Changes In Health Symptoms Among Occupants During And After Water Damage Remediation In A Large Office Building

J. Park[1], J. Cox-Ganser[1], S. Cho[2], S. White[1], K. Kreiss[1, 3]

[1]National Institute for Occupational Safety and Health, Morgantown, WV, [2]Minnesota Department of Health, St. Paul, MN, [3]

Corresponding author's email: gzp8@cdc.gov

Rationale
Various adverse health effects have been associated with dampness and mold in indoor environments. However, there is limited information of remediation effectiveness on occupants' health in water-damaged buildings. Using repeated measurement studies, we examined how remediation changed health symptoms in approximately 1,300 occupants of a water-damaged building.

Methods
In response to a health hazard evaluation request in 2001, we conducted an initial health survey of all occupants before substantial remediation occurred between late 2002 and April 2004. After remediation we conducted two follow-up surveys in August of 2004 and 2005. The building underwent additional remediation in late 2005 through 2006, and the last follow-up survey was in August of 2007. In each survey we collected information on respiratory and non-respiratory symptoms occurring at least once every week in the last 4 weeks as well as in the last 12 months. Work-related symptoms were defined as those which improved when away from work. We collected floor dust samples for analysis of ergosterol, culturable fungi, and endotoxin. We categorized participants using a severity score: 0=asymptomatic, 1= symptomatic only in the last 12 months but not 4 weeks, 2=symptomatic at least once every week in the last 4 weeks. To estimate change in odds of a symptom or the severity score over the surveys (survey time effect), we used generalized linear mixed models with random intercept effects. All models were adjusted for demographics, smoking status, and the three environmental measurements.

Results
There was an average of 65% participation for the surveys. Our models showed that odds of work-related wheezing, shortness of breath on exertion, nasal symptoms, and difficulty concentrating in the last 4 weeks significantly increased over the follow-up period (odds ratio (OR) per year=1.08-1.16, p-values<0.05). Conversely, work-related throat symptoms, eye symptoms, fever and chills, excessive fatigue, difficulty concentrating, and headache in the last 12 months showed significant improvement (OR per year=0.83-0.93, p-values<0.05). Work-related chest tightness, attacks of shortness of breath, or cough attacks showed no change. Severity scores for work-related wheezing, and shortness of breath on exertion also significantly (p-values<0.05) increased over time whereas those for work-related fever and chills, throat symptoms, excessive fatigue, and headache decreased. Severity scores for other work-related respiratory symptoms did not change significantly over time.

Conclusion
Our findings showed that respiratory symptoms associated with exposure to dampness/mold among occupants of a water-damaged building may not be improved by remediation as compared to non-respiratory symptoms.

This abstract is funded by: National Institute for Occupational Safety and Health, National Occupational Research Agenda Program