

## CHALLENGES FACED IN THE PLANNING, DEPLOYMENT, AND ADOPTION OF A LAYERED MEDICAL DEFENSE STRATEGY

### Characterization Of A Cynomolgus Macaque Model Of Q Fever

Sara Ruiz USAMRIID

A robust animal model that recapitulates human clinical disease is essential for screening novel medical countermeasures. Although Q fever, caused by the bacterium *Coxiella burnetii*, is rarely lethal, it can lead to a debilitating acute and chronic infection that is naturally recalcitrant to antibiotics. The only vaccine available is currently approved for use in Australia and requires a skin test prior to administration to avoid a potential hypersensitive response in previously sensitized individuals. This requirement precludes it from being utilized on a wider scale or for rapid deployment. In order to test next-generation vaccines, this portfolio of work has generated characterized challenge stock, determined the median aerosol lethal dose, and defined Q fever disease progression in an aerosol nonhuman primate (NHP) model. To date, the NHP clinical model demonstrates respiratory illness as measured through increased respiratory rate, clinical signs, and radiographs, coupled with sustained fever over approximately seven days. Although overt clinical signs typically resolve by day 28 post-exposure, histopathology on major organs show continual damage is present in the lungs and heart. The developed aerosol NHP model shares many key parameters that mimic *C. burnetii* infection in humans, demonstrating its future utility in next-generation medical countermeasure efficacy studies.

Disclaimers: Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily endorsed by the U.S. Army. Research was conducted under an IACUC approved protocol in compliance with the Animal Welfare Act, PHS Policy, and other Federal statutes and regulations relating to animals and experiments involving animals. The facility where this research was conducted is accredited by the AAALAC, International and adheres to principles stated in the Guide for the Care and Use of Laboratory Animals, National Research Council, 2011.