An Evaluation Of Nonresponse And Bias In A Study Of Asthma In Healthcare Workers

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RATIONALE Confronted with a low response percentage in a survey of asthma among unionized healthcare workers in an eastern USA city, we developed weights to adjust for nonresponse and investigated the impact on estimates of the prevalence of wheeze and asthma, and on the association of these respiratory outcomes with healthcare occupation.
METHODS The survey questionnaire inquired about occupational history and asthma-related health outcomes, took approximately 25 minutes to complete, and was offered online and by telephone interview. With an effective sample size of 15,213 who were either known or presumed eligible, 2030 (13.3%) completed the survey questionnaire and 434 (2.9%) finished part of it. Another 505 invitees (3.3% of sample) completed a 5-minute survey that inquired about demographics and respiratory health. To adjust for nonresponse, we calculated weights based on the inverse probability of inclusion at several steps, which in order were: random selection for invitation among healthcare workers listed in the union database, having sufficient data to confirm eligibility, having data on cigarette smoking, and completing the survey questionnaire. This was accomplished in the first two steps by stratifying by 9 healthcare occupations, and in the last two steps by modeling inclusion with covariates for gender, age, occupation, wheeze, and asthma, as well as smoking status in the last step. The final weight was the product of weights from all steps. To evaluate the impact of the weights, weighted and unweighted estimates were obtained for the prevalence of wheeze and asthma and their odds ratio (OR) from logistic models with occupation and other covariates as independent variables.
RESULTS Final weights for the 2030 with complete data ranged from 5.3 to 14.1, with median=8.8. Prevalence estimates were lower when weighted versus unweighted, for wheeze in the past 12 months (13.2% versus 14.4%) and for ever asthma (13.8% versus 14.8%). When modeling respiratory outcomes with nursing assistants as the common comparison group for occupations, the weighted and unweighted models resulted in similar ORs. Specifically, a statistically significant ($p<0.05$) elevated OR for wheeze was observed for licensed practical nurses and respiratory therapists, while for asthma significant association was observed with cleaners and registered nurses. Respiratory therapists had an elevated OR for asthma that was statistically significant only in the unweighted analysis.
CONCLUSION The small differences between adjusted and unadjusted estimates of prevalence and association suggest that bias was minimal despite a low response percentage.

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