Decontaminating Materials Contaminated with an Enveloped RNA Virus Surrogate for Influenza, Ebola, and Smallpox, and *Francisella* Vegetative Cells Using Hot Humid Air

Tony Buhr | *Naval Surface Warfare Center Dahlgren Division*

Aims: To develop test methods and evaluate survival of the enveloped RNA bacteriophage Φ6 or *Francisella philomiragia* vegetative cells on contaminated materials after exposure to hot, humid air.

Methods and Results: Dirty preparations of the enveloped RNA bacteriophage Φ6 (containing host cell debris) or *F. philomiragia* vegetative cells (mixed with humic acid) were dried on wiring insulation, aircraft performance coating, polypropylene, or nylon at > 8 $\log_{10}$ per test coupon. Inoculated materials were exposed to numerous test combinations of temperature, relative humidity and time. Virus inactivation was similar on different materials. Vegetative cell inactivation was most difficult on nylon. High temperatures, high relative humidity and longer times strongly correlated with inactivation of both organisms.

Conclusions: Hot, humid air effectively decontaminates materials contaminated with enveloped RNA virus or *Francisella* vegetative cells at ≤60°C and ≤12 h in the presence of high humidity. Inactivation was minimal at 60°C under dry conditions.

Significance and Impact of the Study: Response surface models were developed which may be used to select decontamination parameters for contamination scenarios including aircraft. The temperature and time parameters are significantly lower than for *Bacillus* spores. This greatly increases the applicability of hot, humid air decontamination.