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Abstract

Are We Done with Respiratory Deposition and Dosimetry of Inhaled Particles?

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Deposition of inhaled particles and subsequent dose estimation in the respiratory airways is an essential information needed for assessing potential health hazard of airborne pollutant particles on the one hand and therapeutic efficacy of drug aerosols on the other hand. Over several decades tremendous efforts have been made to obtain accurate dose of inhaled aerosols utilizing *in vivo* and *in vitro* experiments, mathematical analyses and computer modeling. As a result, a large amount of data has been accumulated that can be tapped into for estimating dose of inhaled aerosols under various inhalation or exposure conditions. In addition, well-documented mathematical models are widely available for use that provide means of estimating dose in a very specific and detailed manner. This gives us a sense of accomplishment and to a degree puts us into complacency despite the fact that the current knowledge is based on discrete experimental data of a small number of mainly healthy adult subjects and models built with highly ideal lung morphology, both of which are far from adequate for providing answers to challenging real world questions. Dose estimation process requires at least three critical inputs from physicochemical characteristics of aerosol particles, inhalation pattern and lung morphology. Although advancement of technology has introduced some new aerosol monitoring instruments, experimental method, particularly *in vivo* has not been much progressed. Mathematical models are still based on idealized simple lung structure, limiting the scope of analysis and predictability. This presentation will discuss the current status of aerosol lung dosimetry, needs for improvement and expansion of data base, and methodologic approaches that may be employed for further studies. *This is an abstract of a proposed presentation and does not necessarily reflect EPA policy.*