Anna M. Engel

Senior Research Associate

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Ms. Engel is a senior research associate with expertise in epidemiology, exposure, and historical research. Prior to joining Gradient, Ms. Engel conducted original research for her undergraduate thesis, which examined the development of mental health diagnoses and treatments among women during the 1900s. At Gradient, she applied her research skills to conduct historical research on industrial sites with complex contamination histories, such as manufactured gas plant sites and manufacturing facilities. She has also conducted historical state-of-knowledge evaluations, in which she traced the scientific understanding of potential health hazards associated with a substance (*e.g.*, asbestos) or an industry (*e.g.*, rubber manufacturing, shipbuilding, steel production) over time. Her other responsibilities at Gradient include managing projects related to epidemiology, exposure, and toxicology; evaluating potential cancer clusters; assessing causation; and critically reviewing the scientific literature. In addition to her extensive work on potential exposures to asbestos in consumer products, Ms. Engel has also assessed the scientific literature on a wide variety of substances, including coal ash constituents, methyl tert-butyl ether, lead and other heavy metals, polychlorinated biphenyls, petroleum products, and perfluorinated chemicals.

Representative Projects

Worker's Compensation Evaluation: Reviewed the epidemiology literature to assess whether employment as a firefighter was associated with brain cancer.

Cancer Cluster Assessment: Using guidelines outlined by the Centers for Disease Control and Prevention, assessed whether appropriate epidemiology methods were used to evaluate a potential pediatric cancer cluster in a military housing complex.

Asbestos Exposure Analysis: Assessed potential occupational and non-occupational exposures to chrysotile asbestos in consumer products, including electrical equipment, wire, refractory materials, heating systems, and, automotive friction materials. Assessed the state of the science regarding the ability of asbestos in these products to cause mesothelioma, lung cancer, asbestosis, and esophageal cancer.

State-of-Knowledge Assessments: Analyzed the scientific literature spanning several decades regarding the prevailing knowledge of the toxicity of and exposure to chemicals used in various industries. Assessed the actions taken by government and industry to understand, inform, and reduce the hazards posed by the chemicals in these industries over time.

Occupational Exposure Assessment: Assessed whether several health effects could have been caused by working at a coal ash landfill by evaluating potential exposures and other risk factors.

Database Development: Assisted in the development of a database and tracking systems that were used to quickly assess risk factors, past exposures, and health conditions.

Areas of Expertise

- Epidemiology
- Exposure Science
- Specific Causation Analysis
- Historical State-of-Knowledge
- Site History Assessment

Education

B.A., History, University of Mary Washington

Introduction to Epidemiology, Harvard Extension School

Environmental Health, Johns Hopkins University Bloomberg School of Environmental Health

Selected Publications

Cox, LA Jr.; Goodman, JE; **Engel, AM**. 2020. "Chronic inflammation, adverse outcome pathways, and risk assessment: A diagrammatic exposition." *Regul. Toxicol. Pharmacol.* (Submitted)

Peterson, MK; Mohar, I; Lam, T; Cook, TJ; Lynch, HN; **Engel, AM**. 2019. "Critical review of the evidence for a causal association between exposure to asbestos and esophageal cancer." *Crit. Rev. Toxicol.* 49(7):597-613.