

**SILICOSIS FROM ENGINEERED STONE:
BACKGROUND AND SCOPE OF THE PROBLEM**

Public Health Surveillance

**Kristin J. Cummings, MD, MPH
Occupational Health Branch
California Department of Public Health**



Silicosis: Old Disease, New Risks

- Silicosis is a severe, incurable lung disease caused by inhaling silica dust particles.
- Engineered stone (artificial stone, quartz), material used for kitchen countertops, contains **especially high levels of silica (>90%)**.
- Workers who **cut and grind engineered stone** (stone fabricators) can be exposed to **hazardous levels of silica dust**.



Photo credit: Earl Dotter

Respirable Crystalline Silica (RCS)

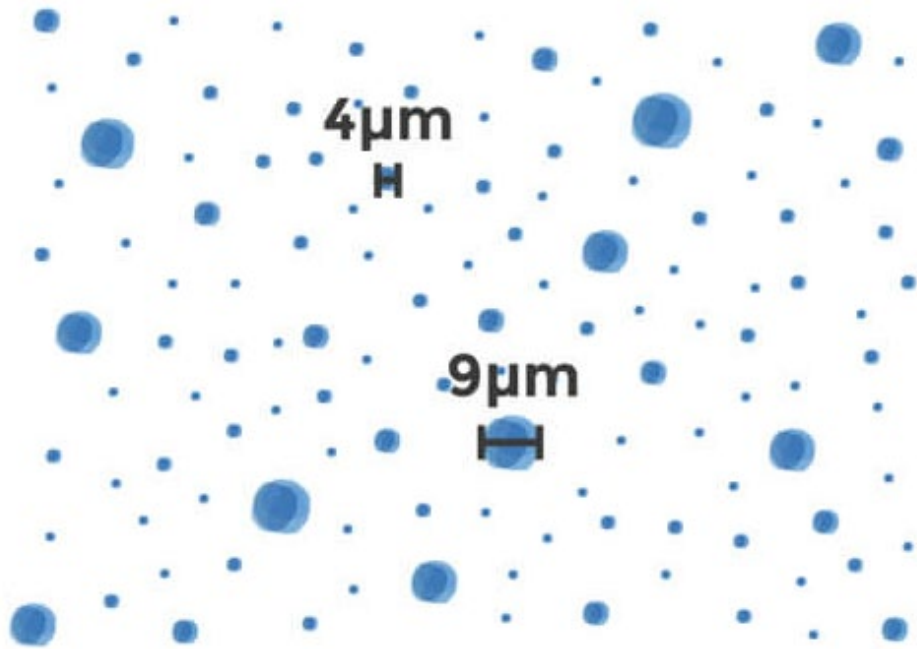
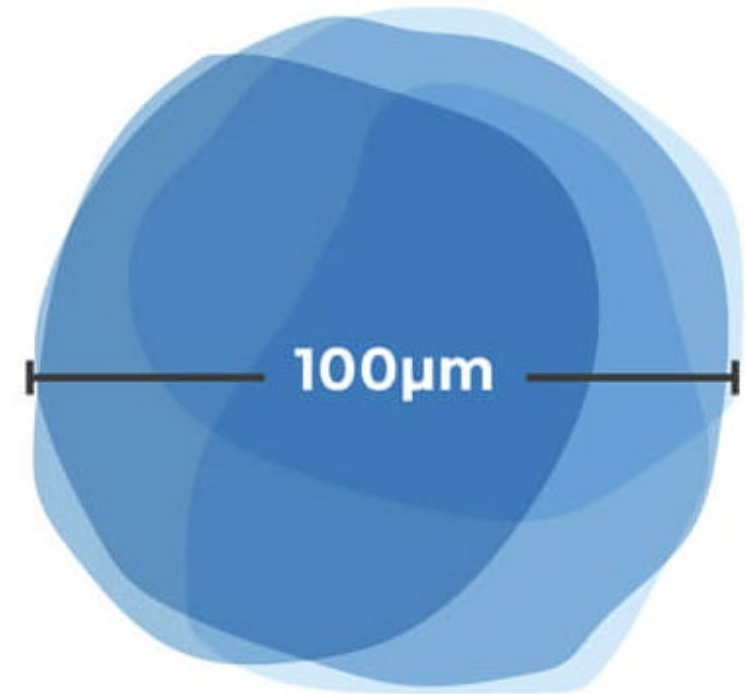


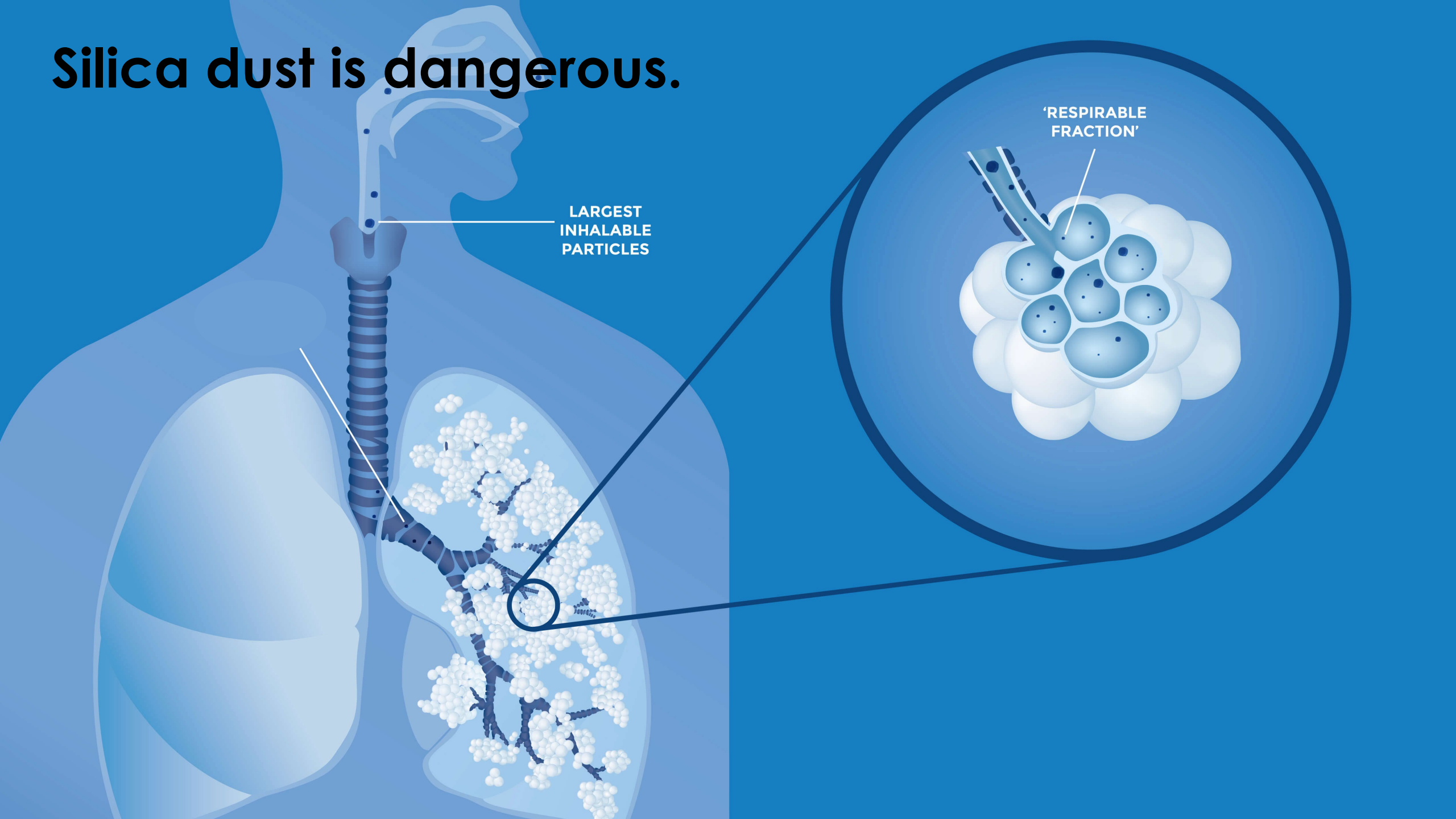
Table Salt



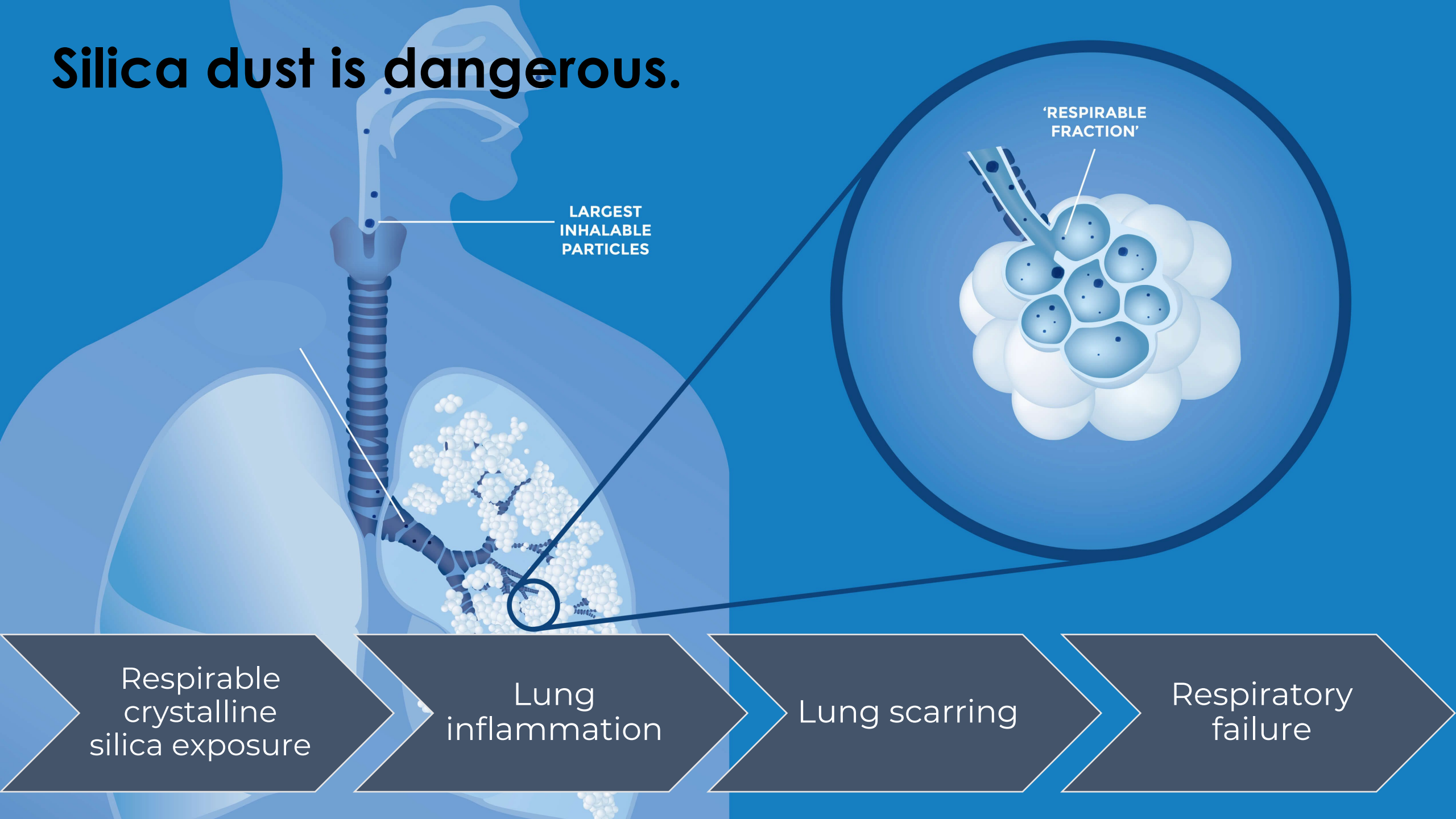
Silica dust is dangerous.

LARGEST
INHALABLE
PARTICLES

'RESPIRABLE
FRACTION'



Silica dust is dangerous.



LARGEST
INHALABLE
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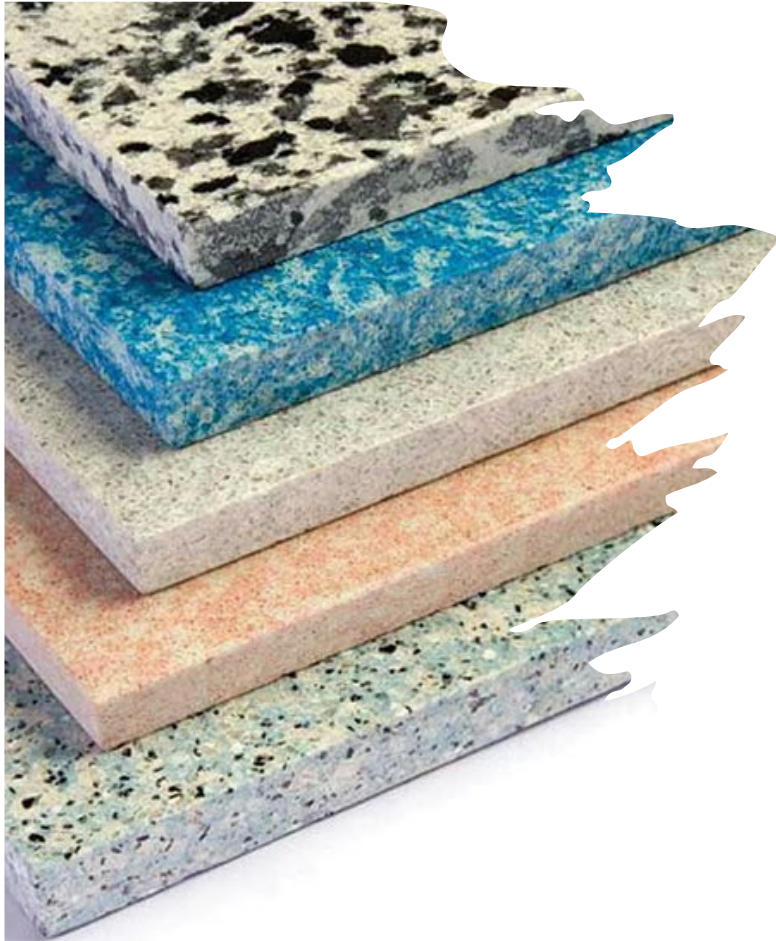
Respirable
crystalline
silica exposure

Lung
inflammation

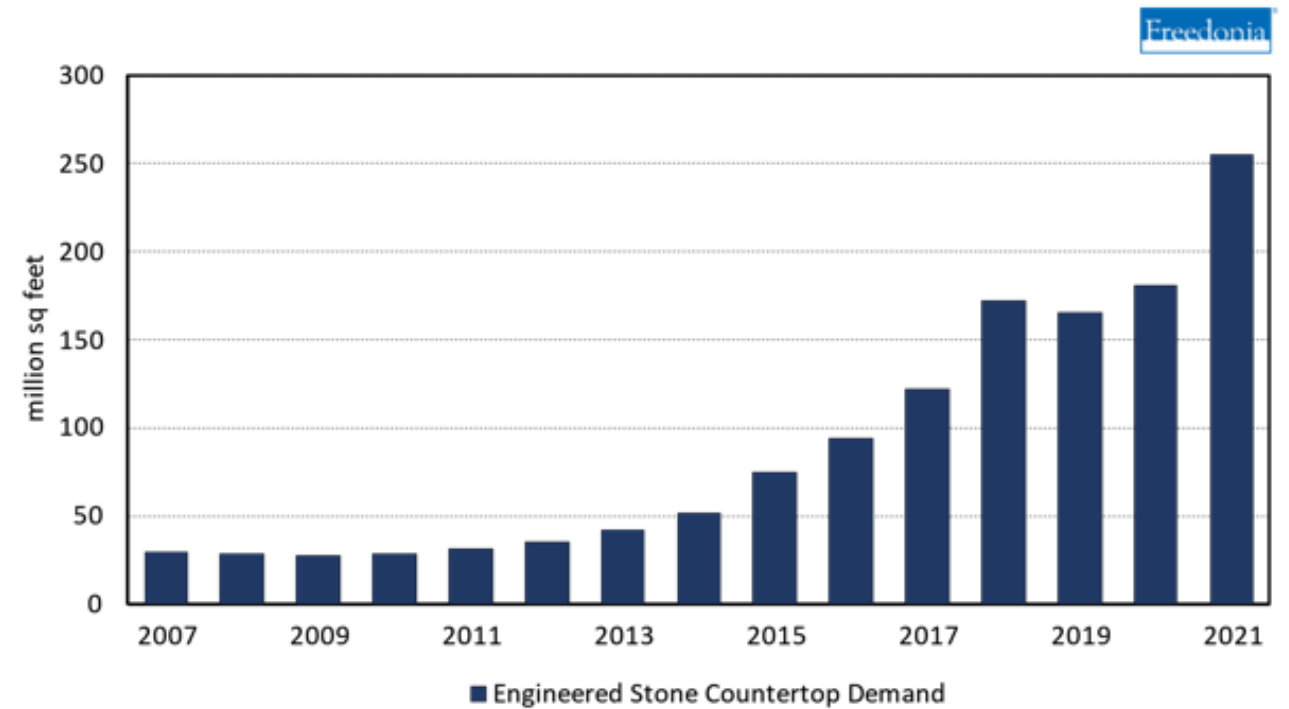
Lung scarring

Respiratory
failure

Engineered Stone: Growing Demand



U.S. Engineered Stone Countertop Demand, 2007-2021 (million square feet)



Source: The Freedonia Group



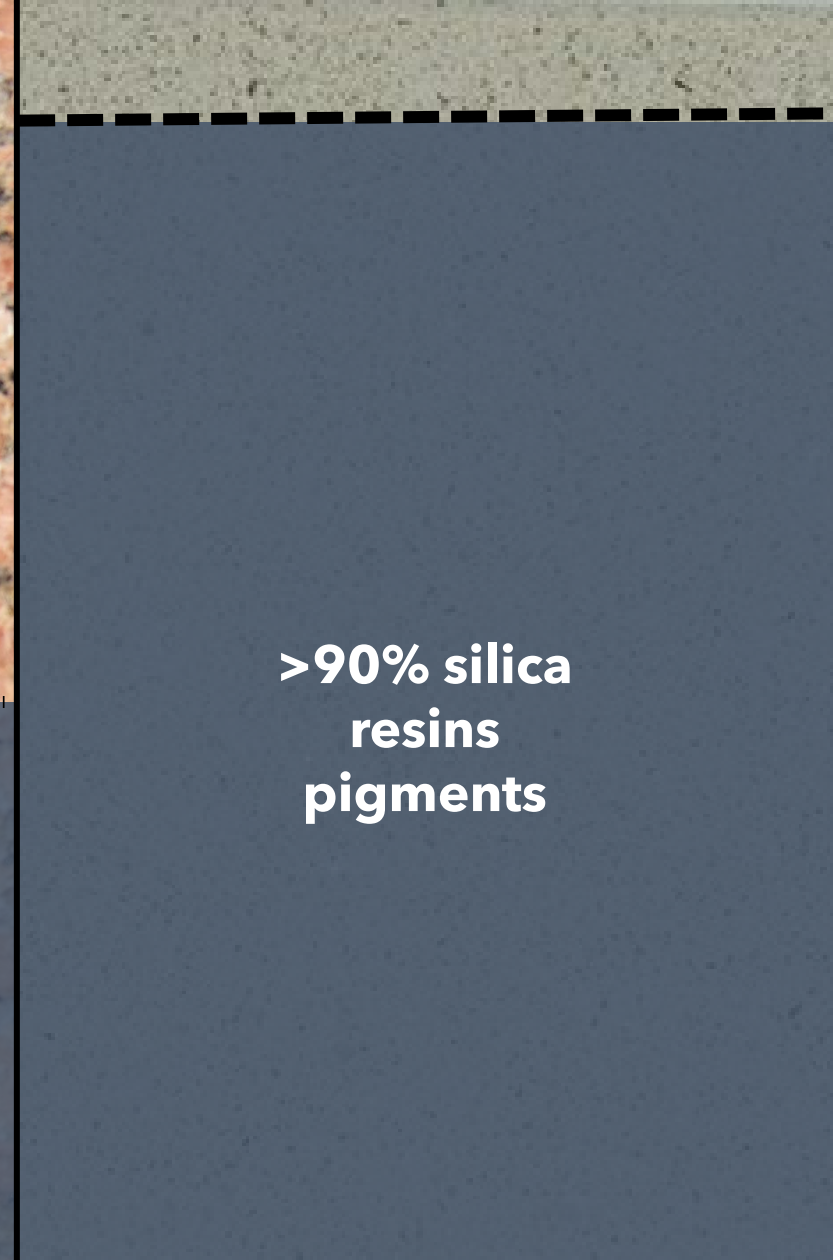
<5% silica

Marble



~45% silica

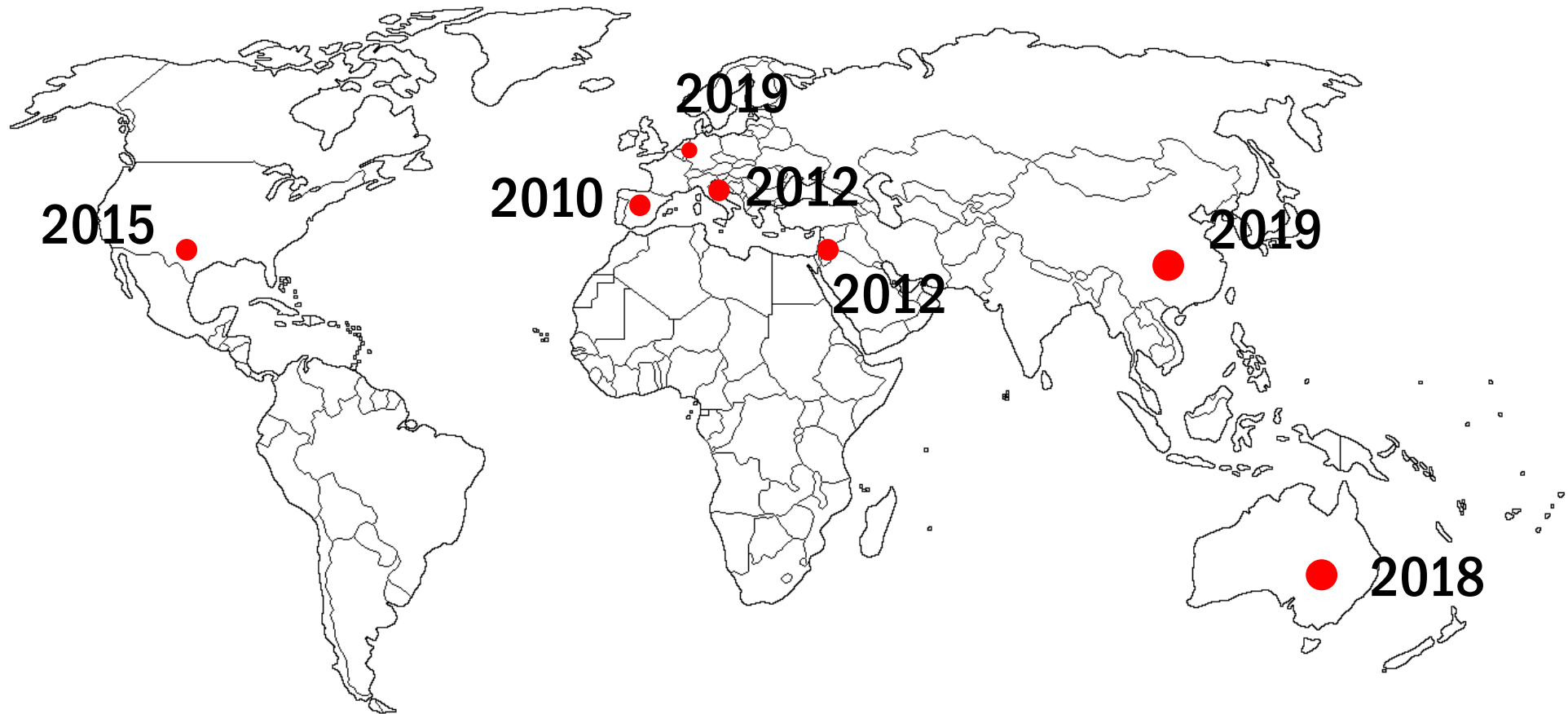
Granite



**>90% silica
resins
pigments**

Engineered Stone

Silicosis Related to Engineered Stone



California Index Case

- **37-year-old man hospitalized with silicosis in 2017**



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 - **2004-2013:** Worked at a countertop fabrication shop



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California Index Case

- **37-year-old man hospitalized with silicosis in 2017**
 - **2004-2013:** Worked at a countertop fabrication shop
 - **2013:** Diagnosed with silicosis
 - **2014-2017:** Worsening symptoms, lung function
 - **2018:** Ineligible for lung transplant, dies of silicosis



Workplace Investigation

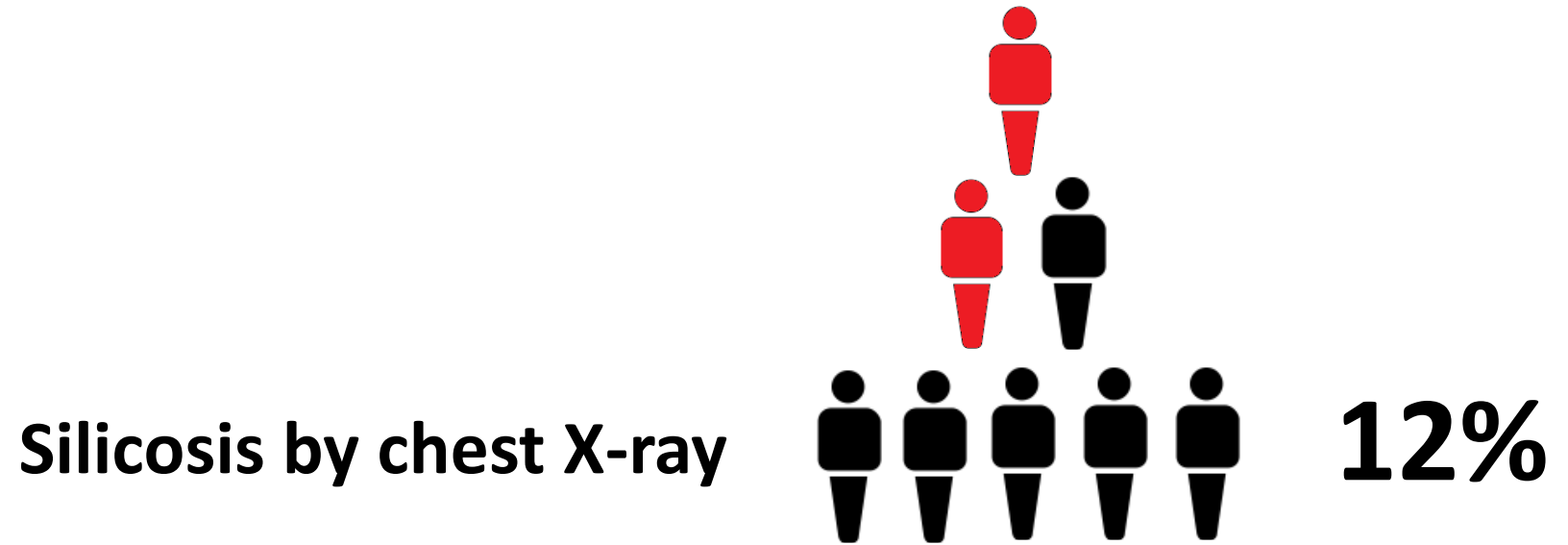
Hospital discharge records

Investigation with Cal/OSHA



All were Hispanic men
in their 30s at diagnosis.
Two cases were fatal.

Workforce Screening



Median age of cases detected
by screening was 37.

Surveillance Methods

- Tracking silicosis cases in California
 - Hospital data (discharge and emergency)
 - Voluntary provider reporting
 - Piloting: electronic case reporting (eCR)
 - Coming soon: reportable condition
 - NIOSH surveillance case definition

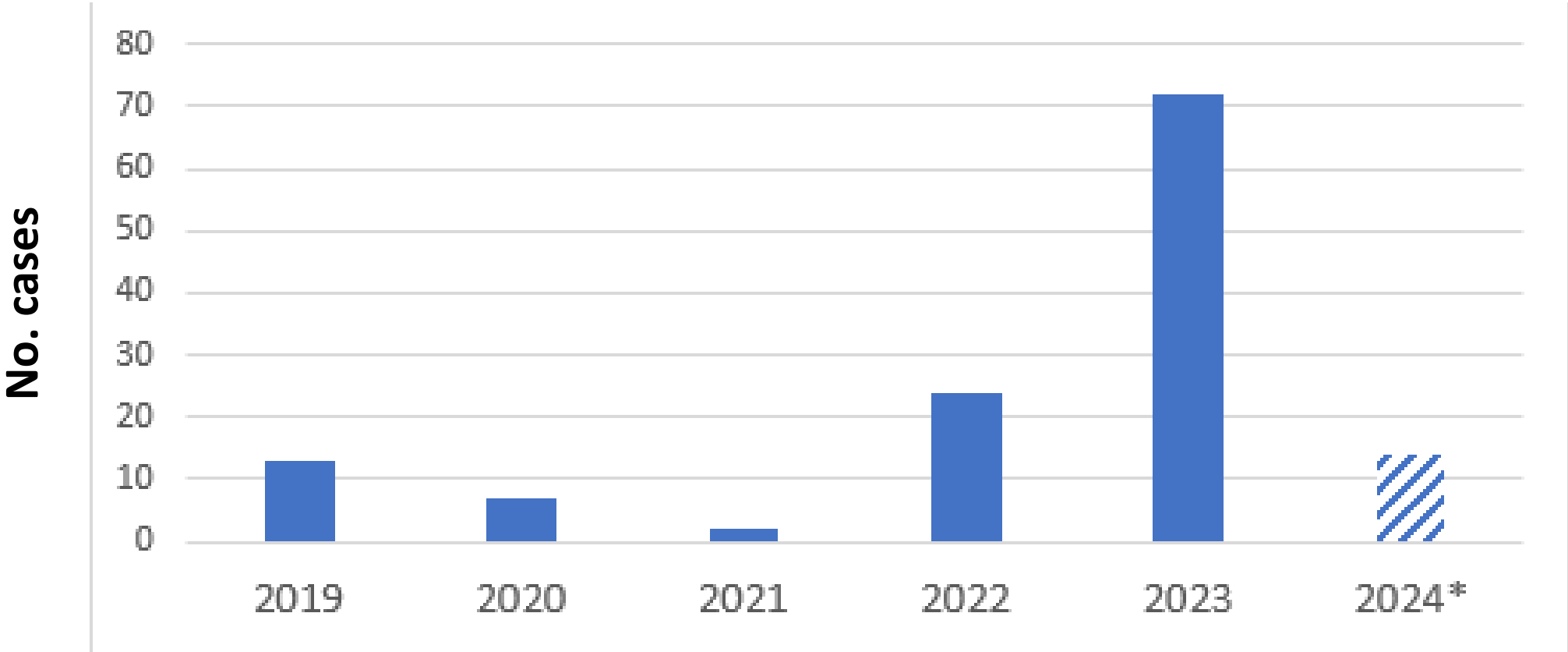


Surveillance Methods

- Tracking silicosis cases in California
 - Hospital data (discharge and emergency)
 - Voluntary provider reporting
 - Piloting: electronic case reporting (eCR)
 - Coming soon: reportable condition
 - NIOSH surveillance case definition
- Enumerating countertop fabrication shops
 - Business database
 - Web searches
 - Outreach



Cases Increasing in California



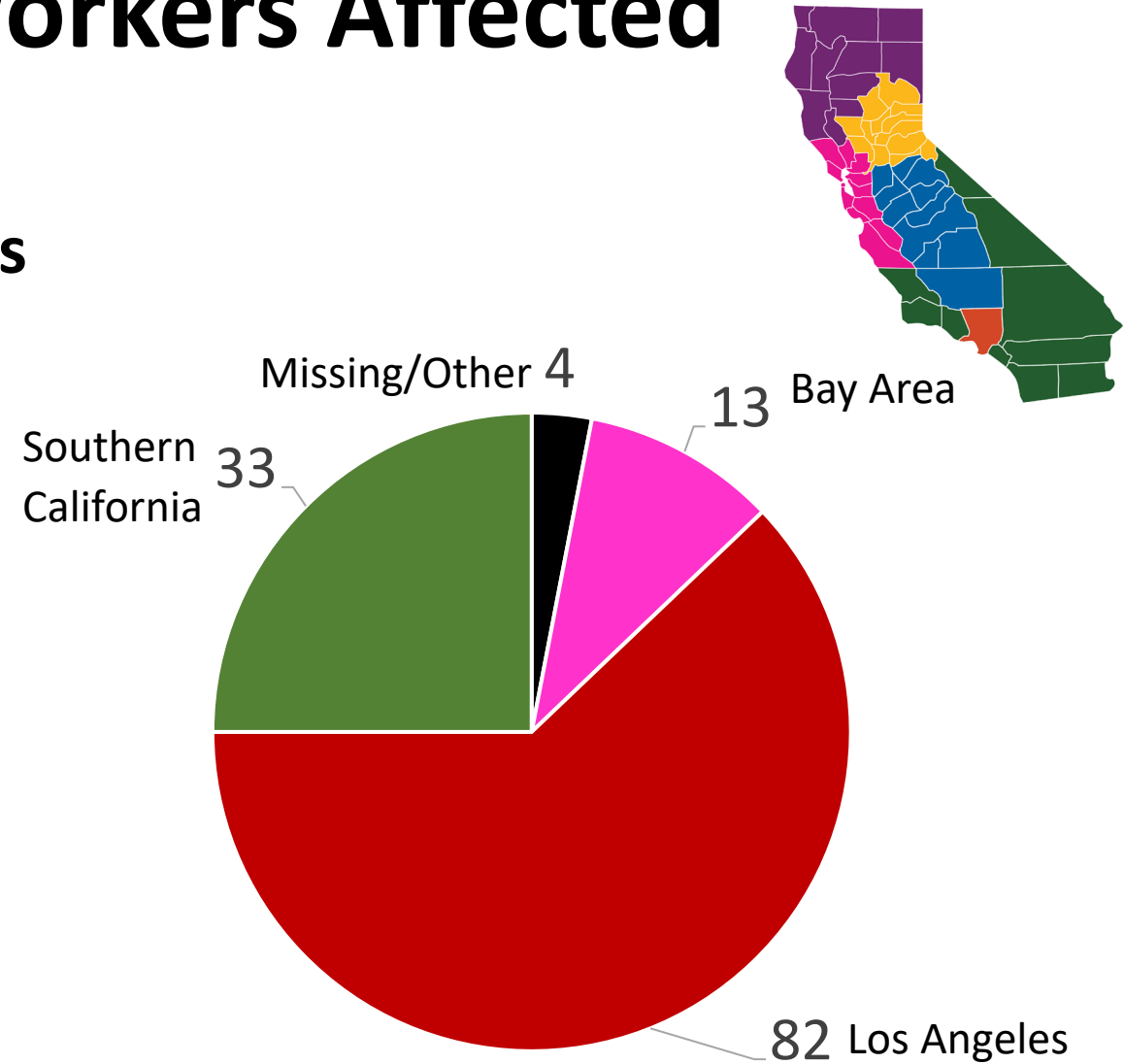
*through April 2024



Year identified by CDPH

Young Immigrant Workers Affected

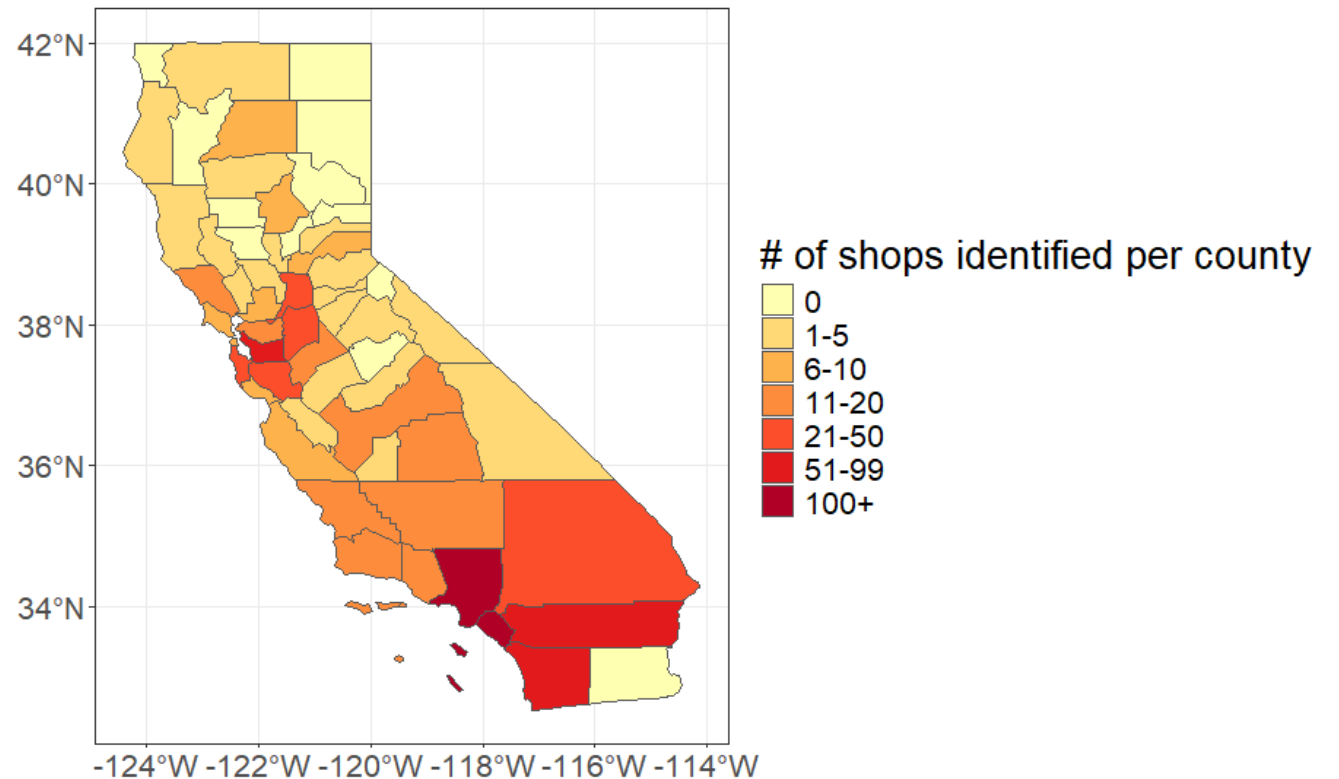
- **132 fabrication workers with silicosis**
 - Most in their 30s and 40s
 - Almost all immigrants from Mexico & Central America
 - Many under/uninsured
- At least **13 deaths**
- At least **17 lung transplants**



The Tip of an Iceberg?

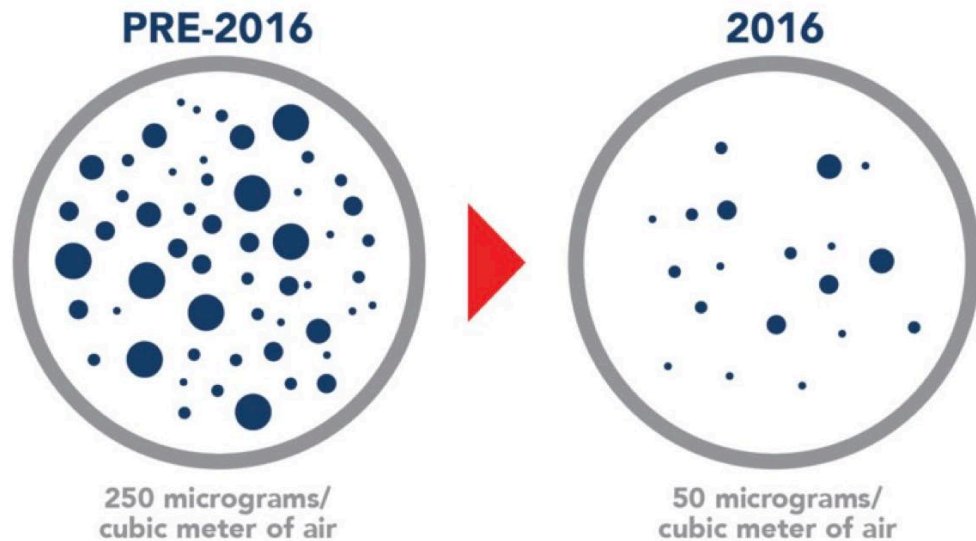
- >900 shops in CA
- Silicosis prevalence estimates
 - 12% in one CA workplace
 - >20% in Australian screening programs
- Likely many unidentified case

Engineered Stone Fabrication Shops in CA
as of 5/6/24



OSHA Silica Standard for Employers (2016)

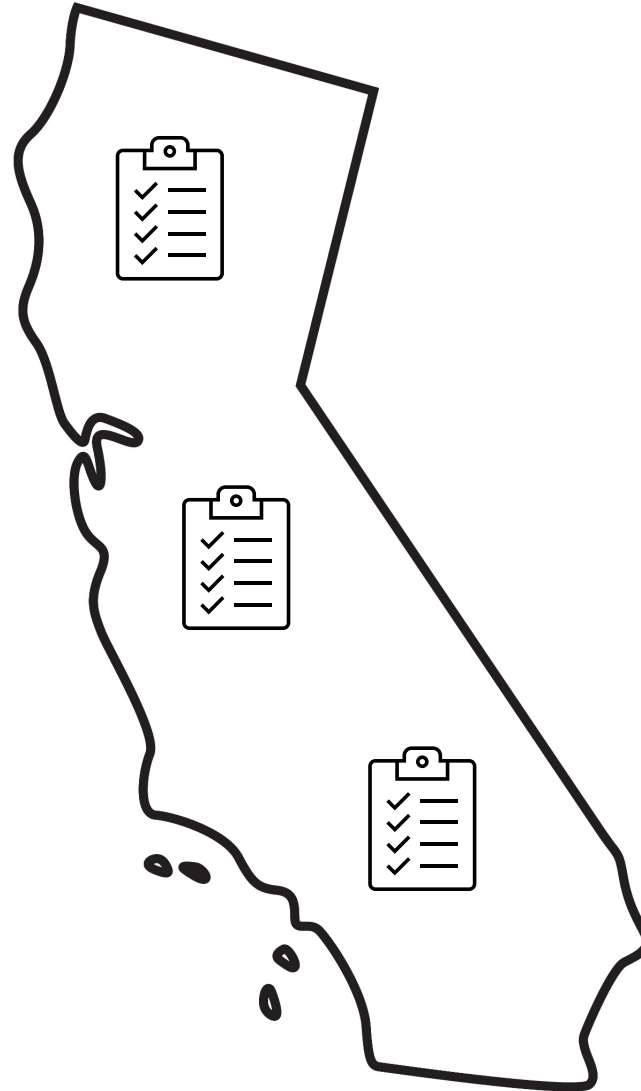
IN 2016, OSHA REDUCED THE PEL OF RESPIRABLE CRYSTALLINE SILICA AVERAGED OVER AN 8-HOUR SHIFT BY 5X.



- **Determine amount of exposure**
 - Action Level: 25 $\mu\text{g}/\text{m}^3$
 - Permissible Exposure Limit: 50 $\mu\text{g}/\text{m}^3$
- Use **exposure controls**
- **Train workers** on health effects
- Offer **medical exams**
 - CXR, spirometry, TB test

OSHA. Occupational Exposure to Respirable Crystalline Silica. Final rule. *Fed Regist.* 2016;81(58):16285-16890.

Cal/OSHA Special Emphasis Program (SEP)



Cal/OSHA Special Emphasis Program (2019-2020)

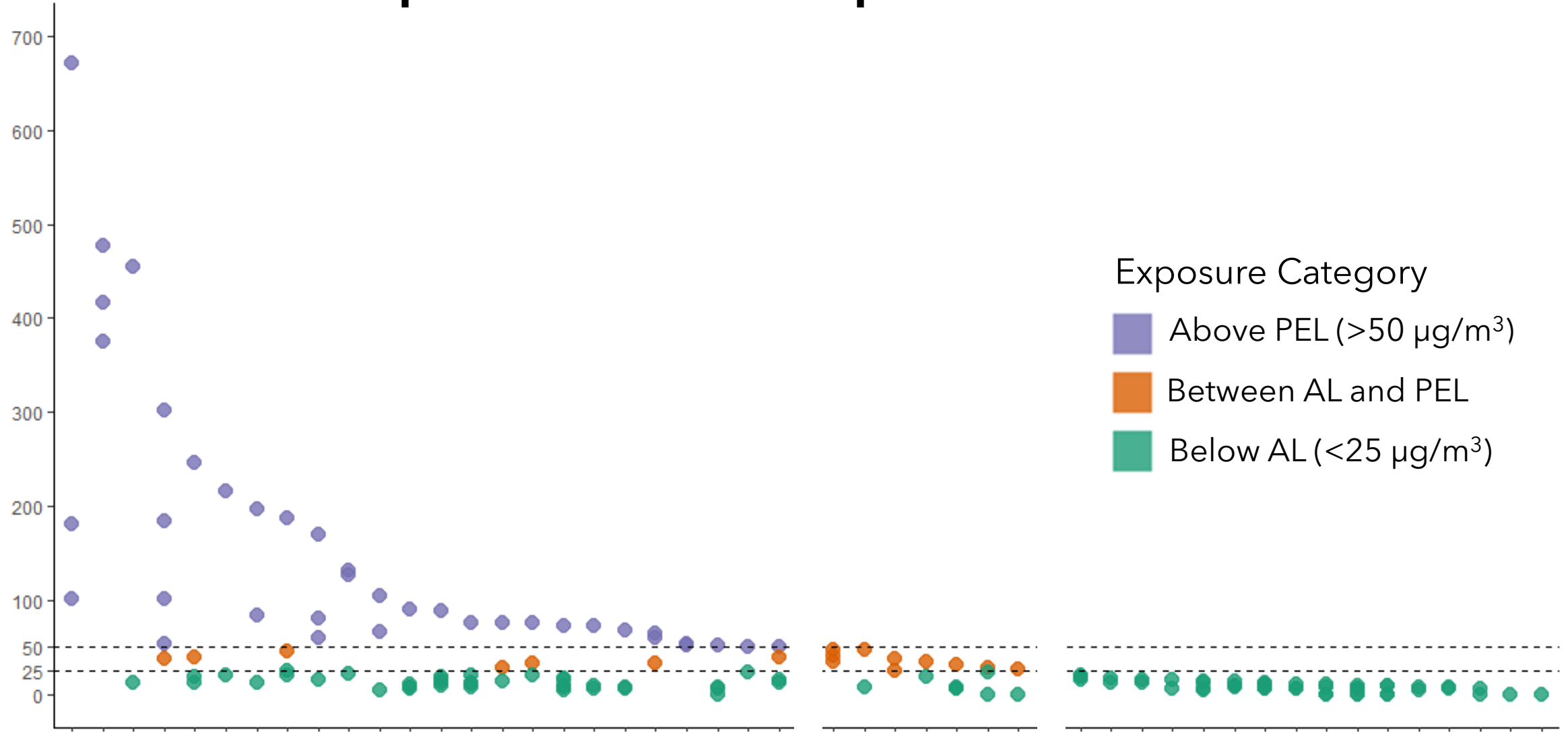
Inspections opened: 106



Air sampling performed: 47

47 companies with ≥ 1 exposure measurements

RCS Exposure ($\mu\text{g}/\text{m}^3$)



24 (51%)

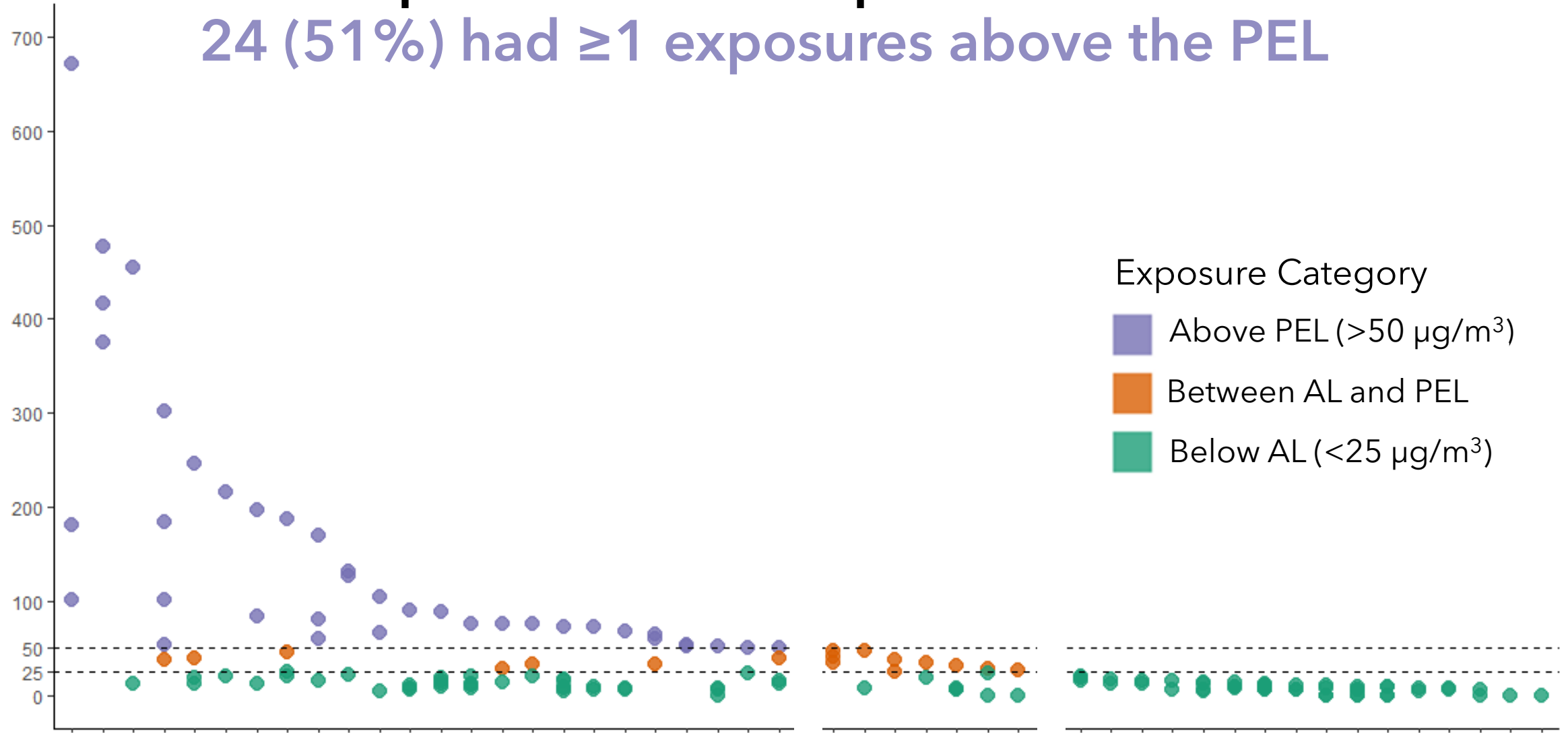
7 (15%)

16 (34%)

47 companies with ≥ 1 exposure measurements

24 (51%) had ≥ 1 exposures above the PEL

RCS Exposure ($\mu\text{g}/\text{m}^3$)



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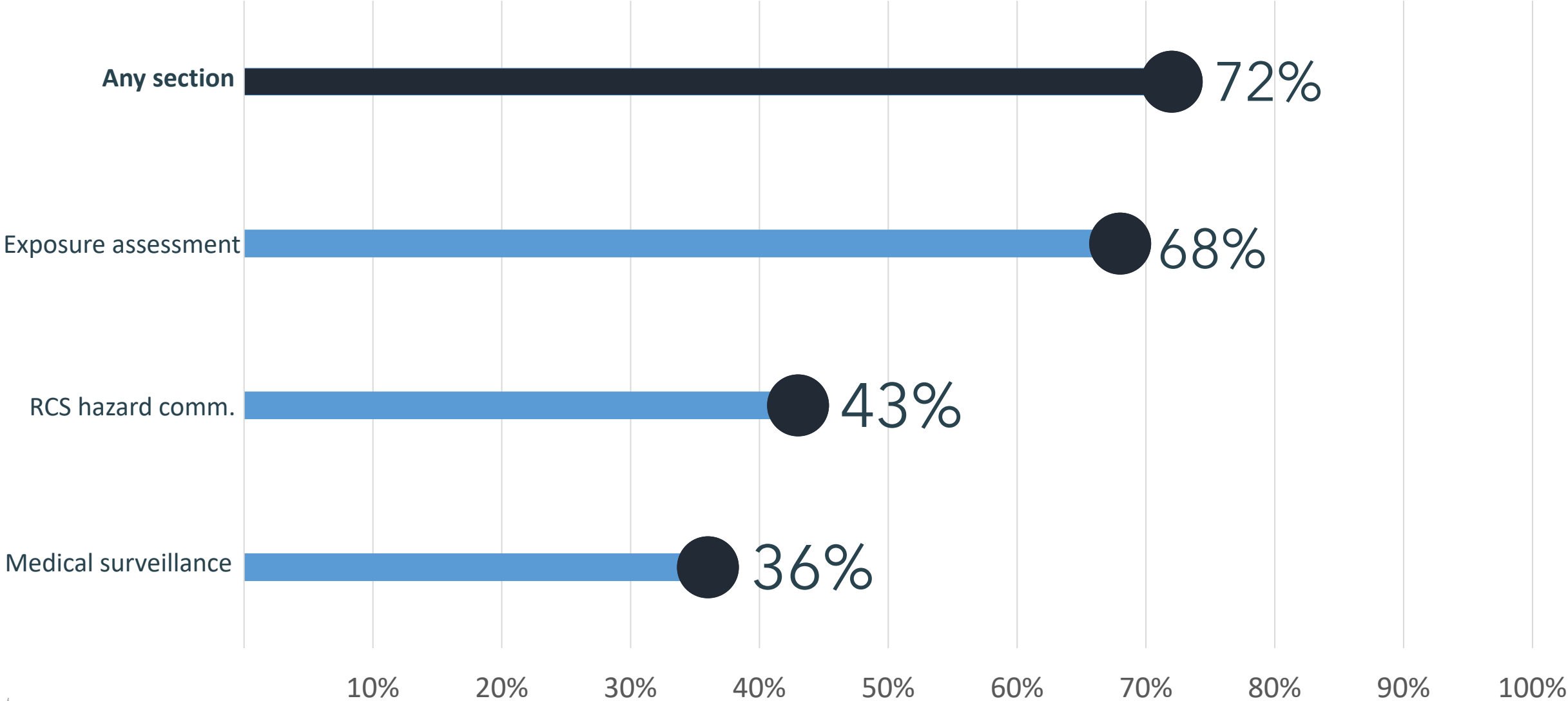
16 (34%)

Worker Interviews (n=92)

- Young (median age 39)
- Short tenure (median 3.8 years)
- Many Spanish-speaking (39%)
- Performed dust-generating tasks (91%), using dry methods (26%)
- Most not informed of air sampling (68%)
- Few fit tested (20%) or offered medical examinations (5%)

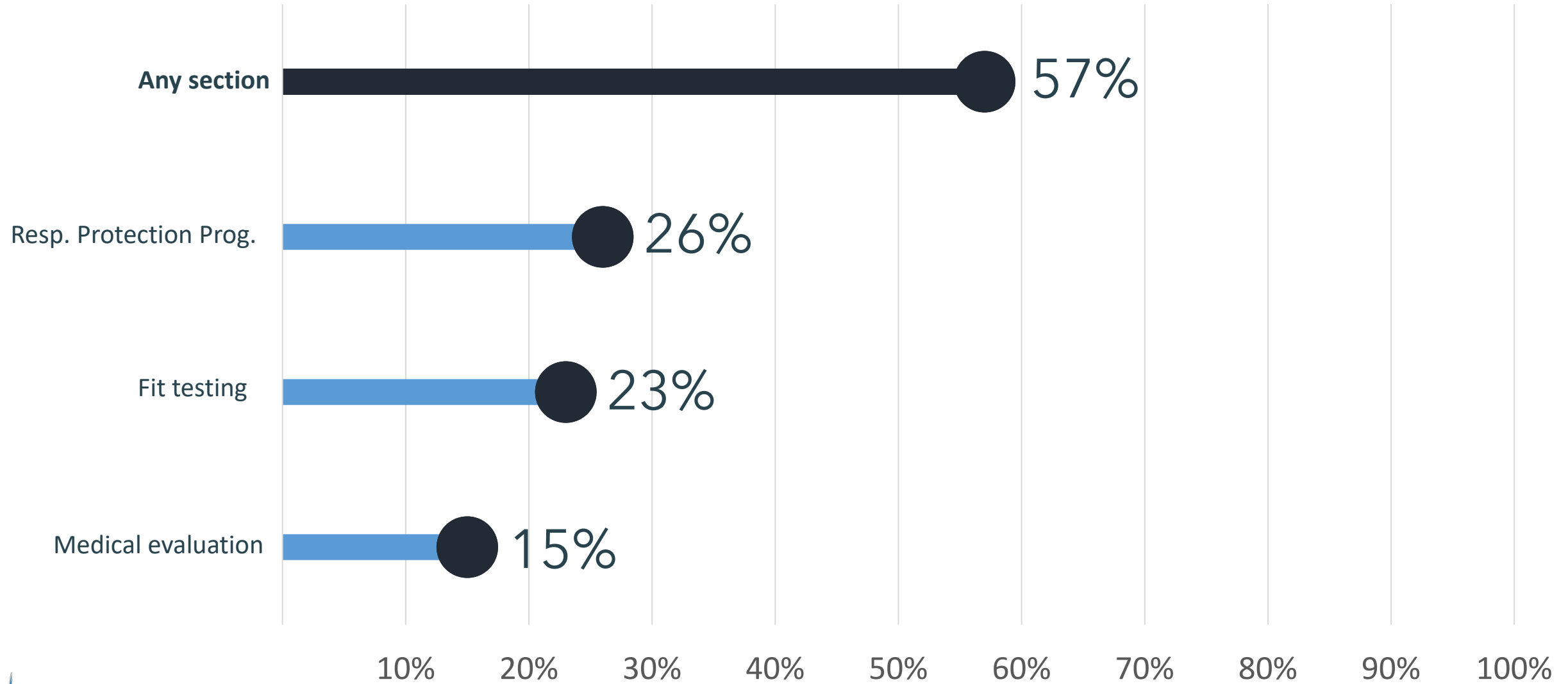


RCS Standard Violation Citations



Number of Employers (N = 47)

Respiratory Protection Standard Violation Citations



Number of Employers (N = 47)

Emergency Temporary Standard (ETS)

- In effect since December 29, 2023
- Introduces new protections for “high exposure trigger tasks”
 - Requires wet methods
 - Prohibits dry cutting, sweeping
 - Requires tight-fitting, full-face, powered air-purifying respirator (PAPR)
- Defines “imminent hazards” and allows Cal/OSHA to issue “order prohibiting use” when imminent hazards present



Photo credit: Chaolong Xi, NIOSH

Summary: Silicosis from Engineered Stone

- Large and growing problem in California
- Impacts young, immigrant workforce
- Surveillance depends on screening, diagnosis, reporting
- Burden of disease likely underestimated
- Non-compliance with silica regulations is widespread
- ETS introduces new requirements and new authority

New Continuing Medical Education Course

- Free 1-hour online course
- 1 AMA PRA Category 1 credit
- More info:
<https://erc.ucla.edu/course/silicosis-in-countertop-fabrication-workers/>



Course Overview

This course is created by the California Department of Public Health to educate healthcare providers about the emerging epidemic of silicosis among countertop fabrication workers.

This course is designed for general providers, as well as providers who conduct silica medical surveillance examinations or care for patients with silicosis.

Learning Objectives

By the end of this course, the participant will be able to:

- Describe the potential health effects of respirable crystalline silica exposure.
- Identify patients at risk of silicosis.
- Describe the silica hazards associated with countertop fabrication work and recent cases of silicosis in this industry.
- Summarize medical surveillance requirements for patients exposed to silica and understand their limitations.
- Describe how to diagnose silicosis and identify appropriate clinical actions following a suspected or confirmed silicosis diagnosis.
- Understand the unique vulnerabilities of workers in the countertop fabrication industry, and develop strategies for addressing these concerns in partnership with patients.

Course Location and Duration

This one hour course is offered asynchronously via UCLA's BruinLearn platform.

Course Cost

This course is offered free of cost.

Professional Credits

The Southern California NIOSH Education and Research Center is accredited by the Institute for Medical Quality / California Medical Association (IMQ/CMA) to provide continuing medical education for physicians.

This activity is designated for a maximum of 1 AMA PRA Category 1 Credits.

Registration QR Code



Contact Us



310-206-3204



erc@ph.ucla.edu



erc.ucla.edu

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