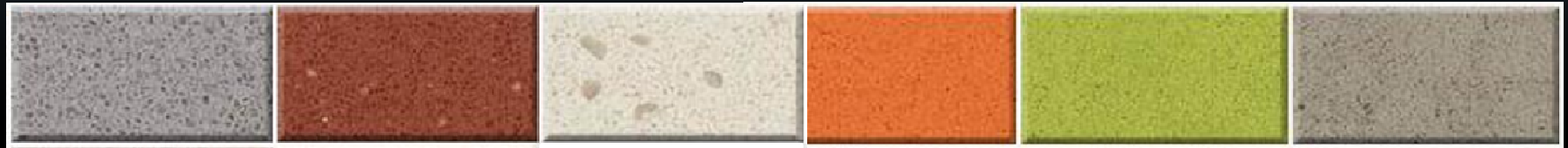


COUNTERING AN OLD HAZARD MADE NEW



Thank you
Robert Harrison, MD, MPH
Karen Worthington, MS, RN, COHN-S

Artificial Stone Silicosis: Disease Resurgence Among Artificial Stone Workers

Krasner et al: 2012



CHEST

Original Research

OCCUPATIONAL AND ENVIRONMENTAL LUNG DISEASES

Artificial Stone Silicosis

Disease Resurgence Among Artificial Stone Workers

Mordechai R. Kramer, MD, FCCP; Paul D. Blanc, MD, MSPH, FCCP;
Elizabeth Fireman, PhD; Anat Amital, MD, FCCP; Alexander Guber, MD, FCCP;
Nader Abdul Rhaman, MD; and David Shitrit, MD

Background: Silicosis is a progressive, fibrotic, occupational lung disease resulting from inhalation of respirable crystalline silica. This disease is preventable through appropriate workplace practices. We systematically assessed an outbreak of silicosis among patients referred to our center for lung transplant.

Methods: This retrospective cohort analysis included all patients with a diagnosis of silicosis who were referred for evaluation to the National Lung Transplantation Program in Israel from January 1997 through December 2010. We also compared the incidence of lung transplantation (LTX) due to silicosis in Israel with that of the International Society for Heart and Lung Transplantation (ISHLT) registry.

Results: During the 14-year study period, 25 patients with silicosis were referred for evaluation, including 10 patients who went on to undergo LTX. All patients were exposed by dry cutting a relatively new, artificial, decorative stone product with high crystalline silica content used primarily for kitchen countertops and bathroom fixtures. The patients had moderate-to-severe restrictive lung disease. Two patients developed progressive massive fibrosis; none manifested acute silicosis (silicoproteinosis). Three patients died during follow-up, without LTX. Based on the ISHLT registry incidence, 0.68 silicosis cases would have been expected instead of the 10 observed (incidence ratio, 14.6; 95% CI, 7.02-26.8).

Conclusions: This silicosis outbreak is important because of the worldwide use of this and similar high-silica-content, artificial stone products. Further cases are likely to occur unless effective preventive measures are undertaken and existing safety practices are enforced.

CHEST 2012; 142(2):419-424

Abbreviations: ISHLT = International Society for Heart and Lung Transplantation; LTX = lung transplantation; NIOSH = National Institute for Occupational Safety and Health; PMF = progressive massive fibrosis

Silicosis is a progressive, fibrotic, occupational lung disease resulting from inhalation of respirable crystalline silica. This disease is preventable through appropriate workplace practices.^{1,2} Mineral sources of silica are abundant, and include quartz, granite,

sandstone, slate, and sand.³ Occupations traditionally associated with increased risk of silicosis include glass and pottery making, mining and quarrying, sandblasting, and any construction trades that generate silica dust through stone or concrete work.^{4,5} There is no established effective treatment regimen for silicosis other than supportive care. Although corticosteroid

Manuscript received June 1, 2011; revision accepted December 19, 2011.

Affiliations: From the Pulmonary Institute (Drs Kramer, Amital, and Rhaman), Rabin Medical Center, Beilinson Campus, Petach Tikva; the Pulmonary Department (Drs Guber and Shitrit), Meir Medical Center, Kfar Saba, affiliated with Sackler Faculty of Medicine, Tel Aviv University; the Institute of Pulmonary and Allergic Diseases (Dr Fireman), National Service for Interstitial Lung Diseases, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel; and the Division of Occupational and Environmental Medicine (Dr Blanc), Department of Medicine, University of California, San Francisco, San Francisco, CA.

Funding/Support: The authors have reported to CHEST that no funding was received for this study.

Correspondence to: David Shitrit, MD, Pulmonary Department, Meir Medical Center, Kfar Saba 49100, Israel; e-mail: david3@clalit.org.il

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Custom Countertop Solutions

Quartz
Cuarzo

Stonemark Granite

HOME DEPOT
SERVICES

Backsplash Selections

2012 Chest article

“artificial stone”

2011 & 2014 Case reports - Spain

“quartz conglomerates”

2012 article from Italy

“quartz resin composite”

2014 NIOSH Science Blog

“Engineered stone”

“Quartz Surfacing Materials”



Consumer Reports

“Great-looking
countertops that last:

The results of Consumer
Reports tests of 16
countertop materials”



#1 = Quartz Surfacing Materials

Steep growth in U.S. imports of quartz surfacing materials

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Stone Imports ▶ Mid-Year/Annual ▶ 2012 U.S. Quartz Imports Boom



2012 U.S. Quartz Imports Boom

THURSDAY, FEBRUARY 21, 2013 07:22 PM

by [Emerson Schwartzkopf](#)

The foreign flow of quartz surfaces continued in 2012, setting import records reminiscent of granite-slab traffic in the mid-2000s.

U.S. ports-of-entry saw 20,608,057 ft² of quartz slabs last year, up 63% from 2011, according to an exclusive Stone Update analysis of import figures from the U.S. International Trade Commission.



While the data doesn't account for all quartz-surfaces use in the United States, the large push in imported material shows the continued rise in popularity for the man-made slabs.

Spain led all countries with 8.3 million ft² shipped here in 2012, up 78% from the previous year. Israel staked a strong second, with its 6.1 million ft² representing an impressive 118.3% annual rise.

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Stone Imports ▶ Monthly Report ▶ StatWatch: Quartz Slab Imports Up in March



StatWatch: Quartz Slab Imports Up in March

FRIDAY, MAY 18, 2012 10:46 AM

U.S. imports of quartz-surface slabs this March made a substantial improvement from 2011, with volume outpacing total value by almost a 2:1 ratio.



U.S. ports-of-entry accepted 1.2 million ft² of quartz slabs in March, a 36.4% increase from the previous March.

Spain led the march handily, shipping 549K ft² in March, up 69.2%. Israel came in second by almost half – 275K ft² – but that represented a 184.0% increase from March 2011.

Other larger exporters didn't fare as well, as four of the 10-top countries supplying quartz slabs showed a decrease from last March, including Canada (111K ft², down 44.9%), China (79K ft², down 12.6%) and Italy (47K, down 17.6%). Some of the decline with Canada, however, may be reflective of panel production shifting to new U.S. operations.



Global Marketplace



SDS for Quartz Surfacing - over 85% crystalline silica

SAFETY DATA SHEET

Caesarstone

Product Name: Caesarstone® / Conetto®

MSDS Date: March 26th, 2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Caesarstone® / Conetto®

Product Use: Caesarstone® Quartz Surfacing and Conetto® Natural Stone Surfacing

Company: Caesarstone
Kibbutz Sdot-Yam
MP Menashe, 38805
Israel

Emergency Phone Number: 972-4-6364-555

Material	CAS Number	%
Crystalline silica and other natural stone	14808-60-7	>85
Cristobalite	14464-46-1	<50
Polymeric resin		7-15
Additives		0-8

3. HAZARDS IDENTIFICATION

Emergency Overview

Information Pertaining to Particular Dangers for Man and Environment: Classification: This preparation is not classified as hazardous according to the latest adaptation of European Union Directives 67/548/EEC and 1995/45/EC.

Zodiaq

Material	CAS Number	%/100
Silica, Crystalline (Quartz)	14808-60-7	93

An old story?

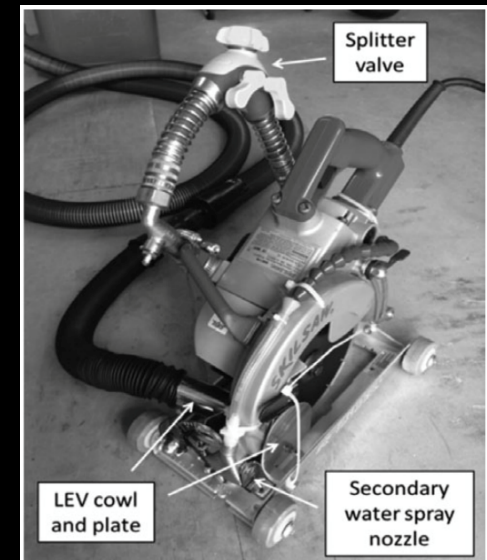
TABLE I

Range and mean silica concentrations during dry processes, calculated as eight-hour time weighted averages (TWAs)^A

Company ID	No. of workers sampled	Range (mg/m ³)	Mean (mg/m ³)
1	1	0.43	
2	6	0.11–0.77	0.49
3	9	<0.04–0.58	0.22
4	3	<0.08–0.22	0.16

^AReported exposures may include several activities: grinding, cutting, and polishing. Companies used similar equipment, such as angle grinders and circular saws.

Simcox et al: Silica exposure during Granite countertop fabrication.
App Occ Env Hyg 1999



Silica Dust Poses Health Hazard in Stone Fabrication Industry

May 1998

*Fabrication of
respiratory protection
and the
silicosis
This ha.*

HAZARD ALERT



To: Employees and employers in the granite counter top fabrication industry

Fabricating granite counter tops and other silica containing materials may expose workers to levels of respirable crystalline silica that are hazardous to health. Workers who inhale silica dust are at risk of developing silicosis, a lung disease.



Silicosis from Synthetic Countertops

That cl
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Synthetic quartz-containing bathroom and kitchen countertops were first introduced in 1987. These artificial stone countertops are composed of a mixture of synthetic polymer resin with natural quartz aggregates, and have a silica content ranging from 85-93%. In contrast, the average silica content of pure granite countertops is 60-70%. Synthetic countertops with high silica content are manufactured under different brand names such as CaesarStone®, Silestone®, and Zodiaq®. The synthetic countertops have attained increased popularity because of their strength, water resistance and pigment options in comparison to pure granite.

Risky business out in the States

NIOSH Science Blog

Safer Healthier Workers

[NIOSH](#) > [NIOSH Science Blog](#)



The Continuing Persistence of Silicosis

Categories: [Respiratory Health](#), [Silica](#)

October 18th, 2011 11:00 am ET - **David Weissman, MD, and Paul Schulte, PhD**
the dust which is stirred and beaten up by digging penetrates into the windpipe and lungs and produces difficulty in breathing. (Agricola, 1556)



Crystalline silica (silicon dioxide) has long been recognized as an occupational hazard. The Occupational Safety and Health Administration

“Practical guidance for preventing the terrible occupational illness of silicosis...”

John Howard, MD
Director, NIOSH



CDC
Workplace Safety

Silicosis:

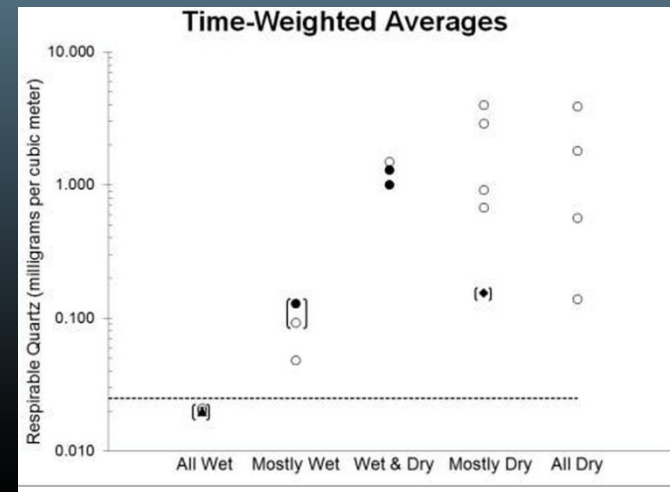
Learn the Facts!

Do you work in construction or do abrasive blasting?

Do you know someone who does?



Courtesy David L. Johnson & Margaret Phillips,
University of Oklahoma Health Sciences Center



Though based on sampling in only a small number of workplaces, the results of this study provide evidence that whenever dry methods are used, even for limited periods, there is a high likelihood that full-shift TWA exposure to respirable quartz could exceed the TLV of 0.025 mg/m^3 , and a significant chance that exposure may approach or exceed the effective permissible exposure limit (PEL) of 0.1 mg/m^3 established by the Occupational Safety and Health Administration (OSHA).⁽¹⁸⁾

Phillips et al: Determinants of respirable silica exposure in stone countertop fabrication: a preliminary study . J Occ Env Hyg, 2013

“The proposal seeks to lower worker exposure to crystalline silica, a deadly dust which needlessly kills hundreds of workers and sickens thousands more each year.”

**August 23, 2013
David Michaels, PhD
Assistant Secretary of Labor**



OSHA[®] FactSheet

OSHA's Proposed Crystalline Silica Rule: Overview

Silica Hazards from Engineered Stone Countertops

Categories: [Construction](#), [Manufacturing](#), [Personal Protective Equipment](#), [Respiratory Health](#), [Silica](#)

March 11th, 2014 3:11 pm ET - **Karen Worthington, MS, RN, COHN-S; Margaret Filios, SM, RN; Mary Jo Reilly, MS; Robert Harrison, MD, MPH; and Kenneth D. Rosenman, MD**



A new engineered stone countertop product known as "quartz surfacing," was created in the late 1980s by combining quartz aggregate with resins to create a product for use in home building and home improvement. Manufacturing of this material, including products such as CaesarStone™, Silestone™, Zodiaq™, or Cambria™ is a fast growing industry. First made in Israel and Spain, production of these materials has grown world-wide, driving quartz slab imports to the U.S. up 63% between 2011 and 2012 and 48% between April 2012 and April 2013 (Schwartzkopf

Notes from the Field

Silicosis in a Countertop Fabricator — Texas, 2014

Gary K. Friedman, MD¹, Robert Harrison, MD²,
Heidi Bojes, PhD³, Karen Worthington, MS⁴, Margaret Filios, MSc⁵
(Author affiliations at end of text)

In May 2014, the Texas Department of State Health Services was notified of a case of silicosis with progressive massive fibrosis in a Hispanic male aged 37 years who worked for an engineered stone countertop company as a polisher, laminator, and fabricator. He was exposed to dust for 10 years from working with conglomerate or quartz surfacing materials containing 70%–90% crystalline silica.* This is the first reported case of silicosis associated with exposure to quartz surfacing materials in North America.

In 2010, the patient presented to a primary care provider with a 2-year history of persistent cough and dyspnea on exertion. He had no history of tobacco use or pulmonary disease. On physical examination, he had diminished bibasilar breath sounds and a right-sided inspiratory wheeze. Pulmonary function studies showed a combined obstructive and restrictive defect with no change post bronchodilator and reduced diffusion capacity. An electrocardiogram showed right ventricular hypertrophy, and cardiac catheterization confirmed the presence of pulmonary hypertension. A B Reader[†] classified the patient's chest radiograph as large opacity Category "C" with 3/2 profusion, q/r bilateral upper and middle lobe rounded opacities. Computed tomography scan of the chest showed bilateral upper and middle lobe small rounded and large opacities, with hilar and mediastinal adenopathy. The worker was reassigned to a different job to minimize silica dust exposure. He is oxygen-dependent, and his medical condition is being monitored for possible lung transplantation.

Clusters of silicosis cases, some requiring lung transplantation, have occurred among fabrication workers exposed to silica dust from quartz surfacing materials in Israel, Italy, and Spain (1–4). In the last year, imports of quartz surfacing

materials to the United States have risen 49%,[§] and these materials are among the most popular countertop materials. The increased use of this silica-containing material poses a new risk for silica exposure (<http://blogs.cdc.gov/niosh-science-blog/2014/03/11/countertops>). An investigation by CDC's National Institute for Occupational Safety and Health of the patient's work site is ongoing to identify work hazards and assess silica exposures and the health of the other employees.

Health care providers need to be aware of quartz surfacing materials as a source of silica exposure, advise reassignment of patients with silicosis to jobs without silica dust exposure, and report cases to their state public health agency; in 2010, silicosis was reportable in 25 states.[‡] Employers are responsible for maintaining a safe workplace by measuring silica exposure, limiting access to areas where silica exposures are high, using effective methods to reduce exposure (e.g., wet methods,** local exhaust ventilation, and use of personal protective equipment), providing medical examinations to workers with high exposures, and training workers about silica hazards and how to limit exposures.^{††}

* Information available at http://www.stoneupdate.com/us-stone-imports/starwatch-monthly-report/805-granite-quartz-imports-continue-2014-boom?utm_source=mailinglist&utm_medium=email&utm_campaign=edge+16-december+2014.

† In 2010, silicosis was a reportable condition in 25 states (Arkansas, California, Connecticut, Delaware, Florida, Illinois, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Rhode Island, Texas, Virginia, and Wisconsin); however, only two states (Michigan and New Jersey) currently submit case data to CDC's National Institute for Occupational Safety and Health. Additional information available at <http://www.cdc.org/group/srcaqueries>.

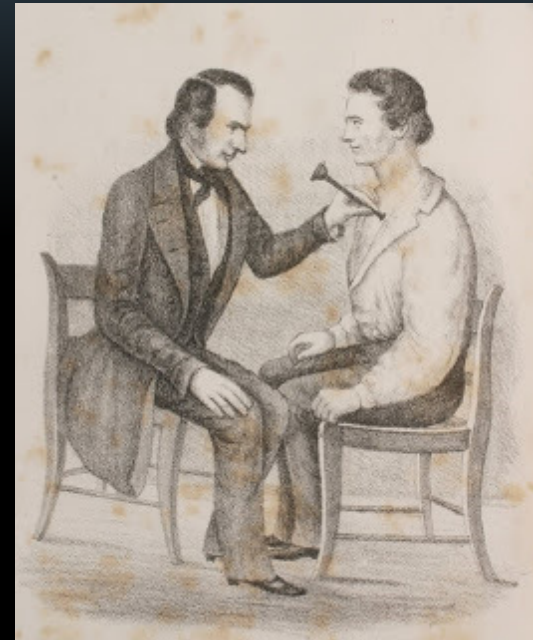
** Suppression of dust using water stream or spray.

†† Additional information available at <https://www.osha.gov/dsp/topics/silicacrystalline/index.html>, https://www.osha.gov/OshDoc/data_General_Faces/crystalline-fschesheet.pdf.

Acknowledgments

Kenneth D. Rosenman, MD, Michigan State University; Kristin Yeoman, MD, National Institute for Occupational Safety and Health, CDC.

¹Pulmonary Division, University of Texas Health Houston; ²California Department of Public Health; ³Texas Department of State Health Services; ⁴New Jersey Department of Health and Senior Services; ⁵Division of Respiratory Disease Studies, National Institute for Occupational Safety and Health, CDC (Corresponding author: Margaret Filios, mfilios@cdc.gov, 304-285-5754)



MMWR Case Report

February 13, 2015

OSHA • NIOSH

HAZARD ALERT

Worker Exposure to Silica during Countertop Manufacturing, Finishing and Installation

The Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) have identified exposure to silica as a health hazard to workers involved in manufacturing, finishing and installing natural and manufactured stone countertop products, both in fabrication shops and during in-home finishing/installation. This hazard can be mitigated with simple and effective dust controls in most countertop operations.

“...the continuing occurrence of new occupations and tasks that place workers at risk for silicosis, including fabricators and installers of quartz-containing engineered stone products...underscore the need for strengthening efforts to limit workplace exposure to crystalline silica”

Jacek Mazurek et al
June 19, 2015 - MMWR



Morbidity and Mortality Weekly Report (MMWR)

[MMWR](#)



Notes from the Field: Update: Silicosis Mortality – United States, 1999-2013

Weekly

June 19, 2015 / 64(23);653-654

Jacek M. Mazurek, MD¹; Patricia L. Schleiff, MS¹; John M. Wood, MS¹; Scott A. Hendricks, MS²; Ainsley Weston, PhD¹ (Author affiliations at end of text)

NIOSH Science Blog

Safer Healthier Workers

[NIOSH](#) > [NIOSH Science Blog](#)



Silicosis Update

Categories: [Respiratory Health](#), [Silica](#)

June 15th, 2015 3:23 pm ET - **Jacek Mazurek, MD, MS, PhD and David Weissman, MD**

Pulmonary Fibrosis Associated with Aluminum Trihydrate (Corian) Dust

TO THE EDITOR: A 64-year-old man who was an exercise physiologist was noted to have clinical and physiological features of idiopathic pulmonary fibrosis.¹ On detailed questioning, he stated that he had ground, machined, drilled, and sand-

garage for about 16 years (Fig. 1A). He had typical clinical features of idiopathic pulmonary fibrosis and radiographic features of usual interstitial pneumonia, and a surgical lung biopsy showed histologic features of usual interstitial

e
a

Occupational Medicine 2015;65:444–450
Advance Access publication 12 June 2015 doi:10.1093/occmed/kqv073

Outbreak of autoimmune disease in silicosis linked to artificial stone

O. Shtraichman¹, P. D. Blanc², J. E. Ollech¹, L. Fridel³, L. Fuks¹, E. Fireman⁴ and M. R. Kramer¹

More case reports coming in...



Can we prevent silicosis in stone fabrication workers?

 caesarstone®
Quartz Surfaces

Product stewardship?



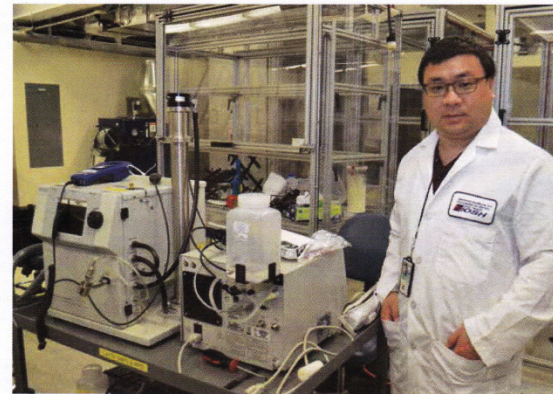
Fabrication and Installation Manual

“Government agencies are collaborating with stone industry professionals to develop solutions for safer working conditions inside fabrication shops, including the prevention of silicosis.”

Stone safety moving forward

Government agencies are collaborating with stone industry professionals to develop solutions for safer working environments inside fabrication shops, including the prevention of silicosis

by Jason Kamery



Dr. Chaolong Qi (NIOSH Research Engineer) standing in the NIOSH's Ventilation Laboratory. The chamber in the back is used to test the dust generation and evaluate engineering control measures for a variety of projects. The instruments on the cart are used to measure the particle size distributions and flow velocities during these tests.

There's been a lot of controversy over the past year about silica dust. The Occupational Safety and Health Administration (OSHA) wants to cut the allowable level of airborne silica dust in half; fabricators are doubtful of being able to comply with the reduced

levels and fear potential fines. It will take a while for all of this to play out through the regulatory process, but in the meantime, the question is: How can fabrication shop operators best protect their workers without losing their shirts? Silicosis is an irreversible, but pre-

ventable disease, which has long been associated with work in industry occupations using quartz-containing materials. The key to preventing the disease is preventing workers from inhaling the silica dust generated when these materials are cut, drilled, ground