



Structured Deterministic Model (SDM 2.0)

An Excel-based, user-friendly tool for estimating airborne concentrations that represent potential occupational inhalation exposure to volatile and semi-volatile chemicals and chemical mixtures, aerosols, particulates, and fibers.

Technology No. 2022-255

IP Status: Copyrighted

Applications

- Can be used by corporate and consulting companies to develop exposure estimates for regulatory compliance, health and safety program management, emergency response planning or for toxic tort cases.
- Can be used by organizations to estimate the measure of health risk for a worker or group of workers

Key Benefits & Differentiators

- **Higher Accuracy:** More accurate than traditional methods of estimating exposure
- **Avoids negative bias:** Avoids negative bias due to absence of (or limited) exposure measurement data

Technology Overview

Subjective approaches have been traditionally used by industrial hygienists to estimate exposure to workers. These subjective approaches provide inaccurate estimates, resulting in significant underestimation of exposures. Another common approach used by hygienists is to base exposure estimates on a very small number of exposure measurements, an approach that also negatively biases exposure assessment judgments, leading to underestimating worker exposures.

Led by researchers at the University of Minnesota, the SDM 2.0 team has developed an Excel-based, user-friendly tool for estimating airborne concentrations that represent potential occupational inhalation exposure to volatile and semi-volatile chemicals and chemical mixtures, aerosols, particulates, and fibers. It provides a point estimate of the 95th percentile value of an exposure distribution that can be compared to an occupational exposure limit, as a

measure of health risk for a worker or group of workers. It improves the accuracy with which airborne concentrations of chemicals and chemical mixtures that represent potential worker exposure in work environments are estimated. SDM 2.0 is also a teaching tool. With its highly visual, interactive report dashboard, this tool allows users to evaluate the impact of different exposure control options on exposure and health risk.

Phase of Development

TRL: 5-6 Working prototype software. Beta testing is planned

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

Researchers

- [Susan F. Arnold](#) Associate Professor with Tenure, Division of Environmental Health Sciences

References

Susan F. Arnold, Mark Stenzel, Daniel Drolet, and Gurumurthy Ramachandran,
<https://www.tandfonline.com/doi/full/10.1080/15459624.2015.1053892>, J Occup Environ Hyg

<https://license.umn.edu/product/structured-deterministic-model-sdm-20>