

Re: 2024 Review of the NSW Dust diseases scheme

RACP response to supplementary question 1: *If the scheme were to include non-lung diseases related to silica exposure, what specific diagnostic criteria should be used to establish causality and eligibility for benefits? and*

Question taken on notice (page 42 of the unofficial transcript): For this scheme we only recognise silica-related lung diseases. If we were to include that broader group of diseases within the scheme, what level is the evidence at and what would we need to be shown in order to link it causally with the exposure?

There is a growing body of evidence to support a causal relationship between respirable silica dust exposure and non-lung diseases in susceptible individuals. Exposure to silica has been associated with a wide spectrum of autoimmune diseases including systemic sclerosis (scleroderma), rheumatoid arthritis, systemic lupus erythematosus, Anti-Neutrophil Cytoplasmic Antibody (ANCA)-associated vasculitis, and sarcoidosis. There is also an association with a range of renal pathologies.

The specific mechanisms leading to autoimmune and renal diseases and the effects of environmental and occupational exposures on these mechanisms remain largely unknown, which makes establishing causality an inherent challenge and why engaging with specialist practitioners, such as Consultant Physicians in Occupational and Environmental Medicine, is needed.

Besides autoimmune diseases, silica exposure is also associated with several other diseases including lung cancer, chronic obstructive pulmonary disease (COPD), interstitial pulmonary fibrosis, and potentially others such as tuberculosis and renal disease. ^{1 2 3} International reports indicate that construction workers have a 50% greater incidence of moderate to severe COPD. ⁴

There is no definitive way to establish if a worker's autoimmune or renal disease is because of their work and/or associated exposures, or if they would have developed this disease outside their work or exposure. A thorough clinical assessment by specialist practitioners (Consultant Physicians in Occupational and Environmental Medicine) who are trained to assess and diagnosis, on the balance of probabilities (Bradford-Hill factors⁵) and causation, is needed. Engaging persons without their expertise in the diagnostic process can have significant adverse implications for workers, worker compensations claims, and worker entitlements.

Development of an informed structured decision-making process to minimise the number of workers harmed is needed, in addition to commissioning a comprehensive review of the current literature on this area and funding for continuing research.

145 Macquarie Street, Sydney NSW 2000, Australia
Tel: +61 2 9256 5444
memberservices@racp.edu.au
www.racp.edu.au

ACN 000 039 047 ABN 90 270 343 237

¹ RACP 2022 <u>Submission to Safe Work Australia</u> Consultation Regulation Impact Statement

² Steenland K. One agent, many diseases: exposure-response data and comparative risks of different outcomes following silica exposure. American journal of industrial medicine. 2005 Jul;48(1):16-23.

³ Leung CC, Yu IT, Chen W. Silicosis. The Lancet. 2012 May 26;379(9830):2008-18.

⁴ Blanc PD, Annesi-Maesano I, Balmes JR, Cummings KJ, Fishwick D, Miedinger D, Murgia N, Naidoo RN, Reynolds CJ, Sigsgaard T, Torén K. The occupational burden of nonmalignant respiratory diseases. An official American Thoracic Society and European Respiratory Society statement. American journal of respiratory and critical care medicine. 2019 Jun 1;199(11):1312-34.

⁵ Hill AB. The environment and disease: association or causation? Proceedings of the Royal Society of Medicine. 1965;58:295-300. This reference describes criteria as originally presented by Austin Bradford Hill (1897-1991), a British medical statistician as a way of determining the causal link between a specific factor and a specific disease. Hill identified nine factors to consider before causation might be described. The degree of evidence required must be convincing enough to warrant a particular policy action, and rests on the balance of alternate explanations appearing unlikely.

Supplementary research evidence:

 Tomic D, Hoy RF, Sin J, et al. Autoimmune diseases, autoantibody status and silicosis in a cohort of 1238 workers from the artificial stone benchtop industry. Occupational and Environmental Medicine, 2024; 81: 388-394.

This recent Australian study states: Screening for autoimmune disease is indicated in workers exposed to RCS as these individuals need specialised management and may be entitled to compensation.

• Fireman EM, Fireman Klein E. Association between silicosis and autoimmune disease. Curr Opin Allergy Clin Immunol. 2024 Apr 1;24(2):45-50. doi: 10.1097/ACI.000000000000066. Epub 2024 Jan 24. PMID: 38277164; PMCID: PMC10906195.

There is an association between silica inhalational exposure and autoimmune disease, particularly in the context of intense exposure. Silica exposure is recognised as a causative factor for autoimmune disorders, with connections to conditions such as pulmonary fibrosis (silicosis), rheumatoid arthritis (Caplan's syndrome), systemic sclerosis, systemic lupus erythematosus, and ANCA-related vasculitis/nephritis.

 Yuewei Liu, Yun Zhou, Eva Hnizdo, Tingming Shi, Kyle Steenland, Xinjian He, Weihong Chen, Total and Cause-Specific Mortality Risk Associated With Low-Level Exposure to Crystalline Silica: A 44-Year Cohort Study From China, *American Journal of Epidemiology*, Volume 186, Issue 4, 15 August 2017, Pages 481–490, <u>https://doi.org/10.1093/aje/kwx124</u>

This study followed a large cohort (44,807 workers in China) who had worked in metal mines or pottery factories exposed to low-level silica exposure. Low-level silica exposure was significantly associated with increased risk of mortality from all diseases, malignant neoplasms (including lung cancer), circulatory diseases (including ischemic heart disease and pulmonary heart disease), and respiratory disease (including silicosis).



RACP response to supplementary question 2: *It was mentioned that there was an overrepresentation of silicosis cases for workers working on sites that used a roadheader. Can you provide any further data or information on the prevalence of silicosis in different tunnelling roles and the specific risk factors associated with each role?*

This is an example of where research, as well as incidence and case study data, would be valuable, because, as Dr Muir noted, the majority of tunnellers medical practitioners are treating with silicosis are roadhead operators/bolters and shotcreters. Whilst the actual prevalence has not been substantiated, we can provide experiential information and a reasonable explanation.

It is important to appreciate that many workers often undertake multiple roles on the same job, and over the course of their career. This makes it difficult to break down roles and accurate risk factors or exposure based on past history. However, anecdotally the vast majority of tunnellers that Dr Muir and colleagues are treating with silicosis are roadhead operators/bolters and shotcreters. These are all roles that are "at the face" during active excavation.

It is recognised that the mechanism of dust generation and exposure to freshly fractured silica is more toxic and harmful to health than aged dust, due to the generation and quantum of free radicals.

It is also important to note that workers "at the face" generally remain underground for the entirety of their shift (usually 10-12 hours), including meal breaks spent underground in positive pressure and filtered crib rooms. These long shifts mean workers lungs do not have adequate time for the natural clearing mechanism to work to its full potential between shifts.

The RACP has advocated for appropriate funding for research to identify risk factors, disease progression and effective management of occupational respiratory diseases.¹

See also the RACP website for more information: Silicosis.

¹ Alif SM, Glass DC, Abramson M, Hoy R, Sim MR. Occupational Lung Diseases in Australia. 2020 Feb. Pages 1 to 86. Safe Work Australia.



RACP response to supplementary question 3: Can you provide more information on the potential long-term health effects of even low-level silica exposure?

In the RACP 2023 <u>submission on prohibition</u> on the use of engineered stone, we underlined the latency associated with the development of lung cancer and that this is the early stage of capturing reliable figures regarding the disease outcome for workers who have worked with engineered stone.

To better determine the risk, longer term linkage studies of the identifiable cohort of exposed workers engaged in various scheming programs are essential.

There is a similar situation regarding autoimmune diseases, although published findings from the Victorian silica-related disease registry have shown that markers of autoimmune disease are substantially increased in engineered stone workers, strongly suggesting that there will be a substantial increase in these autoimmune diseases over time.

A screening program would be of great value to workers, employers and to occupational and environmental medicine physicians and respiratory physicians. From a policy perspective, a better approach and to minimise harm, a much-needed informed structured decision-making process would be needed.

Supplementary research evidence:

 Vanka KS, Shukla S, Gomez HM, et al. Understanding the pathogenesis of occupational coal and silica dust-associated lung disease. Eur Respir Rev 2022; 31: 210250 [DOI: 10.1183/16000617.0250-2021]

The pathogenesis and manifestation of symptoms and patient outcomes of occupational dust diseases vary greatly. A greater understanding of how different types of dust and biological responses to these dusts affect disease in workers is required to help determine which workers are at greatest risk and inform better prevention strategies, develop earlier diagnostic tests and highlight pathogenic processes that can be targeted with novel therapeutics.

Though silicosis is predominantly seen in construction and stone workers, miners and coal workers involved in mining operations like sandblasting, surface drilling and roof bolting are exposed to high levels of respirable crystalline silica dust clouds for extended periods. This cohort of miners/workers is at heightened risk of developing silicosis during or after their tenure in coal sectors.

• Yuewei Liu, Yun Zhou, Eva Hnizdo, Tingming Shi, Kyle Steenland, Xinjian He, Weihong Chen, Total and Cause-Specific Mortality Risk Associated With Low-Level Exposure to Crystalline Silica: A 44-Year Cohort Study From China, *American Journal of Epidemiology*, Volume 186, Issue 4, 15 August 2017, Pages 481–490, <u>https://doi.org/10.1093/aje/kwx124</u>

This study followed a large cohort (44,807 workers in China) who had worked in metal mines or pottery factories exposed to low-level silica exposure. Low-level silica exposure was significantly associated with increased risk of mortality from all diseases, malignant neoplasms (including lung cancer), circulatory diseases (including ischemic heart disease and pulmonary heart disease), and respiratory disease (including silicosis).

The large cohort study found that long term exposure to low levels of silica is associated with increased total and certain cause-specific mortality risk including malignant neoplasms, lung cancer, ischemic heart disease, pulmonary heart disease, and respiratory disease. While it is generally accepted the impacts on health from silica exposure are dose dependent, some individuals are more susceptible than others at lower cumulative doses.

145 Macquarie Street, Sydney NSW 2000, Australia
Tel: +61 2 9256 5444
memberservices@racp.edu.au
ACN 000 039 047
ABN 90 270 343 237



RACP response to supplementary question 4: Can you provide further details on the current research and evidence regarding the link between silica exposure and autoimmune diseases?

There is an association between silica inhalational exposure and autoimmune disease, particularly in the context of intense exposure.¹ Multiple studies have identified statistically significant higher prevalences of both autoimmune conditions and asymptomatic autoimmune serological markers in silica exposed individuals than would be expected from the background prevalence including systemic lupus erythematosus, rheumatoid arthritis, systemic sclerosis, autoimmune myositis, mixed connective tissue disease, psoriasis, and antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis among individuals with silicosis.² For example, published findings from the Victorian silicarelated disease registry have shown that markers of autoimmune disease are substantially increased in engineered stone workers, strongly suggesting that there will be a substantial increase in these autoimmune diseases over time.3

Further, research from our RACP members states: Other currently unexplained aspects of silicosis pathogenesis include the association with several systemic autoimmune disorders, and the inexact correlation between the level of workplace exposure and development of disease.⁴

The RACP had anticipated this much-needed data might be obtained through the National Occupational Respiratory Disease Registry.⁵

The RACP is pleased that research funding has been allocated to the NSW Dust Diseases Board. This will play an important part in addressing worker health in high risk industries.

Supplementary research evidence:

Tomic D, Hoy RF, Sin J, et al. Autoimmune diseases, autoantibody status and silicosis in a cohort of 1238 workers from the artificial stone benchtop industry. Occupational and Environmental Medicine 2024: 81: 388-394.

This recent Australian study states: Screening for autoimmune disease is indicated in workers exposed to RCS as these individuals need specialised management and may be entitled to compensation.

• Fireman EM, Fireman Klein E. Association between silicosis and autoimmune disease. Curr Opin Allergy Clin Immunol. 2024 Apr 1;24(2):45-50. doi: 10.1097/ACI.00000000000066. Epub 2024 Jan 24. PMID: 38277164; PMCID: PMC10906195.

There is an established association between silica inhalational exposure and autoimmune disease. particularly in the context of intense exposure. Silica exposure is recognized as a causative factor for autoimmune disorders, with connections to conditions such as pulmonary fibrosis (silicosis), rheumatoid arthritis (Caplan's syndrome), systemic sclerosis, systemic lupus erythematosus, and ANCA-related vasculitis/nephritis.

 Hoy RF, Glass DC, Dimitriadis C, Hansen J, Hore-Lacy F, Sim MR. Identification of early-stage silicosis through health screening of stone benchtop industry workers in Victoria, Australia. Occupational and environmental medicine. 2021 Apr 1;78(4):296-302.

¹ Fireman EM, Fireman Klein E. Association between silicosis and autoimmune disease. Curr Opin Allergy Clin Immunol. 2024 Apr 1;24(2):45-50. doi: 10.1097/ACI.00000000000000966. Epub 2024 Jan 24. PMID: 38277164; PMCID: PMC10906195. ² Fireman EM, Fireman Klein E. <u>Association between silicosis and autoimmune disease</u>. Curr Opin Allergy Clin Immunol. 2024
 Apr 1;24(2):45-50. doi: 10.1097/ACI.0000000000066. Epub 2024 Jan 24. PMID: 38277164; PMCID: PMC10906195. ³ RACP 2023 submission on prohibition on the use of engineered stone

 ⁴ Hoy RF, Chambers DC. <u>Silica-related diseases</u> in the modern world. Allergy. 2020 Nov;75(11):2805-17.
 ⁵ RACP, TSANZ, ANZSOM 2023 <u>submission on prohibition</u> on the use of engineered stone

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RACP response to supplementary question 5: You discussed the challenges faced by workers who wish to return to their jobs after being diagnosed with silicosis. What specific guidelines and support mechanisms can be put in place to ensure their safe return to the workplace?

Consistent specific guidelines and support mechanisms are needed and should be developed in collaboration with all stakeholders: regulators, insurers, employer representatives, RACP members and specialist medical advisors, and worker representatives.

Evidence documented by the National Dust Disease Taskforce (NDDT) revealed that some workers with silicosis will progress even without further exposure to respirable crystalline silica dust.¹ However, the NDDT also noted many workers *will not significantly* progress in their immediate foreseeable future. It is important to not penalise workers who wish to return to work and who do not have evidence of progressive disease, or symptoms.

There are several issues related to returning workers diagnosed with silicosis to the workplace. The evidence review conducted during the development of the National Guidance for Doctors¹ revealed some workers with continuing heavy exposure do not develop disease, and for others, they do not develop rapidly progressive disease. Significantly, the disease does continue to progress for some workers. The reasons for the differences are unclear and further research is needed on this issue.

For workers with recently diagnosed disease, the cumulative exposure that led to their disease has already occurred. Therefore, in the absence of progressive disease or symptoms, workers should not be penalised if they want to work in a potentially hazardous workplace, especially if they engage in a patient-centred informed decision process. Equally, employers who comply with safe work practices should not be penalised for reasonably accommodating such workers.

Important to this question and pointing to ways forward include:

- Recommendation 5 of the NDDT <u>Final Report</u> is yet to be implemented and fully addressed. Recommendation 5 pertains to the training and support of the medical, health and other related professionals concerning the diagnosis and management of persons exposed to or suffering from exposure to respirable crystalline silica dust.
- Although the <u>National guidance for doctors assessing workers exposed to respirable</u> <u>crystalline silica dust</u>, (pertains to NDDT Recommendation 2) was released in February 2022, it has not yet been incorporated into jurisdictional safe work legislation, nor the training resources for doctors. As of 1 January 2025, the 2024 funded development of training resources by Royal Australian and New Zealand College of Radiologists (RANZCR), Thoracic Society of Australia and New Zealand (TSANZ), and the Lung Foundation Australia is not complete.

Many tunnellers often have financial commitments and underground work pays better than work on the surface in low-dust roles, even if these are made available. Whilst there are in-principal guidelines for coal-mine workers with pneumoconiosis to return to the workplace², applying these guidelines to a tunnelling setting may preclude a return to work.

These workers are often young and in the early stage of their working lives, so providing them with adequate support is crucial both for themselves, their families and the broader community.

¹ National Dust Disease Taskforce: <u>National guidance</u> for doctors assessing workers exposed to respirable crystalline silica dust

² Returning workers with mine dust lung diseases to the workplace, available at: <u>https://www.worksafe.qld.gov.au/</u> data/assets/pdf file/0029/88913/mine-dust-lung-disease-guidelines.pdf

In the RACP 2021 submission to the NSW Dust diseases scheme review we urged the NSW Government to support in full Recommendation 4 from the 2019 Dust Diseases Scheme Review -That iCare review and expand the financial assistance it provides for retraining and vocational support when an individual has been diagnosed with a silica related health condition, to ensure workers feel appropriately supported to leave the industry if they wish. Although this was supported in principle by NSW Government, we are unaware of any progress on this recommendation.

RACP has also called for:³

- Opportunities and support for specialist physicians to engage with employers, supervisors, workplace regulators and unions to identify and assess silica exposure and other hazards which are work, health and safety issues.
- A national regulatory framework and enforcement plan for all States and Territories.
- A national respiratory protection program delivered in partnership with the States and Territories.

Support mechanisms that could be considered for workers to return to their tunnelling role include:

- Facilitated shared decision making.⁴
- Provision of vocational retraining for workers that are required to work in low dust • environments.
- Subsidising wages to minimise financial hardship if a change of role is necessary.

We can advise that most tunnellers that we have diagnosed with silicosis are diagnosed early in their disease, with no symptoms and no significant reduction in their respiratory function. Most of these workers express a strong preference to remain in their normal work environment and job, and often have anxiety about the possibility of job loss or being assigned jobs that are not perceived as worthwhile or important. These workers may also be affected by being separated from their friends and work colleagues when they are asked to transfer to low dust occupations.

It is important to restate to the Committee the enormity of the indirect impacts of silica-related diseases on workers and those close to them.⁵ For example, the Victorian silica-associated disease registry has identified a significant number of people with adverse mental health outcomes.⁶ With 25% of screened artificial stone benchtop workers having silicosis, and more workers predicted to develop disease in the future (given the known high exposure levels in screened workers who are yet to be diagnosed with a silica related disease), then there are likely to be substantial negative impacts on healthcare costs, loss of income, compensation claims, insurance and social support systems.

More generally, the United States has acknowledged the pressing need to improve clinical recognition and public health awareness of the contribution of occupational factors across a range of nonmalignant respiratory diseases.7

³ See the RACP webpages on Silicosis

⁴ National guidance for doctors assessing workers exposed to respirable crystalline silica dust – Appendix B – Shared decision making tool https://www.health.gov.au/resources/publications/national-guidance-for-doctors-assessing-workers-exposed-torespirable-crystalline-silica-dust-appendix-b-shared-decision-making-tool?language=en ⁵ RACP, TSANZ, ANZSOM 2023 <u>submission on prohibition</u> on the use of engineered stone

⁶ Hore-Lacy F, Hansen J, Dimitriadis C, Hoy R, Fisher J, Glass D, Sim MR. Predictors of psychological stress in silica-exposed workers in the artificial stone benchtop industry. Respirology. 2022 Jun;27(6):455-61

⁷ Blanc PD, Annesi-Maesano I, Balmes JR, Cummings KJ, Fishwick D, Miedinger D, Murgia N, Naidoo RN, Reynolds CJ, Sigsgaard T, Toren K. The occupational burden of nonmalignant respiratory diseases. An official American Thoracic Society and European Respiratory Society statement. American journal of respiratory and critical care medicine. 2019 Jun 1;199(11):1312-34.



RACP response to supplementary question 6: You highlighted the lack of a central repository for health surveillance results. How can such a system be implemented to improve monitoring and tracking of workers' lung health throughout their careers?

We appreciate the ongoing work of the Standing Committee on Law and Justice and suggest that amendments to the workplace insurance scheme be considered to establish a fit for purpose registry and enable the necessary funding of the health needs of affected workers. Workplace insurance scheme refinements will help too resource and support long term regular health surveillance for all workers at risk.

With the National Occupational Respiratory Disease Registry (NORDR), once a worker is diagnosed and registered with a silica related disease in NSW, they can now be identified. However, to minimise barriers to optimal care, the life-long cost of their increased surveillance requirements needs to be supported by agreement between the worker's compensation scheme in NSW, the State-based public hospital scheme, and Medicare Australia. Funding of an education program for the medical profession and health community in NSW also needs to be introduced, hand-in-hand with legislative reform, to ensure ongoing health monitoring for workers who have been exposed to hazardous levels of respirable crystalline silica dust.¹

The RACP has previously stated that silica-related disorders and occupational lung diseases in general are underdiagnosed.² This limits the potential value of the NORDR until the National Dust Diseases Task Force Recommendation 5 (Better support medical, health and other related professionals to improve the diagnosis and management of workers affected by silicosis) has been addressed.

Unfortunately, NSW workers who have been significantly exposed respirable crystalline silica, but who have not yet developed disease, also carry a significant increased risk of developing disease. If diagnosed early, this could help minimise the degree of harm. Therefore, these workers need heightened surveillance.

For such workers, a central registry would be beneficial, rather than them being dependent on the health surveillance of future industry related employers, or if they change industries.

We note that legislation and systems exist in the mining industry in NSW and Queensland.

 ¹ See RACP webpage Silicosis <u>Overview</u>
 ² RACP 2022 <u>Submission to Safe Work Australia</u> Consultation Regulation Impact Statement