TABLE 7
VACCINES

DISEASE/AGENT	IMMUNITY BY NATURAL EXPOSURE	VACCINE TYPE	VACCINE EFFICACY (aerosol exposure)	COMMENTS
ANTHRAX	Yes[1]	Human: Cell-free culture filtrate of an avirulent, non-encapsulated, derivative of a bovine isolate designated, V770. Animal: Spore suspension of an avirulent, non-encapsulated live strain.	2 dose efficacy against 200 - 500 LD_{50} in monkeys	**Required for Level A Lab**: **No** **Laboratory-acquired cases:** None reported since the late 1950's at which time the human vaccine was introduced. **Immunity:** Combined vaccine efficacy against both forms of anthrax (inhalational and cutaneous) = 93%.
BRUCELLOSIS	Yes	Human: No human vaccine available in U.S. Animal: In 1996, RB51, a live attenuated strain of *B. abortus* replaced the S19 strain which was also a live attenuated vaccine.	No vaccine	**Required for Level A Lab: None available** **Laboratory-acquired cases:** It is the most commonly reported bacterial infection acquired in laboratories. One of the largest reported incidence involved 45 cases with 1 death. Protection is based on adherence to BSL-3 precautions. **Immunity:** Studies in humans demonstrate that immunity is acquired after active infection, both cellular and humoral responses are required.
BOTULISM	No[2]	Pentavalent (ABCDE) Toxoid[4]	3 dose efficacy 100% against 25 - 250 LD_{50} in primates	**Required for Level A Lab: No** **Laboratory-acquired cases:** There has been 1 report of laboratory associated botulism. **Immunity:** In foodborne exposures, immunity does not develop even with severe disease, and its repeated occurrence has been reported.
TULAREMIA	Partial	Live attenuated vaccine	80% protection against 1 - 10 LD_{50}	**Required for Level A Lab: No** **Laboratory-acquired cases:** Over the past 50 yrs, it has been the third most common bacterial infection acquired in laboratories, mostly among research labs. **Immunity:** Multiple episodes of re-infection have been documented among vaccinated laboratory personnel and in unimmunized individuals.
PLAGUE	Partial	Suspension of killed (formalin-inactivated) *Yersinia pestis*.	Has yet to be measured precisely in controlled studies. At least 2 vaccinated persons contracted pneumonic plague following *Y. pestis* exposure.	**Required for Level A Lab: No** **Laboratory-acquired cases:** Few lab-associated cases have been reported; since 1936 only 3 cases of pneumonic plague have been documented. **Immunity:** Indirect evidence, mainly from the military indicates that the plague vaccine is effective for preventing flea-borne transmission of disease.
SMALLPOX	Yes	Vaccinia (smallpox) vaccine[5] (grown in the skin of vaccinated bovine calves)	Vaccine protects against large doses in primates	**Required for Level A Lab: No** **Laboratory-acquired cases:** **Immunity:** If a smallpox sample is handled at the Level A, vaccination within 3 days post-exposure is considered effective in preventing serious infection and death.. Vaccinia immune globulin may also be considered, but may compromise post-exposure vaccination efficacy.
VHF	?[3]	None available	No vaccine	**Required for Level A Lab: No** **Laboratory-acquired cases:** Skin/mucous membrane exposure to virus-laden material, i.e., blood, cell cultures, body fluid/secretions, has been responsible for most recognized cases among humans. **Immunity:** To be determined.

1. Some degree of immunity is conferred following cutaneous anthrax. , i.e., the lethal dose is below that required for an immune response.
3. Immunity to Lassa fever reinfection occurs following infection, but the length of protection is unknown.
4. Distributed by the CDC under an investigational new drug (IND) protocol and used to protect high risk laboratorians actively working with *C. botulinum* or the toxins.
5. Distributed by the CDC.