

Boise State University

ScholarWorks

---

Public Health and Population Science Faculty  
Publications and Presentations

School of Public and Population Health

---

5-2022

## Invited Perspective: Eliminating Toxics to Prevent Disease: Asbestos Leads the Way

David Kriebel

*University of Massachusetts Lowell*

Douglas J. Myers

*Boise State University*

## Invited Perspective: Eliminating Toxics to Prevent Disease: Asbestos Leads the Way

David Kriebel<sup>1</sup> and Douglas J. Myers<sup>2</sup>

<sup>1</sup>Lowell Center for Sustainable Production, University of Massachusetts Lowell, Lowell, Massachusetts, USA

<sup>2</sup>Department of Public Health and Population Science, College of Health Sciences, Boise State University, Boise, Idaho, USA

<https://doi.org/10.1289/EHP11362>

Refers to <https://doi.org/10.1289/EHP11148>

Countries that have consumed more asbestos have historically had higher mortality rates from asbestos-related diseases (ARDs) than countries with lower asbestos consumption.<sup>1</sup> A research letter in this issue by Rath et al. provides a 15-y update on evidence for this link and uses this evidence to support calls for a worldwide ban on the use of asbestos.<sup>2</sup> We find their results convincing, and we agree with the urgent need to stop producing and using asbestos. For those who might be skeptical of this conclusion or who are considering how much weight to give this evidence, we offer this perspective as occupational/environmental epidemiologists.

On the one hand, one can imagine a member of the general public saying, “Well, is not this obvious? Asbestos is dangerous. The more you use, the more people will get sick and die.” And, in fact, that is what Rath et al. are saying.<sup>2</sup> But studies purporting to show links between national death rates and crude measures of toxic chemical use are often discounted by experts for several sound reasons. First, epidemiologists would warn you of the “ecological fallacy”—just because one observes a trend across countries does not mean that the same will hold among individuals.<sup>3</sup> There are many other risk factors that might well track with asbestos consumption to create spurious correlations. Second, occupational hygienists would point out that simply because asbestos is “consumed” by a country does not mean anyone has actually breathed any asbestos fibers. One might reasonably predict that wealthier countries or those with stronger public health systems could consume large amounts of asbestos with very little actual human exposure and therefore minimal ARD, while poorer countries would have many more heavily exposed workers who would sicken and die from the same asbestos “consumption.”

Rath et al. present clear evidence<sup>2</sup> that cuts through the fog of these and other potential biases. Their findings may be explained by several factors from which broader lessons can be drawn. Asbestos causes its own distinct diseases: Asbestosis, by definition, has no other causes, and the vast majority of all mesotheliomas are caused by asbestos.<sup>4</sup> This gives the asbestos death toll its own unique signature and makes it much easier to see the impact of asbestos consumption in national statistics than would be the case for most other toxic chemicals. The authors appropriately excluded deaths from lung cancer from their analysis (even though this is an important component of the asbestos death toll) because lung

cancer has many other environmental causes and would not be expected to show a simple correlation with asbestos consumption.

The takeaway message here is one taught in every basic class in occupational health: The best way to control a hazard is to eliminate it.<sup>5</sup> No matter how well designed, devices and practices aimed at reducing human exposures to chemicals during their use are never fully effective. Control technologies sooner or later will drift into failure through neglect or cost cutting and are thus, over the long term, an entirely unproductive cost on a firm’s balance sheet.<sup>6</sup>

The research letter by Rath et al.<sup>2</sup> should be seen as a clear signal of the need to eliminate asbestos from all products and materials. This evidence from a global perspective supplements and confirms a very large body of high-quality epidemiological studies demonstrating the toxicity of asbestos even at very low levels of exposure.<sup>7,8</sup>

The strong link between asbestos and ARD mortality provides a rare opportunity for us to make inferences about the ecologic association observed by Rath et al.<sup>2</sup> and provides yet another lesson. There is a large and rapidly growing number of toxic chemicals in commerce, including (for example) dozens, if not hundreds, of carcinogens.<sup>9</sup> Plotting consumption statistics for these carcinogens, one at a time, against cancer rates will not help us identify chemicals to eliminate, because there are too many other causes and intervening factors in the causal pathways to cancer. But that does not mean these chemicals are not causing cancers (and other chronic diseases), only that we cannot easily see the patterns. The conclusion? Once again, the most effective way to prevent disease from toxic chemicals is to eliminate the chemicals without waiting for unimpeachable causal evidence.<sup>10</sup>

Although banning a chemical sounds drastic, it can be much better for business than trying, less effectively, to regulate it. Instead of spending money for controlling exposures (money that is a drag on profits), the development and production of less toxic alternatives can be highly profitable as it opens new markets and competitive advantage.<sup>6,11,12</sup> A growing movement including industries, government regulators, and citizens’ groups is working toward this vision, framing it with terms like “sustainable chemistry”<sup>13</sup> and a “cancer-free economy.”<sup>14</sup> Let us hope that we will look back after another 15 y and see that a total worldwide asbestos ban was a critical step in the global transition to safer chemicals.

### References

1. Lin RT, Takahashi K, Karjalainen A, Hoshuyama T, Wilson D, Kameda T, et al. 2007. Ecological association between asbestos-related diseases and historical asbestos consumption: an international analysis. *Lancet* 369(9564):844–849, PMID: 17350453, [https://doi.org/10.1016/S0140-6736\(07\)60412-7](https://doi.org/10.1016/S0140-6736(07)60412-7).
2. Rath EM, Yuen ML, Odgerel CO, Lin RT, Soeberg M, Nowak AK, et al. 2022. The ecological association between asbestos consumption and asbestos-related diseases 15 years later. *Environ Health Perspect* 130(5):057703, <https://doi.org/10.1289/EHP11148>.
3. Lash TL, VanderWeele TJ, Haneuse S, Rothman KJ. 2021. *Modern epidemiology*. 4th ed. Philadelphia, PA: Wolters Kluwer.
4. Driscoll T, Nelson DI, Steenland K, Leigh J, Concha-Barrientos M, Fingerhut M, et al. 2005. The global burden of disease due to occupational carcinogens. *Am J Ind Med* 48(6):419–431, PMID: 16299703, <https://doi.org/10.1002/ajim.20209>.
5. NIOSH (U.S. National Institute for Occupational Safety and Health). 2022. Hierarchy of controls. <https://www.cdc.gov/niosh/topics/hierarchy/default.html> [accessed 31 March 2022].

---

Address correspondence to David Kriebel, Lowell Center for Sustainable Production, University of Massachusetts Lowell, Wannalancit Mill 5th Floor, 600 Suffolk St., Lowell, MA 01854 USA. Telephone: (978) 934-3270. Email: [David\\_Kriebel@uml.edu](mailto:David_Kriebel@uml.edu)

The authors declare they have no actual or potential competing financial interests.

Received 5 April 2022; Revised 2 May 2022; Accepted 4 May 2022; Published 27 May 2022.

**Note to readers with disabilities:** *EHP* strives to ensure that all journal content is accessible to all readers. However, some figures and Supplemental Material published in *EHP* articles may not conform to 508 standards due to the complexity of the information being presented. If you need assistance accessing journal content, please contact [ehpsubmissions@niehs.nih.gov](mailto:ehpsubmissions@niehs.nih.gov). Our staff will work with you to assess and meet your accessibility needs within 3 working days.

6. Quinn MM, Kriebel D, Geiser K, Moure-Eraso R. 1998. Sustainable production: a new strategy for the work environment. *Am J Ind Med* 34(4):297–304, PMID: 9750934, [https://doi.org/10.1002/\(SICI\)1097-0274\(199810\)34:4<297::AID-AJIM1>3.0.CO;2-Q](https://doi.org/10.1002/(SICI)1097-0274(199810)34:4<297::AID-AJIM1>3.0.CO;2-Q).
7. ILO, WHO (International Labor Organization, World Health Organization). 2007. *Outline for the Development of National Programs for Elimination of Asbestos-Related Diseases*. <https://www.who.int/publications/i/item/WHO-SDE-PHE-07-02> [accessed 31 March 2022].
8. IARC (International Agency for Research on Cancer). 2012. *Arsenic, Metals, Fibres, and Dusts*. IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 100(pt C). Lyon, France: IARC.
9. Kriebel D. 2009. Cancer prevention through a precautionary approach to environmental chemicals. *Rev Environ Health* 24(4):271–277, PMID: 20384033, <https://doi.org/10.1515/reveh.2009.24.4.271>.
10. Kriebel D, Tickner J, Epstein P, Lemons J, Levins R, Loechler EL, et al. 2001. The precautionary principle in environmental science. *Environ Health Perspect* 109(9):871–876, PMID: 11673114, <https://doi.org/10.1289/ehp.01109871>.
11. Kriebel D, Hoppin PJ, Jacobs MM, Clapp RW. 2016. Environmental and economic strategies for primary prevention of cancer in early life. *Pediatrics* 138(suppl 1):S56–S64, PMID: 27940978, <https://doi.org/10.1542/peds.2015-42681>.
12. Tickner J, Nieuwenhuizen P. 2022. Reinventing the chemical industry to achieve a sustainable future. We can rebuild a more innovative industry based on renewable and circular feedstocks. *Chemical & Engineering News*, 1 March 2022. <https://cen.acs.org/environment/sustainability/Reinventing-chemical-industry-achieve-sustainable-future/100/web/2022/03> [accessed 31 March 2022].
13. Tickner JA, Geiser K, Baima S. 2022. Transitioning the chemical industry: elements of a roadmap toward sustainable chemicals and materials. *Environment* 64(2):22–36, <https://doi.org/10.1080/00139157.2022.2021793>.
14. CFEN (Cancer Free Economy Network). 2020. Cancer and Health Leaders Call for Action to Reduce the Burden of Cancer by Addressing Environmental Risk Factors. <https://www.cancerfreeeconomy.org/joint-statement/> [accessed 31 March 2022].