Faye Rice, M.P.H.

For the past 13 years, Faye Rice, M.P.H., has been an Epidemiologist with the National Institute for Occupational Safety and Health (NIOSH). She is currently working in the Risk Evaluation Branch of the Education and Information Division. Rice became involved with the topic of crystalline silica in 1992 when assigned to draft a document on the topic. That document, the *NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica*, was finished in April and is an intense review of the literature on the health concerns and facts related to respirable crystalline silica. To view the entire document Online, visit the CDC Web site [http://www.cdc.gov/niosh/02-129A.html].

Rice recently spoke with HarrisMartin Publishing about the *Hazard Review* and other silica topics.

Why is chronic silicosis referred to more often in the epidemiologic literature than acute silicosis?

Chronic silicosis is the most studied type of silicosis. Epidemiologic studies are generally on a population being followed over an extended period of time and the outcome would be chronic silicosis because it takes a good number of years for that condition to develop. Acute silicosis, on the other hand, is thought to develop after exposures to high concentrations of respirable crystalline silica in a period ranging from a few weeks to five years after the initial exposure. So you have a much tighter timeframe for the development of acute silicosis, compared to chronic silicosis that is thought to be usually occurring after 10 or more years of exposure at what may be considered relatively low concentrations of respirable silica.

What is the relationship between silica and some non-pulmonary diseases mentioned in the *Hazard Review*?

Respirable crystalline silica is thought to be related to various immune disorders such as rheumatoid arthritis, certain types of renal problems and scleroderma, which is a connective tissue disease. It is not clear exactly how these diseases develop from exposure to respirable crystalline silica. There is a question about the mechanism for the development of these diseases. There are a number of epidemiologic studies that show statistically significant numbers of deaths or cases from these auto-immune related disorders and renal problems and diseases after occupational exposures to silica. In some cases the individuals have concurrent silicosis and other times they do not.

Would it be accurate to say that people who are occupationally exposed to silica experience a higher incidence of some of these disorders?

Sometimes it had been noted in the literature that this occurs, and although there is not yet an established pattern, we have noted these higher numbers of deaths that are statistically significant.

Are all forms of silica equally toxic?

Well, this is a little bit out of my area because I'm not a toxicologist. There are questions about the toxicity of one form of crystalline silica compared with other forms. Crystalline silica has various forms that are called polymorphs. Alpha quartz is the most common form that occurs in nature and in occupational settings. There are questions about whether some of the other forms are more or less toxic than alpha quartz. This has been examined in experimental studies but has not been well defined in the human population. Often in the work environment you have workers that are exposed to more than one form of silica at the same time depending on the types of jobs they are doing.

What is the relationship between cancer and silicosis? If a person has silicosis, will that person necessarily also develop cancer?

This is debated in the literature. The only cancer that silica has been definitely associated with is occupational lung cancer. Quite a few epidemiologic studies of workers with silicosis have shown increased rates of lung cancer. However, there are also studies of workers with increased rates of lung cancer and no preexisting silicosis. In other words, the two do not necessarily go hand in hand. The question of whether you can have lung cancer without silicosis in silica-exposed populations is highly debatable right now and the studies show it both ways.

It sounds like it is not yet clear if the increased incidence of lung cancer in silica-exposed populations has to do with the actual silica exposure or with other things that those people are doing or coming into contact with.

In the *Hazard Review*, we said that lung cancer is associated with occupational exposures to crystalline silica and that the available data also support the conclusion that silicosis produces an increased risk for bronchial carcinoma, but the data are less clear as to whether silica exposure is associated with lung cancer in the absence of silicosis.

On page 1 of the *Hazard Review*, there is a sentence about how the reported mortality associated with silicosis has declined since 1968, but the number of deaths among persons 15 to 44 did not substantially decline. How do you explain that finding?

There probably are a number of possibilities as to why that might be. I looked at the original articles from the CDC that stated that "over exposures of sufficient magnitude to cause premature death continue to occur in the United States."[1,2] One explanation of the finding you mention might be that younger individuals work in the more physically demanding high-exposure/intense-exposure types of jobs. Younger workers also might be in the low-seniority jobs where there might be higher, more intense exposures. These younger workers may also represent transient populations. Possibly they are doing contract work and sometimes contractors and their employees may not be as well trained or educated about safety precautions on the job. These are all speculations for why we are seeing silicosis in younger workers.

Is the NIOSH recommended exposure level (REL) sufficient to protect individuals from occupational exposure to silica?

To answer this question I will take the exact text from page 2 of the *Hazard Review* Introduction, "current occupational standards are not sufficiently protective to prevent the occurrence of chronic silicosis." That is based on several epidemiologic studies on chronic silicosis.[3-11] In the abstract, we also state:

> "Recent epidemiologic studies demonstrate that workers have a significant risk of developing chronic silicosis when they are exposed to respirable crystalline silica over a working lifetime at the current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL), the Mine Safety and Health Administration (MSHA) PEL, or the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL)."

Table A–1. U.S. guidelines and limits for occupational exposure to crystalline silica

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	Respirable crystalline silica present in concentrations >5% in surface and underground coal mines	RDS† = 10 ÷ % quartz (8-hr TWA)
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† Abbreviations: REL = recommended exposure limit; PEL = permissible exposure limit; RDS = respirable dust standard; TLV = threshold limit value; TWA = time-weighted average.

Reprinted from the Appendix of the April 2002 NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica.

It is also mentioned in the *Hazard Review* that some industries exceed the standards or the recommended limits more than other industries.

Yes, and there are probably some industries that we haven't even identified yet. One key reason that some industries exceed the standards is that there isn't enough being done to control the dust exposure. It's not being controlled. Possibly another reason is that interventions are needed to prevent exposure in those industries. Interventions could be things like engineering controls, occupational health education and training of managers and workers, and adherence to the regulations.

continued on page 6

seven percent worked around silica for fewer than ten years.

Because the number of Michigan ferrous foundry workers peaked in the 1970s at around 40,000, dropped to approximately 20,000 in 1980 and then to 12,000 in the late 1980s, there are fewer workers today at risk of developing silicosis, according to the research. That, combined with improved working conditions, should reduce the number of foundry workers who develop silicosis in the future, the researchers said.

However, they cautioned, silicosis remains an ongoing problem in Michigan with former foundry workers continuing to develop severe silicosis.

"Further, some Michigan workers will continue to be at risk of developing silicosis because of inadequate controls at foundries currently in operation," the researchers said. "In addition, sandblasting continues to be a high risk operation. Given the ready availability of non-silica abrasives, further educational and regulatory efforts are needed to encourage the replacement of silica in blasting operations or at the minimum ensure that silica is used properly."

COMING Next Month in *COLUMNS-Silica*:

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- Developments in the *Clemtex* and *Swan Transportation* Bankruptcies and the Implications for Silica Litigants Everywhere *By Sander L. Esserman, Esq.*
- An Interview with Kenneth D. Linch, CIH, a 17-year Veteran of the National Institute for Occupational Safety and Health in Morgantown, W.Va.
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HarrisMartin Interview:

Faye Rice, M.P.H.

continued from page 3

Is there anything else that you would like to add, especially since you worked on the *Hazard Review* for so long?

What is particularly interesting to me is that silica is not just related to silicosis, but is thought to have these other effects too, the lung cancer, the autoimmune related disorders, the renal problems. It is interesting that silica may affect health by causing wide ranging problems other than just silicosis.

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PERSPECTIVES

HarrisMartin Interview with Faye Rice, MPH on Occupational Exposure to Crystalline Silica

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Letter from the Editor

Silica litigation is heating up across the country. From Mississippi to Wisconsin, t the perennial litigation hot spots of Texas and Ohio, cases that have been filed recently in unprecedented proportion are beginning to take shape. Defendants hav struck first with a recent trial victory in Texas. However, more trials are scheduled and multi-million dollar settlements are being reported, one recently in a case filed last year in the Lone Star State.

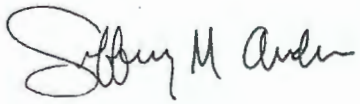
This month, *COLUMNS—Silica* continues comprehensive coverage of the litigation with its first regularly published monthly issue, which contains some of the unique features you can expect to see in the months ahead.

Our Spotlight on Silicosis feature begins this month with a look at Michigan, which is home to three counties where silicosis and silicosis mortality rates are among the highest in the nation. Be sure to check out future issues for analysis of figures released from other states where silica litigation is on the rise.

Also this month, *COLUMNS—Silica* talks with two prominent researchers about variety of silica-related matters. In-depth interviews have become a hallmark of HarrisMartin's suite of legal publications, and this month's discussions with Faye Rice, MPH, and Arthur R. Wickman, CIH, are no exception.

Additional interviews with an assortment of medical and legal experts are schedule to appear in several upcoming issues. For a preview of some of what's to come in the January issue of *COLUMNS—Silica*, be sure to stop by page 6.

As always, any comments, story and interview ideas, as well as attorney-authored commentary are welcome and can be submitted directly to our editorial staff by calling (800) 496-4319 or by emailing jandrus@harrismartin.com.



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