

Questions on
Demma *et al.* (2005), Brownstein *et al.* (2005) &
Kurtenbach *et al.* (2006)

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1. In Kurtenbach *et al.* it is stated that ‘WTBE virus, which is transmitted by the same tick species in continental Europe, has not evolved traits that permit persistence in mice.’. Since Lyme disease and WTBE disease are transmitted by the same tick species, is it possible for a tick to be infected with both and for WTBE to pick up some of the persistence traits of Lyme through this co-infection?
2. In Demma *et al.* they failed to detect a statistically significant difference in the geometric mean titers of the children between the two communities, if they had increased their sample size (especially in community 2) might a significant difference have been detected?
3. In Brownstein *et al.* they state ‘Increasing fragmentation in the landscape through decreasing patch size served to increase tick-infection prevalence, while increasing inter-patch distance served to increase tick density.’ Is there a patch size and inter-patch distance where this would switch, ie decreasing patch size beyond a certain point would result in decrease in prevalence or density?

4. What is the rate of growth in the area sampled? The satellite imagery was from 1995 and sampling was done in 2000 and 2003, how much more fragmentation occurred between when the satellite imagery was obtained and when sampling was conducted?
5. In the Nature Reviews paper, it is mentioned that some natural hosts have acquired resistance to ticks, what hosts are they referring to, and what is the mechanism of resistance? Is the tick not able to attach?
6. In the rickettsia rickettsii paper, I didn't see how they established that the pathogen was coming from the brown dog tick, as opposed to another vector. I realize that they stated the presence of that particular tick was high, but did they consider another tick vector? Are there any other ticks in the region capable of carrying this pathogen?
7. Was there a reason why they limited their sampling to only one month from the hospital in Community 2, and only 3 months in Community 1? With such a small sample size, are they able to get a significant amount of information. Why did they include more than double the sample size taken from dogs?
8. The rickettsial illness has been diagnosed throughout the Americas ('Tobia fever' in Colombia, 'Sao Paulo fever' or 'febre maculosa' in Brazil, and 'fiebre manchada' in Mexico). How many isolates of the bacteria are known? It is the same isolate that causes the disease throughout these countries?
9. Tetracycline and chloramphenicol are the most common antibiotics that are used to treat this pathogen. However, since its early infection is difficult to detect still around 5% of the infected people die. Which are the factors that make difficult its diagnosis?
10. Could it be that Lyme disease is the most common tick-borne disease in North America because its 21 plasmids (the largest number of plasmids found in any known bacterium) which may contribute with its pathogenicity?

11. Can nonpathogenic SFG rickettsiae affect the geographic distribution of the virulent/pathogenic strains of *R. rickettsii* (e.g. competition since they can share the same tick vector, etc.)? Is this epidemiologically important with regards to transmission?
12. How did you establish that the increase in incidence of Lyme disease is not due to an increase in recognition and reporting of disease?
13. How do rickettsiae survive within the tick during the quiescent period between the larval and nymph stages? Is there any change in infectivity during the molt?
14. In the RMSF publication, were all feral dogs tested or were pets included too? This study doesn't mention anything about controlling the animal population problem. Maybe that should be addressed.
15. In the Brownstein *et al.* study on forest fragmentation and Lyme disease, they state that landscape structure in suburban areas increases the possibility of human contact with tick vectors. Was any public awareness program put into place in these new suburban areas? A smart public is an informed public.
16. Why was 70% ethanol used to preserve the ticks? In DNA analyses, 95% alcohol is commonly used since water degrades the DNA.
17. Kurtenback *et al.* explains why generalist vectors "can have a negative effect on transmission cycles." p
18. I believe it has the potential for a positive impact. The very nature of being a generalist opens the ticks up to new hosts that it may have never encountered before. What if this new host is a SUPER reservoir??
19. What is the prevalence of Lyme disease in NA vs. Europe and also throughout NA?

20. Isn't it very difficult for physicians to differentiate between Lyme Disease and RMSF? Why is this, and how should physicians go about diagnosing one or the other in patients presenting symptoms of these tick-borne diseases?
21. From Brownstein *et al.*: "Residential configurations that preserve remnant forests in such a way that reduces adjacency of households to forest fragments would also serve to reduce human exposure to infected ticks." –I really like this, because it seems that you could promote ecologically-sound development using this idea, but I feel a bit cautious about giving the general public any reason to feel afraid of nature. How would you present an idea like this to developers to conserve forests and limit risks of tick-borne diseases?
22. What are the effects of Tick-borne diseases on wildlife populations? What if someone eats a deer with Lyme disease?
23. I've heard that there has been an increase in Lyme disease in the past decade—is this due to an increase in detection or an increase in pathogen prevalence? If you believe that there has been an increase in frequency, do you attribute this to increased suburbanization of the landscape?
24. In the research paper 'Serologic evidence for exposure to *Rickettsia rickettsii* in eastern Arizona and recent emergence of rocky mountain spotted fever in this region', the outbreak of Rocky mountain spotted fever associated with *Rickettsia rickettsii* in an unexpected tick vector- *Rhipicephalus sanguineus*, had not been previously associated with RMSF transmission in the United States. Can you please explain the reason for the unexpected tick vector causing RMSF?
25. According to the article, 'Forest fragmentation predicts local scale heterogeneity of Lyme disease risk' - northwestern and southeastern Connecticut were found to be the

- most highly fragmented regions of the state. Can you please explain the reason?
26. In the article ‘ Fundamental processes in the evolutionary ecology of Lyme borreliosis’ - the transmission of a pathogen by a vector such as tick, might confer advantages over direct transmission. Can please give the reason.
 27. Demma *et al.* (2006) Is there any info on clinical disease of RMSF in dogs taken for the study? Since survey serological data is costly, the direct connection to animal disease prevalence might help predict levels of human exposure as well.
 28. Are these Native American communities? Do they have access to human or animal health care? The demographics of the communities were not really elaborated on, but seem as though they might be important determinants of disease transmission.
 29. Is there any data to support climate change as part of the reason for the RMSF emergence?
 30. Kurtenbach *et al.* (2006) The author mentions that tick expansion is ultimately restricted by climate and photoperiod. Are there many examples of pathogens that adapt outside their climatological niches or is this one of the more rigid determinants of fitness?
 31. The review article states that there is no evidence that *B.burgdorferi* regulates the fitness of its host. (I know this is a semantics question, but) does that mean that the tick is not considered to be ‘parasitic’ to the deer host? (I do not know much about wildlife diseases, but would guess that there are diseases that ticks transmit primarily to deer.)
 32. Its mentioned in the paper that, ‘*Rh. sanguineus* has a worldwide distribution, and can be a vector of *R.rickettsii* in Mexico and *R.conorii* in the Mediterranean region.’

- Is there an inherent property in *Rh. sanguineus* that enables it to serve as a vector for different strains of pathogens in different demographic regions?
33. What do you mean by 'the phenomenon of spatial autocorrelation'?
 34. Landscape analysis of a suburban environment revealed that 'increasing fragmentation in the landscape through decreasing patch size served to increase tick-infection prevalence, while increasing interpatch distance served to increase tick density'. Why do we see such a pattern and is it sustained over a considerable period of time?
 35. Why did you use 70% EtOH to preserve collected ticks? Did you have any problems with PCR amplification? If not, how long did you leave them in 70% EtOH?
 36. In community 2 there are about half the number of people that are in community 1. Could this explain why saw out breaks in the larger community but not in the smaller one despite a similar environment?
 37. Why was the total of dog serum samples tested so much less in community 2? Is it reflective of the number of dogs in that community? Could this explain the lower prevalence of *R. rhipicephali*?