

Case Definition

Confirmed case

A case that has *confirmatory* laboratory results with or without clinical evidence criteria (can include transfusion transmission)

Probable case

A case that has *supportive* laboratory results **AND**

- meets clinical evidence criteria; **OR**
- is in a blood donor or recipient epidemiologically linked to a confirmed or probable babesiosis case.

Laboratory Evidence

Confirmatory laboratory tests include:

- Detection of *Babesia* species (e.g. *Babesia microti*, *Babesia duncani* or *Babesia divergens*) DNA in a whole blood specimen by amplification of a specific target Nucleic Acid Amplification Test (NAAT).

Supportive laboratory evidence:

- Serological evidence of elevated immunoglobulin (Ig) G (IgG) antibodies to *B. microti* in a single sample by indirect immunofluorescence assay (IFA) where the endpoint titre is $\geq 1:64$; **OR**
- Identification of intraerythrocytic *Babesia* organisms by light microscopy in a Giemsa, Wright, or Wright-Giemsa–stained blood smear; **OR**
- Demonstration of a positive *B. microti* IgG immunoblot result by Centers for Disease Control and Prevention (CDC); **OR**
- Demonstration of a *B. divergens* total Ig or IgG antibody titre of $\geq 1:256$ in an IFA; **OR**
- Demonstration of a *B. duncani* total Ig or IgG antibody titre of $\geq 1:512$ in an IFA.

Clinical Evidence

Clinical criteria include fever and at least one of fatigue, chills, sweats, headache, anorexia, hemolytic anemia, or thrombocytopenia.¹

Transfusion Transmission

Transmission can occur via blood transfusion, and rarely, via transplacental, perinatal, and solid organ transplantation.^{2,3-9} *Babesia*-infected individuals can remain parasitemic for long periods following infection, and *Babesia* parasites can survive in blood products.⁹ Babesiosis is the most commonly reported transfusion-transmitted tick-borne infection in the United States, and there has been one documented case to date in Canada.⁹

For the purposes of surveillance, epidemiologic linkage between a transfusion recipient and a blood donor is demonstrated if all the following criteria are met:

1. Laboratory evidence of *Babesia* infection in the recipient and donor; **AND**
2. Transfusion recipient received one or more red blood cell (RBC) or platelet unit(s) within one year before the collection date of the recipient's positive specimen; **AND**
3. Transfused unit(s) was/were plausibly infectious based on assessment of donor infectivity at time of donation of implicated unit(s); **AND**
4. Transfusion-associated infection is considered at least as plausible as tick-borne transmission.

Reporting Requirements

Report confirmed and probable cases to DHW Surveillance via Panorama.

Additional Forms

None.

Data Entry

[Complete data entry in Panorama.](#)

Additional comments

- Babesiosis is a provincially notifiable disease. Case counting will be applied as of May 23, 2023.
- These are definitions for surveillance and epidemiologic purposes only, and they do not represent clinical case definitions.
- Diagnostic testing should be performed by provincial public health laboratories and/or appropriate reference diagnostic centres (e.g., NML for molecular testing, National Reference Centre for Parasitology for *B. microti* IFA).
- Some forms of *Babesia* can be difficult to distinguish from *Plasmodium* on blood smears. Confirmation by a reference laboratory may be required if a patient's travel history and area of residence indicate exposure to *Babesia* is unlikely.
- In persons who are immunosuppressed or who have asymptomatic *Babesia* infections, active infections can be associated with lower antibody titers; titres may also be low early in the course of infection.

- Due to the persistence of elevated antibody titres in some patients, a single elevated titre may indicate either a recent or remote infection. Demonstration of an increase in titres or seroconversion between paired samples is therefore necessary for confirmation.
- Validated commercial IFAs and/or immunoblots specific for *B. divergens* and *B. duncani* are not currently available in Canada but samples may be submitted to reference centres such as the CDC who have validated assays for these rare pathogens. IgG immunoblot for *B. microti* is not available in Canada.

References

1. Krause, PJ, Auwaerter, PG., Bannuru, RR., Branda, JA, Falck-Ytter, YT, Lantos, PM, Lavergne, V, Meissner, HC, Osani, MC, Rips, JG, Sood, SK, Vannier, E, Vaysbrot, EE, Wormser, GP. Clinical Practice Guidelines by the Infectious Diseases Society of America (IDSA): 2020 Guideline on Diagnosis and Management of Babesiosis. *Clinical Infectious Diseases*, 2021; 72(2), e49–e64. doi:10.1093/cid/ciaa1216
2. Fida M, Challener D, Hamdi A, O'Horo J, Abu Saleh O. Babesiosis: A Retrospective Review of 38 Cases in the Upper Midwest. *Open Forum Infect Dis*. 2019;6(7):1-5. doi:10.1093/ofid/ofz311.
3. Herwaldt B, Linden J V, Bosserman E, Young C, Olkowska D, Wilson M. Transfusion-associated babesiosis in the United States: A description of cases. *Ann Intern Med*. 2011;155(8):509-519. doi:10.7326/0003-4819-155-8-201110180-00362.
4. Krause P, Vannier E. Transplacental transmission of human babesiosis. *Infect Dis Clin Pra*. 2012;20(6):365-367.
5. Cornett JK, Malhotra A, Hart D. Vertical transmission of babesiosis from a pregnant, splenectomized mother to her neonate. *Infect Dis Clin Pract*. 2012;20(6):408-410. doi:10.1097/IPC.0b013e31825b20c1.
6. Linden J, Prusinski M, Crowder L, et al. Transfusion-transmitted and community-acquired babesiosis in New York, 2004 to 2015. *Transfusion*. 2018;58(3):660-668. doi:10.1111/trf.14476.
7. New D, Quinn J, Qureshi M, Sigler S. Vertically Transmitted Babesiosis. *J Pediatr*. 1997;131:163-164.
8. Drews SJ, Van Caesele P, Bullard J, et al. *Babesia microti* in a Canadian blood donor and lookback in a red blood cell recipient. *Vox Sang*. 2021;(July):9-12. doi:10.1111/vox.13198.
9. Kain K, Bu Jassoum S, Fong I, Hannach B. Transfusion-transmitted babesiosis in Ontario: First reported case in Canada. *Can Med Assoc J*. 2001;164(12):1721-1723.