

Exposure to Vapours, Gases, Dusts, and Fumes at Work in Relation to Chronic Bronchitis, Emphysema, and Chronic Obstructive Pulmonary Disease: A Systematic Review With Meta-analyses

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RATIONALE Chronic obstructive pulmonary disease (COPD) is defined by fixed (irreversible) airflow limitation and can encompass both chronic bronchitis (CB) and emphysema. Though the occupational contribution to COPD is accepted scientifically, the contribution of smoking and genetic factors to the development of COPD can make decisions on workers' compensation eligibility challenging. The objective was to undertake a systematic review of the evidence examining the relationship of vapours, gases, dusts and fumes (VGDF) with different definitions of COPD. **METHODS** Databases were searched from inception until August 31, 2023 (MEDLINE, Cochrane (Systematic Reviews and Register of Controlled Trials), Embase, and CINAHL). The outcomes of interest were COPD, CB, and emphysema. Search terms included these outcomes, exposures of interest (VGDF, specific VGDF exposures) and occupations and industries where VGDF exposure is common. Inclusion criteria required studies to report an estimate of COPD, CB or emphysema relative risk (Y/N; incidence or prevalence) associated with a workplace VGDF exposure. Separate random effects meta-analysis models were constructed for each health outcome to yield an odds ratio (metaOR) for the association with exposure. Study results were grouped by outcome (COPD, CB, emphysema) and exposure metric (VGDF Y/N, and exposure levels and duration). Both crude and adjusted metaORs were examined. Analyses were conducted using R (metafor). **RESULTS** In total 8226 unique citations were retrieved, following duplicate title and abstract review 1144 remained. After full-text review in duplicate, 155 studies were included. For the association of COPD (defined using post-bronchodilator spirometry) with exposure to VGDF (Y/N), the crude metaOR=2.16 (95%CI 1.53-3.05) based on data from 12 studies and the smoking-adjusted metaOR=1.64 (95%CI 1.36-1.97) based on data from 15 studies. For the association of CB (symptoms or doctor diagnosed) with VGDF (Y/N), the crude metaOR=1.85 (95%CI 1.43-2.40) based on data from 15 studies, and the smoking-adjusted metaOR=1.88 (95%CI 1.47-2.40) based on data from 24 studies. Fewer studies (n=5) examined emphysema and preliminary meta-analyses suggest the relationship between VGDF and emphysema is weaker than observed for COPD and CB. **CONCLUSION** Results from initial analyses suggest VGDF exposure at work is an important risk factor for COPD and CB, but not emphysema.

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