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Old adversaries in new places

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Inhalation of crystalline silica dust is a well-known occupational health hazard that is a risk factor for silicosis, lung cancer, chronic obstructive pulmonary disease, autoimmune disorders and chronic renal disease.[12] Crystalline silica is a common component of the earth's crust and occurs in many materials that workers extract, manufacture or manipulate. Consequently, occupational exposure to crystalline silica is common in both low-in-come/middle-income and developed nations. For example, the number of sili-ca-exposed workers has been estimated at 2million in Brazil,[2] 3.2million in the European Union,[3] 10 million in India[2] and 2.3 million in the USA.[1] These workers are employed in many industries, including construction; mining; quarries and stone crushing operations; foundries; abrasive blasting of buildings, bridges and metal products and manufacturing of bricks, concrete, ceramics and glass.

If there is awareness of the hazard, harmful exposures to crystalline silica can be controlled.[4] However, the recognition of even a known health hazard like crystalline silica can be delayed when it appears in a new occupational setting where management and workers are unaware of the hazard. This is especially a problem in smaller companies that do not have the depth of occupational safety and health resources of large corporations.[5] The lack of recognition means that known exposure controls may not be implemented until workers have become sick and sought care, and their caregivers have diagnosed disease and made the connection with work. In this situation, hazard recognition can be very much delayed when there is a long latency between initial exposure and disease development, as is the case for many silica-related diseases.

Sandblasting of jeans in Turkey during the 1990s and the first decade of this century is an excellent example where a silica hazard was recognised in an industry by clinicians.[6] Work was conducted without appropriate controls, leading to cases of silicosis that were identified by alert clinicians who played an important role in establishing the association with workplace exposures.[7] After the practice was banned in that country in 2009, the work

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moved to other countries like Bangladesh where the same problems occurred.[6] By 2010, major denim brands had begun announcing efforts to ban sandblasting of their products.

The current journal includes an article by Hoy and colleagues in which they describe a series of seven cases of silicosis in Australia among workers who fabricated benchtops from artificial stone that had a high crystalline silica content.[8] Artificial stone (also called artificial quartz conglomerates and engineered stone) is made by combining crushed stone with a resin and moulding the mixture into the desired shape before heat curing. Using power tools to cut, grind or drill artificial stone can release dangerous amounts of respirable crystalline silica that must be managed through appropriate controls. The first case series of silicosis related to working with artificial stone appeared in the medical literature in 2010 and was based on three cases identified in Spain.[9] Similar reports have appeared in the medical literature from Israel, Italy and the USA. In the current report, all cases worked for small operations with no more than 20 employees, in which large pieces of artificial stone benchtop were cut to fit customers' specifications. The cases had the signs and symptoms characteristic of accelerated silicosis, with a median of only 7.3 years of work prior to symptom onset, rapid declines in pulmonary function and radiological evidence of progressive massive fibrosis for all but one of the seven. This case series is potentially the tip of a much larger iceberg that includes other Australian workers who were similarly exposed. Hoy and colleagues have appropriately emphasised the need to limit dust concentrations and monitor workers in the benchtop fabrication industry. In a positive development, investigators have recently reported their findings on the effectiveness of control technologies like tool-mounted local exhaust ventilation and wet methods for suppressing respirable dust when working on artificial stone with power tools.[10,11]

There were reports at least as early as 1999 about silica exposure associated with the fabrication of granite countertops that could have alerted employers, workers and occupational health professionals to the possibility that cutting, grinding and drilling other silica-containing countertops like artificial stone could result in harmful exposures.[12] While insufficiently controlled exposure to crystalline silica in the Australian benchtop industry represents a missed opportunity to prevent disease caused by a known hazardous material, it is also a story of alert clinicians who suspected that their patients' signs and symptoms were associated with exposures at work. Surveillance for silicosis and silica-related lung cancer is often passive and based on mortality, which is a lagging indicator of dangerous occupational exposures. Surveillance for more leading indicators such as hazardous silica exposures or morbidity could possibly provide more timely identification of silica-related public health problems. Electronic health records (EHRs) are a health information technology that could facilitate surveillance for silica-related morbidity. However, EHRs are not widely used in all countries, and there could be challenges to accessing health and personal identifying information for this purpose. Product stewardship can also help to avert the mishandling of potentially dangerous materials, if the manufacturers actively communicate the risks of working with products and provide resources for the prevention of harmful exposures. Government agencies can contribute to prevention by not only setting and enforcing protective exposure standards but also by providing health and safety support to businesses, especially smaller companies. Regardless of these other efforts, clinicians play a critical role

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in surveillance of occupational diseases by recognising cases and case clusters and reporting them to public health authorities.

Exposure to crystalline silica will continue to be a challenge in various industries worldwide. Occupational health professionals, employers, workers and clinicians will need to play a role in the identification and control of this disease agent, especially when it occurs in new and unexpected work settings.

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