(ADE) of disease in vaccinates has been demonstrated in experimental challenge exposure studies,[47] but it is uncertain whether ADE occurs in a natural setting. Discrepancies between study results are probably attributable to differences in test methodology (eg, strain and dose of challenge virus, genetic predisposition of the test animals). Protection from disease has not been demonstrated in animals vaccinated when younger than 16 weeks of age. However, most kittens born and reared in environments in which FCoV infection is endemic are infected prior to reaching this age.[41,48] In these instances, vaccination of infected cats has not proven beneficial. *At this time, there is no evidence that the vaccine induces clinically relevant protection, and its use is* ***not recommended.***

Dermatophytosis—Dermatophytosis in cats is primarily caused by infection with *Microsporum canis*. A variety of clinical manifestations, including transitory clinical disease and chronic infection with or without clinical signs, have been reported. Although successful treatment of individual cats is usually straightforward, elimination of endemic infection from multiple-cat environments is expensive, labor intensive, and time consuming.[49]

An *M. canis* vaccine (Fel-O-Vax MC-K, Fort Dodge Animal Health) is approved for use as an aid in the prevention and treatment of clinical signs associated with *M. canis* infection. Vaccination has not been demonstrated to prevent infection or to eliminate *M. canis* organisms from infected cats. *Therefore, routine vaccination against* M. canis *infection is not recommended.* At the time of this writing, the product has not been independently evaluated for efficacy. Based on studies conducted by the manufacturer, it is reasonable to consider vaccination as adjunctive treatment for individual infected cats 4 months of age or older to hasten resolution of clinical signs. If the vaccine induces an immune response that accelerates lesion resolution, then the number of infectious fungal spores produced by vaccinates may be reduced as well; therefore, it is reasonable to consider vaccination as one component of a comprehensive treatment program in multiple-cat environments in which *M. canis* infection is endemic. Nonetheless, the ability of this product to hasten elimination of endemic infections from such environments has not been evaluated. The revaccination interval is not stipulated on the label. Major adverse events reportedly associated with the use of this product are pain, temporary hair loss, and formation of sterile abscesses or granulomas at the vaccine site.[49]

***Bordetella bronchiseptica* infection**—*Bordetella bronchiseptica* is a small, aerobic, gram-negative coccobacillus long recognized as a respiratory tract pathogen of several species of animals. The natural route of transmission in cats is believed to be via the aerosol or intranasal route.[50] Experimental challenge exposure studies have shown that *B. bronchiseptica* can act as a primary pathogen in cats; inoculation of specific-pathogen-free (SPF) kittens results in self-limiting disease characterized by variable degrees of fever, nasal or ocular discharge, sneezing, induced or spontaneous coughing, pulmonary rales, and submandibular lymphadenopathy.[50] Bronchopneumonia associated with naturally occurring *B. bronchiseptica* infection has been reported in both kittens and adult cats.[51] Other factors, including nutritional status, overcrowding, co-infection with other agents such as FCV or FHV-1, and suboptimal hygiene, may influence the outcome of exposure.[52,53]

Seroprevalence surveys suggest that exposure to the organism is common, with infection rates varying from population to population. The highest rates of seropositivity (often > 80%) are found among cats in rescue shelters and multiple-cat households, especially when there is a history of respiratory tract disease. Lowest rates are found among cats in households with few cats and no history of respiratory tract disease.[54,55] Similarly, isolation rates vary. *B. bronchiseptica* was isolated from the oropharynx of 19 of 614 (3.1%) and from the distal trachea in 6 of 614 (1%) of asymptomatic cats from shelters in Lousiana.[56] In a recent survey of 740 cats in the United Kingdom, none of the household cats were found to be infected, but 9% of cats from breeding colonies and 19% of cats from rescue shelters were found to be carrying the organism.[57] In the same survey, 9% of healthy cats and 14% of cats with respiratory tract disease tested positive for the organism. An additional finding was a strong positive association between oropharyngeal isolation of *B. bronchiseptica* and residence in households containing dogs with a recent history of respiratory tract disease.

Definitive diagnosis of disease associated with *B. bronchiseptica* infection may be difficult, in part because signs of infection often mimic those associated with FHV-1 or FCV infection. Isolation of *B. bronchiseptica* from a cat with respiratory tract disease is supportive of the diagnosis, but carriage of the organism in asymptomatic cats precludes establishing a direct cause-and-effect relationship. Resolution of disease with appropriately chosen antimicrobial medication might suggest a causative role for *B. bronchiseptica*, but the self-limiting nature of many cases of viral upper respiratory tract disease prevents attributing disease resolution solely to antimicrobial treatment.

A vaccine (Protex-Bb, Intervet Inc) to prevent disease caused by infection with *B. bronchiseptica* has recently been licensed. The product contains a live, reduced-virulence culture of *B. bronchiseptica* and is licensed for administration via the intranasal route to cats 4 weeks of age and older. Efficacy of the vaccine has not been independently evaluated, but in studies conducted by the manufacturer to gain vaccine licensure, vaccinated 4-week-old SPF cats experienced less severe signs of disease than did unvaccinated controls when challenge exposed 3 weeks after vaccination. Similar results were obtained when 8-week-old kittens were challenge exposed 72 hours after vaccination. As of this writing, studies to evaluate the duration of protection induced by the vaccine have not been completed, and the revaccination interval is not yet stipulated on the label. *Routine use of this vaccine is* ***not recommended.*** It is reasonable to consider vaccinating cats entering or residing in multiple-cat environments (eg,