








# Air pollution exposure may heighten risk of heart disease among US adults receiving hemodialysis

June 14 2022

## Long-Term Ambient PM<sub>2.5</sub> Exposure and Cardiovascular Outcomes Among US Patients on Hemodialysis

Setting & Participants	Methods	Key Findings						
 <b>Retrospective Cohort Study</b>  <b>N = 314,079</b> <ul style="list-style-type: none"> <li>• 51% aged ≥ 65 years</li> <li>• Initiated in-center HD between 2011-2016</li> <li>• Identified from USRDS</li> </ul>	<b>Exposure:</b>  Annual-average PM <sub>2.5</sub> by ZIP code of dialysis clinic  <i>Median annual-average PM<sub>2.5</sub>: 8.7 µg/m<sup>3</sup></i> <b>Outcomes:</b>  CV event (over mean F/U of 0.8 y)  CVD-specific mortality (over mean F/U of 1.7 y)	<table border="1"> <thead> <tr> <th colspan="2">HR (95% CI) per 1 µg/m<sup>3</sup> greater annual-average PM<sub>2.5</sub></th> </tr> </thead> <tbody> <tr> <td>CV event</td> <td><b>1.02 (1.01-1.02)</b></td> </tr> <tr> <td>CVD-specific mortality</td> <td><b>1.02 (1.02-1.03)</b></td> </tr> </tbody> </table> <p><b>Association was more pronounced for:</b></p> <ul style="list-style-type: none"> <li>• Patients who initiated dialysis at older age</li> <li>• Asian population</li> <li>• Patients with COPD at baseline</li> </ul>	HR (95% CI) per 1 µg/m <sup>3</sup> greater annual-average PM <sub>2.5</sub>		CV event	<b>1.02 (1.01-1.02)</b>	CVD-specific mortality	<b>1.02 (1.02-1.03)</b>
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<div style="border: 1px solid orange; padding: 5px; text-align: center;"> <b>CONCLUSION:</b> Long-term ambient PM<sub>2.5</sub> exposure is associated with CVD outcomes among patients receiving maintenance in-center HD.         </div>								
<p><i>Yuzhi Xi, David B. Richardson, Abhijit V. Kshirsagar, et al</i>            @AJKDonline   DOI: 10.1053/j.ajkd.2022.04.008</p>								

Visual Abstract for "Long-Term Ambient PM<sub>2.5</sub> Exposure and Cardiovascular Outcomes Among US Patients on Hemodialysis" by Yuzhi Xi et al (AJKD, 2022). Credit: Visual Abstract for "Long-Term Ambient PM<sub>2.5</sub> Exposure and Cardiovascular Outcomes Among US Patients on Hemodialysis" by Yuzhi Xi et al (AJKD, 2022)

In a study published in the *American Journal of Kidney Diseases (AJKD)*,

researchers found that US adults receiving hemodialysis with higher levels of air pollution exposure have more heart attacks and strokes compared to those with low levels of exposure; strongest associations of air pollution exposure with cardiovascular events were noted among patients who were Asian, older, or had chronic lung disease at dialysis initiation.

Long-term exposure to air pollution, also called PM<sub>2.5</sub>, has been linked to adverse cardiovascular (CV) outcomes. However, little is known about the association of PM<sub>2.5</sub> and outcomes among patients receiving dialysis, individuals with high CV disease burdens.

Led by Yuzhi Xi, researchers conducted an epidemiological study to assess the association between the annual PM<sub>2.5</sub> exposure and CV events and death among patients receiving regular outpatient [hemodialysis](#) in the United States between 2011-2016. They found a higher risk of heart attacks, strokes, and related events in patients exposed to higher levels of air pollution. Stronger associations between air pollution and adverse health events were observed among patients who were older at the start of dialysis, had chronic obstructive pulmonary disease, or were Asian.

These findings bolster the evidence base linking air pollution and adverse health outcomes and may inform policymakers and clinicians. Exposure mitigation on the individual level could be beneficial to at-risk individuals. Future studies should be conducted to study additional potential health impacts of [air pollutants](#) such as ozone, NO<sub>x</sub>, and others among such vulnerable populations.

**More information:** Yuzhi Xi et al, Association Between Long-term Ambient PM<sub>2.5</sub> Exposure and Cardiovascular Outcomes Among US Hemodialysis Patients, *American Journal of Kidney Diseases* (2022). [DOI: 10.1053/j.ajkd.2022.04.008](https://doi.org/10.1053/j.ajkd.2022.04.008)

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