Despite studies, health effects of coal-burning power plants remain unknown

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Credit: Duke University

A review of studies over the past 30 years provides a body of evidence that people living near coal-fired power plants have higher death rates and at earlier ages, along with increased risks of respiratory disease, lung cancer, cardiovascular disease and other health problems.

The elevated health risks appear to be associated with exposure to air pollutants from the coal-burning power plant emissions and to the heavy metals and radioactive material in coal ash, a waste product of the plants.

But even with strong evidence, details remain unknown about the specific components associated with poor health outcomes and the exposure levels that become toxic, according to a review article from Duke University School of Medicine researchers published today in the North Carolina Medical Journal.

"We reviewed 113 studies that have been published in peer-reviewed journals over the past 30 years chronicling the health effects of coal-burning power plants," said lead author Julia Kravchenko, M.D., Ph.D., assistant professor in Duke's Department of Surgery.

"Together, this body of literature outlines a clear need to conduct definitive studies that fully detail the severity of health effects from air, water, and soil contaminants and to set specific limits to exposures," Kravchenko said.

Kravchenko and co-author H. Kim Lyerly, M.D., director of the Environmental Health Scholars Program at Duke, highlighted the pollution sources of health hazards identified in their review.

- Air pollution: Burning coal produces particles called fly ash, which lodge predominantly in the lungs, causing irritation and inflammation. Exposures to additional emissions of sulfur dioxide, nitrogen dioxide and heavy metals are also harmful;

these are associated with worse respiratory and cardiovascular health and higher death rates for people living near and around the coal-burning power plants.

- Water and soil pollution: Fly ash is stored in wet form and can contaminate ground and nearby surface water with leaking toxins, including mercury, arsenic and other heavy metals known to damage the neurological and gastrointestinal systems, kidneys and other organs.
- Radioactive contaminants: Burning coal also releases uranium, thorium, and ruthenium and other radioactive isotopes in concentrated form. Even at low levels, these isotopes can accumulate in the human body and form life-long deposits in bones and teeth.

Documented health risks from exposures to the pollutants include premature deaths, cardiovascular diseases, lung cancer, low birth weights, higher risk of developmental and behavioral disorders in infants and children, and higher infant mortality.

"Despite a large body of research into the health risks of coal-fired power plants, there are still major gaps not only in our knowledge about the impact of these exposures, but also the appropriate regulatory response in setting limits to these pollutants," Lyerly said.

Coal-burning power plants remain the major source of electrical production in North Carolina, Kravchenko said. And while air pollution from coal-burning power plants emissions is regulated by the Clean Smokestacks Act and other laws, North Carolina has the highest number of highly hazardous coal ash impoundment sites in the Southeast.

"This contributes to contamination in nearby communities," she said. "That makes evaluation of the health in residential communities located in close proximity to coal-burning power plants and/or to coal ash

impoundments in North Carolina very important."

Provided by Duke University