

Asthma

How “clean” is the cleaning profession?

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Commentary on the paper by Medina-Ramón *et al* (see page 598)

Based on the assumption that cleanliness equates with healthiness, many people are likely to consider the cleaning profession to be relatively free of health risks. In fact, some cleaning compounds, either alone or mixed, pose a risk for inhalation injuries, and this risk is heightened when cleaners work in a confined space, such as a small lavatory. The harmful agents are usually irritant aerosols or gases, which means that cleaners are at risk for irritant induced asthma, including reactive airways dysfunction syndrome (RADS), and other respiratory diseases. Over the past 15 years, professional cleaners have emerged as one of the high risk groups for work related asthma in industrialised nations. For example, in the multinational European Community Respiratory Health Survey (ECRHS) that was initiated in 1992, the reference occupational group comprised professional, clerical, and administrative workers. The cleaning occupation had the fourth highest odds ratio (OR = 1.97, 95% confidence interval (CI) 1.33 to 2.92) for asthma among 29 occupational groups, and cleaners had an increased odds ratio in 11 of the 12 countries where the survey was conducted.¹ Epidemiologists in Finland, France, Singapore, South Africa, Spain, and the United States have also published reports that identified an association between asthma and professional cleaning. Most of these studies implicate employment as a cleaner or the use of cleaning compounds in general as a risk factor for asthma. A few researchers have reported additional details, such as the cleaning compounds that cleaners claimed were associated with onset or aggravation of asthma, or the types of businesses where the cases among cleaners were most numerous. Prevention would be greatly facilitated if additional details were available regarding the harmful exposures that cleaners encounter.

The investigation by Medina-Ramón and colleagues² is a case-control study among domestic cleaning women, nested in the 2000–2001 ECRHS cohort in

Cornellà, Spain. Cases had asthma and/or chronic bronchitis symptoms, and controls had no respiratory symptoms in the past year and no history of asthma. This study is distinguished by the amount of information provided on occupational exposures. The investigators used a questionnaire to determine the frequency with which cleaners performed 23 different cleaning tasks and used 22 different cleaning products, and to determine whether the cleaners had experienced high exposures to vapours, gases, or fumes as the result of accidents with cleaning agents. When asthma was modelled using multivariate regression, the odds ratios were increased for frequent use of bleach, frequent washing of dishes, and accidental high exposures while cleaning. The authors concluded that the initiation or aggravation of asthma symptoms is associated with the use of bleach and other irritant domestic cleaning products.

It is extremely difficult to measure accidental peak exposures that are unpredictable and transient. Medina-Ramón and colleagues asked participants to report if they had experienced high exposures to gases while cleaning. This self-reported information could result in differential misclassification of exposure. In particular, the disease cases might have preferentially recalled high exposures because they had respiratory symptoms. If this biased reporting had occurred, one would expect to see increased odds ratios for both asthma and chronic bronchitis. In fact, the odds ratio for high exposures was increased for asthma symptoms (OR = 3.8, 95% CI 1.0 to 14) but not for chronic bronchitis symptoms without asthma (OR = 0.9, 95% CI 0.2 to 4.3).

The researchers also measured chlorine and ammonia during cleaning tasks in order to characterise irritant gas exposures that cleaners are likely to experience. With both substances, the investigators measured transient peaks that exceeded the 15-minute short term exposure limits (STELs) recommended by the American Conference of Governmental Industrial Hygienists

(ACGIH). Although these peaks did not persist for the 15-minute time period specified in the ACGIH STELs, these findings still raise concern that domestic cleaners are potentially exposed to unsafe levels of irritant gases. In future exposure monitoring, researchers could conduct video monitoring of cleaners in conjunction with real-time exposure monitoring to further document the conditions (for example, tasks, agents, confined space settings) associated with exposures to irritants. An understanding of these conditions would help to predict and prevent potentially harmful exposures.

In their discussion section, Medina-Ramón and colleagues describe that many of the domestic cleaners (that is, 25% of cases and 15% of controls) mixed bleach with dishwashing liquid when washing dishes by hand. This practice could have resulted in the release of harmful chloramines, due to the hypochlorite in the bleach reacting with either the ammonium salts in the dishwashing liquid or the organic material from the dirty dishes. It is not clear that this particular practice is common in many industrialised countries. However, it does serve as a reminder that cleaning products and practices can vary by country or region. Armed with an understanding of the specific dangerous work practices, public health officials can tailor occupational health communications to the needs of their constituents.

In many countries, the cleaning profession presents barriers to both medical research and health communications. The profession is decentralised, with cleaners often working alone or in small groups in widely dispersed locations. Cleaners are infrequently unionised, and might even work “off the books” and be relatively invisible to public health officials. Employers of domestic cleaners generally do not have a sense of responsibility for the cleaners’ safe use of cleaning agents. Immigrants with limited knowledge of the dominant national language(s) often work in this profession, further complicating communication. Despite these barriers, several investigators have been able to conduct medical surveys of cleaners as part of population based studies or surveillance programmes. In order to reach the largest number of professional cleaners, public health officials might also employ a population-wide approach to communicate recommendations on the safe use of cleaning products. Medina-Ramón and colleagues appropriately observe that the findings from this and other studies of professional cleaners are also relevant to the very large number of people who clean their

own homes. If public health officials were to disseminate recommendations widely, such as through mass media outlets, they would provide information about safe work practices to all people who engage in cleaning activities.

As noted above, the current case-control study is nested in a larger cohort study. In that larger study, one fourth of the asthma cases among women were attributable to work in domestic cleaning.³ Successful prevention efforts in this profession would lead to a substantial reduction in the burden of asthma among women. The case-control study by Medina-Ramón and colleagues has

made an important contribution to the understanding of unsafe work practices in domestic cleaning. Additional research in Spain and other countries should be pursued to refine that understanding, which can then be used to inform interventions that direct cleaners from unsafe to safe work practices.

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