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Engineering & Scientific Consulting

## Ryan C. Lewis, Ph.D., CIH

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### Professional Profile

Dr. Lewis is a certified industrial hygienist (CIH) who specializes in exposure science and epidemiology. His work involves evaluations of exposures and health effects in occupational and non-occupational settings and consumer product use scenarios among both children and adults, encompassing a wide range of chemical, physical, and biological agents (e.g., asbestos, bisphenol A, electromagnetic fields, flame retardants, fungi, metals, noise, pesticides, phthalates, silica, talc, volatile organic compounds, and wood dust). He has published over 20 peer-reviewed scientific papers, which largely focus on exposure science issues (e.g., exposure distributions, predictors, and temporal variability; exposure biomarkers; exposure measurement error and misclassification in reproductive epidemiology studies; and exposure contextualization). He has served on two scientific journal editorial boards and as an ad hoc reviewer for over 20 scientific journals.

Dr. Lewis completed his Ph.D. in Environmental Health Sciences with concentrations in Exposure Assessment and Environmental Epidemiology from the University of Michigan, where he was a Rackham Pre-doctoral Fellow and recipient of the American Industrial Hygiene Association's John A. Leonowich Award for educational excellence in non-ionizing radiation. His dissertation research concerned power-frequency magnetic fields and was at the interface of exposure science and reproductive epidemiology. He also has an M.S. in Environmental Health with a concentration in Industrial Hygiene from the Harvard School of Public Health.

### Academic Credentials & Professional Honors

Ph.D., Environmental Health Sciences, University of Michigan, Ann Arbor, 2015

M.S., Environmental Health, Harvard School of Public Health, 2006

B.S., Anthropology, University of Michigan, Ann Arbor, 2003

Exponent HERO Award for Best Colleague Development, 2020

NIH Intramural Paper of the Month (Muñoz et al. 2018), November 2018

AIHA Conference Scholarship, 2015

AIHA John A. Leonowich Award (for educational excellence in non-ionizing radiation), 2015

University of Michigan Rackham Predoctoral Fellow, 2014-2015

University of Michigan Rackham International Travel Grant, 2013

National Institute for Occupational Safety and Health Graduate Fellowship, 2005-2006, 2011-2012

University of Michigan James B. Angell Scholar, 2004

University of Michigan Undergraduate Degree with Distinction, 2003

University of Michigan University Honors, 2001-2003

## Licenses and Certifications

NIOSH 582E-Certified, MICA (Microscopy Instruction, Consultation & Analysis), 2020

Certified Industrial Hygienist, American Board of Industrial Hygiene, CP# 9947, 2011 (recertified 2016)

## Academic Appointments

Sponsored Affiliate, University of Michigan School of Public Health, 2015-2017

## Prior Experience

Graduate Student Research Assistant, University of Michigan School of Public Health, Environmental Exposure & Epidemiology Laboratory, 2011-2015

Senior Associate Health Scientist, ChemRisk, 2010-2011

Associate Health Scientist, ChemRisk, 2008-2010

Staff Scientist, Golder Associates, 2008

Scientist, Golder Associates, 2006-2008

Intern, Singapore Ministry of Manpower, Occupational Safety & Health Division, 2006

Intern, Dana-Farber Cancer Institute, Department of EH&S, 2005

Research Assistant, University of Michigan Comprehensive Cancer Center, 2003-2004

## Professional Affiliations

ASTM International, 2019-present

- D22.07 Technical Subcommittee (Sampling, Analysis, Management of Asbestos, and Other Microscopic Particles), 2019-present

International Society of Exposure Science, 2013-present

American Industrial Hygiene Association, 2004-present

- Non-Ionizing Radiation Committee, 2015-2017

## Publications

Ingle ME, Mínguez-Alarcón L, Lewis RC, Williams PL, Ford JB, Dadd R, Hauser R, Meeker JD, for the EARTH Study Team. Association of personal exposure to power-frequency magnetic fields with pregnancy outcomes among women seeking fertility treatment in a longitudinal cohort study. *Fertility and Sterility* 2020. Accepted for publication.

Bogen KT, Lewis RC, Singhal A, Sheehan PJ. Development of a novel method for estimating dermal contact with hand-applied cleaning solutions. *Environmental Monitoring and Assessment* 2020; 192(3):157.

Muñoz MGI, Colacino JA, Lewis RC, Arthur AE, Meeker JD, Ferguson KK. Associations between school lunch consumption and urinary phthalate metabolite concentrations in US children and adolescents: Results from NHANES 2003-2014, *Environment International* 2018; 121:287-295.

Lewis RC, Meeker JD, Basu N, Gauthier AM, Cantoral A, Mercado-García A, Peterson KE, Téllez-Rojo MM, Watkins DJ. Urinary metal concentrations among mothers and children in a Mexico City birth cohort study. *International Journal of Hygiene and Environmental Health* 2018; 221:609-615.

Lewis RC, Mínguez-Alarcón L, Meeker JD, Williams PL, Mezei G, Ford JB, Hauser R. Response to correspondence by Mortazavi et al. re: "Self-reported mobile phone use and semen parameters among men from a fertility clinic". *Reproductive Toxicology* 2017; 71:165.

Lewis RC, Mínguez-Alarcón L, Meeker JD, Williams PL, Mezei G, Ford JB, Hauser R; EARTH Study Team. Self-reported mobile phone use and semen parameters among men from a fertility clinic. *Reproductive Toxicology* 2017; 67:42-47.

Ferguson KK, Colacino JA, Lewis RC, Meeker JD. Personal care product use among adults in NHANES: Associations between urinary phthalate metabolites and phenols and use of mouthwash and sunscreen. *Journal of Exposure Science and Environmental Epidemiology* 2017; 27(3):326-332.

Lewis RC, Johns LE, Meeker JD. Exploratory analysis of the potential relationship between urinary molybdenum and bone mineral density among adult men and women from NHANES 2007-2010. *Chemosphere* 2016; 164:677-682.

Lewis RC, Hauser R, Maynard AD, Neitzel RL, Wang L, Kavet R, Meeker JD. Exposure to power-frequency magnetic fields and the risk of infertility and adverse pregnancy outcomes: Update on the human evidence and recommendations for future study designs. *Journal of Toxicology and Environmental Health, Part B: Critical Reviews* 2016; 19(1):29-45.

Lewis RC, Hauser R, Maynard AD, Neitzel RL, Wang L, Kavet R, Morey P, Ford JB, Meeker JD; EARTH Study Team. Personal measures of power-frequency magnetic field exposure among men from an infertility clinic: Distribution, temporal variability, and correlation with their female partners' exposure. *Radiation Protection Dosimetry* 2016; 172(4):401-408.

Lewis RC, Hauser R, Wang L, Kavet R, Meeker JD. Personal power-frequency magnetic field exposure in women recruited at an infertility clinic: Association with physical activity and temporal variability. *Radiation Protection Dosimetry* 2016; 168(4):478-488.

Lewis RC, Johns LE, Meeker JD. Serum biomarkers of exposure to perfluoroalkyl substances in relation to serum testosterone and measures of thyroid function among adults and adolescents from NHANES 2011-2012. *International Journal of Environmental Research and Public Health* 2015; 12:6098-6114.

Omoike OE, Lewis RC, Meeker JD. Association between urinary biomarkers of exposure to organophosphate insecticides and serum reproductive hormones in men from NHANES 1999-2002.

Reproductive Toxicology 2015; 53:99-104.

Bowman DM, Lewis RC, Yeo C, Lee M. The growing public health challenges of exposure to ultraviolet radiation from use of indoor tanning devices in the United States. *New Solutions: A Journal of Environmental and Occupational Health Policy* 2015; 25(2):164-171.

Lewis RC, Cantonwine DE, Anzalota Del Toro LV, Calafat AM, Valentin-Blasini L, Davis MD, Montesano MA, Alshwabkeh AN, Cordero JF, Meeker JD. Distribution and determinants of urinary biomarkers of exposure to organophosphate insecticides in Puerto Rican pregnant women. *Science of the Total Environment* 2015; 512-513:337-344.

Lewis RC, Meeker JD. Biomarkers of exposure to molybdenum and other metals in relation to testosterone among men from the United States National Health and Nutrition Examination Survey 2011-2012. *Fertility and Sterility* 2015; 103(1):172-178.

Lewis RC, Evenson KR, Savitz DA, Meeker JD. Temporal variability of daily personal magnetic field exposure metrics in pregnant women. *Journal of Exposure Science and Environmental Epidemiology* 2015; 25(1):58-64.

Lewis RC, Cantonwine DE, Anzalota Del Toro LV, Calafat AM, Valentin-Blasini L, Davis MD, Baker SE, Alshwabkeh AN, Cordero JF, Meeker JD. Urinary biomarkers of exposure to insecticides, herbicides, and one insect repellent among pregnant women in Puerto Rico. *Environmental Health* 2014; 13(1):97.

Lewis RC, Meeker JD, Peterson KE, Lee JM, Cantoral A, Tellez-Rojo MM. Predictors of urinary bisphenol A and phthalate metabolite concentrations in Mexican children. *Chemosphere* 2013; 93(10):2390-2398.

Lewis RC, Gershon RRM, Neitzel RL. Estimation of permanent noise-induced hearing loss in an urban setting. *Environmental Science and Technology* 2013; 47(12):6393-6399.

Lewis RC, Gaffney SH, Le MH, Unice KM, Paustenbach DJ. Airborne concentrations of metals and total dust during solid catalyst loading and unloading operations at a petroleum refinery. *International Journal of Hygiene and Environmental Health* 2012; 215(5):514-521.

Beebe-Dimmer JL, Lange LA, Cain JE, Lewis RC, Ray AM, Sarma AV, Lange EM, Cooney KA. Polymorphisms in the prostate-specific antigen gene promoter do not predict serum prostate-specific antigen levels in African-American men. *Prostate Cancer and Prostatic Diseases* 2006; 9(1):50-55.

### **Technical Reports**

Gosman S, Lewis R, Bowman D. Chemical use (in "High volume hydraulic fracturing in Michigan: Integrated assessment final report"). Ch. 4, University of Michigan Graham Sustainability Institute, Ann Arbor, MI. September 2015.

Lewis RC, Hauser R, Meeker JD. A pilot study of pregnancy outcome, physical activity, and magnetic field exposure: A technical update prepared for EPRI Environment Division. Electric Power Research Institute, Palo Alto, CA. 2012. Product ID: 1025386.

### **Book Contributions**

Singhal A, Posson M, Kalmes R, Gauthier A, Lewis R, Schenk J, Goswami E, Sheehan P. Risk Assessment Case Studies: Proposition 65 Risk Assessment. In: *Professional Practices of Product Stewardship*. Hart FA (ed). Falls Church: Product Stewardship Society 2018; 423-427.

### **Conference Abstracts**

Sheehan P, Bus J, Lewis RC, Winegar E, Li A. An assessment of historical occupational and non-occupational ethylene oxide exposure questions the applicability of EPA's 10<sup>-6</sup> increase in cancer risk at an exposure Level of 0.1 ppt. Poster presentation at Society of Toxicology Meeting, Anaheim, CA, March 15-19, 2020. Abstract P192.

Lewis RC, Bogen KT, Singhal A, Sheehan PJ. Use of a novel method for estimating dermal contact with hand-applied aqueous and petroleum-based cleaning solutions. Oral presentation by last author in first author's absence as part of L6, "Exposure assessment: estimating methods," at the American Industrial Hygiene Conference & Exposition, Philadelphia, PA, May 20-23, 2018.

Sheehan P, Kalmes R, Posson M, Singhal A, Lewis R, Gauthier A. Challenges in assessing health risk from exposure to bisphenol A (BPA) in consumer products. Poster presentation at the Society of Toxicology Meeting, San Antonio, TX, March 11-15, 2018. Abstract 2916.

Gauthier AM, Lewis RC. Challenging exposure assessment assumptions: A volatile cleaning product case study. Oral presentation at Product Stewardship 2017, Tampa, FL, November 2-4, 2017.

Ferguson KK, Lewis RC, Meeker JD, Colacino JA. Self-reported consumption of school lunches and urinary phthalate metabolite levels in US children. Oral presentation at the International Society of Exposure Science Annual Conference, Durham, NC, October 15-19, 2017. Abstract TU-SY-G3-326.

Gauthier A, Lewis R, Bogen K, Singhal A, Sheehan P. Wearable technology biocompatibility: A unique opportunity in green chemistry and engineering. Poster presentation at the Annual Industrial Roundtable Poster Reception of the Annual Green Chemistry and Engineering Conference, Reston, VA, June 13-15, 2017.

Lewis RC, Winegar E, Posson M, Gauthier AM, Singhal A, Sheehan PJ. Exposures to an ethanol-based cleaning product. Oral presentation as part of D10, "New approaches to exposure monitoring and screening," at the American Industrial Hygiene Conference & Exposition, Seattle, WA, June 3-5, 2017.

Singhal A, Bogen KT, Lewis RC, Gauthier A, Winegar E, Sheehan P. A novel approach to estimating dermal contact with hand-applied cleaning solutions: a simulation study involving denatured alcohol. Poster presentation at the Society of Toxicology Meeting, Baltimore, MD, March 12-16, 2017. Abstract 3247.

Winegar E, Bogen K, Lewis RC, Singhal A, Sheehan P. A use-simulation study of a denatured alcohol cleaning product to assess potential worker exposure. Poster presentation at the Society of Toxicology Meeting, Baltimore, MD, March 12-16, 2017. Abstract 1881.

Singhal A, Posson M, Jones A, Lewis RC, Schenk J, Kalmes R, Sheehan P. Assessing risk for consumer products under California's Proposition 65 regulations. Poster presentation at the Society of Environmental Toxicology and Chemistry Annual Meeting, Orlando, FL, November 6-10, 2016. Abstract MP156.

Gauthier A, Lewis R, Kalmes R. Hand-to-mouth contact frequency among adults: review of the literature and recommendations for future studies. Poster presentation at the Society of Environmental Toxicology and Chemistry Annual Meeting, Orlando, FL, November 6-10, 2016. Abstract MP159.

Lewis RC, Singhal A, Gauthier A, Kalmes R, Sheehan P. Proposed methods for characterizing dermal exposure to BPA for purposes of Proposition 65. Poster presentation at the Society for Risk Analysis Annual Meeting, San Diego, CA, December 11-15, 2016. Abstract P82.

Lewis RC, Meeker JD, Mínguez-Alarcón L, Mezei G, Hauser R. Self-reported cell phone use patterns and semen quality parameters among men from an infertility clinic. Poster presentation at BioEM2016, Ghent, Belgium, June 5-10, 2016. Abstract PB-92.

Lewis RC. Exposure to power-frequency magnetic fields and risk of adverse reproductive health outcomes: the case for additional research. Oral presentation as part of RT 234, "What do I need to know about nonionizing radiation?" at the American Industrial Hygiene Conference & Exposition, Baltimore, MD, May 21-26, 2016.

Lewis RC, Meeker JD, Peterson KE, Cantoral A, Schnaas L, Tellez-Rojo MM. Predictors of urinary bisphenol A and phthalate metabolite concentrations in Mexican children. Poster presentation at the International Society of Environmental Epidemiology, International Society of Exposure Science, and International Society of Indoor Air Quality and Climate Joint Annual Conference, Basel, Switzerland, August 19-23, 2013. Abstract P-1-13-13.

Lewis RC, Gaffney SH, Le MH, Unice KM, Paustenbach DJ. Airborne concentrations of metals and total dust during solid catalyst loading and unloading operations at a petroleum refinery. Poster presentation at the International Society of Exposure Science Annual Conference, Baltimore, MD, October 23-27, 2011. Abstract WP1-06.

Lewis RC. Global welding practices: manganese exposure assessment, control, and litigation. Roundtable arranger at the American Industrial Hygiene Conference & Exposition, Toronto, ON. May 30-June 4, 2009. Abstract RT 241.

Lewis RC, Herrick RF, Tan KT, Yep-Abu MR. Dilution ventilation to control welding fumes in a crude oil tank at a shipyard in Singapore. Poster presentation at the American Industrial Hygiene Conference & Exposition, Chicago, IL, May 13-18, 2006. Abstract G7.

### **Invited Presentations**

Lewis RC, Chang ET. Beyond compliance: A greater understanding of exposure limits for informing risk communication. Webinar presentation for Products Liability Advisory Council. May 16, 2019.

Lewis RC. Biological hazards. Oral presentation (guest lecture) in EHS 550: Introduction to Occupational and Environmental Health, University of Michigan School of Public Health, November 3, 2014.

Hauser R, Lewis RC. Magnetic fields and pregnancy loss: Four-year study among couples from a fertility clinic. Joint oral presentation at the Electric Power Research Institute (EPRI) Electric and Magnetic Fields and Radio-Frequency Health Assessment and Safety Scientific Advisory Committee Meeting, Palo Alto, CA, September 3, 2014.

Hauser R, Lewis RC. Magnetic fields and pregnancy loss: Four-year study among couples from a fertility clinic. Joint oral presentation at the Electric Power Research Institute (EPRI) Environmental Program Council Advisory Meeting, San Francisco, CA, February 25, 2014.

Lewis RC. Biological hazards. Oral presentation (guest lecture) in EHS 550: Introduction to Occupational and Environmental Health, University of Michigan School of Public Health, October 28, 2013.

Lewis RC. Exposure to 60 Hz magnetic fields and reproductive health. Oral presentation (guest lecture) in EHS 675: Advanced Exposure Assessment, University of Michigan School of Public Health, April 9, 2013.

Lewis RC. Epidemiology: a brief overview. Oral presentation (guest lecture) in the University of Michigan-American Industrial Hygiene Association Comprehensive Industrial Hygiene Review Course, Ann Arbor, MI, March 21, 2012.

Lewis RC. Dilution ventilation to control welding fumes in a crude oil tank at a shipyard in Singapore. Oral presentation in Harvard School of Public Health Seminar Series in Occupational Health, Boston, MA, April 25, 2006.

## Editorships & Editorial Review Boards

Journal of Toxicology and Environmental Health, Part A: Current Issues (2015-2018)

Toxicology and Industrial Health (2015-2016)

## Peer Reviewer

### Research Grants

NIOSH ERC 2017 Pilot Project Research Training Program, Icahn School of Medicine at Mount Sinai

### Scientific Journals

Annals of Occupational Hygiene

BMC Public Health

BMJ Open

Chemosphere

Ear and Hearing

Ecotoxicology and Environmental Safety

Environment International

Environmental Health Perspectives

Environmental Pollution

Environmental Research

International Archives of Occupational and Environmental Health

International Journal of Hygiene and Environmental Health

International Journal of Environmental Research and Public Health

Journal of Exposure Science and Environmental Epidemiology

Journal of Occupational and Environmental Hygiene

Journal of Toxicology and Environmental Health, Part A: Current Issues

Journal of Toxicology and Environmental Health, Part B: Critical Reviews

Regulatory Toxicology and Pharmacology

Safety Science

Science of the Total Environment

Toxicology and Industrial Health