Transfusion-Associated Babesiosis
Instructions for completing the investigation form

CDC's Parasitic Diseases Branch developed the ***Transfusion-Associated Babesiosis*** form (and these instructions) to facilitate investigating and tracking potential transfusion-associated cases of babesiosis (e.g., by public health departments). Of note, CDC also has developed a generic ***Transfusion-Associated Infections*** form, which provides a useful framework for transfusion investigations (e.g., tables for tracking donors/donations).

The babesiosis and generic forms are intended to serve as guides for investigating transfusion-associated babesiosis; they are not OMB (Office of Management and Budget)–approved report forms. As such, the forms are flexible and can be modified to suit the needs of the user and the case at hand. However, *Babesia* cases (regardless of mode of transmission) are notifiable to CDC by jurisdictions in which babesiosis is a reportable disease.

Well-coordinated investigations among public health agencies, blood centers, transfusion services, clinicians, and laboratorians are strongly encouraged. CDC can be consulted regarding all aspects of diagnosing, treating, and investigating *Babesia* cases.

The form is largely self-explanatory; however, some instructions are provided below, to assist in completing the form.

Page numbers refer to those in the form.

Throughout the form, **approximate dates are acceptable (mm/yyyy)**, if precise dates are not available.

Transfusion-Associated Babesiosis: Investigation Information (pages 1 & 2)

Investigation #:

At the top of each page of the form, space is provided to record an identification number for the transfusion investigation. In addition, as noted below, space is provided on pages 3 and 5 for Case ID#'s for recipient(s) and donor(s), respectively.

Form completed by:

Provide contact information for the primary person who completed the form, even if multiple persons within your agency, as well as other agencies, collaborated in the investigation. Space for additional partners is provided on page 2.

Date completed:

Indicate the date this form was completed.

Categorization:

The criteria provided on **page 1** are intended to help assess the likelihood that a case of babesiosis was transfusion associated. These criteria and their associated categories (Definite, Probable, etc) are adapted from **National Healthcare Safety Network (NHSN)**, a voluntary, internet-based surveillance system that integrates patient and healthcare personnel safety surveillance systems managed by CDC's Division of Healthcare Quality Promotion. NHSN also includes a component for **hospitals** to monitor adverse reactions and incidents associated with transfusions. In this context, NHSN developed generic criteria for classifying the likelihood that a case of infection was transfusion associated. We do not yet know whether and how often babesiosis transfusion cases will be reported via NHSN.

All case criteria (including pathogen/disease-specific criteria) are dependent on laboratory expertise and epidemiologic/clinical judgment. In addition, the strength of evidence that a case was transfusion associated might change as the investigation proceeds and more information becomes available.

Contact information (page 2):

This page can be used to record additional contact information.

Transfusion-Associated Babesiosis: Recipient Information (pages 3 & 4)

Indicate at the top of **page 3** if the information in this section applies to the **initial (index) recipient** or to an **additional (non-index) recipient**, if any, linked to the same donor—either the same or a different donation. We recommend completing a separate copy of the ***Recipient Information*** section for each pertinent recipient, even though some questions might be more applicable to the index recipient.

CDC Case Status:

If indicated, specify the case status (confirmed, probable, or suspect), using the **CDC Case Classification Definition** for national public health reporting: http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/babesiosis_current.htm.

Case ID#:

This space is provided to record a case number.

Demographics:

Include whatever basic demographic information is available. Indicate the recipient's **age** at the time of the relevant transfusion(s); and specify if the unit is days, months, or years. For **race**, select all that apply.

Transfusion information

Summarize the number and type of cellular components that were transfused:

On the appropriate blank line, specify the component(s) received in the year (12–month period) before babesiosis was diagnosed. Indicate if (and why) the period of interest is lengthened or shortened.

Date(s) of relevant transfusion(s):

If this recipient was diagnosed with babesiosis and if a blood component(s) was 'implicated' in the investigation, specify the date(s) of transfusion(s). Use the ***Notes*** section (page 4) to provide more details.

Reason(s) for relevant transfusion(s):

Select all that apply. Also see the question (page 4) regarding underlying medical conditions. Use the ***Notes*** section (page 4) to provide more details.

Diagnostic testing

Date of diagnosis:

The intent is to specify the date babesiosis was diagnosed, which might be later than the date(s) the pertinent specimen(s) was collected or initially examined (e.g., if babesiosis was diagnosed on retrospective review of specimens collected/tested earlier; see below). Approximate dates are acceptable. If the recipient (e.g., a non-index recipient) tests negative for evidence of *Babesia* infection, mark 'Not applicable.' If the recipient could not be located for testing, mark 'Unknown.'

Were any pre-transfusion specimens tested for evidence of *Babesia* infection?

See the **second criterion** (page 1)—in essence: no evidence that the recipient was infected before the pertinent transfusion.

Test type:

Specify type of test (e.g., blood smear, indirect fluorescent antibody [**IFA**] assay, polymerase chain reaction [**PCR**]).

Testing facility:

Provide details about the laboratory that actually performed this testing (rather than a facility that collected the specimen but shipped it elsewhere). Indicate in the table or the ***Notes*** section (page 4) if multiple laboratories conducted testing (e.g., a commercial laboratory and CDC's Parasitic Diseases Reference Diagnostic Laboratory).

Specimen:

Specify type of specimen (e.g., whole blood or serum).

Date specimen collected:

Specify date of collection.

***Babesia* species:**

If applicable to the test (e.g., *B. microti*-specific PCR), indicate the species.

Titer:

If applicable to the test (e.g., *B. microti* IFA), indicate the titer.

Result:

Specify the overall test result (positive, negative, indeterminate, or unknown). Use the ***Notes*** section (page 4) to provide more details (e.g., parasitemia level).

Were any post-transfusion specimens tested for evidence of *Babesia* infection?

Follow instructions for the preceding set of questions.

Also see the **first criterion** (page 1)—i.e., laboratory evidence of *Babesia* infection in the recipient.

Did the recipient receive antimicrobial treatment for *Babesia* infection?

Select all that apply. Use the ***Notes*** section (page 4) to provide more details about antimicrobial or other therapy (e.g., exchange transfusion).

Clinical information

Date of symptom onset:

Indicate the onset date of symptoms thought, in retrospect, to be attributable to babesiosis; this date might precede the date of diagnosis by a considerable amount of time. If asymptomatic, mark 'Not applicable.' Mark 'Unknown,' if this information is not available or is not even estimable (e.g., because the patient had comorbidities or altered mental status).

Clinical manifestations:

Specify presence (mark 'Yes') or absence (mark 'No') of the listed manifestations. Mark 'Unknown,' if the information is not available. Include **other clinical manifestations** on the extra line provided in this section or in the ***Notes*** section (page 4).

Underlying medical conditions:

Select all that apply.

Is the recipient asplenic? Functionally asplenic?

Babesiosis can be more severe in persons who are asplenic. 'Asplenic' refers to surgical absence of the spleen. 'Functionally asplenic' applies to persons who have not undergone surgical splenectomy but have little or no splenic function (e.g., some patients with sickle cell disease have an autoinfarcted spleen). Approximate dates are acceptable for the date of splenectomy. However, if possible, obtain/provide perspective regarding the timing of and reason for splenectomy, particularly if the splenectomy was during the peritransfusion period (e.g., post-trauma transfusion and splenectomy) or thereafter; splenectomy can trigger activation of latent *Babesia* infection.

History of diagnosis or treatment of other tickborne diseases:

A history of other tickborne diseases could be indicative of risk factors for tick exposure (see questions below) but would not necessarily exclude the possibility that *Babesia* parasites were transmitted via transfusion. Use the ***Notes*** section (page 4) to provide more details (e.g., year of diagnosis).

Risk factors (*in addition to transfusion*)

Is there a possibility that this case was tick transmitted?

Indicate if the recipient (if infected) might have become infected via a tick bite. Consider potential exposures in state/county of residence or while traveling. Also see questions below. Attempt to assess the relative possibility and plausibility of tickborne vs. transfusion-associated infection. Use the ***Notes*** section (page 4) to provide more details/perspective.

Is there a possibility that this case was congenital?

If the case-patient is an infant and if the mode of transmission could have been congenital, answer additional questions:

Was the patient's mother tested for evidence of *Babesia* infection?

What were the results of the testing?

The following questions deal with activities and potential exposures during a particular period. (In the ***Notes*** section, indicate if and why the period of interest is adjusted—e.g., lengthened.)

In the year (12-month period) before the relevant blood transfusion, did the recipient…:

Live in/travel to the Northeast or upper Midwest?

If yes, indicate (by selecting all that apply) where, how long (<1 week, 1–4 weeks, 5 or more weeks), and whether any part of that time was during June–September, the period during which ticks are most likely to be questing for a blood meal. However, the seasonality may vary by year and place. Use the ***Notes*** section (page 4) to provide more details.

Engage in outdoor activities?

If yes, select all that apply from the list of activities, and specify the state(s) where the activities occurred. Known risk areas for tickborne transmission of *B. microti* include parts of the Northeast and upper Midwest. However, outdoor activities in any location also should be specified. The timeframe of June–September is intended to capture outdoor exposures when ticks are most likely to be questing for a blood meal. However, the seasonality may vary by year and place. Use the ***Notes*** section (page 4) to provide more details.

Spend time in or near wooded or brushy areas?

The intent is to know whether the recipient spent time in areas where ticks might have been present. Of note, persons may have spent time in or near wooded or brushy areas without engaging in outdoor activities. (See previous question.)

Notice any tick bites?

Indicate when the recipient noticed the tick bite and where (county/state) the recipient was when it occurred. Of note, tick bites can easily be overlooked.

Notes:

This section can be used to record additional test results and other information about this recipient—e.g., factors that affect the possibility and plausibility of various routes of transmission.

Transfusion-Associated Babesiosis: Donor Information (pages 5 & 6)

We recommend completing the ***Donor Information*** section for each pertinent donor. (Also see the generic ***Transfusion-Transmitted Infections*** form.)

Throughout the form, **approximate dates are acceptable (mm/yyyy).**

CDC Case Status:

If indicated, specify the case status (confirmed, probable, or suspect), using the **CDC Case Classification Definition** for national public health reporting: http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/babesiosis_current.htm.

Case ID#:

This space is provided to record a case number.

Demographics:

Include whatever basic demographic information is available. Indicate the donor's **age** at the time of the index donation (*donation associated with the index recipient*; see below). For **race**, select all that apply.

Donation information

Date(s) of relevant donation(s):

Specify the date(s) of index and other relevant donation(s), if any. Use the ***Notes*** section (page 6) to provide more details.

For the index donation:

Was a retained segment or cocomponent tested for evidence of *Babesia* infection?

Of note, segments are also called pigtails or retention tubes.

What were the results of the testing?

Provide more details in the table below (*donor diagnostic testing*).

Were there additional recipients of cellular components from the index donation?

We recommend completing the ***Recipient Information*** section for each recipient, regardless of whether the patient tested positive.

For other donation(s):

Were there recipients of cellular components?

Consider previous and subsequent donations. We recommend completing the ***Recipient Information*** section for each recipient, regardless of whether the patient tested positive.

Donor diagnostic testing:

See the **third criterion** (page 1)—i.e., laboratory evidence of the same *Babesia* sp. in the donor.

Test type:

Specify type of test (e.g., blood smear, indirect fluorescent antibody [**IFA**] assay, polymerase chain reaction [**PCR**]).

Testing facility:

Provide details about the laboratory that actually performed this testing (rather than a facility that collected the specimen but shipped it elsewhere). Indicate in the table or the ***Notes*** section (page 6) if multiple laboratories conducted testing (e.g., a commercial laboratory and CDC's Parasitic Diseases Reference Diagnostic Laboratory).

Specimen:

Specify type of specimen (e.g., whole blood or serum).

Date specimen collected:

Specify date of collection. For example, if a segment (pigtail) from the original donation(s) was available for testing (see above), the date of collection would be the date of donation. Use the ***Notes*** section (page 6) to provide more details.

***Babesia* species:**

If applicable to the test (e.g., *B. microti*-specific PCR), indicate the species.

Titer:

If applicable to the test (e.g., *B. microti* IFA), indicate the titer.

Result:

Specify overall test result (positive, negative, indeterminate, or unknown).

Did the donor receive antimicrobial treatment for *Babesia* infection?

Select all medications that apply, if the donor was treated.

Clinical information

Date of diagnosis:

For example, if a segment from the original donation tested positive, the date of diagnosis would be the date of testing. (See *donor diagnostic testing* above.)

Date of symptom onset:

Indicate the onset date (or approximate timing) of potentially relevant symptoms, if any, that occurred either before or after the relevant donation(s); see next 2 questions. If the donor does not recall any pre- or post-donation symptoms, mark 'Not applicable.' Mark 'Unknown,' if the information is not available.

Symptoms (if any) <u>before</u> relevant donation(s):

Indicate potentially relevant symptoms (e.g., fever, headache, chills, sweats, myalgia, arthralgia) that were noted before the blood donation. Use the ***Notes*** section (page 6) for more details.

Symptoms (if any) <u>after</u> relevant donation(s):

See instructions for previous question.

Clinical manifestations (if any):

If applicable, indicate other potentially relevant clinical manifestations, such as anemia or thrombocytopenia.

History of diagnosis or treatment of other tickborne diseases:

A history of other tickborne diseases could be indicative of risk factors for tick exposure. (See questions below.)

Risk factors

The following questions deal with activities and potential exposures during a particular period. (In the *Notes* section, indicate if and why the period of interest is adjusted—e.g., lengthened.)

In the year (12-month period) before the relevant blood donation(s), did the donor…:

Live in/travel to the Northeast or upper Midwest?

If yes, indicate (by selecting all that apply) where, how long (<1 week, 1–4 weeks, 5 or more weeks), and whether any part of that time was during June–September, the period during which ticks are most likely to be questing for a blood meal. However, the seasonality may vary by year and place. Use the ***Notes*** section (page 6) to provide more details.

Engage in outdoor activities?

If yes, select all that apply from the list of activities, and specify the state(s) where the activities occurred. Known risk areas for tickborne transmission of *B. microti* include parts of the Northeast and upper Midwest. However, outdoor activities in any location also should be specified. The timeframe of June–September is intended to capture outdoor exposures when ticks are most likely to be questing for a blood meal. However, the seasonality may vary by year and place. Use the ***Notes*** section (page 6) to provide more details.

Spend time in or near wooded or brushy areas?

The intent is to know whether the donor spent time in areas where ticks might have been present. Of note, persons may have spent time in or near wooded or brushy areas without engaging in outdoor activities. (See previous question.)

Notice any tick bites?

Indicate when the donor noticed the tick bite and where (county/state) the recipient was when it occurred. Of note, tick bites can easily be overlooked.

Notes:

This section can be used to record additional test results and other information about this donor—e.g., factors that affect the possibility and plausibility that the donor was infected at the time of the pertinent donation(s).