24-ID-04

Committee: Infectious Disease

Title: Standardized Surveillance Case Definition for Acute, Congenital, and Chronic *Trypanosoma cruzi* Infection or Chagas Disease

☐Check this box if this position statement is an update to an existing standardized surveillance case definition and include the most recent position statement number here: N/A.

Synopsis:

- This position statement creates standardized surveillance case definitions for acute, congenital, and chronic Chagas disease.
- Standardized surveillance case definitions for Chagas disease are needed because:
  - Chagas disease is currently reportable in 8 states and 2 local jurisdictions; however, each jurisdiction is using a different case definition. Implementation of a standardized surveillance case definition would allow for consistent case classification across jurisdictions.
  - Per OMB Control No. 0920-0728, standardized surveillance case definitions would enable CDC to accept Chagas disease surveillance data from jurisdictions who choose to submit it and to guide surveillance efforts at the national level.
  - Implementation of standardized surveillance case definitions for Chagas disease would strengthen surveillance, improve understanding of the burden of disease, and guide public health prevention and response efforts.
- Case ascertainment criteria include laboratory, vital record, and healthcare record criteria.
- Case classification criteria include laboratory and epidemiologic linkage criteria.
- Case classifications include confirmed, probable, and suspect cases.

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I. Statement of the Problem

Chagas disease is an infection caused by the protozoan parasite *Trypanosoma cruzi* (1,2). Infection with *T. cruzi* has been well-characterized in Latin America, where it is primarily transmitted by triatomine vectors (3,4). While imported cases of Chagas disease outnumber locally-transmitted cases, enzootic transmission of *T. cruzi* has been described in the United States (U.S.), where there are 11 triatomine vector species (5–20). In addition to vector-borne transmission, Chagas disease has been domestically observed to transmit via blood transfusion, organ transplantation, and vertically from a gestational parent to their fetus (7,8,21–28). While many infections with *T. cruzi* are mild, chronic infection can result in significant pathology and progression to severe and fatal disease (29–33).

Surveillance for Chagas disease in the U.S. is limited. Chagas disease has never been nationally notifiable in the U.S., though it is currently reportable in Arizona, Arkansas, Louisiana, Los Angeles County (CA), Mississippi, San Diego County (CA), Tennessee, Texas, Utah, and Washington State (34–41). Despite routine blood and organ donor screening efforts, the burden of Chagas disease in the U.S. remains unknown. Attempts to estimate the burden of Chagas disease in the U.S. are limited by a lack of population-representative surveillance data (42–48).

II. Background and Justification

Eleven triatomine species, commonly known as kissing bugs, have been detected in the U.S., with a geographic range spanning from coast to coast and as far north as Illinois (5,49,50). The most common triatomine species are *Triatoma gerstaeckri*, *T. protracta*, *T.rubida*, and *T. sanguisuga,* each of which has documented natural *Trypanosoma cruzi* infections (5,51,52). Detection of human blood meals in tested triatomines is common, and all triatomine species in the U.S., except for *Paratriatoma hirsute*, *T. incrassata,* and *T. neotomae*, are known to invade human living spaces (53–59). Taken together, this evidence indicates potential for local transmission of Chagas disease.

Transmission of Chagas disease to human hosts may occur through: 1) stercorarian transmission, whereby a triatomine vector defecates during or shortly after a human blood meal, contaminating the bite wound, 2) transfusion of blood from an infected human to an uninfected human, 3) transplantation of an organ procured from an infected human into an uninfected human, 4) consumption of food or beverages contaminated with feces from a triatomine vector, and 5) vertically from an infected gestational parent to their fetus (60).

Different testing methods are needed to diagnose Chagas disease depending on the phase of the infection (62). Microscopy and molecular tests are employed in the acute phase of Chagas disease or in the event of suspected reactivation (63–66). Serologic testing for host immunoglobulin G (IgG) against *T. cruzi* antigens is the preferred method for diagnosing chronic Chagas disease (67). Serologic testing is also used in the context of screening donors of blood, organs, and human cells, tissues, and tissue-based products (HCT/P). Importantly, the sensitivities and specificities of the currently available assays are not high enough for a single assay to be used alone (68).

Many *T. cruzi* infections go unrecognized (51). This is likely due to the progression from acute to chronic indeterminate Chagas disease one to two months after initial infection, during which parasitemia falls below levels commonly detectable by microscopy and the host becomes asymptomatic, as well as lack of familiarity with the disease among clinicians (69–73).

Without appropriate treatment, infection with *T. cruzi* lasts for the life of the host due to the parasite's replication cycle (74,75). Approximately 20-30% of infected individuals go on to develop Chagas cardiomyopathy or gastrointestinal disease (2,60). Immunocompromised individuals are at particularly high risk of severe Chagas disease reactivation (76). In some of these cases, Chagas disease has involved the central nervous system, exacting a high case fatality rate (77–83).

Chagas disease poses health equity challenges in the U.S. Individuals who have migrated from Chagas disease-endemic areas in Mexico, Central America, and South America, and their children, face an increased likelihood of Chagas disease compared with the broader U.S. population. This heightened risk is attributed to their prior residence in endemic regions and the potential for vertical transmission even after leaving the endemic area. Given limited public health surveillance, the burden of Chagas disease in these at-risk populations is not well-described,

and interventions to provide tailored health education and enhance access to diagnosis and treatment for Chagas disease lack a comprehensive evidence base.

The establishment of standardized case definitions and reporting of Chagas disease surveillance data will help public health practitioners in the U.S. monitor the incidence of Chagas disease, investigate and identify risk factors for local transmission of *T. cruzi*, identify population groups experiencing increased risk and burden of Chagas disease, guide interventions to provide tailored health education and enhance access to diagnosis and treatment, and identify cases of Chagas disease for public health response.

III. Statement of the Desired Action(s) to be Taken

CSTE recommends the following actions:

1. Implement standardized surveillance case definitions for **acute, congenital, and chronic Chagas disease**.

    A. Utilize recommended reporting* sources for case ascertainment for **acute, congenital, and chronic Chagas disease**. Surveillance for **acute, congenital, and chronic Chagas disease** should use the recommended sources of data to the extent of coverage presented in Section V.

    B. Utilize standardized criteria for case ascertainment for **acute, congenital, and chronic Chagas disease** presented in Section VI and Table VI in Technical Supplement.

    C. Utilize standardized criteria for case classification for **acute, congenital, and chronic Chagas disease** presented in Section VII and Table VII in Technical Supplement.

** Reporting: process of a healthcare provider, laboratory, or other entity submitting a report (case information) of a condition under public health surveillance to local, state, or territorial public health.*

IV. Goals of Surveillance

To provide data on the temporal, geographic, and demographic occurrence of Chagas disease to facilitate its prevention and control including:

- Monitoring incidence and prevalence trends and changes in the geographic and demographic distribution of Chagas disease over time
- Investigating and identifying risk factors for local transmission of *T. cruzi*
- Identifying population groups in the U.S. experiencing increased risk and burden of Chagas disease
- Guiding interventions to provide tailored health education and enhance access to diagnosis and treatment of Chagas disease
- Identifying cases of Chagas disease for public health response

V. Recommended Data Sources and Methods for Surveillance

Surveillance for acute, congenital, and chronic Chagas should use the following recommended sources of data and/or methodologies and the extent of coverage listed in Table V.

While most reports of suspected cases of acute, congenital, and chronic Chagas disease will likely come from clinicians and laboratories, additional entities that may have information needed for case ascertainment include: organ procurement facilities, blood donation facilities, vital records, hospital discharge records, electronic medical records, and fetal death certificates.

[*continued*]

Table V. Recommended Sources of Data, Surveillance Methods, and Extent of Coverage for Ascertainment of Cases of Acute, Congenital, and Chronic Chagas Disease.

Source of Data/Methodology for Case Ascertainment	Coverage	
	Population-Wide	Sentinel Sites
Clinician reporting	X	
Laboratory reporting	X	
Reporting by other entities, specify: • Organ procurement organizations • Blood donation organizations	X	
Death certificates	X	
Hospital discharge or outpatient records	X	
Data from electronic medical records	X	
Telephone or online survey		
School-based survey		
Other, specify: Fetal death certificates	X	

VI. Criteria for Case Ascertainment

Case ascertainment is the process through which public health identifies potential cases of a disease or condition using data reported or provided to public health by healthcare, laboratories, and other reporting entities. This public health reporting is triggered by the case ascertainment criteria (a single criterion or a combination of criteria) included in this position statement, and each initial report sent to public health should include common data elements and disease-specific data elements. Case ascertainment criteria are not intended to be used for clinical diagnosis purposes.

A. Narrative: A description of suggested criteria for case ascertainment of acute, congenital, and chronic Chagas disease and recommended reporting procedures.

Case ascertainment and reporting should be ongoing and routine. Clinicians, laboratories, organ procurement facilities, blood donation facilities, and other reporting entities should apply standard criteria to determine whether a suspected case of acute, congenital, or chronic Chagas disease should be reported to public health agencies. These criteria include laboratory, vital record, and healthcare record criteria.

All reporting to public health authorities should be conducted in a manner consistent with established procedures.

Report to public health authorities any infection or person meeting the following criteria:

A1. Clinical Criteria for Reporting

N/A

A2. Laboratory Criteria for Reporting

- Visualization of *T. cruzi* by microscopy (e.g., wet mount-microscopic examination, thick and thin smears-Giemsa stain) performed on any tissue or body fluid,
  OR
- Detection of *T. cruzi* DNA by molecular testing (e.g., NAAT, metagenomic sequencing) performed on any tissue or body fluid,
  OR
- Detection of IgG antibodies specific to *T. cruzi* by one or more diagnostic tests,
  OR
- Positive blood, organ, or human cell, tissue, and cellular and tissue-based product (HCT/P) donor screen for *T. cruzi**

** Blood, organ, and HCT/P donor screening does not constitute diagnostic testing.*

A3. Epidemiologic Linkage Criteria for Reporting
N/A

A4. Vital Record Criteria for Reporting

- A person whose death certificate lists *T. cruzi* infection or Chagas disease as an underlying cause of death or a significant condition contributing to death.

A5. Healthcare Record Criteria for Reporting

- A person whose healthcare record contains a diagnosis of *T. cruzi* infection or Chagas disease.

B. Disease-Specific Data Elements to be Included in the Initial Report
Disease-specific data elements should be included in addition to the common data elements that are to be reported for all initial individual case reports (see CSTE Position Statement 09-SI-01 "Common Core Data Elements for Case Reporting and Laboratory Result Reporting" https://cdn.ymaws.com/www.cste.org/resource/resmgr/PS/09-SI-01.pdf). Public health authorities do not expect that an initial report will contain all the information necessary for case investigation and case classification.

In addition to the Common Core Data Elements, Chagas disease-specific data elements should include:

- Pregnancy status
- Country of birth
- Gestational parent country of birth
- Travel history
- Reason for testing

This information will help public health agencies prioritize case investigations for Chagas disease. Additional clinical, laboratory, and epidemiological data may be collected as needed during case investigations.

VII. Case Definition for Case Classification

These case definitions for case classification are intended solely for public health surveillance purposes and do not recommend criteria for clinical diagnosis purposes. Once a public health agency has ascertained data on suspected cases of a disease or condition from reporting entities, the public health agency assigns case statuses based on the case classifications included within this position statement.

A. Narrative: A description of criteria to determine how public health should classify a case of acute, congenital, or chronic Chagas disease.
Public health agencies should apply standard criteria to classify cases of acute, congenital, and chronic Chagas disease. Acute, congenital, and chronic Chagas disease each have their own set of criteria used to classify cases, including laboratory and epidemiologic linkage criteria. For additional information on clinical signs and syndromes that may be present in cases of acute and congenital Chagas disease, please see Appendix 1. For additional information on clinical signs and syndromes which may be present in chronic Chagas disease, please see Appendix 2. Supplemental information is included in Appendix 2 to assist public health agencies in optional subclassification of chronic cases of Chagas disease.

A1. Clinical Criteria
N/A

[*continued*]

A2. Laboratory Criteria*

Acute Chagas Disease**

*Confirmatory Laboratory Evidence***:*

- Visualization of *T. cruzi* by microscopy (e.g., wet mount-microscopic examination, thick and thin smears-Giemsa stain) performed on any tissue or body fluid,
  OR
- Detection of *T. cruzi* DNA by molecular testing (e.g., NAAT, metagenomic sequencing) performed on any tissue or body fluid

Presumptive Laboratory Evidence: N/A

Supportive Laboratory Evidence: N/A

Congenital Chagas Disease**

*Confirmatory Laboratory Evidence***:*

- Visualization of *T. cruzi* by microscopy (e.g., wet mount-microscopic examination, thick and thin smears-Giemsa stain) performed on any tissue or body fluid (collected from the fetus or infant within three months of delivery to gestational parent),
  OR
- Detection of *T. cruzi* DNA by molecular testing (e.g., NAAT, metagenomic sequencing) performed on any tissue or body fluid (collected from the fetus or infant within three months of delivery to gestational parent)

Presumptive Laboratory Evidence: N/A

Supportive Laboratory Evidence: N/A

Chronic Chagas Disease^

Confirmatory Laboratory Evidence:

- Detection of IgG antibodies specific to *T. cruzi* by at least two diagnostic tests using two different antigen preparations^^

Presumptive Laboratory Evidence:

- Detection of IgG antibodies specific to *T. cruzi* by a single diagnostic test,
  OR
- Positive blood, organ, or HCT/P donor screen for *T. cruzi*^^^

Supportive Laboratory Evidence: N/A

** Note: The categorical labels used here to stratify laboratory evidence are intended to support the standardization of case classifications for public health surveillance. The categorical labels should not be used to interpret the utility or validity of any laboratory test methodology.*

*** See Appendix 1 for more information related to signs and syndromes of acute and congenital Chagas disease.*

**** Individuals experiencing reactivation may test positive using molecular testing or microscopic observation. These individuals can be counted as a chronic case pending positive serology that meets the chronic case definition. In the context of transplant recipients, case classification should be informed by whether the positive result may reflect an acute, donor-derived infection or chronic infection in a case experiencing reactivation.*

^ Includes chronic indeterminate and chronic symptomatic Chagas disease. See Appendix 2 for more information related to chronic Chagas disease.

^^ See Appendix 3 for more information related to antigen preparations for T. cruzi*-specific IgG tests.*

^^^ Blood, organ, and HCT/P donor screening does not constitute diagnostic testing.

A3. Epidemiologic Linkage Criteria

Acute Chagas Disease

- Suspected triatomine or kissing bug exposure (e.g., bite, triatomine found in bed, etc.) within the 3 months prior to specimen collection,
  OR
- Residence for at least 6 months in a Chagas endemic country[¥], which concluded within the 3 months prior to specimen collection,
  OR
- History of donor-derived infection in the recipient of organ or HCT/P transplant within the 3 months prior to specimen collection,
  OR
- History of donor-derived infection in the recipient of a blood transfusion within the 3 months prior to specimen collection

[¥]*Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, and Venezuela*

Congenital Chagas Disease

N/A

Chronic Chagas Disease

- Gestational parent that delivered a fetus or infant with confirmed congenital *T. cruzi* infection

A4. Case Classifications

Acute Chagas Disease*

Confirmed:

- Meets acute Chagas disease confirmatory laboratory evidence **AND** acute Chagas disease epidemiologic linkage criteria.

Congenital Chagas Disease*

Confirmed:

- A fetus (≥20 weeks or ≥350g) or an infant who meets congenital Chagas disease confirmatory laboratory evidence in the absence of other known routes of transmission.

Chronic Chagas Disease**

Confirmed:

- Meets chronic Chagas disease confirmatory laboratory evidence.

Probable:

- Meets **all** chronic Chagas disease presumptive laboratory evidence criteria, **OR**
- Meets one chronic Chagas disease presumptive laboratory evidence criterion **AND** chronic Chagas disease epidemiologic linkage criterion.

Suspect:

- Meets **only one** chronic Chagas disease presumptive laboratory evidence criterion.

** See Appendix 1 for more information related to signs and syndromes of acute and congenital Chagas disease.*
*** Includes chronic indeterminate and chronic symptomatic Chagas disease. See Appendix 2 for more information related to chronic Chagas disease.*

B. Criteria to Distinguish a New Case of Acute, Congenital, or Chronic Chagas Disease from Reports or Notifications which Should Not be Enumerated as a New Case for Surveillance

A person should not be enumerated as a case of Chagas disease more than once within the same case category (e.g., a person previously enumerated as a case of acute Chagas MAY be enumerated as a case of chronic Chagas, but MAY NOT be enumerated as a case of acute Chagas for a second time).

VIII. Period of Surveillance

Surveillance should be ongoing and routine, and frequency of reporting should follow the state, local, or territorial health department's routine schedule.

IX. Data Sharing/Release and Print Criteria

CSTE recommends the following case statuses* be included in the 'case' count released outside of the public health agency:

☒Confirmed
☒Probable
☐Suspect
☐Unknown

**Which case statuses are included in case counts constitute the "print criteria."*

Jurisdictions (e.g., States and Territories) conducting surveillance under this case definition can voluntarily submit de-identified case information to CDC, if requested and in a mutually agreed upon format.

Production of national data summaries and national data re-release for non-NNCs:

- Prior to release of national data summaries CDC should follow the CDC/ATSDR Policy on Releasing & Sharing Data, issued on April 16, 2003 and referenced in 11-SI-01 and custodians of such data should consult the CDC-CSTE Intergovernmental Data Release Guidelines Working Group report (www.cste2.org/webpdfs/drgwgreport.pdf) which contains data release guidelines and procedures for CDC programs re-releasing state, local, or territorial-provided data.
- CDC programs have a responsibility, in collaboration with states, localities, and territories, to ensure that CDC program-specific data re-release procedures meet the needs of those responsible for protecting data in the states and territories.

Additional Notes:

- The print criteria above apply to acute, congenital, and chronic Chagas disease.
- While only "confirmed" and "probable" acute, congenital, and chronic Chagas disease case statuses will be included in the 'case' count released outside for the public health agency, jurisdictions may also voluntarily submit de-identified case information for those with "suspect" case statuses to CDC, if requested and in a mutually agreed upon format.
- Health departments that further classify cases of chronic Chagas disease using the optional sub-classifications, as described above in section VII and outlined in Appendix 2, may voluntarily choose to submit data for these sub-classifications to the CDC, if requested and in a mutually agreed upon format.

X. Revision History

N/A. This is the first standardized surveillance position statement for acute, congenital, and chronic Chagas disease.

XI. References

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Additional references are listed in Appendix 4.

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Technical Supplement

Table VI. Table of criteria to determine whether a case should be reported to public health authorities

Criterion	Chagas Disease
Clinical Criteria for Reporting	
N/A	
Laboratory Criteria for Reporting	
Visualization of *T. cruzi* by microscopy (e.g., wet mount-microscopic examination, thick and thin smears-Giemsa stain) performed on any tissue or body fluid	S
Detection of *T. cruzi* DNA by molecular testing (e.g., NAAT, metagenomic sequencing) performed on any tissue or body fluid	S
Detection of IgG antibodies specific to *T. cruzi* by one or more diagnostic tests	S
Positive blood, organ, or human cell, tissue, and tissue-based product (HCT/P) donor screen for *T. cruzi**	S
Epidemiologic Linkage Criteria for Reporting	
N/A	
Vital Record Criteria for Reporting	
A person whose death certificate lists *T. cruzi* infection or Chagas disease as an underlying cause of death or a significant condition contributing to death	S
Healthcare Record Criteria for Reporting	
A person whose healthcare record contains a diagnosis of *T. cruzi* infection or Chagas disease	S

Notes:
S = This criterion alone is SUFFICIENT to report a case.
** Blood, organ, and HCT/P donor screening does not constitute diagnostic testing.*

[*continued*]

Table VII.A. Classification Table: Criteria for defining a case of acute, congenital, or chronic Chagas disease

Criterion	Acute Chagas Disease*	Congenital Chagas Disease*	Chronic Chagas Disease**			
	Confirmed	Confirmed	Confirmed	Probable		Suspect
Clinical Evidence						
Fetus (≥20 weeks or ≥350g) or an infant		N				
Laboratory Evidence						
Visualization of *T. cruzi* by microscopy (e.g., wet mount-microscopic examination, thick and thin smears-Giemsa stain) performed on any tissue or body fluid***	O					
Detection of *T. cruzi* DNA by molecular testing (e.g., NAAT, metagenomic sequencing) performed on any tissue or body fluid***	O					
Visualization of *T. cruzi* by microscopy (e.g., wet mount-microscopic examination, thick and thin smears-Giemsa stain) performed on any tissue or body fluid*** (collected from the fetus or infant within three months of delivery to gestational parent)		O				
Detection of *T. cruzi* DNA by molecular testing (e.g., NAAT, metagenomic sequencing) performed on any tissue or body fluid*** (collected from the fetus or infant within three months of delivery to gestational parent)		O				
Detection of IgG antibodies specific to *T. cruzi* by at least two diagnostic tests using two different antigen preparations^			S			
Detection of IgG antibodies specific to *T. cruzi* by a single diagnostic test				N	O	O
Positive blood, organ, or HCT/P donor screen for *T. cruzi*^^				N	O	O
Epidemiologic Linkage Evidence						
Suspected triatomine or kissing bug exposure (e.g., bite, triatomine found in bed, etc.) within the 3 months prior to specimen collection	O					
Residence for at least 6 months in a Chagas endemic country¥, which concluded within the 3 months prior to specimen collection	O					
History of donor-derived infection in the recipient of organ or HCT/P transplant within the 3 months prior to specimen collection	O					
History of donor-derived infection in the recipient of blood transfusion within the 3 months prior to specimen collection	O					
Gestational parent that delivered a fetus or infant with confirmed congenital *T. cruzi* infection					N	
Absence of other known routes of transmission		N				

Notes: S = This criterion alone is SUFFICIENT to classify a case.
N = All "N" criteria in the same column are NECESSARY to classify a case.
O = At least one of these "O" (ONE OR MORE) criteria in each category (categories=clinical evidence, laboratory evidence, and epidemiologic evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to classify a case.

** See Appendix 1 for more information related to signs and syndromes of acute and congenital Chagas disease.*

*** Includes chronic indeterminate and chronic symptomatic Chagas disease. See Appendix 2 for more information related to chronic Chagas disease.*

**** Individuals experiencing reactivation may test positive using molecular testing or microscopic observation. These individuals can be counted as a chronic case pending positive serology that meets the chronic case definition. In the context of transplant recipients, case classification should be informed by whether the positive result may reflect an acute, donor-derived infection or chronic infection in a case experiencing reactivation.*

^ See Appendix 3 for more information related to antigen preparations for T.cruzi-specific IgG tests.

^^ Blood, organ, and HCT/P donor screening does not constitute diagnostic testing.

¥ Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, and Venezuela

Table VII.B. Classification Table: Criteria to distinguish a new case of acute, congenital, or chronic Chagas disease from reports or notifications which should not be enumerated as a new case for surveillance

Criterion	Acute Chagas Disease	Congenital Chagas Disease	Chronic Chagas Disease*		
	Confirmed	Confirmed	Confirmed	Probable	Suspect
Criteria to distinguish a new case					
Not previously enumerated as a case of acute Chagas disease	S				
Not previously enumerated as a case of congenital Chagas disease		S			
Not previously enumerated as a case of chronic Chagas disease			S	S	S

Notes:
S = This criterion alone is SUFFICIENT to enumerate as a new case.
** Includes chronic indeterminate and chronic symptomatic Chagas disease.*

Appendix 1. Signs and Syndromes of Acute and Congenital Chagas Disease

This table displays clinical signs and syndromes which may be present in cases of acute and congenital Chagas disease for reference by jurisdictions conducting surveillance for Chagas disease.

Congenital Chagas Disease	Other Acute Chagas Disease
Hepatomegaly	Fever
Splenomegaly	Rash
Acute myocarditis (rare)	Vomiting
Meningoencephalitis (rare)	Diarrhea
Low birth weight	Hepatomegaly
Premature birth	Splenomegaly
Low Apgar scores	Lymphadenopathy
Anemia	Chagoma
Thrombocytopenia	Romaña's sign
Gastrointestinal megasyndromes (e.g., megaesophagus, megacolon)	Acute myocarditis (rare)
Pneumonitis	Meningoencephalitis (rare)
Respiratory distress	Asymptomatic
Anasarca	
Asymptomatic	

Appendix 2. Operational Guidance for Further Sub-Classification of Chronic Chagas Disease

This table provides guidance for jurisdictions conducting surveillance for Chagas disease to operationalize the further sub-classifications of chronic Chagas disease into chronic indeterminate Chagas disease and chronic symptomatic Chagas disease.

Criterion	Chronic Chagas Disease							
	Indeterminate				Symptomatic			
	Confirmed	Probable		Suspect	Confirmed	Probable		Suspect
Clinical Evidence								
Heart arrhythmia					O	O	O	O
Conduction abnormalities					O	O	O	O
Cardiomyopathy					O	O	O	O
Heart failure					O	O	O	O
Sudden death					O	O	O	O
Megaesophagus					O	O	O	O
Megacolon					O	O	O	O
Asymptomatic	N	N	N	N				
Laboratory Evidence								
Detection of IgG antibodies specific to *T. cruzi* by at least two diagnostic tests using two different antigen preparations*	N				N			
Detection of IgG antibodies specific to *T. cruzi* by a single diagnostic test		N	O	O		N	O	O
Positive blood, organ, or HCT/P donor screen for *T. cruzi* **		N	O	O		N	O	O
Epidemiologic Linkage Evidence								
Gestational parent that delivered a fetus or infant with confirmed congenital *T. cruzi* infection			N				N	

Notes:
N = All “N” criteria in the same column are NECESSARY to further classify a case.
O = At least one of these “O” (ONE OR MORE) criteria in each category (clinical evidence, laboratory evidence, epidemiologic linkage evidence) in the same column – in conjunction with all “N” criteria in the same column – is required to further classify a case.
** See **Appendix 3** for more information related to antigen preparations for T.cruzi-specific IgG tests.*
*** Blood, organ, and HCT/P donor screening does not constitute diagnostic testing.*

Appendix 3. Notes on Antigen Preparations for *T. cruzi*-specific IgG Tests

To confirm a case of chronic Chagas disease, specimens must test positive using at least two *T.cruzi*-specific IgG diagnostic tests using two different antigen preparations. Antigen preparations used in tests for *T.cruzi*-specific IgG can be broadly categorized into two groups: whole parasite antigen preparation and recombinant antigen preparation. The use of two different antigen preparations optimizes sensitivity and specificity, as no individual test for *T.cruzi*-specific IgG is adequately sensitive and specific.

Most commercial labs in the U.S. perform one assay for Chagas disease. Furthermore, commercial diagnostic labs use different test kits, with different antigen preparations, and may change the test kits they use at any given time. It cannot be assumed that tests conducted by two different commercial labs were conducted using two different antigen preparations. To appropriately classify, jurisdictions would need to confirm which antigen preparation was used for each test result.

CDC offers confirmatory testing for Chagas disease, including testing for discordant results. Samples forwarded to CDC for confirmatory testing are tested twice using two different antigen preparations. In the event of discordant results between the two tests, a third test with a third antigen preparation is performed.

Appendix 4. References (continued)

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