

# Pollution from marine vessels linked to heart and lung disease

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Pollution from marine shipping causes approximately 60,000 premature cardiopulmonary and lung cancer deaths around the world each year, according to a report scheduled to appear in the Dec. 15 issue of *Environmental Science and Technology*, the journal of the American Chemical Society.

The report benchmarks for the first time the number of annual deaths caused globally by pollution from marine vessels, with coastal regions in Asia and Europe the most affected.

Conducted by James Corbett of University of Delaware and James Winebrake from Rochester Institute of Technology, the study correlates the global distribution of particulate matter—black carbon, sulfur, nitrogen and organic particles—released from ships' smoke stacks with heart disease and lung cancer mortalities in adults. The results indicate that approximately 60,000 people die prematurely around the world each year from shipping-related emissions. Under current regulation, and with the expected growth in shipping activity, Corbett and Winebrake estimate the annual mortalities from ship emissions could increase by 40 percent by 2012.

Corbett and Winebrake's results come in the midst of current discussions by the International Maritime Organization to regulate emissions from ships.

“This study will help inform policymakers about some of the health

impacts associated with ship emissions and the long range transport of those emissions to population centers,” says Winebrake, chair of RIT’s Department of Science, Technology and Society/Public Policy. “We now have a benchmark by which we can begin to evaluate the benefits of emission reduction policies.”

Annual deaths related to shipping emissions in Europe are estimated at 26,710, while the mortality rate is 19,870 in East Asia and 9,950 in South Asia. North America has approximately 5,000 premature deaths, concentrated mostly in the Gulf Coast region, the West Coast and the Northeast, while the eastern coast of South America has 790 mortalities.

Ships run on residual oil, which has sulfur content thousands of times greater than on-road diesel fuel. “Residual oil is a byproduct of the refinery process and tends to be much dirtier than other petroleum products,” Winebrake says.

“We needed to know what the benefits are of cleaning up this fuel,” he explains. “Now we can evaluate the human health impacts of policies to require low-sulfur fuels for the shipping industry or that require ships to put emissions control technology on their vessels. Our study will help inform this policy debate.”

Up until recently, researchers had little information with which to work; emissions data for marine vessels had to be linked with data tracking the movement of these vessels around the world. In their report, Corbett and Winebrake mapped marine pollution concentrations over the oceans and on land, estimating global and regional mortalities from ship emissions by integrating global ship inventories, atmospheric models and health impacts analyses.

The focus on long-term exposure to particulate matter in this study does not extend to impacts on children or other related health issues such as

respiratory disease, asthma, hospital emissions and the economic impact of missed workdays and lost productivity.

“Our work will help people decide at what scale action should be taken,” says Corbett, associate professor of marine policy at University of Delaware. “We want our analysis to enable richer dialogue among stakeholders about how to improve the environment and economic performance of our freight systems.”

Source: Rochester Institute of Technology

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