



Science Highlight from the ACC LRI | February 17, 2021

Improving Understanding of Indoor Exposures



Addressing uncertainty in mouthing-mediated ingestion of chemicals on indoor surfaces, objects, and dust

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- While conservative deterministic modeling, handwipes, and passive samplers (e.g., wristbands) have been used to predict human indoor household exposure, their relative performance has been highly variable, inconsistent and difficult to explain.
- Therefore, this [ACC Long-Range Research Initiative](#) project focused on developing an innovative modeling approach to establish an emission-to-exposure continuum to more accurately predict mouthing-mediated ingestion of chemicals in the indoor environment from dust and molecules adsorbed on indoor surfaces.
 - ✓ This model is designed for simultaneous simulations of mouthing-mediated ingestion of both dust and chemicals for various age groups to support chemical- and subpopulation-specific assessments.
- This new modular model was developed by [ARC Arnot Research & Consulting](#) in collaboration with [Dr. Li Li at the University of Nevada, Reno](#). The model consists of 1) an indoor fate module describing the mass balance of dust and chemicals between indoor compartments and the resulting loadings of dust and chemicals on indoor surfaces, and 2) a human exposure module describing the oral ingestion of chemicals via hand to mouth transfer of chemical residues in dust and on indoor surfaces.
- The model, verified by comparisons to several empirical datasets, can be used to improve exposure and risk evaluations for various indoor exposure scenarios.
 - ✓ The model successfully reproduced dust ingestion rates from nationally representative frequencies of hand-to-mouth and object-to-mouth contact and predicted chemical loadings on hands reasonably agreed with published studies of measured handwipe loadings.
- Consistent with the [ACC-LRI Strategic Plan](#), the ACC LRI has supported development of a wide array of [methods and tools to investigate and characterize toxicity, exposures, dosimetry, and risks](#).

This Science Highlight was prepared by Richard A. Becker Ph.D. DABT of the ACC LRI. The views expressed are his alone.
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