Melissa J Vincent, MS

Current Position
Supervising Health Scientist

Discipline Areas
> Human Health Risk Assessment
> Dose-Response Modeling
> Environmental Epidemiology
> Occupational Epidemiology

Years' Experience
14 Years

Joined Cardno
2018

Education
> M.S., Epidemiology, University of Cincinnati, 2013
> B.A., Zoology, Miami University, 2007

Summary of Experience

Ms. Melissa Vincent is a Supervising Health Scientist with Cardno ChemRisk. She has fourteen years of experience in the fields of epidemiology, toxicology, risk assessment and public health. Ms. Vincent received her B.A. in Zoology from Miami University and a M.S. in Epidemiology from the University of Cincinnati. Ms. Vincent's primary training and areas of expertise include quantitative dose-response assessment and the integration of epidemiology and toxicology information into human health risk assessment. Ms. Vincent has developed risk assessment guidance and evidence integration approaches for evaluating multiple types of exposure-response outcomes. These topics include evaluation of cancer, asthmatic and other obstructive pulmonary responses, or sensitization associated with consumer product and occupational exposures. Projects have included the analysis of exposure to acrylamide, pesticides, ethylene oxide, nickel, food flavorings (including diacetyl and 2,3-pentanedione), disinfection products, and electronic nicotine delivery systems (ENDS).

Significant Projects

Regulatory Support

Provided support for submission of Pre-Market Tobacco Applications (PMTA) to the U.S. Food and Drug Administration (FDA) for electronic nicotine delivery systems (ENDS). This support included assistance with development of nonclinical research strategies, development of risk assessment frameworks and use of bridging strategies for minimizing testing requirements, and preparation of submission documents. Lead a team of toxicologists and risk assessors for evaluating anticipated health risks from use of ENDS, in comparison to combustible cigarettes, to evaluate the estimated impact of ENDS on public health.

Statistical Analysis

Used statistical methods to evaluate associations between alcohol-based hand sanitizer packaging and formulations and the risk of accidental an intentional abuse. This analysis implemented characterization of relative abuse rates from Poison Control Center data. Outcomes included recommendations for packaging characteristics to reduce likelihood of accidental exposures.

Evaluated the distribution of industrial hygiene and exposure data to characterize exposure, identify data gaps, and determine additional testing needs for multiple consumer product use scenarios.

Analyzed the impact of changes in dietary cholesterol intake on serum lipoprotein concentrations through linear and non-linear Bayesian meta-regression analysis using Markov Chain Monte Carlo methods (MCMC). Designed the methods for the meta-regression analysis, including specifying the inclusion and exclusion criteria and identifying study-level variants that should be explored in the models. Extracted and verified the data collected from a large database of clinical trial publications. Built the

meta-regression models using R and STAN and evaluated multiple analyses and sensitivity analyses, specifically the inclusion of hierarchical parameters.

Conducted a linear and Bayesian non-linear meta-regression analysis of the relationship between trans-fatty acid (TFA) intake from industrial or non-ruminant sources and LDL-C levels. Assisted in the design of the methods for the meta-regression analysis, including specifying the inclusion and exclusion criteria for the analysis, identifying study-level variants that should be included in the model as co-factors, identifying necessary sensitivity analyses (e.g., ruminant sources of TFA vs industrial sources), and building the meta-regression models in SAS. Developed a systematic method for extracting relevant information from each of the randomized controlled clinical trials that met the inclusion criteria.

Reviewed all available epidemiological data on occupational nickel exposures and reported mortality risks due to lung and/or sino-nasal cancer. Performed a meta-regression analysis to determine the relative risks associated with exposure to varying nickel-containing compounds (i.e., oxidic, soluble, insoluble, and metallic nickels) and identify and quantify the associated dose-response relationships. Evaluated the effects of multiple co-factors, including duration of employment, latency period, and co-exposures to carcinogens on the observed dose-response relationships. Performed sensitivity analyses to assess the impact of multiple uncertainties, specifically the accuracy of reported exposure estimates and the impact of imprecise or dated exposure monitoring methods on the observed dose-response.

Risk Assessment and Quantitative Dose-Response Assessment

Integrated hazard assessment and dose-response assessment for risk characterization of exposures from ENDS, including evaluation of flavorings, leachables, and other chemicals of concern. Risk characterizations were developed in supported of PMTA applications to FDA.

Evaluated the association between ethylene oxide exposure and breast and lymphohematopoietic cancers through mode of action analysis, evidence integration, and dose-response evaluation.

Estimated health protective concentrations for acute exposures to the pesticide methyl isothiocyanate (MITC). Assessed data from a clinical study on subjective eye irritation in humans, in addition to currently available literature, to determine the appropriate endpoint and uncertainty factor to use in dose-response assessment. Researched and investigated the mode of action of MITC and reviewed incident reports from accidental releases that involve human bystanders.

Evaluated the human relevance of the toxicological data on acrylamide exposure and assisted in proposing a hypothesized carcinogenic mode of action. Analyzed study data to determine whether acrylamide significantly increased the risk of thyroid, mammary, or testicular cancer in rats. Performed the benchmark dose analysis of toxicological study data.

Reviewed epidemiological data pertaining to occupational exposures to diacetyl and 2,3-pentanedione. Summarized the study results and determined which studies were useful and sufficiently robust for dose-response assessments, based on consideration of issues

such as adequacy of sample size, accuracy and sufficiency of exposure monitoring, and control for confounding factors. Assisted in development of a proposed OEL.

Developed Immediately Dangerous to Life or Health (IDLH) documentation for the National Institute for Occupational Safety and Health (NIOSH). Screened and reviewed the available scientific literature, identified key studies and appropriate endpoints, used the ten Berge equation to adjust inhalation exposures to 30 minute equivalent concentrations, and determined appropriate safety factors.

Developed skin notation documents for occupational toxicants for NIOSH. Searched and reviewed the available scientific literature, analyzed the available human and animal data on skin absorption, acute and repeat-dose toxicity, skin irritation, and skin sensitization potential following dermal exposure, and identified relevant endpoints.

Reviewed epidemiological and mode of action literature regarding dietary intake of inorganic arsenic and associations with cancer, neurodevelopmental, cardiovascular, and diabetic responses. This review identified key studies that provide useful dose-response information for evaluating causal relationships between low-dose drinking water exposures and biologically plausible health outcomes.

Collaborated with biomathematicians in evaluating a variety of mixtures data sets and associated single-chemical data sets for consistency with, or violation of, dose addition. This work earned an Honorable Mention for the US EPA's Scientific and Technical Achievement Award (STAA).

Epidemiology

Reviewed epidemiological information regarding occupational exposures to vapors at a nuclear facility. Many of the effects in this cohort were mild and reversible, which led to discussion and definition of what types of effects are categorized as adverse health effects, and the complexities of interpreting this definition across scientific disciplines (i.e., clinicians versus risk assessors). This work required consideration of biases (e.g., under-reporting), confounding exposures, and diagnostic limitations.

Reviewed epidemiological studies regarding initiation, switching, and transition behaviors among ENDS users for a state-of-the-science evaluation.

Conducted a systematic literature search and review of the current epidemiological research investigating cleaning, or cleaning product ingredients, and asthma or asthma-like syndromes. Based on these findings, developed a set of tools for safety assessment of asthma and respiratory responses in occupational cleaning scenarios. These tools include a systematic method for assessing the quality of epidemiological studies and a weight-of-evidence framework. This framework identified agents that could potentially pose health risks, specifically asthma and respiratory irritation or sensitization, through a tiered safety screening assessment.

Evaluated historical exposures to sulfidic, oxidic, soluble, and metallic nickel in refining operations. Created an exposure matrix that most accurately represents actual historical exposures and speciation percentages by identifying refining process changes, possible inaccuracies in speciation measurement methods, and accounting for worker history, location, and duration of exposure or employment.

Conducted screening assessments to evaluate the predicted cancer risk associated with ethylene oxide in potentially exposed communities, based on US EPA cancer risk models.

Identified, summarized, and compiled information on mold exposure scenarios and mycotoxin health effects related to consumer product contamination.

Honors and Awards

> US Environmental Protection Agency Scientific and Technological Achievement Award (STAA) – Honorable Mention - 2015

> Society of Risk Analysis; Best Poster Award, “The Effects of Acute Exposure to Methyl Isothiocyanate (MITC)” - 2008

Publications

> Peer-Reviewed, Books, Published Papers

> Cherry, D., E. Friedman, M. Vincent, A. Maier. 2021. The legacy of weapons grade plutonium production: Health status of Hanford complex workers who manage the waste. Toxicol Ind Health. 37(5):260-269. doi: 10.1177/0748233721996555.

> Haber, L.T., J.F., Reichard, A.K. Henning, P. Dawson, R.S. Chinthraja, S.B. Sindher, A. Long, M.J. Vincent, K.C. Nadeau, B.C. Allen. 2021. Bayesian hierarchical evaluation of dose-response for peanut allergy in clinical trial screening. Food Chem Toxicol. 151:112125. doi:10.1016/j.fct.2021.112125.

> Gadagbui, B., J. Moore, A. Parker, D. McCready, A.D. Monnot, L. Garnick, M. Vincent, P. Spencer, A. Maier. 2020. Derivation of cancer no significant risk levels and screening safety assessment for 2-nitropropane in spray products. J Appl Tox 40(5):691-705. doi: 10.1002/jat.3937.

> Vincent M.J., S.J. Kozal W.J. Thompson, A. Maier, G.S. Dotson, E.A. Best, K.A. Mundt. 2019. Ethylene Oxide: Cancer Evidence Integration and Dose-Response Implications. Dose Response. 2019 Dec 11;17(4). PMID:3185323510.

> Vincent, M.J., B.A. Allen, O.M. Palacios, K.C. Maki. 2018. Meta-regression analysis of the effects of dietary cholesterol intake on LDL and HDL cholesterol. Am J Clin Nutr. Doi:10.1093/ajcn/nqy273.

> Haber, L.T., M.L. Dourson, B.C. Allen, R.C. Hertzberg, A. Parker, M.J. Vincent, A. Maier, A.R. Boobis. 2018. Benchmark dose (BMD) modeling: current practice, issues, and challenges. Crit. Rev. Toxicol. 48(5):387-415. doi: 10.1080/10408444.2018.1430121.

> Pecquet, A.M., J.M. Martinez, M. Vincent, N. Erraguntla, M. Dourson. 2018. Derivation of a no-significant-risk-level for tetrabromobisphenol A based on a threshold non-mutagenic cancer mode of action. J. Appl. Toxicol. 38(6):862-878. doi: 10.1002/jat.3594.

> Vincent, M.J., J.A. Bernstein, D. Basketter, J.S. LaKind, G.S. Dotson, A. Maier, 2017. Chemical-induced asthma and the role of clinical, toxicological, exposure and epidemiological research in regulatory and hazard characterization approaches. Regul. Toxicol. Pharmacol. 90:126-132. doi: 10.1016/j.yrtph.2017.08.018.

> Vincent, M.J., A. Parker, A. Maier. 2017. Cleaning and asthma: A systematic review and approach for effective safety assessment. Regul. Toxicol. Pharmacol. 90:231-243. doi: 10.1016/j.yrtph.2017.09.013

- Haber, L.T., H.K. Bates, B.C. Allen, M.J. Vincent, A.R. Oller. 2017. Derivation of an oral toxicity reference value for nickel. Regul Toxicol Pharmacol 87(S1-S18). doi: 10.1016/j.yrtph.2017.03.011.
- Allen, B.C., M.J. Vincent, D.A. Liska, L.T. Haber. 2016. Meta-regression analysis of the effect of trans fatty acids on LDL-Cholesterol. Food and Chemical Toxicology. 98:295-307
- Maier, A., M.J. Vincent, A. Parker, B.K. Gadagbui, M. Jayjock. 2015. A tiered asthma hazard characterization and exposure assessment approach for evaluation of consumer product ingredients. Regul. Toxicol. Pharmacol. 73(3):903-913.
- Maier, A., M.J. Vincent, B. Gadagbui, J. Patterson, W. Beckett, P. Dalton, I. Kimber, M.J.K. Selgrade. 2014. Integrating asthma hazard characterization methods for consumer products. Regul. Toxicol. Pharmacol. 70(1):37-45.
- Maier, A., M. Vincent, E. Hack, P. Nance, W. Ball. 2014. Derivation of an Occupational Exposure Limit for Inorganic Borates Using a Weight of Evidence Approach. Regul Toxicol Pharm 68(3):424-37.
- Dourson, M., J. Reichard, P. Nance, H. Burleigh-Flayer, A. Parker, M. Vincent, E.E. McConnell. 2014. Mode of action analysis for liver tumors from oral 1,4-dioxane exposures and evidence-based dose response assessment. Regul Toxicol Pharm. 68(3):387-401.
- Gadagbui, B., M. Vincent, A. Willis. 2014. Methyl Isothiocyanate. In: Encyclopedia of Toxicology (3rd ed.). Wexler, P. (eds.). Elsevier. pp 310-313. ISBN: 9780123864543
- Patterson, J., A. Maier, M. Kohrman-Vincent, M.L. Dourson. 2013. Peer consultation on relationship between PAC profile and toxicity of petroleum substances. Regul Toxicol Pharmacol 67:S86-S93.
- Maier, A., M. Kohrman-Vincent, R. Hertzberg, B. Allen, L.T. Haber, M. Dourson. 2012. Critical review of dose-response options for F344 rat mammary tumors for acrylamide – additional insights based on mode of action. Food Chem Toxicol 50(5):1763-1776.
- Mwanza, J.C., D.F. Lyke, R.C. Hertzberg, L. Haber, M. Kohrman-Vincent, R. Li, Y. Pan, R.H. Lyles, J.E. Simmons, D.K. Macmillan, R.D. Zehr, A.E. Swank, D.W. Herr. 2012. Cholinesterase inhibition and depression of the photic after discharge flash evoked potentials following acute or repeated exposures to a mixture of carbaryl and propoxur. Neurotoxicology 33(3):332-346.
- Cain, W.S., M.L. Dourson, M.J. Kohrman-Vincent, B.C. Allen. 2010. Human Chemosensory Perception of Methyl Isothiocyanate: Odor and Chemesthesis. Regul Toxicol Pharmacol 58(2):173-180.
- Dourson, M., M. Kohrman-Vincent, B. Allen, W. Cain. 2010. Dose Response Assessment from Effects of Acute Exposure to Methyl Isothiocyanate (MITC).Regul Toxicol Pharmacol 58(2): 181-188.
- Maier, A., M. Kohrman-Vincent, A. Parker, L.T. Haber. 2010. Evaluation of Concentration-Response Options for Diacetyl in Support of Occupational Risk Assessment. Regul Toxicol Pharm 58(2):285-296.
- Zhao, Q.J., L. Haber, M. Kohrman-Vincent, P. Nance, M. Dourson. 2010. Quantitative modeling in noncancer risk assessment. In: Quantitative Modeling in Toxicology. Krishnan, K., and Andersen, M.E. (eds.). John Wiley & Sons Ltd.
- Haber, L.T., A.M. Maier, O.L. Kroner, M.J. Kohrman. 2009. Evidence-Based Assessment of Human Relevance and Mode of Action for Tunica Vaginalis

Mesotheliomas Resulting from Oral Exposure to Acrylamide. Regulatory Toxicology and Pharmacology 53(2): 134-149.

> Dourson, M., R. Hertzberg, B. Allen, L. Haber, A. Parker, O. Kroner, A. Maier, M. Kohrman. 2008. Evidence-Based Dose Response Assessment for Thyroid Tumorigenesis from Acrylamide. Regulatory Toxicology and Pharmacology 52(3): 264-289.

> Wullenweber, A., O. Kroner, M. Kohrman, A. Maier, M. Dourson, A. Rak, P. Wexler, C. Tomljanovic. 2008. Resources for Global Risk Assessment: The International Toxicity Estimates for Risk (ITER) and Risk Information Exchange (RiskIE) Databases. Toxicology and Applied Pharmacology 233(1): 45-53.

Published Abstracts

> O'Neil, H.C., M.J. Vincent, A.A. Han, S.E. Brown, A.M. Hazell, M.L. Krieder, A.M. Madl. 2021. Abstract 4095. Hazard and Risk Banding Framework for Prioritization and Bridging of E-liquids for Toxicity Testing. Poster Presentation at the Society of Toxicology's (SOT) Annual Meeting, March, 2021. Virtual Event.

> Kozal, J.S., M.J. Vincent, W.J. Thompson, A. Maier, G.S. Dotson, E.A. Best, and K.A. Mundt. 2020. Abstract PS 1502. Ethylene Oxide: Cancer Evidence Integration and Dose-Response Implications. Poster Presentation at the Society of Toxicology's (SOT) Annual Meeting, March 15-19, 2020. Anaheim, California.

> Best, E.A., M.J. Vincent, W.J. Thompson, A. Maier, G.S. Dotson, J.S. Kozal, and K.A. Mundt. 2019. Abstract P.120. The Role of Study Quality in Examining the Risk of Cancer from Occupational Exposure to Ethylene Oxide. Poster Presentation at the Society for Risk Analysis (SRA) Annual Meeting, December 8-12, 2019. Arlington, Virginia. Melissa Vincent, Orsolya Palacios, Bruce Allen, Lynne Haber, Kevin Maki. Non-Linear Models Best Characterize the Relationship Between Dietary Cholesterol Intake and Circulating Low-Density Lipoprotein Cholesterol Levels. American Society of Nutrition Meeting. June 2018.

> Orsolya Palacios, Melissa Vincent, Bruce Allen, Lynne Haber, Kevin Maki. The Effect of Dietary Cholesterol on High-Density Lipoprotein Cholesterol Levels in Men and Women: A Meta-Analysis of Randomized Controlled Trials. American Society of Nutrition Meeting. June 2018.

> Melissa Vincent, Bruce Allen, DeAnn Liska, Michael Dourson, Lynne Haber. Meta-regression analysis of the effect of trans fatty acids (TFAs) on LDL-cholesterol. American Society of Nutrition in Experimental Biology Meeting. March 2015.

> Maier, A. M., Vincent, A., Parker. 2016. Cleaning and asthma: A systematic review and approach for effective safety assessment. The Toxicologist. In Press

> Vincent, M., A. Maier, M., Jayjock, B. Gadagbui, A. Parker, S. Ross. 2014. A tiered safety assessment approach for evaluating chemicals in consumer products and applications for asthma risk management. The Toxicologist. 138:601.

> Patterson, J., A, Maier, M. Vincent, B. Gadagbui. 2013. Integrating hazard characterization approaches for evaluating the potential of consumer products to cause asthma. The Toxicologist. 132:420.

> Maier, A., M. Kohrman-Vincent, E. Hack, P. Nance, W. Ball. 2013. Derivation of an occupational exposure limit for inorganic borates using a weight of evidence approach. The Toxicologist 132:476.

- Melissa Kohrman-Vincent, Andrew Maier, Ann Parker, Lynne Haber. Evaluation of concentration-response options for diacetyl in support of occupational risk assessment. Society of Toxicology Meeting. March 2011.
- Michael Dourson, Melissa Kohrman, William Cain. Effects of Acute Exposure to Methyl Isothiocyanate (MITC): A comparison of Irritant Risks. Society of Toxicology Meeting. March 2009.
- Michael Dourson, Melissa Kohrman, William Cain. The Effects of Acute Exposure to Methyl Isothiocyanate (MITC). Society of Risk Analysis Meeting. December 2008.
- Michael Dourson, Rick Hertzberg, Bruce Allen, Lynne Haber, Ann Parker, Oliver Kroner, Andy Maier, and Melissa Kohrman. Evidence-Based Dose Response Assessment for Thyroid Tumorigenesis from Acrylamide Exposure. Society of Risk Analysis Meeting. December 2007, San Antonio, TX.
- Lynne T. Haber, Andrew M. Maier, Oliver L. Kroner, and Melissa J. Kohrman. Evidence-Based Assessment of Human Relevance and Mode of Action for Tunica Vaginalis Mesotheliomas Resulting from Oral Exposure to Acrylamide. Society of Risk Analysis Meeting. December 2007, San Antonio, TX.
- Andrea Wullenweber, Oliver Kroner, Andrew Maier, Melissa Kohrman, Phil Wexler, Andrew Rak, Chuck Tomljanovic. Risk Information Exchange (RiskIE): A database to communicate in-progress risk assessments. Society of Risk Analysis Meeting. December 2007, San Antonio, TX.