Tammie R. Covington, M.S.

SUPERVISING SCIENTIST

CONTACT INFORMATION

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PROFESSIONAL PROFILE

Ms. Tammie Covington is a Supervising Scientist in ToxStrategies' Health Sciences Practice. As an applied mathematician, she has over 30 years of experience in the development and application of physiologically based pharmacokinetics (PBPK) models, primarily in the areas of risk and exposure assessment. The models she has developed have been for occupational and environmental exposure for various species including human. They have also encompassed various life stages including pregnancy, lactation and entire lifetime, and have incorporated mathematical descriptions of physiological changes occurring during these life stages. Her expertise extends to applying sensitivity, Monte Carlo, and Markov Chain Monte Carlo analyses to these models. Most recently, she has used PBPK modeling and NHANES biomarker data to determine the feasibility of this framework for assessing potentially increased risk due to allostatic loads in relation to the U.S. Environmental Protection Agency's (EPA) environmental justice initiative. Her work has also included exploring the impact of genetic polymorphisms to better understand risk to susceptible populations through the use of PBPK modeling and Monte Carlo analysis. Additionally, she has adapted existing models for new applications, including reverse dosimetry to estimate distributions of potential inhaled concentrations based on exhaled breath concentrations and determination of the feasibility of a proposed biomarker for asthma inhaler use. Ms. Covington has also applied PBPK models to the development of various regulatory risk levels and evaluated existing risk levels by using PBPK models and Markov chain Monte Carlo analysis to base risk assessments on internal dose rather than external exposure and thus, allow for better extrapolation between animal and human exposures and across routes of exposure.

Ms. Covington has extensive experience coding PBPK models in acslX but also experience with SimBiology, and more recently, developing models in R. This includes writing scripts to not only run the model and compare predictions to experimental data, but also extensive use of scripting functions to handle and summarize simulation results such as the large amounts of output from Monte Carlo simulations. She has also used scripting to help automate specific simulation tasks as well as using text functions and Visual Basic code in Excel to help automate the development of some of these scripts. Ms. Covington also developed an array, or vector, version of an existing model to help facilitate modeling of mixtures; this model allowed for more rapid modification of the model while reducing the risk of coding errors. Ms. Covington's modeling experience is not limited to development of bespoke models; she also has experience in using the EPA's httk package which includes scripting, comparing and combining data sets, and defining Monte Carlo analyses.

Ms. Covington also gained experience with statistical programming and epidemiological and benchmark dose (BMD) modeling. Her experience with BMD modeling was in using internal doses from PBPK modeling rather than external exposures. Throughout her career, she has consulted with a variety of regulatory agencies, developing models for chemical assessment, as well as exposure limits.

Ms. Covington has an extensive publishing history, including peer-reviewed manuscripts and technical reports. In addition to being asked to contribute a book chapter on her work modeling VX, she was also invited to contribute a chapter on sensitivity and Monte Carlo analysis for a textbook. Based on her extensive PBPK experience, she was invited to serve as an ad hoc member of the Toxic Substances Control Act Science Advisory Committee on Chemicals peer-review meeting to evaluate submissions for methylene chloride and N-methyl-2-pyrrodlidone (NMP).

EDUCATION AND DEGREES EARNED

1990 M.S., Mathematics, Louisiana Tech University, Ruston, LA

1989 B.S., Mathematics (*summa cum laude*), Louisiana Tech University, Ruston, LA

PROFESSIONAL HONORS/AWARDS

2007 Society of Toxicology Risk Assessment Specialty Section; Top Ten Papers in the Application of Risk Assessment, Covington et al. (2007), "The use of Markov chain Monte Carlo uncertainty analysis to support a Public Health Goal for perchloroethylene."

2005 Society of Toxicology Risk Assessment Specialty Section; Outstanding Presentation for poster.

2002 Invited conference session co-presenter, Conference on Theories and Practices in Toxicology and Risk Assessment, April 15, 2002, Cincinnati, OH. Co-presented a workshop titled, "An overview of the development of age/gender-specific (children and adults) PBPK models for application in health risk assessment."

PROFESSIONAL ASSOCIATIONS AND COMMITTEES

2006–present	Society of Toxicology
2024-present	American Society for Cellular and Computational Toxicology
2018–2020	Secretary/Treasurer of the Society of Toxicology Biological Modeling Specialty Section
2019	Ad hoc member of the Toxic Substances Control Act (TSCA) Science Advisory Committee on Chemicals peer-review meeting to review submissions for methylene chloride and N-methyl-2-pyrrolidone (NMP), Washington, DC, December 2019

SELECTED PROFESSIONAL EXPERIENCE

PBPK Modeling

Used *in vitro* to *in vivo* extrapolation (IVIVE) to estimate external *in vivo* doses corresponding to *in vitro* assays and compared with *in vivo* study doses and results.

Modified existing models to explore the predicted kinetics and address safety questions in the absence of *in vivo* data.

Used PBPK modeling along with biomarker data from NHANES to assess the feasibility of this framework to assess the potential for increased risk to susceptible communities due to allostatic loads in relation to EPA's environmental justice initiative.

Developed a PBPK model to predict exhaled breath concentrations of the inhaler propellant to explore the feasibility of these concentrations as a biomarker for asthma inhaler use. Ms. Covington took over leadership of this work after her team lead's retirement.

Developed an initial array PBPK model for use in modeling mixtures and was a co-author on a paper describing the use of this model for jet fuel components.

Developed a PBPK-PD model for the VX nerve agent, which included dermal exposure and chlolinesterase inhibition, and was invited to author a book chapter on this work.

Collaborated on the development of a PBPK model to describe physiological changes across lifetime and changes during pregnancy and lactation. Ms. Covington is a co-author on the manuscripts describing this work.

Developed a harmonized PBPK model for trichloroethylene using previously developed PBPK models for trichloroethylene. Ms. Covington was first author on the technical report detailing this work.

Assisted with the critical evaluation of PBPK modeling in risk assessment for EPA and OSHA for several chemicals.

Risk Assessment

Used a PBPK model, in conjunction with Markov Chain Monte Carlo and Monte Carlo analyses, to reappraise a public health goal for perchloroethylene in drinking water and was first author on a publication describing this work.

Collaborated on a cancer risk assessment for dichloromethane using Markov chain Monte Carlo and Monte Carlo analyses, along with data on specific polymorphisms.

Collaborated on the development of a Department of Defense (DoD) occupational exposure limit for trichloroethylene by validating and applying the EPA model to develop points of departure based on internal dose. Ms Covington is first author on several technical reports detailing this work and was asked by the DoD to be present during two NASEM reviews of this work as the PBPK subject matter expert on the project.

Exposure Assessment

Assessed chemical exposures for high-performance aircraft pilots by estimating distributions of potential inhaled concentrations, based upon exhaled breath samples, through development of a PBPK model used to simulate 4 different volatile organic chemicals and use of Monte Carlo analysis and reverse dosimetry. Ms. Covington proposed and was the principal investigator for the portion of this work that involved incorporating genetic polymorphisms and was first author on technical reports detailing this work.

Collaborated on a case study, using EPA's httk package, to develop a tiered screening process for chemical assessment.

Assisted in the initial phase of an exposure assessment for decamethylcyclopenta–siloxane in consumer and personal care products.

Collaborated on a methyl mercury assessment of women of child-bearing age using Monte Carlo methods along with NHANES data on fish consumption.

COURSES AND TRAINING

Pharmacokinetic Parameters and Cell Morphology Data for Predicting Toxicity Using Machine Learning, American Society for Cellular and Computational Toxicology, October 29, 2024.

High Throughput Toxicokinetics (httk) Virtual Training, virtual course, November 8-9, 2023.

Benchmark Dose (BMD) Modeling in Practice — A Practical Guide to BMD in the Context of Regulatory Risk Assessment, Toxicology and Risk Assessment Conference, Miamisburg, OH, April 24, 2023.

Modern Modeling Strategies to Address Uncertainty and Variability in Dose-Response Assessment, Society of Toxicology Annual Meeting, Anaheim, CA (virtual course), March 15, 2020.

Applications and Review of Physiologically Based Pharmacokinetic Modeling for Regulatory Risk Assessment, Society of Toxicology Annual Meeting, Baltimore, MD, March 10, 2019.

Physiologically-Based Pharmacokinetic Modeling to Support Modernized Chemical Safety Assessment, Society of Toxicology Annual Meeting, San Antonio, TX, March 11, 2018.

Extrapolation in the Airways: Strategies to Incorporate In Vivo and In Vitro Data to Better Protect Human Health, at Society of Toxicology Annual Meeting, Baltimore, MD, March 12, 2017.

Genetics and Population Variability in Chemical Toxicity: The What, the How, and So What?, Society of Toxicology Annual Meeting, New Orleans, LA, March 13, 2016.

Quantitative In Vitro and In Vivo Extrapolation: The Essential Element of In Vitro Assay Based Risk Assessment, Society of Toxicology Annual Meeting, Washington, D.C., March 6, 2011.

Characterizing Variability and Uncertainty with Physiologically-Based Pharmacokinetic Models, Society of Toxicology Annual Meeting, Baltimore, MD, March 15, 2009.

Mid-America Toxicology Course, Kansas City, Kansas, April 24-29, 2005.

Workshop on Physiologically Based Pharmacokinetic/Pharmacodynamic Modeling and Risk Assessment, Fort Collins, CO, August 5-16, 1996.

BOOK CHAPTERS

Covington TR, Gearhart JM. 2020. Sensitivity and Monte Carlo analysis techniques and their use in uncertainty, variability, and population analysis. In: Fisher JW, Gearhart JM, Lin Z (eds), Physiologically Based Pharmacokinetic (PBPK) Modeling, pp. 211–242. Academic Press.

Covington TR, Lumley LA, Ruark CD, Clarkson ED, Whalley CE, Gearhart JM. 2016. Modeling organophosphorus chemical warfare nerve agents: a physiologically based pharmacokinetic-pharmacodynamic (PBPK-PD) model of VX. In: Worek F, Jenner J, Thiermann H (eds), Chemical Warfare Toxicology: Volume 1: Fundamental Aspects, pp.213–263. Royal Society of Chemistry.

MANUSCRIPTS

Borghoff SJ, Rivera B, Fitch S, Buerger AN, Choksi N, Franzen A, Vincent MJ, **Covington T**, Bus J, Rushton E, Lea IA. 2025. Systematic evaluation of the evidence base on methyl tert-butyl ether supporting a lack of concern for carcinogenic hazard in human based on animal cancer studies and mechanistic data. Curr Res Toxicol 8:100224; doi: 10.1016/j.crtox.2025.100224.

Perry CS, Verwiel AH, **Covington TR**, Proctor DM. 2024. PBPK modeling demonstrates that exposure time adjustment is unnecessary for setting an acute manganese inhalation exposure guideline. Regul Toxicol Pharmacol 153:105698; doi: 10.1016/j.yrtph.2024.105698.

Sterner TR, **Covington TR**, Mattie DR. 2023. Complex mixtures: Array PBPK modeling of jet fuel components. Toxics 11:187; doi: 10.3390/toxics11020187.

Sterner TR, Ruark CD, **Covington TR**, Yu KO, Gearhart JM. 2013. A physiologically based pharmacokinetic model for theoxime TMB-4: Simulation of rodent and human data. Arch Toxicol 87:661–680.

Teeguarden JG, Bogdanffy MS, **Covington TR**, Tan C, Jarabek AM. 2008. A PBPK model for evaluating the impact of aldehyde dehydrogenase polymorphisms on comparative rat and human nasal tissue acetaldehyde dosimetry. Inhal Toxicol 20:375–390.

Covington TR, Gentry PR, Van Landingham CB, Andersen ME, Kester JE, Clewell HJ. 2007. The use of Markov chain Monte Carlo uncertainty analysis to support a Public Health Goal for perchloroethylene. Regul Toxicol Pharmacol 47(1):1–18.

Hack CE, **Covington TR**, Lawrence G, Shipp AM, Gentry R, Yager J, Clewell, HJ, III. 2007. A pharmacokinetic model of the intracellular dosimetry of inhaled nickel. J Toxicol Environ Health A 70(5):445–464.

Teeguarden JG, Dorman DC, **Covington TR**, Clewell HJ III, Andersen ME. 2007. Pharmacokinetic modeling of manganese. I. Dose dependencies of uptake and elimination. J Toxicol Environ Health A 70:1493–1504.

Teeguarden JG, Dorman DC, Nong A, **Covington TR**, Clewell HJ III, Andersen ME. 2007. Pharmacokinetic modeling of manganese. II. Hepatic processing after ingestion and inhalation. J Toxicol Environ Health A 70:1505–1514.

Teeguarden JG, Gearhart J, Clewell HJ III, **Covington TR**, Nong A, Andersen ME. 2007. Pharmacokinetic modeling of manganese. III. Physiological approaches accounting for background and tracer kinetics. J Toxicol Environ Health A 70:1515–1526.

David RM, Clewell HJ, Gentry PR, **Covington TR**, Morgott DA, Marino DJ. 2006. Revised assessment of cancer risk to dichloromethane II. Application of probabilistic methods to cancer risk determinations. Regul Toxicol Pharmacol 45(1):55–65.

Marino DJ, Clewell HJ, Gentry PR, **Covington TR**, Hack CE, David RM, Morgott DA. 2006. Revised assessment of cancer risk to dichloromethane: Part I Bayesian PBPK and dose-response modeling in mice. Regul Toxicol Pharmacol 45(1):44–54.

Gentry PR, **Covington TR**, Lawrence G, McDonald T, Snow ET, Germolec D, Moser G, Yager JW, Clewell HJ, III. 2005. Comparison of tissue dosimetry in the mouse following chronic exposure to arsenic compounds. J Toxicol Environ Health A 68:329–351.

Teeguarden JG, Waechter JM Jr, Clewell HJ 3rd, **Covington TR**, Barton HA. 2005. Evaluation of oral and intravenous route pharmacokinetics, plasma protein binding and uterine tissue dose metrics of bisphenol A: A physiologically based pharmacokinetic approach. Toxicol Sci 85:429–446.

Clewell HJ, Gentry PR, **Covington TR**, Sarangapani R, Teeguarden JG. 2004. Evaluation of the potential impact of age- and gender-specific pharmacokinetic differences on tissue dosimetry. Toxicol Sci 79(2):381–93.

Gentry PR, Haber LT, McDonald TB, Zhao Q, **Covington T**, Nance P, Clewell HJ III, Lipscomb JC, Barton HA. 2004. Data for physiologically based pharmacokinetic modeling in neonatal animals: physiological parameters in mice and Sprague-Dawley rats. J Children's Health 2(3–4):363–411.

Gentry PR, **Covington TR**, Mann S, Shipp AM, Yager JW, Clewell HJ III. 2004. Physiologically based pharmacokinetic modeling of arsenic in the mouse. J Toxicol Environ Health A 67:43–71.

Gentry PR, **Covington TR**, Clewell HJ, Andersen ME. 2003. Application of a physiologically based pharmacokinetic model for reference dose and reference concentration estimation for acetone. J Toxicol Environ Health A 66(23):2209–2225.

Sarangapani R, Gentry PR, **Covington TR**, Teeguarden JG, and Clewell HJ. 2003. Evaluation of the potential impact of age- and gender-specific lung morphology and ventilation rate on the dosimetry of vapors. Inhal Toxicol 15(10):987–1016.

Gentry RP, **Covington TR**, Clewell HJ III. 2003. Evaluation of the potential impact of pharmacokinetic differences on tissue dosimetry in offspring during pregnancy and lactation. Regul Toxicol Pharmacol 38:1–16.

Clewell HJ, Teeguarden J, McDonald T, Sarangapani R, Lawrence G, **Covington T**, Gentry R, Shipp A. 2002. Review and evaluation of the potential impact of age and gender-specific pharmacokinetic differences on tissue dosimetry. Crit Rev Toxicol 32(5):329–389.

Gentry PR, **Covington TR**, Andersen ME, Clewell HJ. 2002. Application of a physiologically based pharmacokinetic model for isopropanol in the derivation of a reference dose and reference concentration. Regul Toxicol Pharmacol 36:51–68.

Clewell HJ, Gentry PR, Gearhart JM, **Covington TR**, Banton MI, Andersen ME. 2001. Development of a physiologically based pharmacokinetic model of isopropanol and its metabolite acetone. Toxicol Sci 63:160–172.

Andersen ME, Sarangapani R, Gentry PR, Clewell HJ, **Covington TR**, Frederick CB. 2000. Application of a hybrid CFD-PBPK nasal dosimetry model in an inhalation risk assessment: An example with acrylic acid. Toxicol Sci 57:312–325.

Clewell HJ, Gentry PR, Allen BC, **Covington TR**, Gearhart JM. 2000. Development of a physiologically-based pharmacokinetic model of trichloroethylene and its metabolites for use in risk assessment. Environ Health Perspect 108(Suppl 2):283–305.

Shipp AM, Gentry PR, Lawrence G, Van Landingham C, **Covington T**, Clewell HJ, Gribben K, Crump K. 2000. Determination of a site-specific reference dose for methylmercury for fish-eating populations. Toxicol Ind Health 16(9-10):335–438.

Clewell HJ, Gearhart JM, Gentry PR, **Covington TR**, Van Landingham CB, Crump KS, and Shipp AM. 1999. Evaluation of the uncertainty in an oral reference dose for methylmercury due to interindividual variability in pharmacokinetics. Risk Anal 19:541–552.

Allen BC, **Covington TR**, Clewell HJ III. 1996. Investigation of the impact of pharmacokinetic variability and uncertainty on risks predicted with a pharmacokinetic model for chloroform. Toxicology 111:289–303.

Hochberg F, Miller G, Valenzuela R, McNelis S, Crump KS, **Covington T**, Valdivia G, Hochberg B, Trustman JW. 1996. Late motor deficits of Chilean manganese miners: A blinded control study. Neurology 47:788–795.

TECHNICAL REPORTS

Covington TR, Gearhart JM, Sterner TR. 2022. Revisions to physiologically-based pharmacokinetic modeling in the development of health protective levels for trichloroethylene. Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Airman Biosciences Division, Biotechnology Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2022-0052.

Covington TR, Sterner TR, Gearhart JM, Linakis MW. 2022. Physiologically-based pharmacokinetic model to predict propellant levels in exhaled air from pressurized medical inhaler use. Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Airman Biosciences Division, Biotechnology Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2022-0016. AD1165995.

Covington TR, Gearhart JM, Jarvis JP, Pangburn HA, Ott DK. 2020. Investigation of inter-individual genetic variability with physiologically-based pharmacokinetic models and Monte Carlo analysis. Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Airman Biosciences Division, Performance Optimization Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2020-0059. AD1109562.

Reilly D, McNeilly R, Cowan D, Griffith C Jr, McKenzie-Smith D, **Covington T**, Gearhart J, Linakis M, Pangburn H, Duran C, Frazey J. 2020. Characterization of chemical contaminants in A-10 pilot breathing air and toxicokinetic simulation to predict impact on pilot performance. Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Airman Biosciences Division, Performance Optimization Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2020-0058. AD1107022.

Covington TR, Gearhart JM, Pangburn HA, Ott DK. 2020. Technical transfer: cockpit exposure reconstruction via physiologically-based pharmacokinetic modeling for HPARS. Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Warfighter Medical Optimization Division, Airman Readiness Optimization Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2020-0016. AD1102406.

Covington TR, Gearhart JM, Pangburn HA, Ott DK. 2020. Incorporation of operational features of flight into a physiologically-based pharmacokinetic (PBPK) model. Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Warfighter Medical Optimization Division, Airman Readiness Optimization Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2020-0015. AD1096307.

Covington TR, Gearhart JM, Sterner TR, Mattie DR, Pangburn HA, Ott DK. 2019. Translation of a physiologically based pharmacokinetic model used to develop health protective levels for trichloroethylene. Air Force Research Laboratory, 711th Human Performance Wing, US Air Force School of Aerospace Medicine, Aeromedical Research Department, Wright-Patterson AFB, OH. AFRL-SA-WP-TR-2019-0006. AD1072649.

Covington TR, Gearhart JM, Sterner TR, Mattie DR. 2017. Evaluation of a physiologically-based pharmacokinetic (PBPK)model used to develop health protective levels for trichloroethylene. Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Bioeffects Division, Molecular Bioeffects Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2017-0014. AD1036558.

Sterner TR, Robinson PJ, Hack CE, Qi L, Narayanan L, Law ST, **Covington TR**, Merrill EA, Grobe N, Brown DN Mattie DR. 2017. Jet fuel exacerbated noise-induced hearing loss: focus on prediction of central auditory processing dysfunction. Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Bioeffects Division, Molecular Bioeffects Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2017-0079. AD1043041.

Gearhart JM, Ruark CD, Merrill EA, Makley MK, Poeppelman LD, Ghering AB, Chapleau RR, Hoffmann A, **Covington TR**. 2015. Collaborative Core Research Program for chemical-biological warfare defense. Air Force Research Laboratory, 711th Human Performance Wing, Human Effectiveness Directorate, Bioeffects Division, Molecular Bioeffects Branch, Wright-Patterson AFB, OH. AFRL-RH-WP-TR-2015-0050. ADA626004.

Covington TR, Clewell HJ, Fisher JW. 2006. Development of a physiologically-based pharmacokinetic model of trichloroethylene and its metabolites for use in risk assessment. Air Force Research Laboratory, Human Effectiveness Directorate, Biosciences and Protection Division, Wright-Patterson AFB, OH. AFRL-HE-WP-TR-2006-0049. ADA452195 and ADA451076.

PRESENTATIONS

Stemer TR, **Covington TR**, Cowan DW, Coyle JP, Gearhart JM, LaLonde TJ, Ring CL, Sweeney LM, Wambaugh JF, Wooten AT, Bang AG, Clewell RA. Rapid risk assessment of potential neurotoxicants using non-animal test methods. Abstract 4842, Society of Toxicology 64th Annual Meeting, Orlando, FL, March 2025.

Sweeney LM, Coyle JP, **Covington TR**, Sterner TR, Clewell RA. Rapid dosimetry in a tiered chemical screening process for military personnel-toxicokinetic considerations for a case study with in vitro neurotoxicity. Abstract 3495, Society of Toxicology 64th Annual Meeting, Orlando, FL, March 2025.

Covington TR, Borghoff SJ, Bacigalupi L, O'Neal S, Cook B, Nelms M, et al. Prediction of chemical suitability for screening in a high-throughput assay platform using an in silico mass balance model. American Society of Cellular and Computational Toxicology Annual Meeting, Research Triangle Park, NC, October 2024.

East A, Klaren W, **Covington T**, Rish W. Exploring biomarker-based methods to incorporate non-chemical stressor exposures into cumulative assessments for potentially vulnerable population groups. International Society of Exposure Science Annual Meeting, Montreal, Canada, October 2024.

Urban JD, **Covington TR**, Fitch SE, Wikoff DS. Dioxin-like compounds in soils: A pilot survey updating background soil TEQ. Abstract 5147, Society of Toxicology Annual Meeting, Salt Lake City, UT, March 2024.

Covington TR, Sterner TR. Physiologically-based pharmacokinetic model to predict HFC-134a in exhaled breath following albuterol inhaler use. Poster presented at the 2023 Toxicology and Risk Assessment Conference, Miamisburg, OH, August 25, 2023.

Covington TR, Sterner TR. Physiologically-based pharmacokinetic model to predict HFC-134a in exhaled breath following albuterol inhaler use. Poster presented at the Society of Toxicology Annual Meeting, Nashville, TN, March 2023.

Sterner TR, **Covington TR**. Complex mixtures: array modeling of jet fuel components. Poster presented at the Society of Toxicology Annual Meeting, Nashville, TN, March 2023.

Pangburn HA, Linakis MW, Chushak YG, **Covington TR**, McCarthy MJ, Gearhart JM. New approach methodologies informing operational Air Force mission. Presentation at the Society of Toxicology Annual Meeting, virtual event, March 2021.

Covington TR, Ott DK, Gearhart JM, Pangburn HA. Simulating a virtual high-performance aircraft pilot using physiologically-based pharmacokinetic modeling. Poster presented at Annual Meeting of the Aerospace Medical Association, Las Vegas, NV, May 2019.

Covington TR. Translating an existing physiologically-based pharmacokinetic model for isopropanol from a scalar to an array format. Poster presented at the Society of Toxicology Annual Meeting, Baltimore, MD, March 2019.

Pitts E, Gearhart JM, **Covington TR**, Duran CM, Yamamoto DP, McKenzie-Smith D, Ott DK, Pangburn HA. Thermal stress effects on physiologically based pharmacokinetic model for Department of Defense personnel. Poster presented at the Society of Toxicology Annual Meeting, Baltimore, MD, March 2019.

Sterner TR, **Covington TR**, Merrill EA, Mattie DR. Novel array approach to mixtures model streamlines predictions of cochlea and brain region tissue concentrations from JP-8 inhalation exposure. Poster presented at the Society of Toxicology Annual Meeting, Baltimore, MD, March 2019.

Covington TR, Ott DK, Gearhart JM, Pangburn HA. A physiologically-based pharmacokinetic model to address physiological changes associated with high-performance aircraft flight. Presentation at the Annual Meeting of the Military Health System Research Symposium, Orlando, FL, August 2018.

Covington TR, Ott DK, Gearhart JM, Pangburn HA. Development of a physiologically-based pharmacokinetic model for the virtual high-performance aircraft pilot. Poster presented at the Society of Toxicology Annual Meeting, San Antonio, TX, March 2018.

Gearhart JM, Pitts E, **Covington TR**, Grabinski CM, Yamamoto DP, McKenzie-Smith D, Ott DK, Pangburn HA. Physiological simulation of thermal and chemical stressors in a United States Air Force population. Presentation at the Society of Toxicology Annual Meeting, San Antonio, TX, March 2018.

Pangburn HA, Jarvis JP, **Covington TR**, Ott DK, Gearhart JM. The impact of genetics on the pharmacokinetics of chemicals in a U.S. Air Force population. Poster presented at the Society of Toxicology Annual Meeting, San Antonio, TX, March 2018.

Covington TR, Pangburn HA, Mayes RS, Ott DK, Gearhart JM. Estimated inter-individual variations in high-performance aircraft pilot exposures using physiologically-based pharmacokinetic (PBPK) modeling and Monte Carlo analysis. Poster presented at the Society of Toxicology Annual Meeting, Baltimore, MD, March 2017.

Hack CE, Gearhart JM, **Covington TR**, Starr CR, Chapleau RR. Development of a mathematical model of anthrax in humans and application to estimate risk to fielded biological threat identification equipment operators. Poster presented at the Society of Toxicology Annual Meeting, New Orleans, LA, March 2016.

Pangburn HA, **Covington T**, Habib T, Mayes RS, Grigsby CC, Ott DK, Gearhart JM. Simulated reconstructions of high performance aircraft pilot exposures using physiologically based pharmacokinetic modeling. Poster presented at the Society of Toxicology Annual Meeting, New Orleans, LA, March 2016.

Hack CE, **Covington TR**, Robinson PJ, Shiyanov PA, Mahle DA, Gearhart JM. A PBPK model of hypobaric and hyperbaric toluene exposure. Poster presented at the Society of Toxicology Annual Meeting, Phoenix, AZ, March 2014.

Covington TR, Ruark CD, Yu KO, Gearhart JM. Human lethality predictions from exposure to VX using a physiologically-based pharmacokinetic-pharmacodynamic model. Poster presented at the Society of Toxicology Annual Meeting, San Antonio, TX, March 2013.

Sterner T, Ruark C, **Covington T,** Gearhart J. Monte Carlo and sensitivity analyses of a PBPK model for the oxime TMB-4. Poster presented at the Chemical and Biological Defense Science and Technology Conference, Las Vegas, NV, November 2011.

Covington T, Robinson P, Gearhart J. Exploring issues in simulating dermal exposure using a physiologically-based pharmacokinetic-pharmacodynamic (PBPK-PD) model for VX. Poster presented at the Society of Toxicology Annual Meeting, Washington, DC, March 2011.

Covington T, Robinson P, Gearhart J. Exploring issues in simulating dermal exposure using a physiologically-based pharmacokinetic-pharmacodynamic (PBPK-PD) model for VX. Poster presented at the Chemical and Biological Defense Science and Technology Conference, Orlando, FL, November 2010.

Makley M, Ruark C, **Covington T**, Robinson P, Gearhart J. Route of entry model for predicting chemical warfare agent miosis. Poster presented at the Chemical and Biological Defense Science and Technology Conference, Orlando, FL, November 2010.

Sterner TR, Ruark CD, **Covington TR**, Hack CE, Gearhart JM. Characterizing uncertainty and population variability in a PBPK-PD mathematical model for the oxime HI-6. Poster presented at the Chemical and Biological Defense Science and Technology Conference, Orlando, FL, November 2010.

Covington T, Jakubowski E, McGuire J, Byers C, Evans R, Hulet S, Whalley C, Lumley L, Clarkson E, Gearhart J. A multi-species and -route, ion- and isomer-specific physiologically-based pharmacokinetic-pharmacodynamic model for VX. Poster presented at the Bioscience Review Conference, Baltimore, MD, May 2010.

Yu KO, Ruark CD, Hack CE, Sterner TR, **Covington TR**, Gearhart JM. A physiologically based pharmacokinetic model for pralidoxime in the guinea pig and human. Poster presented at the Society of Toxicology Annual Meeting, Salt Lake City, UT, March 2010.

Covington TR, Jakubowski EM, McGuire JM, Byers CE, Evans RA, Hulet SW, Whalley CE, Lumley LA, Clarkson ED, Gearhart JM. A multi-species and -route ion- and isomer-specific physiologically-based pharmacokinetic-

pharmacodynamic model for VX. Presentation at the Chemical and Biological Defense Science and Technology Conference, Dallas, TX, November 2009.

Yu K, **Covington T**, Ruark C, Sterner T, Hack E, Gearhart J. A physiologically based pharmacokinetic model for pralidoxime in the guinea pig and in human. Presentation at the Chemical and Biological Defense Science and Technology Conference, Dallas, TX, November 2009.

Covington TR, Jakubowski EM, McGuire JM, Evans RA, Hulet SW, Gearhart JM. Accounting for stereo-isomers and ionization in a PBPK/PD model of VX exposure. Poster presented at the Society of Toxicology Annual Meeting, Baltimore, MD, March 2009.

Covington TR, Gearhart JM, Jakubowski EM, McGuire JM, Evans RA, Hulet SW. Physiologically-based pharmacokinetic/pharmacodynamic (PBPK/PD) modeling of VX exposure through various routes to multiple species. Poster presented at the Chemical and Biological Defense Physical Science and Technology Conference, New Orleans, LA, November 2008.

Gearhart JM, **Covington TR**, Robinson PJ, Whalley CE, McGuire JM, Evans RA, Hulet SW, Byers CE, Jakubowski EM. Simulation of VX exposure in multiple species by means of a physiologically based pharmacokinetic/pharmacodynamic model. Poster presented at the Bioscience Review Conference, Baltimore, MD, May 2008.

Covington TR, Gentry P, Van Landingham CB, Clewell HJ. Issues in using Markov Chain Monte Carlo analysis to calibrate a PBPK model for use in risk assessment: case studies with dichloromethane and perchloroethylene. Poster presented at the Society of Toxicology Annual Meeting, San Diego, CA, March 2006.

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