SILICOSIS

History, Recent Updates, & Recommendations

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What is Silicosis?

- A spectrum of lung diseases caused by inhaling free crystalline silica. It is the most common occupational lung disease in the world.
  - Chronic Silicosis - Formerly the most common form of the disease and slowest to develop.
  - Acute and Accelerated Silicosis - Becoming more common among workers and develop much faster (usually within a few weeks to 10 years).

Health Risks

- Excessive silica exposure can lead to and increased risk of:
  - Lung cancer
  - Autoimmune disorders
  - Chronic kidney disease
  - Chronic airflow obstruction
  - Susceptibility to lung infection

Treatment

- There is no cure for silicosis, however treatment is available.
- Lung transplantation is an option, but not for everyone:
  - Patients must have end-stage respiratory failure.
  - Patients must bc under the age of 65 have have no other health conditions.
  - Available donor lungs are often difficult to find and it can take months or years to find viable matches.

Disease Management

- Controlling ongoing exposure
- Using bronchodilators for easier airflow
- Monitoring and treating possible respiratory infections
- Implementing pulmonary rehabilitation and supplemental oxygen
- Receiving appropriate vaccinations
- Encouraging patients to quit smoking

Prevention

- Silicosis is a preventable disease. It is important to prioritize prevention because once silicosis is developed, it is irreversible.

Prevention Methods

- Monitoring and limiting exposure
- Using respiratory protection, although this is not a long-term solution to dust control
- Medical monitoring of at-risk workers to allow for early detection as most cases go undetected until the disease becomes most aggressive

History: Where have we seen silicosis before?

- Silicosis is the oldest and most common occupational lung disease.
- It was first described among miners in the 16th century in Germany, and then in the 17th century among stonecutters in Italy.

History in the United States

- Became prevalent in the United States during the early 20th century
- Caused a public health emergency during the 1930s when hundreds of laborers died after working on a water tunnel in West Virginia.
- the U.S. Department of Labor released films educating the public on preventative measures
- The disease was thought to have disappeared, however it has re-emerged amongst miners, construction workers, and countertop fabricators.

Why is silicosis relevant NOW?

- Rates → Epidemic
- Accelerated profession of disease in patients

Timeline of Cases

- 2019: 6 cases of silicosis reported in CA
- Rapid increase in silicosis cases in Latino immigrants
  - From 2019-2022: 52 patients diagnosed with silicosis
    - **ALL**, but 1 were Latinos immigrants
      - Mexico (62%), El Salvador (27%), elsewhere in Central America (10%)
    - 71% (37 cases) from LA County
- Since 2022, over 60 local cases have been identified at Olive View UCLA Medical Center.
- In 2023, 91 countertop workers were diagnosed with silicosis in CA and 50 of them received treatment at Olive View UCLA Medical Center.

Rates

- Projected statistics from Dec 2023 according to Cal/OSHA:
  - 4,040 workers employed in fabrication ships
  - Estimated 500 to 850 cases of silicosis among these workers
  - Between 90-160 will die of silicosis
- As of 2024, of the known silicosis cases, more than 60% comes from the San Fernando Valley
  - ~190 known silicosis cases in CA (~114 cases from SFV)
- Of the CA workers who got silicosis, nearly ⅕ have died; median age: 45
  - More than half suffered delays in diagnosis or were given improper diagnosis
  - Over ⅓ already had severe scarring when diagnosed

Current Progression & Prognosis

- Silicosis typically takes 10-30 years to develop
- However, workers in Los Angeles are diagnosed with an accelerated or acute form of silicosis.
  - Diagnoses have dated back to January of 2016
- Accelerate silicosis can take 1-10 years to develop after exposure.
- Acute silicosis can occur after only weeks or months of exposure. Death occurs within months.
  - In cases of acute silicosis, patients drown in their own fluids.
- Compared to past cases of silicosis, workers are now developing acute and accelerated forms of the disease over shorter exposure period.
  - This is due to exposure to high-intensity concentrations of freshly fractured silica, leading to rapid inflammatory and fibrotic responses in the lungs,

Why is this occurring?

- Workplace hazards involving:
  - Poor quality or lack thereof personal protective equipment (PPE)
  - Failure to abide by OSHA guidelines
    - Installing expensive air-filtering machines/ventilation systems
    - Specialized machinery to control dust using water
- Challenges in screening and diagnosis
  - Arranging for regular medical screenings
  - Delays in diagnosis
    - Incorrect diagnosis
    - Insufficient collection of occupational history
  - Lack of educational materials at the workplace, community, or clinics

Easy fix? Well…

- Personal protective equipment
  - Provided flimsy masks, rather than protective respirator
  - Protective respirators cost from $1,000-2,000
  - Small businesses can’t afford and won’t shell out the money
  - Dust can still get into eyes and pores

Easy fix? Well…

- Water spraying systems and machinery
    - Dust comes out finer
    - Will cause dust to stick to their clothes even more
    - Water jets will push the dust even further up respiratory systems
  - All contributing to accelerated deterioration of their lungs
- Lack of educational materials
  - Our target audience: monolinguistic (Spanish-speaking) undocumented Latino men
    - Education levels: 75-80% with less than high school education level
  - **Monolinguistic-Spanish speaking**: limits accessibility to information and their awareness of what's going on
  - **Undocumented**: fear of engaging with hospitals or local governments because of possibility of deportation
  - **Latino men**: reluctance to engage with educational materials or take time to review educational materials due to cultural stigmas and attitudes

Current Actions: Emergency Temporary Standard by Cal/OSHA

- Recently, California has implemented an emergency temporary standard to protect workers from silica dust exposure. The standard mandates:
  - Dust Suppression: Employing the use of wet cutting methods and vacuum systems with filters to minimize dust in the air during cutting, grinding, polishing.
  - Personal Protective Equipment (PPE): Employers must provide their workers with appropriate respiratory protection.
  - Immediate Reporting: Employers must report confirmed cases of silicosis to Cal/OSHA and the California Department of Public Health within 24 hours.
  - Workers Education: Employees must understand the risks associated with silica exposure. Communication must be easy to understand as employees are of different educational backgrounds and may be fluent in other languages.
  - Enforcement: Cal/OSHA may conduct inspections of workplaces where silica exposure is most likely to occur. Non-compliance with mandates may lead to fines or other legal repercussions for employers.

Looking at Our Neighbors: Australia

- Australia's credentials:
  - Ranks 1st among countries for equity and healthcare outcomes
  - Ranks 3rd for overall healthcare performance
  - Australia's health system ranked as top performing country in 2024
  - 2022: spent least amount of GDP (9.8%) vs USA (16.5%)
- Australia has banned products containing silica becoming the first country to do so.
  - Ban: "prohibits the manufacture, supply, processing, and installation of all [artificial stone] containing more than 1% crystalline silica" (Glass & Hoy 2024)

Recommendations

- Prohibit the manufacture, supply, processing, and installation of all [artificial stone] containing more than 1% crystalline silica.
- Make silicosis a compensable work-related disease and a reportable disease.
  - Only 7% of workers received compensation
  - Improve public health surveillance and allow for case investigations
- Create a task force to coordinate initiatives between workers, employers, healthcare systems, and local officials.
  - Develop medical screening program to assess health status prior to development of silicosis
  - Characterize the workforce to develop better outreach strategies and educational materials to help employees understand the symptoms and health consequences of silica exposure

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Questions & Discussion