Resource Summary Report

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Multiple-Path Particle Dosimetry Model

RRID:SCR_001486
Type: Tool

Proper Citation

Multiple-Path Particle Dosimetry Model (RRID:SCR_001486)

Resource Information

URL: http://www.ara.com/products/mppd.htm

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Description: Computational model that can be used for estimating human and rat airway particle dosimetry. The model is applicable to risk assessment, research, and education. The MPPD model calculates the deposition and clearance of monodisperse and polydisperse aerosols in the respiratory tracts of rats and human adults and children (deposition only) for particles ranging in size from ultrafine (0.01 micrometers) to coarse (20 micrometers). The models are based on single-path and multiple-path methods for tracking air flow and calculating aerosol deposition in the lung. The single-path method calculates deposition in a typical path per airway generation, while the multiple-path method calculates particle deposition in all airways of the lung and provides lobar-specific and airway-specific information. Within each airway, deposition is calculated using theoretically derived efficiencies for deposition by diffusion, sedimentation, and impaction within the airway or airway bifurcation. Filtration of aerosols by the nose and mouth is determined using empirical efficiency functions. The MPPD model includes calculations of particle clearance in the lung following deposition.

Abbreviations: MPPD

Synonyms: Multiple Path Particle Dosimetry Model

Resource Type: software resource

Defining Citation: PMID:8566482

Keywords: model, computational model, particle dosimetry, risk assessment, adult human, child, aerosol, deposition, clearance, lung

Funding:

Availability: Registration required

Resource Name: Multiple-Path Particle Dosimetry Model

Resource ID: SCR_001486

Alternate IDs: nlx_152744

Record Creation Time: 20220129T080207+0000

Record Last Update: 20250420T014030+0000

Ratings and Alerts

No rating or validation information has been found for Multiple-Path Particle Dosimetry Model.

No alerts have been found for Multiple-Path Particle Dosimetry Model.

Data and Source Information

Source: SciCrunch Registry

Usage and Citation Metrics

We found 11 mentions in open access literature.

Listed below are recent publications. The full list is available at NIF.

Gustafsson Å, et al. (2022) Estimated daily intake of per- and polyfluoroalkyl substances related to different particle size fractions of house dust. Chemosphere, 303(Pt 2), 135061.

Weiss JM, et al. (2018) Daily intake of phthalates, MEHP, and DINCH by ingestion and inhalation. Chemosphere, 208, 40.

Olumayede EG, et al. (2018) Data set on concentrations, bioavailability, dose and lung deposition of labile metals bound to inhalable and respirable fractions of ambient particulate matters in Akure suburbs. Data in brief, 19, 2146.

Vu TV, et al. (2017) Physical properties and lung deposition of particles emitted from five major indoor sources. Air quality, atmosphere, & health, 10(1), 1.

Morfeld P, et al. (2016) Response to the Reply on behalf of the 'Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area' (MAK Commission) by Andrea Hartwig Karlsruhe Institute of Technology (KIT). Particle and fibre toxicology, 13, 1.

Campbell J, et al. (2016) Predicting lung dosimetry of inhaled particleborne benzo[a]pyrene using physiologically based pharmacokinetic modeling. Inhalation toxicology, 28(11), 520.

Zhou W, et al. (2016) Repeated PM2.5 exposure inhibits BEAS-2B cell P53 expression through ROS-Akt-DNMT3B pathway-mediated promoter hypermethylation. Oncotarget, 7(15), 20691.

Kuempel ED, et al. (2015) Advances in Inhalation Dosimetry Models and Methods for Occupational Risk Assessment and Exposure Limit Derivation. Journal of occupational and environmental hygiene, 12 Suppl 1(sup1), S18.

Morfeld P, et al. (2015) Translational toxicology in setting occupational exposure limits for dusts and hazard classification - a critical evaluation of a recent approach to translate dust overload findings from rats to humans. Particle and fibre toxicology, 12, 3.

Gustafsson A, et al. (2014) Genetic variation influences immune responses in sensitive rats following exposure to TiO2 nanoparticles. Toxicology, 326, 74.

Balasubramanian SK, et al. (2013) The effect of primary particle size on biodistribution of inhaled gold nano-agglomerates. Biomaterials, 34(22), 5439.