

Letter to the Editor

Flu-Like Illness Among Workers at a Soy Processing Plant[†]

Harris-Roberts et al. [2012] described associations between chest symptoms and soy sensitization among workers at South African soy processing plants. These findings were similar to our recently reported observations in workers at a US soy processing plant [Cummings et al., 2010]. Harris-Roberts et al. also described associations between work and flu-like illness, prompting us to examine our unpublished data on flu-like illness in US soy processing workers. These data were collected in a NIOSH IRB-approved research study from participants who provided informed consent.

We asked 147 study participants, all current soy plant employees, whether they had flu-like illness with aches, pains, fever, chills, and night sweats during the past 12 months and whether their symptoms were different away from work. Our determination of soy sensitization, work classification, and exposure categories has been described previously [Cummings et al., 2010]. We calculated frequencies and used logistic regression to examine associations. We considered two-sided $P \leq 0.05$ to be statistically significant. Analyses were conducted with SAS version 9.2 (SAS Institute, Cary, NC).

A total of 55 (37%) participants reported flu-like illness and 20 (14%) reported flu-like illness that was better away from work (“work-related flu-like illness”). Work-related flu-like illness was not associated with soy-specific IgE (odds ratio [OR] = 1.6, 95% confidence interval [CI] = 0.5–4.9). Production workers had a higher odds of work-related flu-like illness than non-production

workers (OR = 4.4, 95% CI = 0.9–21.0). Work-related flu-like illness was not associated with exposure categories for inhalable dust ($P = 0.33$), inhalable soy antigen ($P = 0.33$), or peak dust ($P = 0.41$). When examined linearly, soy-specific IgG was not associated with work-related flu-like illness ($P = 0.44$). Workers in the second distributional tertile of soy-specific IgG had a higher odds of work-related flu-like illness than other workers, including those in the third distributional tertile (OR = 4.6; 95% CI = 0.9–23.4). This finding may reflect immune tolerance or a healthy worker effect.

The prevalence of work-related flu-like illness was lower in our study (14%) than in the study by Harris-Roberts et al. [2012] (24%). This difference may be related to the distinct definitions used in the two studies. However, it is notable that among the South African soy processing workers, reported exposure to dust during soybean off-loading was a significant risk factor. As Harris-Roberts et al. [2012] point out, this task potentially exposes workers to both soy hull antigens, which have been reported as a cause of hypersensitivity pneumonitis [Zubeldia et al., 1995], and endotoxin, which may play a role in organic dust toxic syndrome [Seifert et al., 2003]. The US soy processing plant processed de-hulled soybeans, and a lack of sensitization to soy hull antigens was previously demonstrated [Green et al., 2011]. Although Harris-Roberts et al. [2012] did not measure endotoxin exposures, they did demonstrate that endotoxin concentrations were up to 100 times higher in hull samples than in whole soybeans. In our study, endotoxin exposures were generally low [Gaughan et al., 2009]. Thus, the South African soy processing workers involved in soybean off-loading may have had exposures to two potential causes of flu-like illnesses (hull antigens and endotoxin) to which the US workers were not exposed. Nevertheless, there was evidence of process-related risk (by work classification) and exposure-related risk (by soy-specific IgG tertiles) in our study, suggesting that risk of work-related flu-like illness among soy processing workers is not limited to hull antigen and endotoxin exposures.

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The article by Harris-Roberts et al. [2012] is a welcome addition to the existing body of literature on occupational soy exposures. Although questions about mechanism remain, the information available to date clearly demonstrates that soy processing workers are at risk of work-related adverse health outcomes including respiratory illness. Efforts to reduce exposures and evaluations of the effectiveness of those efforts are now needed.

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