MORBILLIVIRUS IN MARINE MAMMALS

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EMERGING DISEASES
Over the past two decades, diseases caused by morbilliviruses have been emerging in many different species of marine mammals. They have been found to be responsible for large die-offs of Atlantic bottlenose dolphins along the US Atlantic Coast during 1987-1988 and in the Gulf of Mexico in 1993. Since then, other large epizootics have occurred in cetaceans on the Irish Coast and in the Mediterranean Sea and numerous smaller epizootics have occurred around the world. Likewise, large epizootics caused by morbilliviruses occurred in numerous pinnipeds in the late 1980’s around Europe and elsewhere. In addition, antibodies to morbilliviruses have been detected in manatees and polar bears.2 See Miller et al.4 for review.

CETACEANS
At least two different morbilliviruses have been identified via PCR in cetaceans. Porpoise morbillivirus (PMV) and dolphin morbillivirus (DMV) have been isolated from multiple species of cetaceans, but are considered different strains of the same morbillivirus by some investigators. The viruses are not species specific, and even dual infections have been identified. A third type has been identified from long-finned pilot whales and an unidentified morbillivirus has been reported from a fin whale. It has been hypothesized that the pilot whales may act as vectors for the disease in other species1 although recent molecular findings suggest the pilot whale virus is a novel type. Sero-positive animals have been identified in several areas of the Pacific Ocean, including a case of nonpurulent meningoencephalomyelitis in Japan.5 Clinical signs in cetaceans are rarely observed, but usually involve animals in poor body condition with heavy loads of ectoparasites. Respiratory distress and abnormal behavior have also been reported. In 1988, harbor porpoises that stranded during a pinniped epizootic had distemper-like lesions.

PINNIPEDS
In pinnipeds a morbillivirus has been isolated during several major epizootics. The first identified was from a 1988 epizootic in northern European harbor seals and was called phocine distemper virus (PDV) when it was found to be closely related to canine distemper virus. Clinical signs resemble canine distemper in dogs, including fever, ocularonasal discharge, conjunctivitis, keratitis, coughing, difficult breathing, diarrhea, abortion, muscle twitching, and abnormal posture.3

OTHER MARINE MAMMALS
Serological evidence of morbillivirus has been found in manatees, polar bears, and walruses, but active disease has not been documented. The morbillivirus in polar bears is closely related to canine distemper virus and is likely to be indigenous and probably no real health threat.2

DIAGNOSIS
Diagnosis is generally based on characteristic histopathological lesions. In both cetaceans and pinnipeds, bronchial pneumonia and alveolitis are the most common findings. Histologically, these appear as bronchointerstitial pneumonia with congestion, edema, serofibrinous exudation into the alveoli, proliferation of type II pneumocytes, and syncytia. Syncytia and inclusions are more common in cetacean than pinniped lungs. Encephalitis is generally characterized by neuronal necrosis, gliosis, perivascular cuffing, and demyelination with astrocytosis and syncytia. A PCR-based assay can detect viral RNA in fixed or fresh tissues. An ELISA is available for tissue homogenates. Paired serum samples demonstrating a rising antibody titer, or a single serum sample with a high IgM titer can be used to confirm a morbillivirus infection.3

TREATMENT
Treatment is entirely supportive and mortality is high in susceptible populations. Vaccination using canine distemper vaccine has been used in European rehabilitation facilities, but has not been used in North America.

References