



Breathing Under Pressure

The Respiratory Health Impact of Small-Scale and Artisanal Gold Mining

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The Johannesburg Story

- Gold built Johannesburg - A city shaped by mining
 - But at what cost?
- Mining left behind shafts, dumps, pollution



What is Artisanal Mining?

- Small-scale
- Informal
- Often dangerous

SUNDAY TRIBUNE NEWS

Gold rush grips South African township

AFP | Published 4 months ago

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Why Does It Happen?

Why do people do it?

- Unemployment.
- Poverty.
- Opportunity.



Community Health Impact

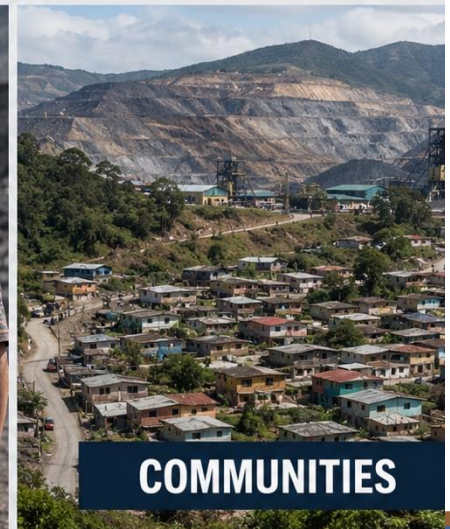
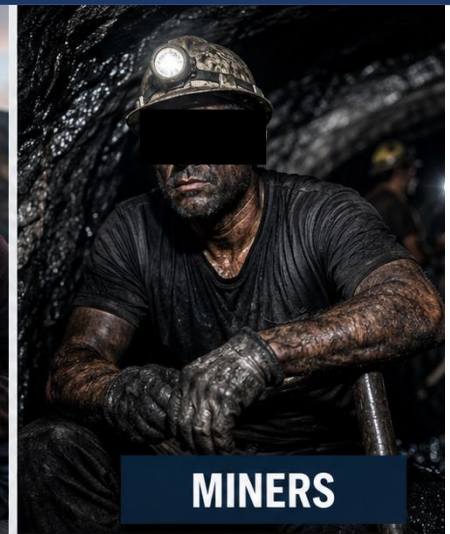
It doesn't stop at the mine

- Mine dumps
- Dust storms
- Air pollution

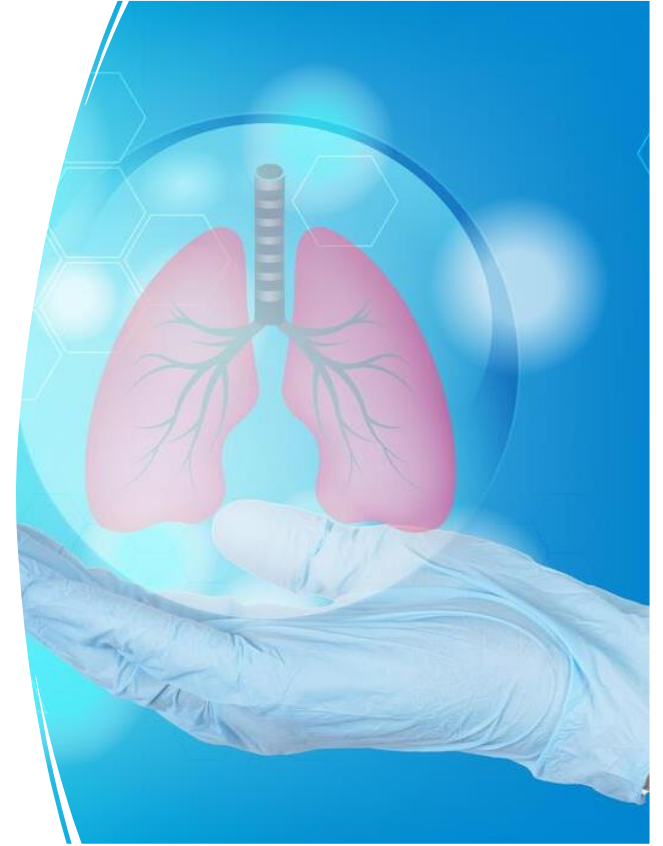


Who Is Affected?

- Miners
- Families
- Children
- Communities

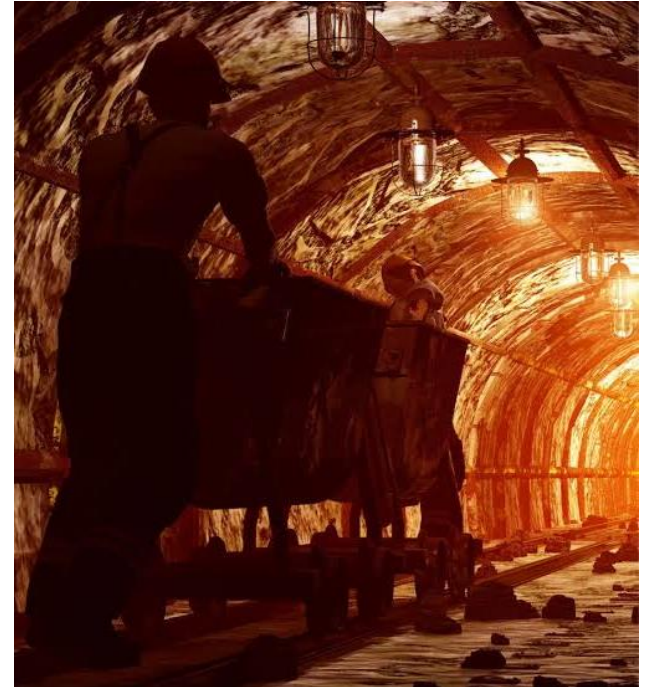


What health risks do you associate with mining?



What Are Miners Breathing?

- Silica dust
- Diesel fumes
- Smoke
- Toxic particles



Respiratory System

How do your lungs work?

- Air -> Airways -> Alveoli -> Bloodstream

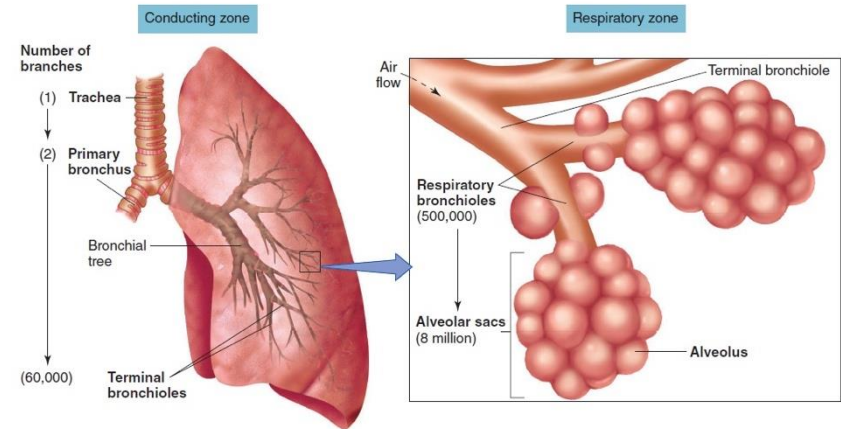


Figure 16.4 The conducting and respiratory zones of the respiratory system. The conducting zone consists of airways that conduct the air to the respiratory zone, which is the region where gas exchange occurs. The numbers of each member of the airways and the total number of alveolar sacs are shown in parentheses. **AP|R**

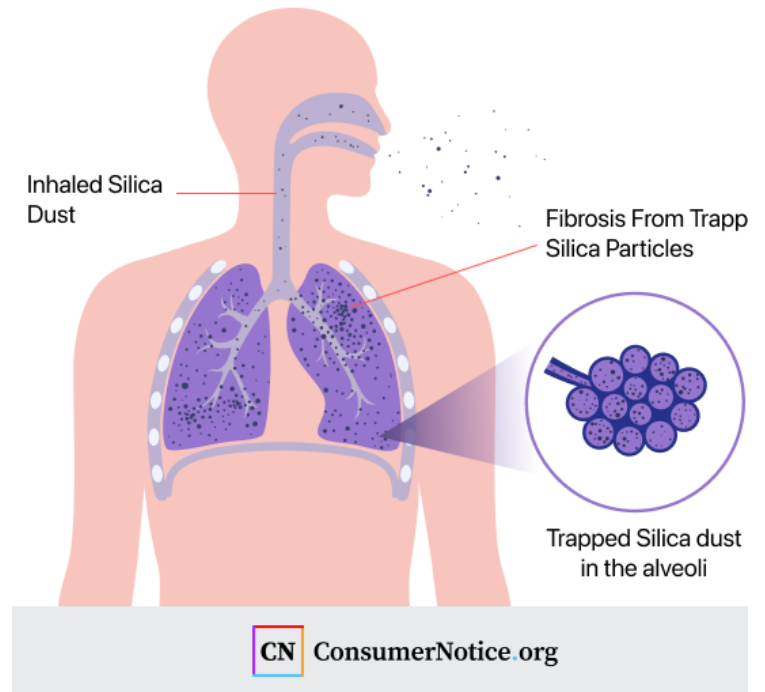
Fox, Human Physiology, 14th Edition

Silica Dust

The invisible danger

- Tiny particles
- Big damage.

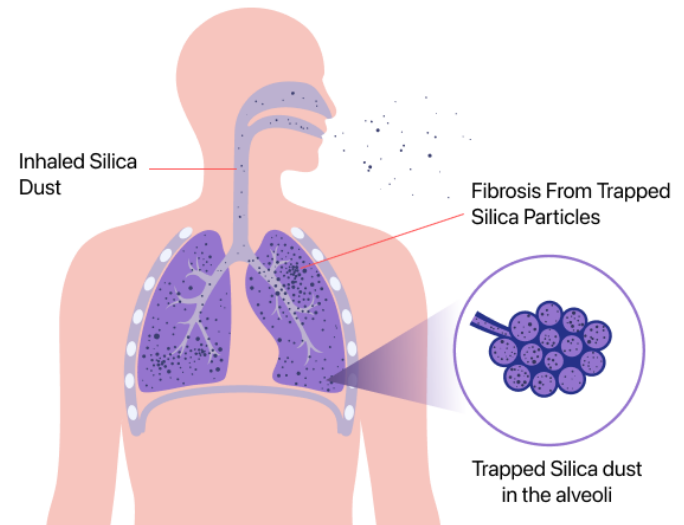
Silicosis Developing in the Lungs



Silicosis

- Permanent lung scarring
- Silicosis happens after breathing in silica dust over time.

Silicosis Developing in the Lungs

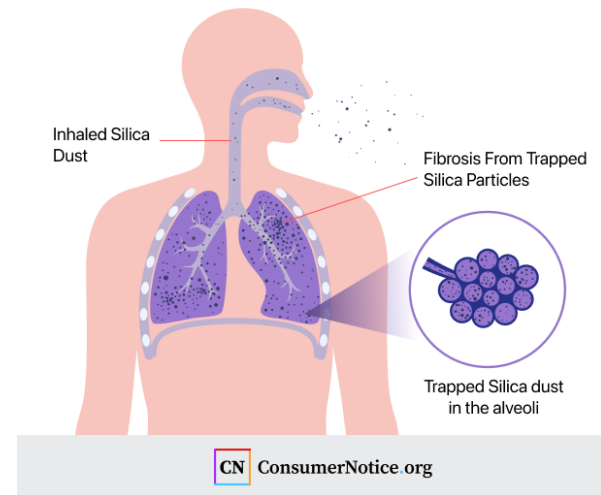


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Silicosis

- The lungs become scarred and stiff.
- Damage is often permanent.
- Symptoms: cough, shortness of breath, fatigue.
- It can make people more vulnerable to other respiratory diseases.

Silicosis Developing in the Lungs



Chronic Obstructive Pulmonary Disease (COPD)

- Obstructive lung disease
- Commonly occurs in diseases such as asthma
- Bronchiolar smooth muscle is contracted and excess mucous fills the airways
- Speed of expiration is still reduced

Protect air. Protect people.

- Healthy lungs. Healthy communities. Sustainable futures.
- Respiratory health is shaped by environment.
- Mining affects workers and communities.
- Prevention matters.
- Health professionals have a role in education, advocacy, screening, and policy.
- Learners can help imagine better solutions

Assignment

- Assign groups different stakeholders:
 - Miners
 - Physiologists
 - Community leaders
 - Government officials
 - Health workers
- Each group must explain how respiratory physiology informs their position and propose solutions.

Peak Flow Challenge

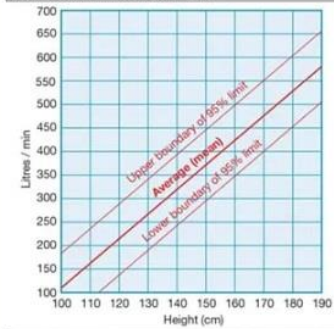
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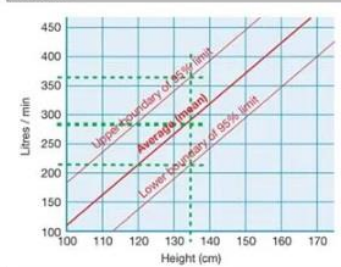
Department of Physiology

Peak flow chart: children both boys and girls

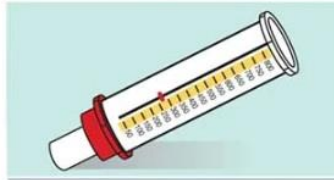
Source: Redrawn from Godfrey et al. (1970)



Graphic representation of how to calculate expected peak flow value



Peak flow meter



How to use a peak flow meter

1. Set to 0
2. Breathe in
3. Blow as hard as you can
4. Repeat three times and record the highest reading

