I. Statement of the Problem

Culture-independent diagnostic testing (CIDT), defined as the detection of antigen or nucleic acid sequences of the pathogen, is rapidly being adopted by clinical laboratories. For Shiga toxin-producing *Escherichia coli* (STEC), these are generally PCR-based testing methods which do not require a stool culture and thus do not yield an isolate. While concerted efforts are being made to ensure reflexive culture is performed at the clinical laboratory or the state public health laboratory, CIDT-positive reports are not always culture-confirmed. The current STEC case definition classifies a positive CIDT result detecting Shiga toxin, that is not culture-confirmed, as a suspect case. Modification of this case definition is needed to address the following three concerns:

1. Positive CIDT results detecting *E. coli* O157 or STEC/Enterohemorrhagic *E. coli* (EHEC) are not addressed in the current case definition, leading to confusion for case classification purposes.
2. Suspect cases are not being reported to national surveillance, and the number of positive CIDT reports is growing rapidly, leading to substantial under-ascertainment of laboratory-diagnosed cases.
3. Case definitions for bacterial enteric pathogens are not consistent. In the CSTE position statements for campylobacteriosis (2014), salmonellosis (2016), shigellosis (2016) and vibriosis (2016), a CIDT-positive report that is not culture-confirmed is classified as a probable case and is reported to national surveillance.

To prevent an increase in underreporting of STEC infection cases and to make case definitions for enteric bacterial pathogens more consistent, this position statement proposes that:

1. Detection of Shiga toxin, Shiga toxin genes, *E. coli* O157 or STEC/EHEC by CIDT without culture-confirmation in a clinically compatible person be classified as a probable STEC case.
2. Illnesses among persons who are epidemiologically linked to a confirmed or laboratory-diagnosed probable case will be classified as probable epidemiologically-linked cases.

II. Background and Justification

*Background:

STEC are estimated to cause more than 265,000 illnesses each year in the United States. STEC can cause illness that ranges from mild diarrhea to bloody diarrhea and life-threatening hemolytic uremic syndrome (HUS). STEC are categorized into serogroups by their somatic O antigen. The STEC serogroup most commonly identified and associated with severe illness and hospitalization in the United States is *E. coli* O157; however, there are over 50 other serogroups that can also cause illness. The majority of infections are not reported to public health, because many individuals do not seek health care or are not tested. In recent years, the number of clinical laboratories that use tests that detect Shiga toxin or Shiga toxin genes has increased, resulting in increased detection of both O157 and non-O157 STEC infections.

*Justification:

Ongoing surveillance of STEC infections is essential to detect and control outbreaks, to determine public health priorities, to monitor trends in illness, and to assess effectiveness of public health interventions. Methods for surveillance must keep pace with changing laboratory diagnostic methods.

- Use of CIDT to detect Shiga toxin or Shiga toxin genes has increased rapidly at clinical laboratories following FDA approval of several multiplex nucleic acid tests in 2014. As of April...
14, 2017, FoodNet data indicate 302/382 (79%) of laboratories in the FoodNet catchment area are testing for Shiga toxin. In addition, 68/382 (18%) are using a PCR based panel that may also test for *E. coli* O157.

- Use of CIDT to detect *E. coli* O157 or EHEC without testing for Shiga toxin has been reported by some jurisdictions. The relationship between the detection of these targets by CIDT and confirmation of STEC infection is not currently understood.
- CIDT positive reports are not always culture-confirmed. This can be because *E. coli* was not able to be isolated at the clinical or public health laboratory, or because culture was not attempted.
- In 2016, 437 cases positive for Shiga toxin by CIDT but not culture-confirmed were reported to FoodNet. These cases represent 24% of all reported STEC cases in the FoodNet catchment area, which represents 15% of the US population. FoodNet has detected a 164% increase in the number of positive CIDT reports during 2016 compared with 2013-2015.
- During 2013-2016, FoodNet received reports of 5,450 Shiga toxin CIDT-positive results for which culture was performed. *E. coli* was isolated in 91% of those cultures.
- The current STEC case definition classifies a CIDT-positive result detecting Shiga toxin without culture confirmation as a suspect case. These cases are not reported to CDC for use in national surveillance.
- Some state health departments have barriers to investigating suspect cases due to rules that only allow local jurisdictions to investigate confirmed and select probable cases. Increasing numbers of CIDT-positive results that are not culture confirmed, could affect outbreak detection and result in missed opportunities for control measures at the local level.
- As the use of CIDT increases, counting only culture-confirmed cases will grossly underestimate the total number of laboratory-diagnosed STEC cases. Public health case definitions must keep pace or surveillance will suffer.

### III. Statement of the desired action(s) to be taken

1. Utilize standard sources (e.g. reporting*) for case ascertainment for STEC. Surveillance for STEC should use the following recommended sources of data to the extent of coverage presented in Table III.

<table>
<thead>
<tr>
<th>Source of data for case ascertainment</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population-wide</td>
<td>Sentinel sites</td>
</tr>
<tr>
<td>Clinician reporting</td>
<td>X</td>
</tr>
<tr>
<td>Laboratory reporting</td>
<td>X</td>
</tr>
<tr>
<td>Reporting by other entities (e.g., hospitals, veterinarians, pharmacies, poison centers)</td>
<td>X</td>
</tr>
<tr>
<td>Death certificates</td>
<td>X</td>
</tr>
<tr>
<td>Hospital discharge or outpatient records</td>
<td>X</td>
</tr>
<tr>
<td>Extracts from electronic medical records</td>
<td>X</td>
</tr>
<tr>
<td>Telephone survey</td>
<td></td>
</tr>
<tr>
<td>School-based survey</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

2. Utilize standardized criteria for case identification and classification (Sections VI and VII) for STEC and add STEC to the *Nationally Notifiable Condition List.*

- 3a. Immediately notifiable, extremely urgent (within 4 hours)
- 3b. Immediately notifiable, urgent (within 24 hours)
- 3c. Routinely notifiable
CSTE recommends that all States and Territories enact laws (statute or rule/regulation as appropriate) to make this disease or condition reportable in their jurisdiction. Jurisdictions (e.g. States and Territories) conducting surveillance (according to these methods) should submit case notifications** to CDC.

CSTE recommends that CDC collaborates with CSTE to incorporate the necessary data elements into a Message Mapping Guide (MMG) for this disease/condition to allow states to transmit disease-specific data elements to CDC through states’ routine NNDSS data transmission mechanisms. CSTE recommends that the CDC enteric program office continue to work with the CDC NNDSS program office to ensure data delivery from NNDSS to the enterics program. CSTE requests that CDC finalize the MMG for this disease/condition and be prepared to receive data sent via that MMG within one year following the approval of this position statement. Prior to implementation of the MMG for this disease/condition, notification to CDC should occur using the Generic V2 MMG which will support transmission of the basic demographic and epidemiologic information common to all cases.

3. CDC should publish data on STEC as appropriate in *MMWR* and other venues (see Section IX).

CSTE recommends that all jurisdictions (e.g., States or Territories) with legal authority to conduct public health surveillance follow the recommended methods as outlined above.

Terminology:

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

** Notification: process of a local or state public health authority submitting a report (case information) of a condition on the Nationally Notifiable Condition List to CDC.

4. State health departments should create a variable to distinguish laboratory-diagnosed probable cases from probable cases that are based on an epidemiologic linkage. This differentiation of probable cases will facilitate assessment of the impact of CIDT on surveillance.

5. CDC should include a variable to distinguish laboratory-diagnosed probable cases from probable cases that are based on an epidemiologic linkage in the disease-specific MMG, to assess the impact of CIDT on surveillance.

6. State health departments should attempt to capture the type(s) of testing performed for reported STEC cases. This could include surveys of laboratory testing practices, capture of LOINC and SNOMED codes from electronic laboratory reporting, or other methods.

7. When available, STEC serotype characterization should be reported.

** IV. Goals of Surveillance **
To provide information on the temporal, geographic, and demographic occurrence of STEC to facilitate its prevention and control.

** V. Methods for Surveillance **
Surveillance for STEC should use the recommended sources of data and the extent of coverage listed in Table III.

** VI. Criteria for case identification **

** A. Narrative: A description of suggested criteria for case ascertainment of a specific condition. **
Report any illness to public health authorities that meets any of the following criteria:

- Any person with *E. coli* O157 or *E. coli* O157:H7 isolated from a clinical specimen.
• Any person with STEC isolated from a clinical specimen.
• Any person with an elevated antibody titer against a known Shiga toxin-producing serogroup of *E. coli*.
• Any person with Shiga toxin, Shiga toxin genes, *E. coli* O157, or STEC/EHEC detected in a clinical specimen using a CIDT.
• Any person with abdominal cramps or diarrhea who is a contact of an STEC case or a member of a risk group defined by public health authorities during an outbreak investigation.
• Any person with a diagnosis of post-diarrheal hemolytic uremic syndrome (HUS).
• Any person with a diagnosis of post-diarrheal thrombotic thrombocytopenic purpura (TTP).
• A person whose healthcare record contains a recent diagnosis of STEC infection.
• A person whose death certificate lists STEC as a cause of death or a significant condition contributing to death.

Other recommended reporting procedures:
• All cases of STEC should be reported.
• Reporting should be ongoing and routine.
• Frequency of reporting should follow the state health department's routine schedule.

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

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

<table>
<thead>
<tr>
<th>Criterion</th>
<th>STEC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Evidence</strong></td>
<td></td>
</tr>
<tr>
<td>Abdominal cramps</td>
<td>O</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>O</td>
</tr>
<tr>
<td>Diagnosis of post-diarrheal hemolytic uremic syndrome (HUS)</td>
<td>S</td>
</tr>
<tr>
<td>Diagnosis of post-diarrheal thrombotic thrombocytopenic purpura (TTP)</td>
<td>S</td>
</tr>
<tr>
<td>Healthcare record contains a recent diagnosis of STEC infection</td>
<td>S</td>
</tr>
<tr>
<td>Death certificate lists STEC as a cause of death or a significant condition contributing to death</td>
<td>S</td>
</tr>
<tr>
<td><strong>Laboratory Evidence</strong></td>
<td></td>
</tr>
<tr>
<td>Isolation of <em>E. coli</em> O157:H7 from a clinical specimen</td>
<td>S</td>
</tr>
<tr>
<td>Isolation of <em>E. coli</em> from a clinical specimen with detection of Shiga toxin or Shiga toxin genes</td>
<td>S</td>
</tr>
<tr>
<td>Isolation of <em>E. coli</em> O157 from a clinical specimen, without confirmation of H antigen, detection of Shiga toxin or detection of Shiga toxin genes</td>
<td>S</td>
</tr>
<tr>
<td>Identification of an elevated antibody titer against a known Shiga toxin-producing serogroup of <em>E. coli</em></td>
<td>S</td>
</tr>
<tr>
<td>Detection of Shiga toxin, Shiga toxin genes, <em>E. coli</em> O157, or STEC/EHEC in a clinical specimen using a CIDT</td>
<td>S</td>
</tr>
<tr>
<td><strong>Epidemiological Evidence</strong></td>
<td></td>
</tr>
<tr>
<td>Epidemiologically linked to an STEC case</td>
<td>O</td>
</tr>
<tr>
<td>Member of a risk group as defined by public health authorities during an outbreak investigation</td>
<td>O</td>
</tr>
</tbody>
</table>

Notes:
*S* = This criterion alone is Sufficient to report a case.
*O* = At least one of these “O” (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all “N” criteria in the same column—is required to report a case.
* A requisition or order for any of the “S” laboratory tests is sufficient to meet the reporting criteria.
C. Disease-specific data elements
CSTE recommends that jurisdictions consider collecting the STEC-specific data elements listed in Appendix A while the disease-specific MMG is being developed. Additional information about MMGs can be found at CDC’s NNDSS HL7 Case Notification Resource Center webpage: https://wwwn.cdc.gov/nndss/case-notification/.

VII. Case Definition for Case Classification
A. Narrative: Description of criteria to determine how a case should be classified.

Clinical Criteria
An infection of variable severity characterized by diarrhea (often bloody) and/or abdominal cramps. Illness may be complicated by HUS (note that some clinicians still use the term thrombotic thrombocytopenic purpura [TTP] for adults with post-diarrheal HUS).

Laboratory Criteria

Confirmatory laboratory evidence
Isolation of *E. coli* O157:H7 from a clinical specimen

OR
Isolation of *E. coli* from a clinical specimen with detection of Shiga toxin or Shiga toxin genes.

Supportive laboratory evidence
Isolation of *E. coli* O157 from a clinical specimen without confirmation of H antigen, detection of Shiga toxin, or detection of Shiga toxin genes,

OR
Identification of an elevated antibody titer against a known Shiga toxin-producing serogroup of *E. coli*,

OR
Detection of Shiga toxin or Shiga toxin genes in a clinical specimen using a CIDT and no known isolation of *Shigella* from a clinical specimen.

OR
Detection of *E. coli* O157 or STEC/EHEC in a clinical specimen using a CIDT.

Epidemiologic Linkage
A clinically compatible illness in a person that is epidemiologically linked to a confirmed or probable case with laboratory evidence

OR
A clinically compatible illness in a person that is a member of a risk group as defined by public health authorities during an outbreak.

Criteria to distinguish a new case of this disease or condition from reports or notifications which should not be enumerated as a new case for surveillance
A new case should be created when a positive laboratory result is received more than 180 days after the most recent positive laboratory result associated with a previously reported case
in the same individual (see Appendix B for details on time period calculation, hierarchy of
dates, and interpretation)

**OR**

When two or more different serogroups/serotypes are identified in one or more specimens
from the same individual, each serogroup/serotype should be reported as a separate case.

**Comments**

Asymptomatic infections and infections at sites other than the gastrointestinal tract in people (1)
meeting the confirmatory laboratory criteria for diagnosis or (2) with isolation of *E. coli* O157 from a
clinical specimen without confirmation of H antigen, detection of Shiga toxin, or detection of Shiga
toxin genes, are considered STEC cases and should be reported.

Although infections with Shiga toxin-producing organisms in the United States are primarily caused
by STEC, in recent years an increasing number are due to infections by Shiga toxin-producing
*Shigella*. Persons with (1) detection of Shiga toxin or Shiga toxin genes using a CIDT and (2)
isoaltion of *Shigella* spp. from a clinical specimen should not be reported as an STEC case.

Due to the variable sensitivities and specificities of CIDT methods and the potential for degradation
of Shiga toxin in a specimen during transit, discordant results may occur between clinical and
public health laboratories. Persons with (1) detection of Shiga toxin or Shiga toxin genes using a
CIDT and (2) the absence of isolation of *Shigella* from a clinical specimen, should be reported as a
probable case, regardless of whether detection of Shiga toxin or Shiga toxin genes is confirmed by
a public health laboratory.

**Case Classifications**

**Confirmed**
A person that meets the confirmatory laboratory criteria for diagnosis.

**Probable**
A person with isolation of *E. coli* O157 from a clinical specimen without confirmation of H
antigen, detection of Shiga toxin or detection of Shiga toxin genes,

**OR**
A clinically compatible illness in a person with identification of an elevated antibody titer
against a known Shiga toxin-producing serogroup of *E. coli*,

**OR**
A clinically compatible illness in a person with detection of Shiga toxin or Shiga toxin
genes in a clinical specimen using a CIDT and no known isolation of *Shigella* from a
clinical specimen,

**OR**
A clinically compatible illness in a person with detection of *E. coli* O157 or STEC/EHEC
from a clinical specimen using a CIDT,

**OR**
A clinically compatible illness in a person that is epidemiologically linked to a confirmed or
probable case with laboratory evidence,

**OR**
A clinically compatible illness in a person that is a member of a risk group as defined by
public health authorities during an outbreak.

**Suspect**
A person that meets the supportive laboratory criteria for diagnosis with no known clinical
compatibility,

**OR**
A person with a diagnosis of post-diarrheal HUS/TTP (see HUS case definition).
### B. Classification Tables

#### Table VII-B. Criteria for defining a case of STEC.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Suspect</th>
<th>Probable</th>
<th>Confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical evidence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal cramps</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Diagnosis of post-diarrheal HUS/TTP</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absence of abdominal cramps and diarrhea</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Laboratory evidence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation of <em>E. coli</em> O157:H7 from a clinical specimen</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation of <em>E. coli</em> from a clinical specimen</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation of <em>E. coli</em> O157 from a clinical specimen without confirmation of H antigen</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification of an elevated antibody titer against a known Shiga toxin-producing serogroup of <em>E. coli</em></td>
<td>O</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Detection of Shiga toxin or Shiga toxin genes in a clinical specimen using a CIDT</td>
<td>O</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Detection of <em>E. coli</em> O157 or STEC/EHEC in a clinical specimen using a CIDT</td>
<td>O</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Absence of isolation of <em>Shigella</em> from a clinical specimen</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absence of detection of Shiga toxin or Shiga toxin genes in a clinical specimen using a CIDT</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Epidemiologic evidence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidemiologically linked to a confirmed or probable STEC case with laboratory evidence</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member of a risk group as defined by the public health authorities during an outbreak investigation</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Criteria to distinguish a new case</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A positive laboratory result reported more than 180 days after the most recent positive laboratory result associated with a previously reported case in the same individual</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Two or more different STEC serogroups/serotypes identified in one or more specimens from the same individual</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

**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. A number following an “N” indicates that this criterion is only required for a specific disease/condition subtype (see below). If the absence of a criterion (i.e., criterion NOT present) is required for the case to meet the classification criteria, list the Absence of criterion as a Necessary component.
- O = At least one of these “O” (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all “N” criteria in the same column—is required to classify a case.

#### VIII. Period of Surveillance

Surveillance should be ongoing.
IX. Data sharing/release and print criteria

Notification to CDC of confirmed and probable cases of STEC is recommended.

- Data will be used to determine the burden of illness due to STEC, trends in illness over time, assess the effectiveness of control programs, and monitor progress toward decreasing STEC. Data may be used to compare cases across jurisdictions.
- Data may also be used to compare case numbers with information from other foodborne disease surveillance systems.
- Electronic reports of STEC cases in NNDSS are summarized weekly in the MMWR Tables. Annual case data on STEC is summarized in the yearly Summary of Notifiable Diseases. State-specific compiled data will continue to be published in the weekly and annual MMWR. All cases are verified with the states before publication.
- The frequency of reports/feedback to the states and territories will be dependent on the current epidemiologic situation in the country. Frequency of cases, epidemiologic distribution, importation status transmission risk, and other factors will influence communications.

X. Revision History

<table>
<thead>
<tr>
<th>Position Statement ID</th>
<th>Section of Document</th>
<th>Revision Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-ID-01</td>
<td>Statement of the desired action(s) to be taken</td>
<td>ADDED recommendation that states and CDC add a variable to distinguish between probable cases with laboratory evidence and probable epi-linked cases.</td>
</tr>
</tbody>
</table>
| 13-ID-01              | Section VI-A          | ADDED the following criteria:  
- Any person with *E. coli* O157 isolated from a clinical specimen,  
- Any person with Shiga toxin, Shiga toxin genes, *E. coli* O157, or STEC/EHEC detected in a clinical specimen using a CIDT.  
EDITED “…with diarrhea who is a contact…” to “with abdominal cramps or diarrhea who is a contact”. |
| 13-ID-01              | Table VI-B            | EDITED terminology to be consistent with terminology used in section VI-A  
ADDED the following criteria:  
- Abdominal cramps,  
- Isolation of *E. coli* O157 from a clinical specimen, without confirmation of H antigen, detection of Shiga toxin or detection of Shiga toxin genes,  
- Detection of Shiga toxin, Shiga toxin genes, *E. coli* O157, or STEC/EHEC in a clinical specimen using a CIDT. |
| 13-ID-01              | Section VI-C          | Moved all disease-specific data elements to Appendix A |
| 13-ID-01              | Section VII-A-Clinical criteria | EDITED “diarrhea (often bloody) and abdominal cramps” to “diarrhea (often bloody) and/or abdominal cramps”  
DELETED “; asymptomatic infections…” |
| 13-ID-01              | Section VII-A-Laboratory criteria | EDITED terminology to be consistent with terminology used in section VI  
EDITED detection of Shiga toxin [ADDED or Shiga toxin genes] in a clinical specimen using a CIDT to meet criteria for a probable case instead of a suspect case.  
ADDED detection of *E. coli* O157 or STEC/EHEC in a clinical specimen using a CIDT to meet criteria for a probable case. |
| 13-ID-01              | Section VII-A-Epidemiologic linkage | EDITED “…probable case” to “…laboratory-diagnosed probable case” |
| 13-ID-01              | Section VII-A-Criteria to | ADDED the following criteria:
| 13-ID-01 | Section VII-A-Comments | ADDED section
ADDED “Asymptomatic infections…”
EDITED terminology to account for all situations with isolation of STEC organism |
| 13-ID-01 | Section VII-B | Moved case classifications from Section VII-B to the end of Section VII-A
EDITED terminology to be consistent with terminology used in section VI
EDITED “without confirmation of H antigen or Shiga toxin production” to “without confirmation of H antigen, detection of Shiga toxin, or detection of Shiga toxin genes”
EDITED detection of Shiga toxin [ADDED or Shiga toxin genes] in a clinical specimen using a CIDT to meet criteria for a probable case instead of a suspect case.
ADDED detection of E. coli O157 or STEC/EHEC in a clinical specimen using a CIDT to meet criteria for a probable case.
ADDED clinical compatibility requirement for probable cases based on CIDT laboratory results |
| 13-ID-01 | Table VII-B | EDITED terminology to be consistent with terminology used in section VI
ADDED the following criteria:
- Abdominal cramps,
- Absence of abdominal cramps and diarrhea
- Unknown option for clinical evidence
- Isolation of *E. coli* from a clinical specimen
- Isolation of *E. coli* O157 from a clinical specimen, without confirmation of H antigen, detection of Shiga toxin or detection of Shiga toxin genes,
- Detection of Shiga toxin or Shiga toxin genes in a clinical specimen using a CIDT,
- Detection of *E. coli* O157, or STEC/EHEC in a clinical specimen using a CIDT.
- Absence of isolation of Shigella from a clinical specimen
- Absence of detection of Shiga toxin or Shiga toxin genes in a clinical specimen using a CIDT
- Criteria to distinguish a new case
EDITED detection of Shiga toxin [ADDED or Shiga toxin genes] in a clinical specimen using a CIDT to meet criteria for a probable case instead of a suspect case.
ADDED detection of E. coli O157 or EHEC in a clinical specimen using a CIDT to meet criteria for a probable case. |

### XI. References

http://dx.doi.org/10.15585/mmwr.mm6354a1


Wahl et al. Investigation of an *Escherichia coli* O145 outbreak in a child day-care center- extensive sampling and characterization of eae- and stx1-positive *E. coli* yields epidemiological and socioeconomic insight. BMC Infectious Diseases, 2011; 11:238.
XII. Coordination

Agencies for Response

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    Email: director@cdc.gov

Agencies for Information

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    kwong@cdc.gov
Appendix A. Disease-Specific Data Elements for Consideration

CSTE recommends jurisdictions consider routine data collection of the disease-specific data elements (n=47) below for each identified STEC case that can be interviewed.

<table>
<thead>
<tr>
<th>General</th>
<th>Ground Beef</th>
<th>Romaine Lettuce</th>
<th>Steak</th>
<th>Bison</th>
<th>Wild Game</th>
<th>Dried or Fermented Meat</th>
<th>Dairy or Juice</th>
<th>Other Leafy Greens</th>
<th>Sprouts</th>
<th>Iceberg Lettuce</th>
<th>Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Purchase locations for foods eaten at home</td>
<td>• Handled raw ground beef</td>
<td>• Ate romaine lettuce at home such as whole leaf or shredded in a salad, on a burger or sandwich</td>
<td>• Ate steak at home</td>
<td>• Ate bison</td>
<td>• Ate venison, elk, boar, or other wild game</td>
<td>• Ate any dried or fermented meat such as jerky, pepperoni, salami or summer sausage</td>
<td>• Drank raw milk</td>
<td>• Ate other leafy green vegetable such as mesclun or red leaf lettuce</td>
<td>• Ate sprouts such as from a salad bar or on a sandwich</td>
<td>• Ate iceberg lettuce at home such as whole leaf or shredded in a salad, on a burger or sandwich</td>
<td>• Spent all or some of incubation period outside home state</td>
</tr>
<tr>
<td>• Purchase locations for foods eaten away from home</td>
<td>• Ate ground beef at home</td>
<td>• Brand, variety of romaine lettuce eaten at home</td>
<td>• Purchase location for steak eaten at home</td>
<td>• Ate bison</td>
<td>• Ate venison, elk, boar, or other wild game</td>
<td>• Type of dried or fermented meat eaten</td>
<td>• Ate cheese made from raw milk such as queso fresco or queso blanco</td>
<td>• Type of other leafy green vegetables eaten</td>
<td>• Type and brand of sprouts eaten</td>
<td>• Brand, variety of iceberg lettuce eaten at home</td>
<td>• Domestic travel locations (states)</td>
</tr>
<tr>
<td></td>
<td>• Purchase location for ground beef handled or eaten at home</td>
<td>• Packaging of romaine lettuce eaten at home (loose or prepackaged)</td>
<td>• Ate steak outside the home</td>
<td>• Ate bison</td>
<td>• Ate venison, elk, boar, or other wild game</td>
<td></td>
<td>• Ate artisanal or gourmet cheese</td>
<td>• Purchase location for sprouts eaten</td>
<td>• Purchase location for iceberg lettuce eaten outside the home</td>
<td>• Ate iceberg lettuce outside the home such as whole leaf or shredded in a salad, on a burger or sandwich</td>
<td>• Domestic travel start date</td>
</tr>
<tr>
<td></td>
<td>• Ground beef eaten at home was purchased as patties</td>
<td>• Ate romaine lettuce outside the home</td>
<td>• Purchase location for ground beef eaten outside the home</td>
<td></td>
<td></td>
<td></td>
<td>• Drank unpasteurized juice or cider</td>
<td></td>
<td>• Purchase location for iceberg lettuce eaten outside the home</td>
<td></td>
<td>• Domestic travel end date</td>
</tr>
<tr>
<td></td>
<td>• Ate ground beef outside the home</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• International travel locations (countries)</td>
</tr>
<tr>
<td></td>
<td>• Purchase location for ground beef eaten outside the home</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>• International travel start date</td>
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<td></td>
<td></td>
<td></td>
<td>• International travel end date</td>
</tr>
</tbody>
</table>
Cases should be interviewed regarding exposures that occurred within seven days prior to symptom onset.

If resources for interviewing are limited, priority should be given to cases caused by STEC known to cause more severe disease (i.e., STEC O157, STEC that produce Shiga toxin 2) and any case that is part of a recognized outbreak.

The following data elements (n=13) are useful for state and local investigations and are also recommended by CSTE for consideration as part of jurisdictions’ routine data collection.

- Works as foodhandler
- Attended or worked at day care facility
- Attended any group meals
- Visited, lived, or worked in a residential facility
- Main source of drinking water
- Visited a petting zoo
- Visited, worked, or lived on a farm with livestock
- Visited county/state fair, 4-H or other similar events with animals
- Contact with similarly ill individuals
- Visited any treated recreational water facilities
- Location of treated recreational water facilities
- Visited any untreated recreational water facilities
- Location of untreated recreational water facilities
Appendix B. Calculating and Interpreting the 180-Day Time Period to Distinguish a New Case from a Previously Reported Case of STEC

Formula

\[
\text{Date}^* \text{ of current positive laboratory result} - \text{Date}^* \text{ of most recent positive laboratory result associated with the previously reported case} = X \text{ days}
\]

* Hierarchy of dates: Available information can vary from laboratory result to laboratory result. To account for this, a hierarchy of dates to be used in the above calculation follows (highest priority to lowest priority):
  - Specimen collection date
  - Specimen received date
  - Laboratory report date
  - Symptom onset date (for individuals who do not have laboratory testing)

Interpretation

- If \( X \) is less than or equal to 180 days, the result should be considered part of the previously reported case (i.e., a new case should not be created).
  - Please note that in this situation, a current result documenting a serogroup/serotype different from the previously reported case would then cause a new case to be created.
- If \( X \) is greater than 180 days, a new case should be created.