



## Are biomarkers worth the effort? An example of a method development for monitoring exposure to isocyanates

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**Wednesday, March 19, 2014**

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**12:00 - 12:50 p.m.**

**Abstract:** A biomarker is simply described as “a characteristic that is objectively measured and evaluated as an indicator of normal biological processes, pathogenic processes, or pharmacologic responses to a therapeutic intervention” by the National Institutes of Health. But how does this translate to research in public health and environmental science? With air pollution exposure, there are multiple types of biomarkers that can be analyzed and evaluated for an endless variety of toxicants. Past research has accurately identified biomarkers of the most hazardous and common toxicants we have faced such as asbestos, benzene, the insecticide DDT, lead, and particulate matter (PM). Worryingly, since the 1980s, there has been gradual shift in research from indoor to outdoor air pollution exposure and subsequent health effects. However, people still spend the vast majority of time indoors and a large portion of this time is spent at the workplace. In the indoor environment, there are hazards that typically are not associated with common outdoor air pollutants ( $\text{NO}_x$ , Ozone, PM,  $\text{SO}_2$ , etc.). Recreational and industrial products contain a wide variety of chemicals that are regulated with more lenient standards than outdoor pollutants yet often produce much higher exposures. In addition to the sheer number of products available, each year about 1000 new chemicals and/or chemical mixtures are introduced to the US commerce. It is difficult to monitor exposures in multiple indoor environments without expanding our efforts to improve monitoring methods and identify new biomarkers. Isocyanates are an important class of chemical used in the production of polyurethanes for insulation, spray paints, and adhesives and previous seminars in this series have discussed research on 1,6-hexamethylene diisocyanate (HDI) exposures in automotive refinishing shops and aircraft repair. Recently, increased emphasis has been placed on inhalation and skin exposures to other isocyanate polymers in paint mixtures (e.g. biuret, uretdione, and isocyanurate). This seminar will show that skin exposure to polymers is significant and that it is important to identify biomarkers that are specific for the polymer exposures and which can discern the routes of exposure - issues that the past research efforts have failed to explore.