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Dear Colleague:

Re: TICKBORNE INFECTIONS IN MANITOBA

- All Manitoban physicians should be aware that cases of Anaplasmosis, Babesiosis and Lyme disease (LD) occur in Manitoba and are provincially reportable.
- Incidence rates of tick-borne diseases (TBD), notably Anaplasmosis and LD, continue to rise. Rates are highest in the Interlake-Eastern and Southern Health-Sante Sud Health Regions.
- Patients may present at any stage of disease, and those with co-infections may present with more severe illness that may require multiple different therapies.
  - Consultation with an appropriate specialist is recommended for patients presenting with disseminated or late LD, and those with possible co-infections.
  - Physicians need to be familiar with signs and symptoms of known **and** emerging TBDs.
- Early treatment improves outcome; **where *early* LD is suspected treatment should be initiated without waiting for laboratory confirmation**. Consult the LD communicable disease management protocol for treatment options (www.gov.mb.ca/health/publichealth/cdc/protocol/lyme.pdf).
- Emerging TBDs, *Borrelia miyamotoi* disease and Powassan virus lineage II (also known as Deer Tick virus), have been detected in locally collected *Ixodes scapularis* (blacklegged ticks).
- The range of *Ix. scapularis*, the vector of TBDs, continues to expand (see Figure 1).
- Approximately 1 in 3 TBD cases recall a tick bite. Therefore taking exposure history to suitable tick habitat is important to assess risk for disease.

ANAPLASMOSIS

In 2017, 9 Anaplasmosis cases were reported, and all but one indicated likely local exposure. Since 2015, nearly 80% of the Anaplasmosis cases reported were locally acquired. Exposures have been recorded between April and December, with most occurring between May and July when blacklegged tick nymphs are most active. Only 1 in 3 cases recalled a tick bite prior to symptom onset.

The number of Anaplasmosis cases reported in Manitoba is likely an under-estimation of the true prevalence[1]. The recent Manitoba sero-prevalence study also noted:

- Potential exposure to ticks and/ or suitable habitat significantly increases the possibility of Anaplasmosis infection,
- A significant association between C6 ELISA positivity, for *Borrelia burgdorferi* and Anaplasmosis infection (likely a function of exposure to a common tick vector), and
- A higher probability of Anaplasmosis and LD co-infection among older adults (i.e. ~ 48 years of

[1] Kadkhoda, K. and Gretchen, A. Retrospective study investigating the seroprevalence of *Anaplasma phagocytophilum* in Manitoba, Canada: 2011 – 2014. *Open Forum Infectious Diseases* **2016**; 3 (4), 1 – 4 (doi: 10.1093/ofid/ofw199)

age and older).

Laboratory diagnosis: Includes direct and indirect detection. For the former, care providers may send a minimum 5ml EDTA whole blood (purple-topped tube) at room temperature to Cadham Provincial Laboratory (CPL) for microscopy and PCR **BEFORE** antibiotics are given. It is recommended that a serum sample (clotted blood; red-topped tube) be sent to CPL at the same time for *Anaplasma* serology.

BABESIOSIS

No cases reported in 2017. For clinical presentation, laboratory diagnosis and treatment information see the Babesiosis communicable disease management protocol (www.gov.mb.ca/health/publichealth/cdc/protocol/babesiosis.pdf).

Laboratory diagnosis: Includes direct and indirect detection. For the former, care providers may send minimum 5 ml EDTA whole blood (purple-topped tube) at room temperature to CPL for microscopy and PCR **BEFORE** antibiotics are given. It is recommended that a serum sample (clotted blood; red-topped tube) be sent to CPL at the same time for *Babesia* serology.

LYME DISEASE

In 2017, all but one of the 43 reported confirmed and probable cases indicated likely locally exposure. Since 2009 exposures have been recorded between March and December, with a peak (~ 80%) between May and July. Less than 1 in 3 cases recalled a tick bite prior to symptom onset.

Patients may present at any stage of LD including the later stages which can make diagnosis challenging.

Co-infection with other TBD should be considered in patients who present with initial symptoms which are more severe than commonly observed with LD, especially when:

- A high grade fever is present for more than 48 hours despite effective LD treatment,
- Thrombocytopenia, leukopenia or anemia is present despite resolved Erythema migrans (EM) and flu-like symptoms.

In 2016, three co-infections, Anaplasmosis and LD were reported.

Laboratory diagnosis: It is recommended that a serum sample (clotted blood; red-topped tube) be sent to CPL at the same time for Lyme serology **BEFORE** antibiotics are given. Providers are also encouraged to consider skin biopsy, where applicable, for Lyme PCR. The latter works best when done before institution of antibiotics and from the leading edge of the EM rash.

Emerging Tick-borne infections

MHSAL continues to work with the Public Health Agency of Canada to monitor the introduction of invasive tick species and novel tick-borne pathogens of human health importance.

***Borrelia miyamotoi* disease**: Though not reportable, this bacterial agent continues to be isolated from *Ix. scapularis* specimens collected from across southern Manitoba[2] at low infection rates.

A recent Manitoba sero-prevalence study demonstrated evidence of *B. miyamotoi* infection in residents with previously suspected or confirmed LD[3]. *B. miyamotoi* infection should be considered in

[2] Dibernardo, A., Cote, T., Ogden, N. H. and Lindsay, L. R. The prevalence of *Borrelia miyamotoi* infection, and co-infections with other *Borrelia* spp. in *Ixodes scapularis* ticks collected in Canada. *Parasites & Vectors* **2014**; 7: 183 (www.parasitesandvectors.com/content/7/1/183)

[3] Kadkhoda, K., Dumouchel, C., Brancato, J., Gretchen, A. and Krause, P. J. Human Seroprevalence of *Borrelia miyamotoi* in Manitoba, Canada, in 2011 – 2014: A Cross-Sectional Study. *CMAJ Open* **2017**, 5 (3): E690 – E693 (10.9778/cmajo.20170070)

patients presenting from late spring through early autumn with a febrile illness, particularly a recurrent one, without an EM.

Laboratory diagnosis: Includes direct detection only. Care providers may send minimum 5 ml EDTA whole blood (purple-topped tube) at room temperature to CPL for *Borrelia* species PCR **BEFORE** antibiotics are given. Both *B. miyamotoi* and the newly described *B. mayonii*[4] may be detected by PCR.

Powassan virus lineage II (*Deer Tick virus*): Similarly not reportable, this virus has been isolated from *Ix. scapularis* specimens collected from three geographically discrete localities spread across Manitoba in 2016 and 2017[5].

Unlike other TBD agents transmitted by blacklegged ticks, ***Powassan virus (POWV) can be transmitted within as little as 15 minutes of attachment***[6]. Prevention measures, most notably the correct application of appropriate repellents, are key to minimize exposure risk.

The incubation period can range from one to five weeks, and the clinical presentation commonly includes fever and features of neurological involvement (i.e. confusion, depressed level of consciousness, seizures and focal neurological deficits)[7] [8]. Rash and gastrointestinal symptoms may also be common. In severe cases, common symptoms include encephalitis, meningoencephalitis and aseptic meningitis. POWV encephalitis is not commonly associated with laboratory abnormalities. Treatment is supportive, and long lasting neurological sequelae have been noted in > 50% of survivors.

Laboratory diagnosis: Includes direct and indirect detection. For the former, care providers may send minimum 5 ml EDTA whole blood (purple-topped tube) at room temperature to CPL for Powassan virus/Deer tick virus RT-PCR. It is recommended that a serum sample (clotted blood; red-topped tube) be sent to CPL at the same time for Powassan virus/Deer tick virus serology.

For further information regarding TBDs laboratory testing (selection and interpretation), please call CPL Serology section Clinical Microbiologist at (204) 945-7545.

Tick-Borne diseases and Travel

TBDs may be acquired wherever vectors and pathogens co-circulate. Most out-of-province exposures to the three reportable TBDs among Manitobans have been linked with travel to northwestern Ontario, Minnesota and Wisconsin. However, exposures have also been associated with travel to other parts of Canada, the northeast US and parts of Europe.

Ticks

Blacklegged ticks can be active whenever temperatures are consistently greater than 4ºC. In Manitoba the risk of exposure is typically between April and November, although activity outside this period has also been recorded when conditions are appropriate.

The risk of exposure to TBDs is highest in 'Blacklegged tick risk areas' where surveillance efforts have revealed established blacklegged tick populations (Figure 1). However, the risk of exposure is not

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[4] Pritt, B. S., Mead, P. S. et al. Identification of a novel pathogenic *Borrelia* species causing Lyme borreliosis with unusually high spirochaetemia: a descriptive study. *Lancet Infectious Diseases* **2016**, 16 (5): 556-564 (https://doi.org/10.1016/S1473-3099(15)00464-8).
[5] Lindsay, L. R. pers. communication (publication pending).
[6] Eisen, L. Pathogen Transmission in Relation to Duration of Attachment by *Ixodes scapularis* Ticks. *Ticks and Tick-borne Diseases* **2018**, 9 (3): 535 – 542 (https://doi.org/10.1016/j.ttbdis.2018.01.002)
[7] Piantadosi, A., Rubin, D. B. et al. Emerging Cases of Powassan Virus Encephalitis in New England: Clinical Presentation, Imaging, and Review of the Literature. *Clinical Infectious Diseases* **2016**, 62 (15 March): 707 – 713. (https://doi.org/10.1093/cid/civ1005)
[8] Hermance, M. E. and Thangamani, S. Powassan Virus: An Emerging Arbovirus of Public Health Concern in North America. *Vector-Borne and Zoonotic Diseases* **2017**, 17 (7): 453 – 462 (https://doi.org/10.1089/vbz.2017.2110)

uniform within, nor solely confined to, these risk areas, as ticks can be transported great distances by migrating birds and deer. Consequently, TBDs can potentially be acquired anywhere in the southern part of the province where there is suitable tick habitat.

For more information visit www.manitoba.ca/tickborne

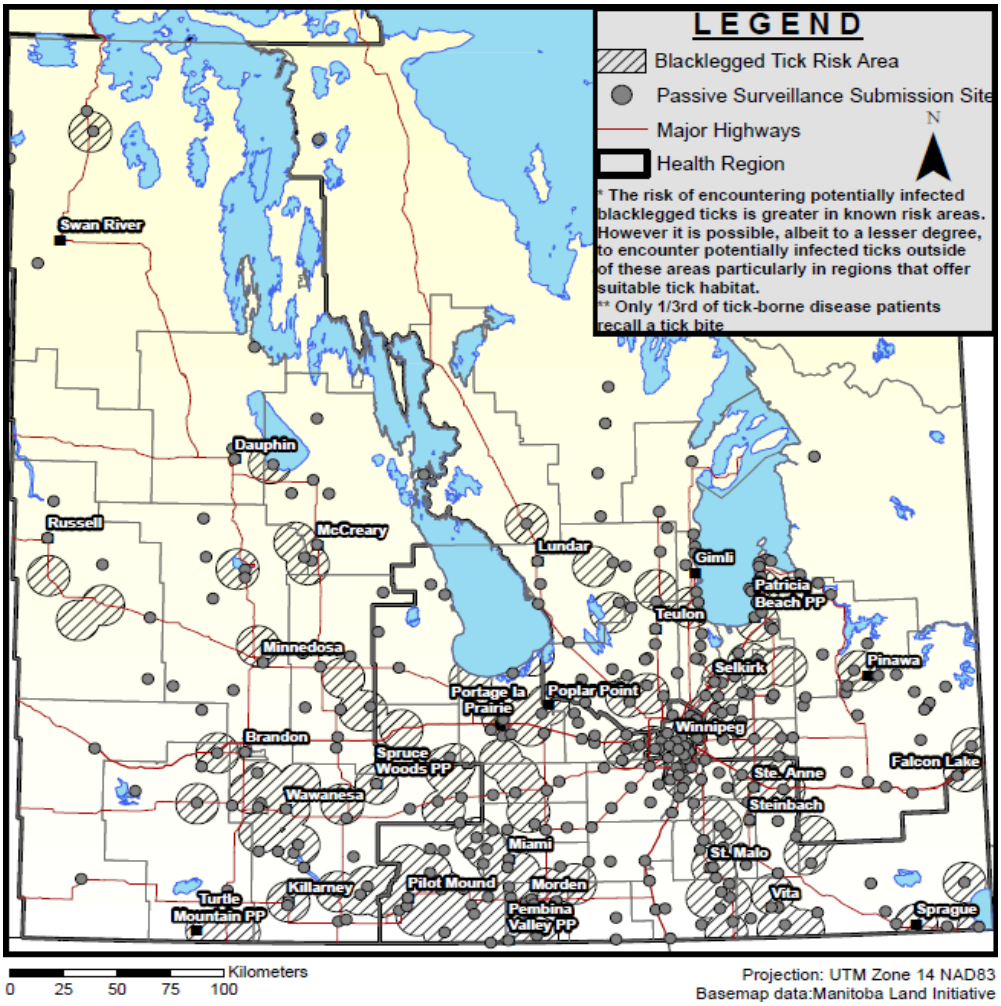

Figure 1 – Distribution of known Blacklegged Tick Risk Areas 2017 and sites where blacklegged ticks were submitted as part of the passive surveillance program.

Thank you for your anticipated cooperation.

Sincerely,

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