Dose-response model for *Burkholderia pseudomallei* (Melioidosis)

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Project Scope:

The work presented in this poster is a component of a larger effort to determine human dose response models and communicate these results to the scientific community and general public. The dose response models may be useful in assessing factors associated with different host-sensitivities, effect of concomitant exposures to other materials, and interspecies extrapolations. Data has been collected for all Category A bioterror agents, some Category B agents and other agents of concern. Future work will focus on developing dose-response models for pathogens with very limited experimental data, developing microbial kinetics and developing relationship between dose-response data and outbreak data.

Recent Progress:

Dose-response models have been developed for different strains of *Burkholderia pseudomallei* as well as different host species. The data sets from the open literature were initially tested for a trend between dose and outcome using the Cochran- Armitage test. Only data showing a statistically significant trend were subjected to further analysis. Dose response relationships were fit to data using the maximum likelihood estimation (MLE). Exponential, beta-Poisson and log-probit models were considered. BALB/c mice exposed intranasally (i.n.) and guinea pigs exposed intraperitoneally (i.p.) are significantly more sensitive to *B. pseudomallei* than C57BL/6 mice exposed i.n. and diabetic rats exposed i.p. The susceptibility in diabetic population was consistent with the outbreak data from Northern Australia.

Future Plans:

Performance of low dose modeling and expanding the amount of experimental data used to develop further models for other exposure routes. Moreover, to validate these models using epidemiological data will help to develop a human model.

Relevance to listed research areas: Biological Threats and Countermeasures.

The low dose prediction can be used as guidance for the decision making processes, allowing for consideration of sensitive subpopulations.

Previous publications:

Bartrand, T.A., Haas, C.N., Weir, M.H. (2008). “Dose-Response Models for Inhalation of *Bacillus anthracic* Spores: Interspecies Caparison.” Risk Analysis. Accepted for the publication.

Weir, M.H., Haas, C.N. (2008). ”Quantification of the Effects of Age on Dose-Response of *Variola major* in Suckling Mice.” Risk Analysis. Currently under Review.’

Tamrakar, S.B., Haas, C.N. (2008). “Dose-Response Model for Lassa Virus”. International Journal of Human Ecology and Risk Assessment. Accepted for publication.