

Passive smoking and air pollution linked to arthritis and poor therapy response

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There is increasing evidence that environmental air pollution is associated with people developing inflammatory arthritis. At the 2021 EULAR congress, a large population-based study of French women reports passive exposure to smoking during childhood or adulthood

increases the risk of developing rheumatoid arthritis (RA). A second study in Italy found that air pollution also has an impact—with air pollution levels showing an association with failure of biologic therapy.

RA is an inflammatory autoimmune disease that causes pain, swelling and stiffness in the joints. It can also cause fatigue, and the underlying inflammation may affect other body systems. It is more common in [women](#) than in men. To date, [active smoking](#) has been the most reproducibly reported risk factor for a type of RA called anti-citrullinated protein antibody (ACPA) positive RA—particularly in people who carry the HLA-DRB1-shared epitope alleles.

Nguyen and colleagues set out to investigate the relationship between [passive smoking](#) and the risk of developing RA in a large prospective cohort of healthy French women.

The E3N-EPIC (Etude Epidémiologique au près des femmes de la Mutuelle générale de l'Education Nationale) has collected data on healthy French women since 1990. RA cases have been identified with specific questionnaires and via the medication reimbursement database. Women were considered to have been exposed to passive [smoking](#) in childhood if they self-declared staying in a smoky room several hours a day during childhood, and to passive smoking as an adult if they self-declared being exposed for at least 1 hour a day.

79,806 women were included in the study. Among them, 698 cases of RA were identified. In the whole cohort, 10,810 (13.5%) were exposed to passive smoking as children, and 42,807 (53.6%) to passive smoking as adults. 6,581 (8.25%) were exposed to both, and 47,036 (58.9%) were exposed to either.

In the whole population, passive smoking in childhood was positively associated with the risk of RA. When analyzed by each person's own

smoking status, passive smoking in childhood was associated with RA among women who had never smoked themselves, but not among those who had ever smoked themselves.

When the authors looked at passive smoking in adulthood, there was also a positive risk association in the whole population. But when analyzed again by individual smoking status, the association with increased RA risk was only among never-smoking women, not those who had ever themselves been a smoker.

These results suggest that smoking by-products—whether actively or passively inhaled—could generate autoimmunity, at least towards antigens involved in RA pathogenesis.

In a poster examining another link between the lungs and inflammatory arthritis, Adami and colleagues looked at the association between concentration of air pollutants and biologic drug retention rates in people with chronic inflammatory arthritis (CIA) living in the Verona area of Italy.

This was a case-crossover study to compare the exposure to pollutants in the 30-day and 60-day periods preceding a drug switch or swap due to disease progression.

1,286 patients with CIA (888 with RA, 260 with psoriatic arthritis and 138 with ankylosing spondylitis) were included, and 13,636 daily [air pollution](#) records were retrieved. The authors found an exposure-dependent relationship between exposure to air pollutants and markers of inflammation in people with CIA. Exposures of greater than $50\mu\text{g}/\text{m}^3$ and greater than $40\mu\text{g}/\text{m}^3$ had a 150% and 65% higher risk of having C-reactive protein (CRP) levels above 5 mg/L, respectively.

If the pollution threshold was set at $30\mu\text{g}/\text{m}^3$ (below the European Union

health protection limit) there was still a 38% higher risk of having altered CRP.

Air pollutants concentrations were higher before a switch or swap due to drug inefficacy. The authors concluded that environmental air pollution was a determinant of poor response to biologic treatment. Interventions to decrease fossil fuel combustion emissions might have beneficial effects on the persistence rate of biologic treatments in people with [inflammatory arthritis](#).

Provided by European Alliance of Associations for Rheumatology

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