Are U.S. Companies that Use Isocyanates Providing Medical Surveillance?

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Research Purpose/Relevance: Patients with a prompt diagnosis of work-related asthma (WRA) and removal from ongoing exposure after the initiation of respiratory symptoms have the best prognosis, with fewer symptoms, need less asthma medication and have less loss of FEV1 over time. There is no requirement in the United States for employers to conduct medical surveillance for employees who work with isocyanates. However, the benefit of early diagnosis is justification for employers, who use substances that cause asthma, to institute periodic medical screening. We evaluated the percentage of companies using isocyanates that provided medical surveillance and the prevalence of symptomatic workers in companies with and without medical surveillance over a 24 year period.

Methods/Analysis: Michigan has an active surveillance system for WRA based on records from the State Workers' Compensation Agency and regulations that require clinics, employers, health care practioners, hospitals and poison control centers to report all known or suspected work-related disease. Cases are confirmed through a standardized patient interview and review of medical records including pulmonary function testing. An OSHA enforcement inspection is initiated if the case or fellow workers are exposed to substance(s) that potentially could be better controlled. During inspections, the presence and content of any medical surveillance program is reviewed and workers from the same work area, including maintenance employees, complete a confidential self administered questionnaire during paid work hours.

Results: Information was available from 142 Michigan OSHA enforcement inspections conducted from 1988 -2011 to follow up 404 cases of isocyanate asthma that occurred in these facilities. Only 29.6% of the companies provided periodic medical surveillance of which less than half included both a questionnaire and spirometry. Only 34.5% provided baseline medical testing of which less than half provided spirometry. The remaining 35.9% of companies provided no medical surveillance. There was no change in the percentage of companies providing medical surveillance over the 24 years. Results of 2051 worker interviews conducted during the inspections found that 19.5% had daily or weekly wheezing, shortness of breath or chest tightness in relationship to work, or new-onset asthma since beginning to work at the company. The percentage of symptomatic workers in companies that provided periodic medical surveillance was 15.5% vs. 21.3% in companies that did not (OR 0.68 (95% C.I. 0.52-0.88). Further analyses by industry type, company size and union status will be presented. Conclusion/ Implications: Only 30% of companies using isocyanates provided a medical surveillance program to their employees without any change in this percentage over a 24 year period. Those companies that do provide medical surveillance had 32% fewer workers with work-related lower respiratory symptoms or new-onset asthma in relation to work. Companies have not voluntarily instituted medical surveillance programs in the absence of a regulatory requirement to do so despite evidence of the benefit of early diagnosis and removal from exposure in reducing morbidity among individuals who develop isocyanate induced asthma.

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Overview of an Industry-wide Study of Toluene Diisocyanate (TDI) Exposure and the Development of Occupational Asthma

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Research Purpose: to evaluate a model medical surveillance program for occupational asthma and to characterize the incidence of occupational asthma, if any, associated with TDI exposure in the production environment.

Specific objectives include: characterize workplace TDI environmental concentrations based on use of standardized industrial hygiene monitoring and assessment procedures for jobs and tasks, monitor employee health through medical surveillance questionnaires and spirometry, investigate potential cases of occupational asthma using a standardized medical monitoring process, evaluate the effectiveness of the program methods, including the standardized health and environmental monitoring procedures, and communicate findings to study subjects, plant management, and the scientific community in a manner consistent with Centers for Disease Control and Prevention (CDC) and American Chemistry Council (ACC) practices for assuring the quality, objectivity, utility, and integrity of the information presented.

Relevance: This longitudinal study will provide valuable information and tools for assessing and mitigating the risk of workplace asthma resulting from exposure to TDI.

Participants: Eligible participants included workers engaged in the production of TDI employed by all producers of TDI in the U.S. between 2006 and 2012. This study conduct was pursuant to review and oversight by human subjects review boards at NIOSH and in Midland, Michigan.

Methods: In October, 2006, the National Institute for Occupational Safety and Health (NIOSH) and the ACC Diisocyanates Panel jointly implemented a study protocol to evaluate a model medical surveillance program for occupational asthma and to characterize the incidence of occupational asthma, if any, associated with TDI exposure in the production environment. All three producers of TDI located within the U.S. were included. The study protocol called for a multi-tier approach to respiratory surveillance. The study was approved by the IRB at NIOSH and The Dow Chemical Company. Participating workers provided informed consent. A brief, self-administered symptom questionnaire and spirometry was completed annually in conjunction with on-going monitoring of TDI airborne exposure within jobs and for specific tasks. A list of specified responses triggered a second tier investigation involving a more in depth questionnaire and physician assessment to determine whether to proceed to a specified diagnostic protocol. Company medical and industrial hygiene staff were provided in-depth training on the protocol and instruments, as well as written materials prior to start of data collection.

Results: 196 workers enrolled in the study. Data collection was completed in July of 2012. Data analysis of 196 workers who enrolled in the study at the three locations will be conducted in the fall of 2012. Final results are expected in the first quarter of 2013. Preliminary results will describe successes and challenges in enrollment and retention of workers, completion of annual questionnaires and spirometry, implementation of the tiered protocol, characterization of jobs and tasks in relation to anticipated exposures, and measurement of exposure.

Conclusions and Implications: to be determined.

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