

Applying translational science approaches to protect workers exposed to nanomaterials

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Abstract

Like nanotechnology, translational science is a relatively new and transdisciplinary field. Translational science in occupational safety and health (OSH) focuses on the process of taking scientific knowledge for the protection of workers from the lab to the field (i.e., the worksite/workplace) and back again. Translational science has been conceptualized as having multiple phases of research along a continuum, from scientific discovery (T0), to efficacy (T1), to effectiveness (T2), to dissemination and implementation (D&I) (T3), to outcomes and effectiveness research in populations (T4). The translational research process applied to occupational exposure to nanomaterials might involve similar phases. This includes basic research (T1) in the areas of toxicology, epidemiology, industrial hygiene, medicine and engineering. In T2, research and evidence syntheses and guidance and recommendations to protect workers may be developed. With countless nanomaterials that are in or will be entering commerce, no simple guidance value can be developed. Therefore, approaches that screen materials individually or as categories and assign them to hazard and control categories are more likely to be used by employers and regulators. In T3, emphasis is needed on D&I research to explore the barriers and facilitators to nanotechnology risk control information/research adoption, use, and sustainment in workplaces. D&I research for nanomaterial exposures should focus on assessing sources of information and evidence to be disseminated to/implemented in complex and dynamic workplaces, how policy-makers and employers use this information in diverse contexts to protect workers, how stakeholders inform these critical processes, and what barriers impede and facilitate multilevel decision-making for the protection of nanotechnology workers. The T4 phase focuses on how effective efforts to prevent occupational exposure to nanomaterials along the research continuum contribute to large-scale impact in terms of worker safety, health and wellbeing (T4). Stakeholder input and engagement is critical to all phases of the translational continuum. This presentation will provide: 1) an illustration of the translational research continuum for occupational exposure to nanomaterials and; 2) a discussion of opportunities for applying D&I science frameworks, methods, and measures to increase the effectiveness, integration, and impact of interventions to protect the health and wellbeing of workers in the nanotechnology field.