

09-OH-01

Committee: Occupational and Environmental Health

Title: Public Health Ascertainment and National Notification for Silicosis

I. Statement of the Problem

CSTE position statement 07-EC-02 recognized the need to develop an official list of nationally notifiable conditions and a standardized definition for reporting each condition on the official list. The position statement also specified that each definition had to comply with American Health Information Community recommended standards to support “automated case reporting from electronic health records or other clinical care information systems.” In July 2008, CSTE identified sixty-eight conditions warranting inclusion on the official list, each of which now requires a standardized reporting definition.

II. Background and Justification

*Background*¹

Silicosis, a type of pneumoconiosis caused by the inhalation of dust containing silica, occurs widely across the U.S. It is estimated that over 1 million U.S. workers are exposed to crystalline silica and at risk for the development of silicosis. Silicosis most commonly occurs as a diffuse nodular pulmonary fibrosis. This lung disease (which is sometimes asymptomatic) is caused by the inhalation and deposition of respirable crystalline silica particles (i.e., particles <10 µm in diameter). According to a report from the U.S. Surgeon General, cigarette smoking has no significant causal role in the etiology of silicosis. Probably the most important factor in the development of silicosis is the “dose” of respirable silica-containing dust in the workplace setting; that is, the product of the concentration of dust containing respirable silica in workplace air and the percentage of respirable silica in the total dust. Other important factors are (1) the particle size, (2) the crystalline or noncrystalline nature of the silica, (3) the duration of the dust exposure, and (4) the varying time period from first exposure to clinically apparent disease and diagnosis (from several months to more than 30 years). Freshly ground, or fractured, crystalline silica, such as that which occurs with sandblasting, may be more toxic or fibrogenic, than aged silica.

A worker may develop one of three types of silicosis, depending on the airborne concentration of respirable crystalline silica and duration of exposure:

1. chronic nodular silicosis, which usually occurs after 10 or more years of exposure at relatively low concentrations;
2. accelerated nodular silicosis, which develops 5 to 10 years after the first exposure and often progresses after exposure has been discontinued; or

¹ Much of the material in the background is directly quoted from NIOSH 2002 and CDC’s Silica Website. See the References for further information on these sources.

3. acute silicosis, which develops after exposure to high concentrations of respirable crystalline silica and results in symptoms within a period ranging from a few weeks to 5 years after the initial exposure.

The symptoms of accelerated silicosis are similar to those of chronic silicosis, but clinical and radiographic progression is rapid. Fibrosis may be irregular and more diffuse, or not apparent on the chest radiograph. Acute silicosis is typically associated with a history of high exposures from tasks that produce small particles of airborne dust with a high silica content, such as sandblasting, rock drilling, or quartz milling. The pathologic characteristics of acute silicosis (sometimes referred to as silicoproteinosis) differ from those of nodular silicosis—with very little of the typical nodular fibrosis—and resemble those of alveolar proteinosis.

Justification

Silicosis meets the following criteria for a nationally and **standard** notifiable condition, as specified in CSTE position statement 08-EC-02:

- A majority of state and territorial jurisdictions—or jurisdictions comprising a majority of the US population—have laws or regulations requiring **standard** reporting of silicosis to public health authorities
- CDC requests **standard** notification of silicosis to federal authorities
- CDC has condition-specific policies and practices concerning the agency’s response to, and use of, notifications.

III. Statement of the desired action(s) to be taken

CSTE requests that CDC adopt this standardized definition for silicosis to facilitate more timely, complete, and standardized local and national ascertainment of this condition.

IV. Goals of Surveillance

To provide information on the temporal, geographic, and demographic occurrence of silicosis to facilitate its prevention and control.

V. Methods for Surveillance

Surveillance for silicosis should use the sources of data and the extent of coverage listed in table V below.

Table V. Recommended sources of data and extent of coverage for ascertaining cases of silicosis.

Source of data for case ascertainment	Coverage
---------------------------------------	----------

	Population-wide	Sentinel sites
clinician reporting		x
laboratory reporting		
reporting by other entities (e.g., hospitals, veterinarians, pharmacies)	X	
death certificates	X	
hospital discharge or outpatient records	X	
extracts from electronic medical records	X	
telephone survey		
school-based survey		
other — state worker compensation claim records	X	

VI. Criteria for reporting

Reporting refers to the process of healthcare providers or institutions (e.g., clinicians, clinical laboratories, hospitals) submitting basic information to governmental public health agencies about cases of illness that meet certain reporting requirements or criteria. Cases of illness may also be ascertained by the secondary analysis of administrative health data or clinical data. The purpose of this section is to provide those criteria that should be used by humans and machines to determine whether a specific illness should be reported.²

A. Narrative description of criteria to be used by humans to determine how a case of silicosis should be ascertained by public health authorities

Ascertain and submit any record to public health authorities that meets *any* of the following criteria:

A person whose healthcare record contains a diagnosis of silicosis or pneumoconiosis due to dust containing silica.

A worker's compensation claim containing a diagnosis of silicosis or pneumoconiosis due to dust containing silica.

A person whose death certificate lists silicosis or pneumoconiosis due to dust containing silica as a cause of death or a significant condition contributing to death.

² "Human-based" criteria (described below under "A. Narrative") can be applied by medical care providers and laboratory staff based on clinical judgment and clinical diagnosis. Machine-based criteria (described below under "B. Table") can be applied using computerized algorithms that operate in electronic health record systems, including computerized records of laboratory test orders and laboratory test results; other clinical data systems (e.g., hospital discharge data systems serving multiple hospitals); or administrative data (e.g., healthcare provider billing data, vital records, and EMS data).

Health care professional's report of an individual diagnosed with silicosis or pneumoconiosis due to dust containing silica.

Other recommended procedures

- All cases of silicosis should be submitted.
- Submission should be on-going and routine.
- Frequency of submission should follow the state health department's routine schedule.

B. Table of criteria to determine whether a case should be submitted to public health authorities

Table VI-B. Proposed Table of criteria to determine whether a case should be reported to public health authorities. Note: The following criteria are proposed for evaluation before general implementation. For purposes of currently implementing reporting the narrative description in VI-A, should be used.

Criterion	Reporting	
<i>Clinical Presentation</i>		
healthcare record contains a diagnosis of silicosis or pneumoconiosis due to dust containing silica	S	
compensation claim contains a diagnosis of silicosis or pneumoconiosis due to dust containing silica	S	
death certificate lists silicosis or pneumoconiosis due to dust containing silica as a cause of death or a significant condition contributing to death	S	
health care professional's report contains a diagnosis of silicosis or pneumoconiosis due to dust containing silica	S	
history of occupational exposure to airborne silica dust or work in an industry or occupation known to be a source of exposure to airborne silica dust		N
<i>Laboratory findings</i>		
chest radiograph (or other radiographic image, such as computed tomography) showing abnormalities interpreted as consistent with silicosis or pneumoconiosis due to dust containing silica		N
lung histopathology consistent with silicosis or pneumoconiosis due to dust containing silica	S	
<i>Epidemiological risk factors</i>		
occupational exposure to airborne dust containing silica	C	

Notes:

S = A single “S” is sufficient to report a case.

N = All “N” criteria in the same column are required to report a case.

C = This finding corroborates (i.e., supports) the diagnosis of—or is associated with—silicosis, but is not required for ascertaining a case.

C. Disease Specific Data Elements:

Disease-specific data elements to be included in the initial report are listed below.

usual industry

usual occupation

employer where silica exposure occurred

- name
- street address
- second address line
- city
- state
- zip code
- phone

lung biopsy/pathology sample obtained (yes/no)

VII. Case Definition for Case Classification

A. Narrative description of criteria to determine whether a case should be classified as confirmed or probable:

Clinical description

Silicosis is an occupational lung disease caused by the inhalation of respirable dust containing crystalline silica. There are two forms of the disease: nodular silicosis and silicoproteinosis (acute silicosis). Nodular silicosis (chronic and accelerated) is slowly progressing and manifests as scarring of the lung tissue. It is typically evident on chest x-ray only after 10 or more years of exposure (chronic silicosis), but may be seen after as little as five years (accelerated silicosis). Nodular silicosis may present without symptoms; shortness of breath and cough typically accompany advanced disease. Silicoproteinosis (acute silicosis), a less common form of silicosis, is an alveolar filling process which becomes evident within weeks to months after a very intense initial exposure; death usually occurs within a few years of onset. Except in acute silicosis, lung biopsy is rarely needed for diagnosis, as the radiologic picture is often sufficiently distinct to permit diagnosis of silicosis in persons with a clear history of exposure. Individuals with silicosis are at increased risk of tuberculosis and lung cancer. Silica exposure and/or silicosis has also been associated with autoimmune diseases such as lupus erythematosus, rheumatoid arthritis, scleroderma, and with glomerulonephritis. Silicosis is a progressive, incurable, and potentially fatal disease that can be effectively prevented by limiting exposure to respirable crystalline silica dust.

Case Classification

Probable:

- death certificate record listing silicosis or pneumoconiosis due to dust containing silica (as underlying or contributing cause of death); *or*
- hospital discharge record listing silicosis or pneumoconiosis due to dust containing silica (as primary, secondary, or other diagnosis); *or*
- workers' compensation claim with a diagnosis of silicosis or pneumoconiosis due to dust containing silica; *or*
- health care professional's report of an individual diagnosed with silicosis or pneumoconiosis due to dust containing silica.

Confirmed:

- history of occupational exposure to airborne silica dust and either or both:
 - chest radiograph (or other radiographic image, such as computed tomography) showing abnormalities interpreted as consistent with silicosis; *or*
 - lung histopathology consistent with silicosis.

B. Classification Tables

Table VII-B lists the criteria that must be met for a case to be classified as confirmed or probable (presumptive).

Table VII-B. Proposed table of criteria to determine whether a case is classified. Note: The following criteria are proposed for evaluation before general implementation. For purposes of current notification, the narrative description in VII-A, should be used.

Criterion	Case Definition	
	Confirmed	Probable
<i>Clinical Presentation</i>		
healthcare record contains a diagnosis of silicosis or pneumoconiosis due to dust containing silica		O
compensation claim contains a diagnosis of silicosis or pneumoconiosis due to dust containing silica		O
death certificate lists silicosis or pneumoconiosis due to dust containing silica as a cause of death or a significant condition contributing to death		O
health care professional's report contains a diagnosis of silicosis or pneumoconiosis due to dust containing silica		O
history of occupational exposure to airborne silica dust or work in an industry or occupation known to be a source of exposure to airborne silica dust	N	N

<i>Laboratory findings</i>			
chest radiograph (or other radiographic image, such as computed tomography) showing abnormalities interpreted as consistent with silicosis or pneumoconiosis due to dust containing silica	N		
lung histopathology consistent with silicosis or pneumoconiosis due to dust containing silica		N	

N = All “N” criteria in the same column—in conjunction with at least one of any “O” criteria in each category (e.g., clinical presentation and laboratory findings) in the same column—are required to classify a case.

O = At least one of any “O” criteria in each category (e.g., clinical presentation and laboratory findings) in the same column—in conjunction with all other “N” criteria in the same column—is required to classify a case.

VIII. Period of Surveillance

Surveillance should be on-going.

IX. Data sharing/release and print criteria

- Notification to CDC/NIOSH of confirmed cases of silicosis is recommended.
- Aggregated case data will be published by CDC/NIOSH on-line and in hard copy in a compilation of work-related lung disease surveillance data. It will also be used for presentation at national meetings and/or for peer reviewed journal articles. Aggregate data is used to support science-based regulations and policy at both the federal and state level; it is shared with regulatory partners (e.g., the Occupational Safety and Health Administration) for purposes of setting work-place standards related to prevention of exposure and disease. It will also be used to support decision-making regarding research and intervention activities by the NIOSH National Occupational Research Agenda (NORA) Sector Research Councils; that is, for problem identification, hypothesis generation, and evaluation. The uses of ad hoc analysis are similar to those uses of the aggregated case data.
- Data will be provided to states annually and with any request for the aggregated data or subset of case data.
- The frequency of release is generally on an annual basis. Publication may include posting to the electronic Work-related Lung Disease (eWoRLD) Surveillance System, epidemiologic summaries in MMWR, or manuscripts in peer-reviewed journals. State case data is de-identified prior to submission to CDC/NIOSH. All cases are verified with the state(s) prior to publication.
- Any re-release or publication of the case data requires permission from states submitting data to CDC/NIOSH. Re-release also requires requesting intramural and extramural researchers fill out special use agreement or Data Release Form, based on the *CDC-ATSDR Data Release*

Guidelines and Procedures for Re-release of State-provided Data. CDC/NIOSH will only publish data on confirmed silicosis cases.

X. References

1. Council of State and Territorial Epidemiologists (CSTE). Adding silicosis as a condition reportable to the National Public Health Surveillance System (NPHSS). CSTE position statement 1996-2. Atlanta: CSTE; June 1996. Available from: <http://www.cste.org>.
2. Council of State and Territorial Epidemiologists (CSTE). Silicosis surveillance and case definition. CSTE position statement 1999 ENV 4. Atlanta: CSTE; June 1999. Available from: <http://www.cste.org>.
3. Council of State and Territorial Epidemiologists (CSTE). CSTE official list of nationally notifiable conditions. CSTE position statement 07-EC-02. Atlanta: CSTE; June 2007. Available from: <http://www.cste.org>.
4. Council of State and Territorial Epidemiologists (CSTE). Criteria for inclusion of conditions on CSTE nationally notifiable condition list and for categorization as immediately or routinely notifiable. CSTE position statement 08-EC-02. Atlanta: CSTE; June 2008. Available from: <http://www.cste.org>.
5. Council of State and Territorial Epidemiologists (CSTE). Data Release Guidelines of the Council of State & Territorial Epidemiologists for the National Public Health System. Atlanta: CSTE; June 1996.
6. Council of State and Territorial Epidemiologists, Centers for Disease Control and Prevention. CDC-CSTE Intergovernmental Data Release Guidelines Working Group (DRGWG) Report: CDC-ATSDR Data Release Guidelines and Procedures for Re-release of State-Provided Data. Atlanta: CSTE; 2005. Available from: <http://www.cste.org/pdffiles/2005/drgwgreport.pdf> or <http://www.cdc.gov/od/foia/policies/drgwg.pdf>.
7. National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention, Department of Health and Human Services. NIOSH hazard review: health effects of occupational exposure to respirable crystalline silica. DHHS (NIOSH) Publication No. 2002-129. Atlanta: CDC; April 2002. Available from: <http://www.cdc.gov/niosh/docs/2002-129/02-129a.html>.
8. National Institute for Occupational Safety and Health (NIOSH) [Internet], Centers for Disease Control and Prevention, Department of Health and Human Services. Silica. Atlanta: CDC. Available from: <http://www.cdc.gov/niosh/docs/2002-129/02-129a.html>. Last updated: 2008 Aug 14. Accessed: 2008 Oct 27.

XI. Coordination:

Agencies for Response:

- (1) Christine Branche, PhD, MSPH

Acting Director, NIOSH

395 E Street, S.W.

Suite 9200

Patriots Plaza Building

Washington, DC 20201

(202) 245-0625

Cbranche@cdc.gov

- (2) Jordan Barab

Acting Assistant Secretary

U.S. Department of Labor

Occupational Safety & Health Administration

200 Constitution Avenue

Washington, D.C. 20210

XII. Submitting Author:

- (1) Martha Stanbury

Division of Environmental Health

Michigan Department of Community Health

PO Box 30195

Lansing, MI 48909517-335-8364

stanburym@michigan.gov