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INFECTIOUS DISEASE MONITORING OF THE ENDANGERED HAWAIIAN MONK SEAL

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ABSTRACT: As part of conservation efforts between 1997 and 2001, more than 25% (332 animals) of the endangered Hawaiian monk seal (*Monachus schauinslandi*) population was sampled in the northwestern Hawaiian Islands. Serum samples were tested for antibodies to viruses, bacteria, and parasites known to cause morbidity and mortality in other marine mammal species. Antibodies were found to phocine herpesvirus-1 by using an enzyme-linked immunosorbent assay, but seropositive results were not confirmed by virus neutralization test. Antibodies to *Leptospira bratislava*, *L. hardjo*, *L. icterohaemorrhagiae*, and *L. pomona* were detected in seals from several sites with the microagglutination test. Antibodies to *Brucella* spp. were detected using 10 conventional serologic tests, but because of inconsistencies in test results and laboratories used, and the lack of validation by culture, the *Brucella* serology should be interpreted with caution. Antibodies to *B. canis* were not detected by card test. *Chlamydophila abortus* antibodies were detected by complement fixation (CF) test, and prevalence increased significantly as a function of age; the low sensitivity and specificity associated with the CF make interpretation of results difficult. Antibodies to *Toxoplasma gondii* and *Dirofilaria immitis* were rarely found. There was no serologic evidence of exposure to four morbilliviruses, influenza A virus, canine adenovirus, caliciviruses, or other selected viruses. Continuous surveillance provides a means to detect the introduction or emergence of these or other infectious diseases, but it is dependent on the development or improvement of diagnostic tools. Continued and improved surveillance are both needed as part of future conservation efforts of Hawaiian monk seals.

Key words: *Brucella*, *Chlamydophila*, Hawaiian monk seal, *Leptospira bratislava*, *Monachus schauinslandi*, phocine herpesvirus, serology, *Toxoplasma gondii*.

INTRODUCTION

The Hawaiian monk seal (*Monachus schauinslandi*) is one of the most endangered marine mammals in the world. Populations of Hawaiian monk seals have declined in recent years and are under the threat of extinction (Ragen and Lavigne, 1999). Although infectious diseases and biotoxins have significantly affected other marine mammal populations, their potential impacts on Hawaiian monk seals are unknown. Ciguatoxin and mitotoxin have been suspected as causes of mortality in Hawaiian monk seals (Gilmartin et al., 1980), and sources of natural mortality have been described, including 1) mobbing (Hiruki et al., 1993); 2) starvation, primarily affecting juveniles (Banish and Gilmartin, 1992); 3) predation by sharks, particularly tiger sharks (*Galeocerdo cuvier*) and Galapagos sharks (*Carcharhynchus galapagoensis*) (Balazs and Whittow, 1979; Alcorn and Kam, 1986); 4) net