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## Air Pollution Can Worsen Bone Health

*A new study by the CHAI Project with over 3,700 people in India associates air pollution with a higher risk to develop osteoporosis*

**Barcelona, January 3rd, 2020.-** Some of the **effects of air pollution on health** are well documented –lung cancer, stroke, respiratory diseases, and a long etcetera– but for others there is less scientific evidence. Such is the case of **bone health**: there are only a few studies and results are inconclusive. Now, a study in India led by the Barcelona Institute for Global Health ([ISGlobal](#)), an institution supported by "la Caixa", has found an **association between exposure to air pollution and poor bone health**.

**Osteoporosis** is a disease in which the density and quality of the bone is reduced. Globally, it is responsible for a substantial burden of disease and its prevalence is expected to increase due to aging of the population.

The new study performed by the [CHAI Project](#), led by ISGlobal and published in *Jama Network Open*, analysed the association between air pollution and bone health in over **3,700 people from 28 villages outside the city of Hyderabad, in southern India**.

The authors used a locally-developed model to estimate **outdoor exposure at residence to air pollution by fine particulate matter** (suspended particles with a diameter of 2.5 µm or less) and **black carbon**. The participants also filled a questionnaire on the **type of fuel used for cooking**. The authors linked this information with bone health assessed using a special type of **radiography that measures bone density**, called dual-energy x-ray absorptiometry, and measured bone mass at the lumbar spine and the left hip.

The results showed that **exposure to ambient air pollution, particularly to fine particles, was associated with lower levels of bone mass**. No correlation was found with use of biomass fuel for cooking.

"This study contributes to the limited and inconclusive literature on air pollution and bone health," explains **Otavio T. Ranzani**, ISGlobal researcher and first author of the study. Regarding the possible mechanisms underlying this association, he says **"inhalation of polluting particles could lead to bone mass loss through the oxidative stress and inflammation caused by air pollution"**.

Annual average exposure to ambient PM<sub>2.5</sub> was 32.8 µg/m<sup>3</sup>, far **above the maximum levels recommended by the World Health Organisation** (10 µg/m<sup>3</sup>). 58% of participants used biomass fuel for cooking.

"Our findings add to a growing body of evidence that indicates that particulate air pollution is relevant for bone health across a wide range of air pollution levels, including levels found in high income and low-and medium income countries" says Cathryn Tonne, coordinator of the study and of the CHAI project. "

## Reference

Otavio T. Ranzani, Carles Milà, Bharati Kullkarni, Sanjay Kinra, Cathryn Tonne. Ambient and Household Air Pollution and Bone Mineral Content Among Adults in Peri-urban South India. *Jama Network Open*. 2020;3(1):e1918504. doi:10.1001/jamanetworkopen.2019.18504

## About ISGlobal

The Barcelona Institute for Global Health, ISGlobal, is the fruit of an innovative alliance between "la Caixa" and academic and government institutions to contribute to the efforts undertaken by the international community to address the challenges in global health. ISGlobal is a consolidated hub of excellence in research that has grown out of work first started in the world of health care by the Hospital Clínic and the Parc de Salut MAR and in the academic sphere by the University of Barcelona and Pompeu Fabra University. The pivotal mechanism of its work model is the transfer of knowledge generated by scientific research to practice, a task undertaken by the institute's Education and Policy and Global Development departments. ISGlobal has been named a Severo Ochoa Centre of Excellence and is a member of the CERCA programme of the Generalitat de Catalunya.

## ISGlobal's Press Office

Marta Solano

[marta.solano@isglobal.org](mailto:marta.solano@isglobal.org)

0034 93 214 73 33 / 0034 661 451 600

Carol Pozo

[carolina.pozo@isglobal.org](mailto:carolina.pozo@isglobal.org)

0034 93 214 73 33

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