NATIONAL VETERINARY LABORATORY

P.O. Box 239, 1Tice Road
Franklin Lakes, NJ 07417
877-NVL-LABS (877-685-5227)
www.natvetlab.com

NEWSLETTER

Healthy Cats and *Bartonella*:
Bartonella are More Important than FeLV and FIV

Evelyn E. Zuckerman, Editor **Winter 2007** **Vol. 6, Number 1**

In This Issue:

In the winter 2007 issue of the NVL Newsletter we will cover the importance of determining if healthy cats are infected with *Bartonella*. Healthy infected cats are prone to develop any of the *Bartonella* inflammatory diseases and can transmit the bacteria to people. There has been a long standing controversy as to whether or not *Bartonella* causes any disease in cats, even though there are ample publications that show *Bartonella* are disease-inducing bacteria.[1, 2]

We strongly recommend that all healthy cats be tested for *Bartonella* as a part of their normal health exams which include FeLV and FIV tests, examination of the stool for intestinal parasites, and routine vaccinations.

Healthy Versus Disease:

Stedman's Medical Dictionary, 25th Edition defines:

Healthy: "Well; in a state of normal functioning; free from disease."

Morbus or Morbid: "Disease and diseased or pathologic."

Disease: "1. Morbus; illness; sickness; an interruption, cessation, or disorder of body functions, systems, or organs. 2. A morbid entity characterized usually by at least two of these criteria: recognized etiologic agent(s), identifiable group of signs and symptoms, or consistent anatomical alterations."

Syndrome: "The aggregate of signs and symptoms associated with any morbid process, and constituting together the picture of the disease."

Pathogenic and Non-Pathogenic Microorganism:

All micoorganisms must infect susceptible healthy hosts in order to propagate. They can be classified into 3 general groups: 1) Non-pathogenic microorganisms: these are non-disease-inducing and live commensally with their hosts, many of which are actually beneficial. 2) Chronic pathogenic microorganisms: these are minimally non-pathogenic for a time and live harmlessly for long periods within their host (chronic persistent infection) and induce disease after a long "latent period" or induce disease when the host is under stress (*Herpesviruses*) or is immunosuppressed (*Mycobacterium avium*).[2] *Bartonella*, FeLV and FIV are examples of this type of microorganism. 3) Acute pathogenic microorganisms: these infect their hosts and quickly induce disease, some resulting in chronic non-life threatening diseases and others inducing death rapidly in their infected hosts (Plague, Parvovirus, Ebola virus).

Healthy Animals:

A healthy animal, by definition, is one that does not exhibit any signs of a recognizable disease syndrome, even though they may be infected with a known pathogenic microorganism. For example, cats can be healthy carriers of FeLV, FIV, FIPV, *Toxoplasma* or *Bartonella*. Cats are known to mask clinical signs of disease far more effectively than dogs or humans. During our FeLV clinical studies we often examined cats with large lymphosarcoma mediastinal masses or severe anemias where the owner had not noticed any signs of illness, such as increased respiration, until the day before coming to the clinic.

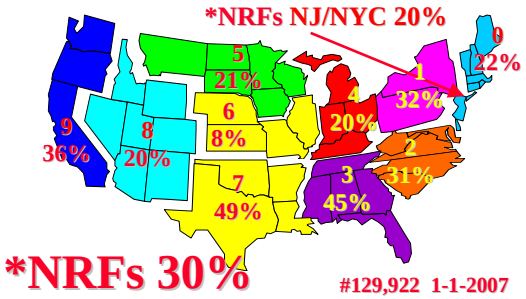
Many practitioners would consider cats to be healthy even though they have gingivitis, skin papules or mild conjunctivitis. However, these may be signs of acute or chronic disease processes and may lead to more severe general pathology. A 3 month-old kitten with gingivitis most likely has an infectious cause for the gingivitis since it has not lived long enough to develop significant tartar to cause the gingivitis. Even though the gingivitis many be the only clinical abnormality noted, the practitioner should not discount this early sign of a systemic disease. The cause may be FIV, FeLV or *Bartonella* or a combination of these microorganisms.

Bartonella-Infected Healthy Cats:

The major risk factor for *Bartonella* infection of cats is not their contact with other infected cats, but rather, factors that increase the exposure to arthropod flea and tick vectors which are responsible for almost all of the transmission of *Bartonella* between cats. These risk factors are: stray or shelter origin, outdoor cat, living in multi cat households, a history of fleas or present flea infestation. In our initial study of healthy cats with no reported risk factors, performed in the metropolitan New York/New Jersey area from the Oradell Animal Hospital, the prevalence was 20%.[3] This is the baseline or denominator for all of our studies of the prevalence in other areas of the United States and for cats with *Bartonella* inflammatory diseases.

As of January 1, 2007, after testing 129,922 cats, we have derived a *Bartonella* prevalence map based on the climate of the United States as differentiated by the first number of the postal zip codes. Nationwide, the prevalence in healthy cats with no reported risk factors is 30%.

***Bartonella* Prevalence in Healthy Cats Based on the First Number of Zip Code**



***NRFs= No reported risk factors**

The prevalence increases in hot and humid climates as shown in the map above and is highest in the southern states of Florida, Texas, Louisiana, the Gulf states, and the Pacific coast states and is lowest in the northern states. The high prevalence parallels the year-round flea and tick incidence in the warmer more humid climates and people living in these areas are at increased risk of zoonotic infection. As of January 1, 2007 we have found that 11,973 of 31,924 (37%) healthy cats (with known or no reported risk factors), were infected with *Bartonella* (See Table below).

Bartonella Prevalence in Cats:

Status	Number Tested	Number Positive	% Positive
Healthy	**31,924**	**11,973**	**37%**
1) No RFs*	**6,912**	**2,054**	**30%**
2) With RFs	**25,012**	**9,919**	**40%**
Diseased Cats	**94,911**	**43,367**	**46%**
Not Specified**	**3,087**	**1,384**	**45%**
Totals	**129,922**	**56,724**	**44%**

*** RF= risk factors ** Diagnosis not given**

Thus, veterinarians should realize that 1 of every 3 healthy cats that they examine are carrying *Bartonella* which are capable of infecting them, their hospital personnel, and the cat owner's family members. Practitioners should re-examine their policy regarding *Bartonella* testing.

Comparison of the Prevalence of FeLV, FIV and *Bartonella* in Healthy Cats

Most practitioners include FeLV and FIV testing as part of their routine health examination of new cats but few include *Bartonella* testing. The prevalence of FeLV and FIV infection in healthy cats is quite low, whereas the *Bartonella* prevalence is 20 times higher. We have tested 4,360 healthy cats for FeLV, FIV and *Bartonella* and the data are given in the Table below. FeLV and FIV are not known to be transmissible to humans, whereas *Bartonella* are transmissible and can even cause death under rare conditions. Thus, *Bartonella* is more important for the health of cats and their owner's than FeLV and FIV.

Prevalence of FeLV, FIV and *Bartonella* in Healthy Cats

Test*	Number Tested	Number Positive	% Positive
FeLV	**4,360**	**60**	**1.4%**
FIV	**4,360**	**75**	**1.7%**
Bartonella	**4,360**	**1,530**	**35%**

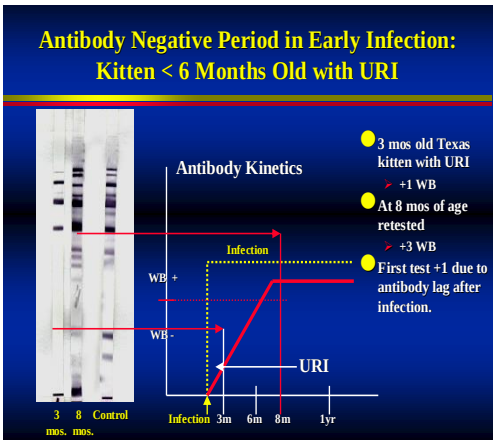
*** 5 cats (0.1%) were infected with all 3 agents.**

Healthy Cats, Especially Kittens, Transmit *Bartonella* to People:

Bartonella organisms are found in the blood plasma, inside erythrocytes and endothelial cells and in tissues of infected cats. In order to be transmitted to people, the organism must be present on the claws (scratch), in the mouth (bites) or on the fur (contact- no abrasion) of infected cats. Infected kittens are rapidly growing and have changing dentition leading to the probability that *Bartonella* can leak into the oral cavity. The loss of kitten teeth or oral trauma due to rough play, chewing and playful fighting, can lead to *Bartonella* in the mouth. Cats groom themselves frequently thereby depositing *Bartonella* organisms from the oral cavity onto their fur or claws. The fact that kittens and children are playful toward each other presents the conditions needed for the zoonotic transmission from kittens to children. Boys tend to play more roughly with kittens than do girls, which is reflected in the higher incidence of cat scratch disease in boys.

***Bartonella* testing of healthy cats should be part of the routine feline health protocol, especially before their first birthday.**

Bartonella antibody negative kittens, 6 months or younger, present a problem for the practitioner. Kittens under 6 months of age with *Bartonella*-like inflammatory diseases (gingivitis, URI, conjunctivitis, rhinitis, uveitis, gastroenteritis, etc.) may be infected but have not yet had enough time to develop antibody. *Bartonella* appear to be able to infect young kittens and induce an inflammatory disease before the development of detectable antibody. Thus, test negative kittens with inflammatory diseases should be retested 8 weeks after the first test to see if they were "incubating the infection." An example of one such Texas kitten's tests are presented below.



Although we make this recommendation, only 270 (4%) of the 6,534 Fe*Bart*® Test negative kittens, with an inflammatory disease, were retested 8 weeks later. 45 of the 270 retested kittens (17%) were found to be infected. Thus, many practitioners allow these kitten's infections to go undetected and the kittens are prone to develop *Bartonella* inflammatory diseases. These cats can transmit the bacteria to a person in the household. In this regard, we have observed *Bartonella* transmission to a person from an initially test-negative kitten with an inflammatory disease who was not retested as recommended. Not adhering to our recommendation may make the practitioner legally responsible for the zoonotic consequences, should they occur.

Transmission of *Bartonella* from Healthy Cats to People:

We presented our human *Bartonella* disease findings at The 5th International Conference on *Bartonella* as Emerging Pathogens, in conjunction with the 20th Meeting of the American Society for Rickettsiology, at the Asilomar Conference Grounds, Pacific Grove, California, September 2-7 2006.[4] We investigated 84 human patients with serologically or biopsy confirmed *Bartonella* diseases and identified 70 cats that transmitted the bacteria. 40 of the 70 cats (57%) were healthy while 30 had *Bartonella* induced inflammatory diseases. 29 of the 70 (41%) cats were kittens under 1 year of age. Thus, more than half of cats that transmit *Bartonella* are healthy and almost half are kittens less than 1 year of age.

We recommend that all healthy cats, especially kittens younger than 1 year of age, be tested for *Bartonella* as a part of their normal health examinations.

Treatment of *Bartonella* Infection:

As has been reviewed in previous Newsletters, therapy of *Bartonella* infected cats is effective.[5] It is very important to stress rigorous flea and tick prevention of *Bartonella* test-negative cats and infected cats that have been treated. **AFTER TREATMENT WE ARE UNABLE TO RETEST PREVIOUSLY POSITIVE CATS TO DETERMINE *BARTONELLA* RE-INFECTION.** However, we can retest *Bartonella* test negative cats should they subsequently be infested with fleas or ticks.

Risk Factors for *Bartonella* Infection in Healthy Cats (Fleas)

Risk Factor	Number Tested	% Infected
None Reported	**840**	**20%**
Stray origin	8,380	40%
Shelter cat	5,124	32%
Multi cat household	14,121	41%
Exposed to Infected cat	3,646	53%
History of fleas	4,709	47%
Present flea infestation	1,307	42%
Lives in CSD household	628	58%
Totals:	**31,590**	**42%**

1/1/07

Reasons to Screen Healthy Cats for *Bartonella* Infection:

1. To reduce the number of infected cats, the bacteria's natural reservoir host, in order to reduce the number of *Bartonella* infected flea and tick vectors.
2. To prevent infected healthy cats from developing any of the many chronic debilitating inflammatory diseases caused by *Bartonella*.
3. To prevent zoonotic transmission from healthy kittens and adult cats to children, adults, and especially to immunosuppressed people.
4. To reduce the incidence of feline *Bartonella*-induced diseases of humans and keep the family of your clients safe.

It is more cost effective to prevent *Bartonella* diseases than to diagnose and treat them once they occur. *Bartonella* testing of healthy cats should be part of your routine feline health protocol.

References:

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***Bartonella* references can be obtained at:**
www.nlm.nih.gov/ or natvetlab.com