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## PASSIVE SMOKING AND AIR POLLUTION – LINKS TO ARTHRITIS DEVELOPMENT AND POOR RESPONSE TO THERAPY

**New data shared at the 2021 EULAR congress**

**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 auprès des femmes de la Mutuelle générale de l'Éducation 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 analysed 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 analysed 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 µg/m<sup>3</sup> and greater than 40 µg/m<sup>3</sup> 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 µg/m<sup>3</sup> (below the European Union health protection limit) there was still a 38% higher risk of having altered CRP (OR 1.383, 95% CI 1.206–1.588).

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.

#### Source

Nguyen Y, et al. Association between passive smoking in childhood and adulthood, and rheumatoid arthritis: results from the French E3N-EPIC cohort study. Presented at EULAR 2021; abstract OP0012.

Adami G, et al. Air pollution is a predictor of poor response to biological therapies in chronic inflammatory arthritides. Presented at EULAR 2021; poster POS0644.

#### About EULAR

EULAR is the European umbrella organisation representing scientific societies, health professional associations and organisations for people with rheumatic and musculoskeletal diseases (RMDs). EULAR aims to reduce the burden of RMDs on individuals and society and to improve the treatment, prevention and rehabilitation of RMDs. To this end, EULAR fosters excellence in education and research in the field of rheumatology. It promotes the translation of research advances into daily care and fights for the recognition of the needs of people with RMDs by the EU institutions through advocacy action.

#### About the EULAR European Congress of Rheumatology

Since its introduction in 2000, the annual EULAR European Congress of Rheumatology has become the primary platform for exchange of scientific and clinical information in Europe. It is also a renowned forum for interaction between medical doctors, scientists, people with arthritis/rheumatism, health professionals and representatives of the pharmaceutical industry worldwide. The EULAR congress is usually held in June in one of the major cities in Europe ([see previous congresses](#)).

The [scientific programme](#) at the congress covers a wide range of topics on clinical innovations, clinical, translational and basic science. Meetings set up by associations of people with arthritis/rheumatism, health professionals and the health care industry complement the programme. The poster sessions, offering lively interaction between presenters and participants, are regarded by many as the heart of the congress.

Over the years, the EULAR Congress has gained a reputation of being a most innovative platform for the practicing physician particularly with respect to the acquisition of information on

novel clinical research. The congress attracts more than 18,000 delegates from more than 130 countries.

The aim of the EULAR European Congress of Rheumatology is to provide a forum of the highest standard for scientific, both clinical and basic, educational, and social exchange between professionals involved in rheumatology, liaising with patient organisations, in order to achieve progress in the clinical care of people with rheumatic diseases.

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