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Job-task-exposure matrices to assess occupational exposure to disinfectants among U.S. nurses

C. Quinot, O. Dumas, P.K. Henneberger, R. Varraso, A.S. Wiley, F.E. Speizer, J.P. Zock, C.A. Camargo Jr., N. Le Moual
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Abstract

Occupational exposure to disinfectants is associated with work-related asthma, especially in healthcare workers. However, little is known about the specific products involved. In epidemiologic studies, assessment of exposure by job-exposure matrices (JEM) is less prone to differential misclassification bias than self-report.

We designed JEM and job-task-exposure matrices (JTEM) to better evaluate disinfectant exposures using data from the Nurses' Health Study II, a prospective study of U.S. female registered nurses.

Disinfectant use was assessed by an occupational questionnaire in a random sample of 8,580 nurses (49-68 years) without asthma. A JEM was created based on the frequency (1-3, >4 days/week) of reported use of 8 disinfectants in 8 nursing jobs. Nurses reported weekly disinfection tasks to clean instruments (21%) and surfaces (54%). A JTEM combining job types and disinfection tasks was created to further reduce misclassification. Exposure was evaluated in 3 classes: no, medium, high.

Alcohol (weekly use: 39%), bleach (22%) and sprays (19%) were the most frequently used; more nurses were classified exposed (medium/high) by JEM (84% for alcohol, bleach and sprays) and JTEM (75%, 64%, 59%, respectively). Agreement between JEM and JTEM were fair (kappa: 0.2 to 0.4). For Emergency Room and administration nursing jobs, JEM and JTEM estimates were similar; more variations were observed for other jobs.

The JTEM may provide more accurate estimates than the JEM especially for nursing jobs with heterogeneous tasks, which will reduce exposure misclassification. These methods and others based on exposure intensity/frequency will be applied to study associations with asthma.

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