

Workplace Exposures and the Development of New Onset Adult Asthma: A Systematic Review With Meta-analysis

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RATIONALE: It is estimated that over 600 agents in the workplace can lead to asthma, and that approximately 16% of adult asthma may be work-related. We conducted a systematic review with meta-analysis to identify work exposures and occupations for which there is epidemiological evidence of a causal association with new-onset adult asthma (NOAA).

METHODS: All of MEDLINE, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Embase, and CINAHL were searched until March 2024. Full papers or reports that studied adult workers (or workplace exposures) in relation to NOAA (confirmed by objective testing with ≥ 3 cases), and reported a risk estimate were included. Studies were limited to cohort, case-control, and repeated cross-sectional designs. Risk of bias was assessed using the Office of Health Assessment and Translation (OHAT) tool. A narrative summary was conducted and, for exposures or occupations examined in ≥ 3 unique study populations, meta-effect estimates (mEE) with 95% CI were estimated using random effects models.

RESULTS: In total, 8090 studies were identified for title and abstract screening. A total of 539 full text documents were reviewed, of which 17 met the inclusion criteria. Included studies were primarily European, population-based, case-control studies, and were published between 2000-2009. Meta-analyses (mEE, 95% CI) found evidence of a significant positive relationship between dusts/particles (1.89, 1.54-2.30), welding fumes/welders (1.92, 1.73-2.14), bakers (3.57, 1.76-7.28), painters (2.26, 1.34-3.80), hairdressers (1.65, 1.27-2.15), healthcare workers (1.27, 1.18-1.37), and construction workers (1.58, 1.44-1.74) and development of NOAA. The narrative review identified relationships between 24 additional occupations/exposures and NOAA, though there was inconsistent evidence of a dose-response relationship. All studies except for one, which was excluded from models, were rated as a low risk of possible bias.

CONCLUSIONS: Results support a causal relationship between work as a welder, baker, painter, hairdresser, as well as work in healthcare and construction and exposure to particulates (unspecified) and the development of NOAA based on epidemiological evidence. The systematic review and meta-analyses relied on a strong case definition of NOAA, increasing certainty of the observed associations with NOAA. The restriction to case-control and longitudinal studies provided stronger evidence for causality but lead to the exclusion of evidence for several exposures/occupations that are known from clinical evidence to cause NOAA.

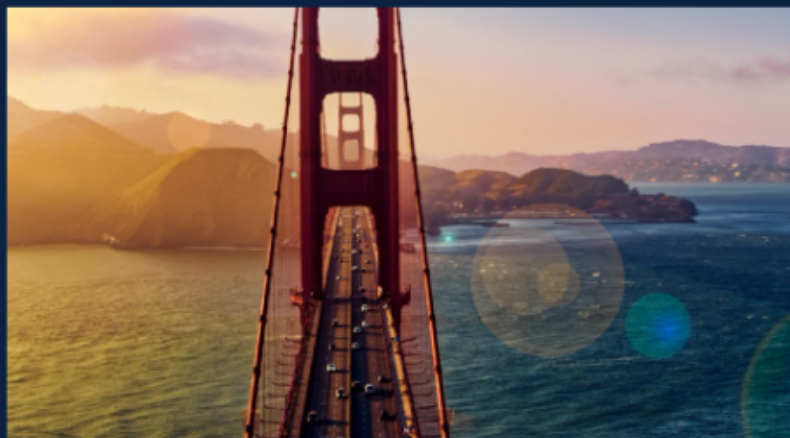
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