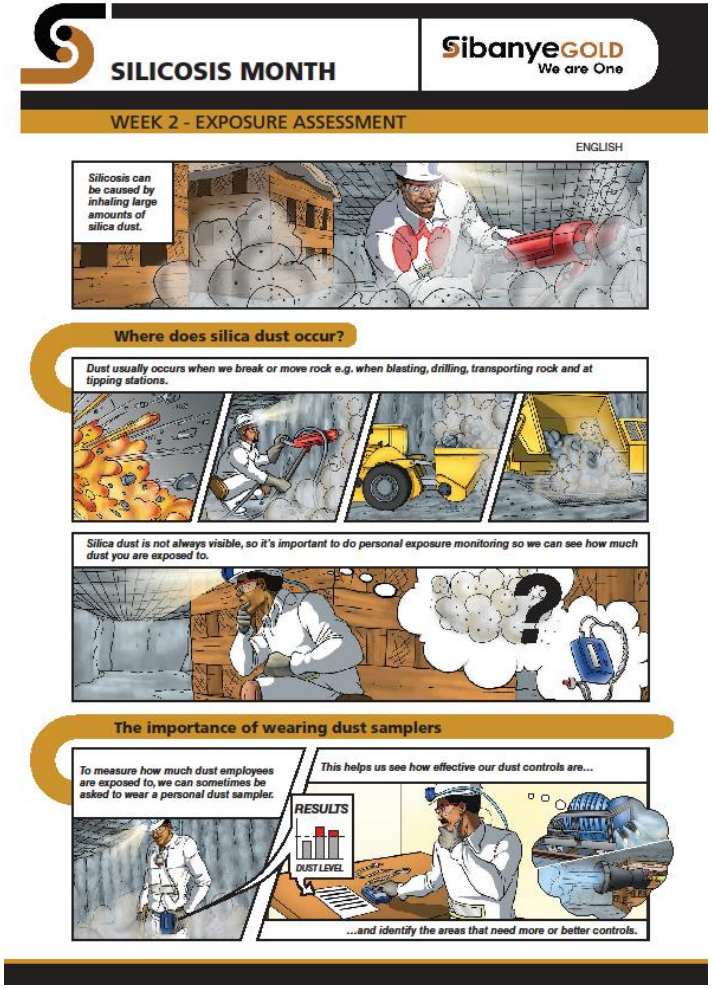
Watering down

Health Rooms

- Health rooms at training centres
  - Employee education

Silicosis month





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Medical Surveillance

Medical Surveillance

- Mandatory **S13 MHSAct** (in employment)
- Appointed OMP issues Certificate of Fitness **ODMWA** (Pre-employment, periodic, Exit and Post employment)
- **Chest X-rays and Lung Function Tests** are used
- Due to long latency period, it is best used for diagnosis
- TB is about 3 times higher in silicosis patients

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Ex-Mineworker Impact

Ex-mineworker Impact

- ODMWA and political pitfalls (race based and biased)
- ODMWA, 1993 amendment to include blacks offered no additional resources to support increased eligible population
- There was total collapse of Benefit Medical Examination
- There was negligible compensation
- No administrative levies

Change of Course

- Mankayi Constitutional Court ruling of 2011
- Litigation: Qubeka Trust
- Gold Working Group Class Action
- Provision for track and tracing, improvement of MBOD/ CCOD functioning, settlement of the qualifying claimants (including non GWG beneficieries)

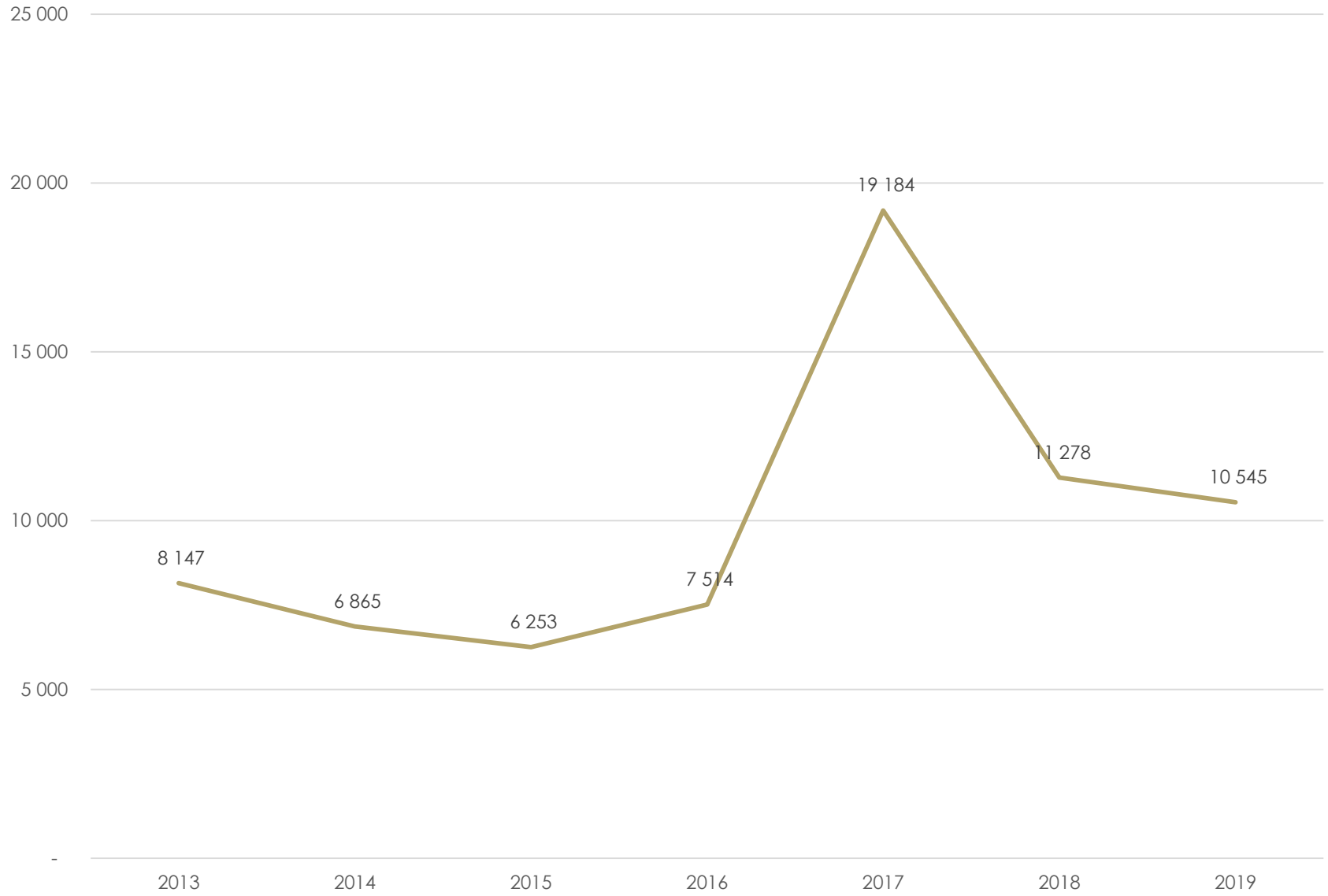
Minerals Council of South Africa Ex-mineworker Projects

- **R42 million project**, 80% from gold companies
- Collaboration between the Dept. of Health, Chamber and NUM.
- Establishment of benefit medical examination sites.
- Support for MBOD/CCOD (Compensation office)
- Support from Gold Working Group to Compensation office
  - Database of ex-mineworkers.
  - Improvements in tracking and tracing of mineworkers and payment of claims.
  - Production of annual financial statements and credible actuarial valuation.

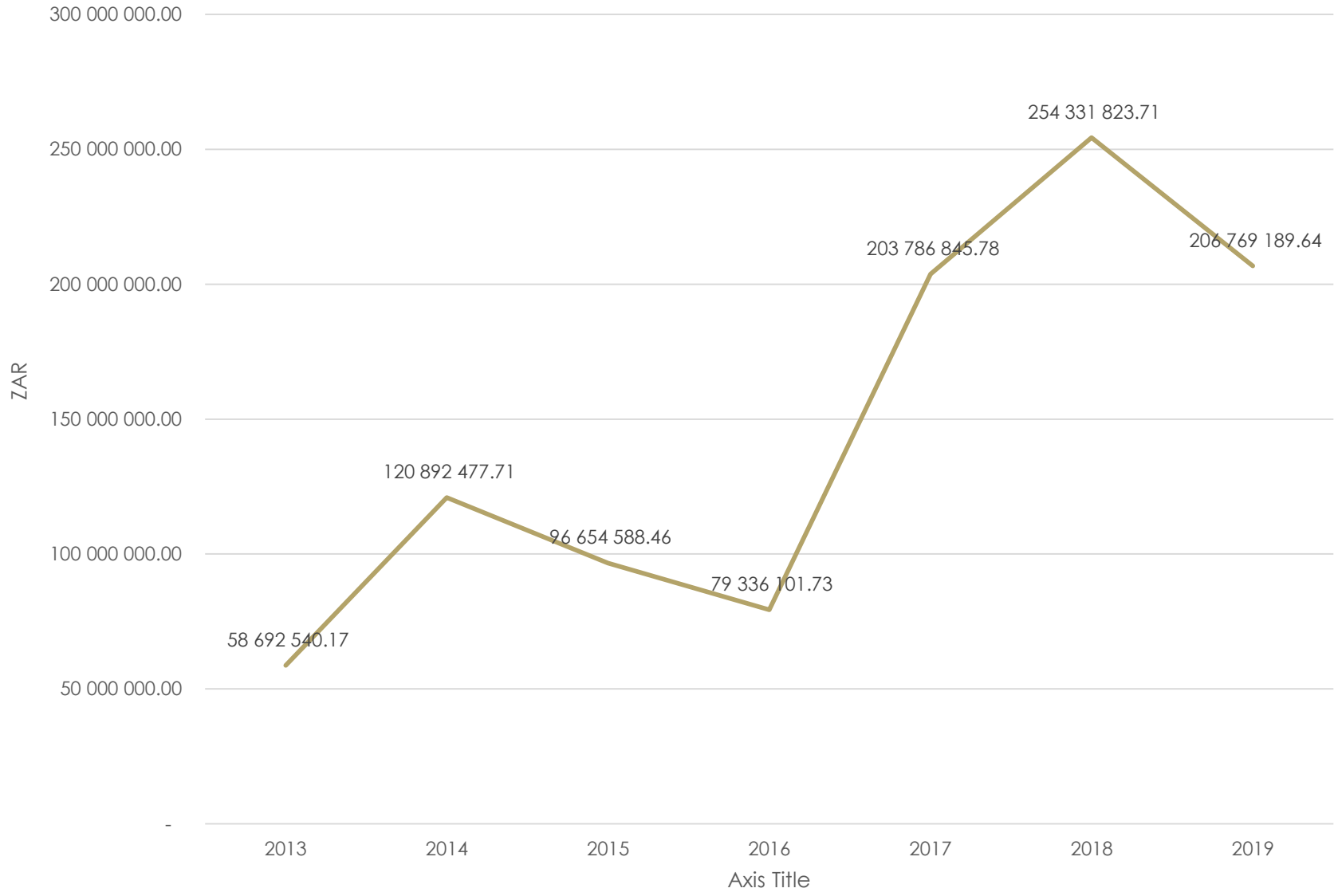
- **R120m** approved by MCSA Board for expenditure in the next 3 years. R47m being first year starting from 2019.
- A study of international best practise was proposed by CEOs ZERO harm for tracking of Ex-mineworkers.

Partnerhsips in Ex-mineworker project

MBOD/ CCOD Certifications



Payment Value



Conclusion

- Silicosis control depends on engineering controls since the risk cannot be eliminated or substituted
- More effort is required to reduce exposure
- Life long risk of TB and Cancer are real
- The past was indeed very dark, the future can be brighter with adoption of known silicosis prevention strategies
- It is key to strengthen health systems to effectively detect and manage all patients with silicosis. Not a blame game.
- The Political declaration UNHLM on TB includes reduction of silica exposure (P17)

A Thought

Can we identify people who are biologically predisposed to develop silicosis and thus prevent them from being exposed to any amount of silica containing dusts?

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