

Effect of Host Species on the Dose Response of Inhaled *Bacillus anthracis* Spores

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The objective of this study was to determine the quantitative differences between inhalation dose response of *Bacillus anthracis* spores. The inhalation of *B. anthracis* spores, once passing into the infection phase, is difficult to diagnose and nearly always fatal. Therefore the proper quantification of the dose response relationship is necessary for determination of the risk associated with inhalation of *B. anthracis* spores. *B. anthracis* was also chosen due to its significance and the existence of data for multiple hosts.

Data using primates, guinea pigs and rabbits were obtained which had sufficient data for a dose response analysis. The fit to exponential and beta Poisson models was obtained using maximum likelihood implemented in the open source platform R.

Overall guinea pigs exposed to the ATCC-6605 strain of *B. anthracis* and the data of primate exposure, showing a good fit to the exponential model, while all the other data for the other hosts and strains showing a good fit to the beta Poisson model. Despite this difference that was found both between strain used in one study and host animal, our analysis found that overall the data from these studies (with two different hosts) can be pooled. Hence, between monkeys and guinea pigs, inhaled dose can be used as a single metric, without interspecies correction. This suggests that such data could also be used to extrapolation to humans without interspecies correction.

Example

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