



# Advancing Electronic Case Reporting of Sexually Transmitted Infections

*Technical Guidance for Public Health Departments*

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## Introduction

### Background

With the broad adoption in recent years of electronic health records (EHRs), public health has the opportunity to take advantage of the availability of electronic health data to improve surveillance. The majority of clinical care providers use manual mechanisms (e.g., facsimile, web form, e-mail, or mailed paper forms) to report cases of reportable and nationally notifiable diseases and conditions to public health authorities. Manual reports create a burden on both the clinical provider and public health and provide opportunities for data errors. Much of the data needed for the case report exists in the patient's EHR. Automating building and sending of case reports with EHR technologies promises to reduce the burden of reporting while improving data accuracy, timeliness, and completeness.

Sexually transmitted infections (STIs) account for the majority of the reportable condition case reports received by state and local public health agencies. In 2014, >1.8 million cases of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infections were reported by state health departments to the Centers for Disease Control and Prevention (CDC) (CDC, 2015). STI cases account for approximately 85% of notifiable condition reports each year; the disease with the next greatest number of reported cases is salmonellosis at 50,634 (CDC, 2015). Clearly, automating STI reporting warrants particular attention.

Leveraging EHR data for case reporting of chlamydia and gonorrhea alone can dramatically lessen the burden of notifiable disease surveillance for clinicians and public health agencies alike. In recent years, timeliness of reporting has improved because public health departments began receiving electronic reports of laboratory test results for reportable conditions from various laboratories. However, these electronic laboratory reports (ELRs) often lack case demographic data that are crucial for tracking disease trends and developing public health responses. Case reports sent automatically from EHRs can further improve data quality through more complete reports and by fulfilling reporting requirements when ELRs and paper-based reports are not provided to public health. Such reports are called *electronic case reports* (ECRs).

While sending a case report by facsimile or web form involves electronic communications, the term *electronic case reporting* (also indicated by the acronym ECR) refers specifically to the approach whereby an EHR or intermediary system (e.g., a health information exchange) automatically detects reportable conditions and sends a case report to a public health surveillance system. ECR depends on clear communications between public health and clinical care about what to include in a case report and what values or codes in a patient's clinical record should trigger report sending. In an effort to facilitate public health agencies' communication of these requirements for ECR of chlamydia and gonorrhea, CDC's Division of Sexually Transmitted Disease Prevention (DSTDPP) collaborated with the Public Health Informatics Institute (PHII) to develop this technical guidance.

## Purpose

The Advancing ECR of STI Project brings public health practitioners and informaticians together to define how EHRs should help primary care providers automatically detect and report STI cases. This guidance provides support to public health agencies and their clinical partners for initiating ECRs of chlamydia and gonorrhea. Our aim is to advance the state-of-the-art for ECRs in collaboration with other national efforts.

## National Efforts

Supporting the capacity for ECR from clinical care to public health is a goal of many national organizations that guide public health practice and develop policy. The Office of the National Coordinator for Health Information Technology (ONC), the Council of State and Territorial Epidemiologists (CSTE), the Association of Public Health Laboratories (APHL), the Association of State Health Officials (ASTHO), Health Level Seven<sup>®</sup> International (HL7), and CDC are involved in the following efforts:

- ONC is defining certification criteria for EHRs to be able to electronically send case reports for Meaningful Use Stage 3.
- CSTE has defined data elements for the electronic initial case report and is working with CDC on the Reportable Conditions Knowledge Management System to support ECR for all notifiable conditions.
- The HL7 Public Health and Emergency Response Working Group has balloted a Standard for Trial Use CDA<sup>®</sup> [clinical document architecture] R2 Implementation Guide for Public Health Case Report, Release 2.
- ASTHO, APHL, CDC, and others are developing a public health community platform to facilitate the exchange of data between clinical facilities and the state and local public health agencies to which they report.

The Advancing ECR of STI Project moves ECR forward by focusing on an approach for STIs that can be a model for or be extended to other conditions. This guide advances discussions toward consensus among public health practitioners regarding the case detection algorithms and set of reporting variables to generate an electronic STI case report. PHII is grateful for the collaboration with representatives from the national efforts described previously and envisions that the resulting ECR approaches for STIs can be implemented in ways that are consistent with those efforts.

## Methods

### Expert Panel

This guidance is based on the work of a panel of experts from national, state, and local public health agencies and supported by subject-matter experts in epidemiology and standards-based terminologies. The expert panel met through three webinars and an in-person meeting to identify data elements to include in the STI case report and the case detection logic that triggers a report to be sent from the EHR system to the local public health agency. A list of the expert panel members is located in the Acknowledgments section. A smaller group of expert panel members participated on a technical working group to vet the documents created from the recommendations of the expert panel by PHII and the subject-matter experts.

## Webinars

During the three webinars hosted by PHII, the expert panel oriented the members to the topic of ECR and the decisions to be made. The following topics were addressed:

- Webinar 1 — the context of ECR and the goals of the Advancing ECR of STI Project;
- Webinar 2 — case detection criteria for chlamydia and gonorrhea; and
- Webinar 3 — case report contents for ECR.

## In-Person Meeting

The webinars were followed by an in-person meeting on December 3–4, 2015, at the PHII offices in Decatur, Georgia. The group spent the first day coming to consensus regarding data elements to be included in a case report and which ones would be required for acceptance by the health department. On the second day, the group reviewed the CSTE Position Statements for chlamydia (CSTE, 2009a) and gonorrhea (CSTE, 2009b, 2013) and considered the criteria for triggering a case report from the EHR. Recommendations from the expert panel guided development of the trigger logic and associated code value sets (Appendix A) and the data elements for the case report (Appendix B), which are described in detail later in this guidance.

## Technical Working Group and Subject-Matter Experts

A technical working group was convened as a subcommittee of the expert panel and was comprised of implementers — representatives from health departments and clinical providers — and staff of CDC’s DSTDP Surveillance and Data Management Branch. That branch receives the data and provides technical support to state and local health departments. On the basis of the expert panel’s recommendations, vocabulary and surveillance subject-matter experts created a draft document with the trigger logic model and value sets of trigger codes. The working group vetted the document through two webinars and by e-mail correspondence. The final trigger document is included with this guide as Appendix A.

## Scope

The Advancing ECR of STI Project is bound by the requirements for ECR of chlamydia and gonorrhea. Included in those bounds and presented in this guidance document are the data elements to be included in a chlamydia or gonorrhea case report, the case detection criteria for each disease, the trigger logic for identifying potential cases, and the trigger code value sets for each condition that correlates with each rule in the logic model. Out-of-scope for this project are the specifications for message or document formats and message transport mechanisms.

The project has benefited directly from concurrent efforts of other national public health organizations that address similar but distinct ECR requirements. Specifically, the work of the CSTE Initial Case Report Task Force guided our vetting of data elements for STI case reports (Appendix B). The CSTE work also provided a starting point for the HL7 Public Health and Emergency Response (PHER) working group’s Standard for Technical Use (STU) for public health case reporting referenced earlier. Concerns with specific case report data elements noted by our expert panel have also been identified by the PHER working group, who have been able to spend considerable time and receive input

from a larger sector of ECR stakeholders than ours. We expect to be able to adopt the final list of data elements proposed in the HL7 DSTU after it is published.

Additionally, as participants on the expert panel, staff from the Reportable Conditions Knowledge Management System project shared their invaluable knowledge of ECR, including the complexities involved in determining the triggering logic and lists of codes used by jurisdictions engaged with that project. Their participation guided development of the trigger code document in Appendix A. We hope our guidance facilitates the work of these and other ECR projects.

## Guidance for ECR of STIs

The complexities involved in implementing ECR of STIs can best be understood through delineating the associations between the entities and systems involved. This guidance first clarifies the ECR context and then describes the specific processes and inputs to be implemented for successful ECR.

### Context of ECR

Reportable condition case reports represent conditions that must be reported to state and local public health agencies by clinical care and laboratories. Public health case reporting by clinicians is legally mandated by each state. After receiving a report, individual jurisdictions determine if it is a reportable case and if an investigation is needed. The case reports are sent in different formats (e.g., by telephone, facsimile, or web-based data entry systems), and states vary to some extent in the conditions and data elements they require to be reported. ECR is intended to help clinicians meet their reporting requirements while improving public health surveillance.

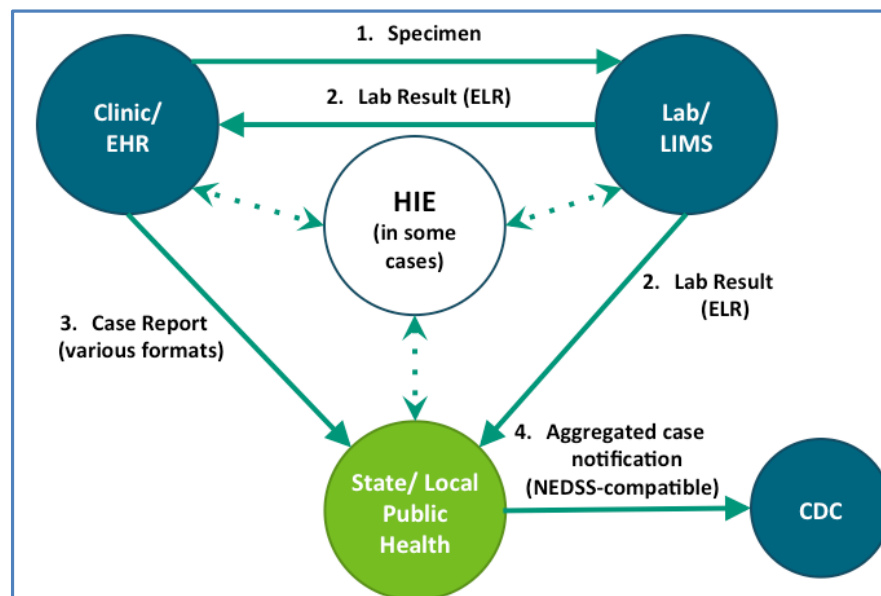


Figure 1. The Context of Electronic Case Reporting

Figure 1 can be understood through the following example:

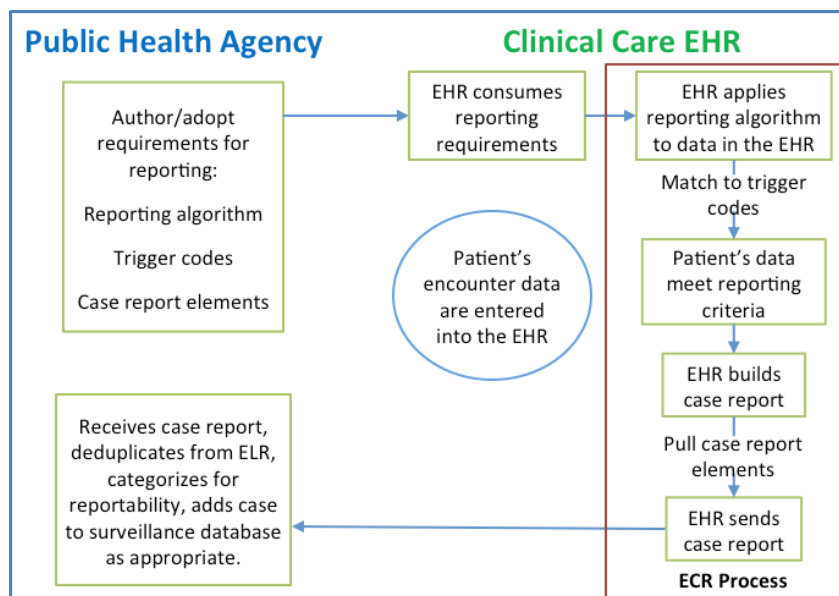
1. A patient presents at a clinical setting (e.g., hospital, physician's office, community health center, or public health agency) and meets the screening guidelines for chlamydia or gonorrhea (e.g., female, age 20 years, and sexually active). Physical specimens are collected and sent to a laboratory for testing.
2. After testing, the laboratory sends the test results to the clinic and, if positive, also to the state or local public health agency. (Some states request reporting of negative results also.) Results might be sent electronically by using HL7 standards from the laboratory information management system.
3. When results are positive, the clinician is also required to send a case report to the state or local public health agency. The case report might be sent by telephone or as a facsimile, by U.S. Postal Service mail, by manual entry into a web-based system, or by the clinic's EHR as an ECR.
4. Finally, each state aggregates the data they receive for each notifiable condition and sends reports on a regular basis to CDC. This is called *case notification*. Certain large municipalities and territories also send aggregate reports to CDC. CDC then disseminates the data to internal programs (e.g., DSTDP) that use it for planning, research, reporting, and intervention development. CDC further makes the data available to the public (e.g., through the *Morbidity and Mortality Weekly Report*).

Figure 1 also illustrates that case reporting can be mediated by a health information exchange (HIE) when an HIE organization is operational in a public health agency's jurisdiction.

Within this context, the ECR process depends on public health communicating to clinical care specific requirements for the EHR to identify cases, build reports, and send them to public health (Figure 2). The requirements include (1) a reporting algorithm that evaluates data in the patient record to match to (2) trigger codes and, when a match is found, builds the case report with (3) specific data elements from the patient record. After a report is sent, the public health agency determines the disposition of the case on the basis of the report, ELR data if available, and possibly, data from contact tracing, partner management, or an investigation.

Figure 2 presents the entire ECR process as taking place within the EHR. Another option is for the case reporting algorithm to reside outside the EHR, which is addressed later in this guide. Regardless of the information technology infrastructure and implementation, the algorithm and value sets of trigger codes can be used to test ECR for these two conditions.





**Figure 2. Interactions between the Public Health Agency and Clinical Care for ECR**

### Case Reporting Criteria

The ECR for STI expert panel deliberated over the criteria that would determine whether a case report should be sent to public health from the EHR. The CSTE Position Statements for chlamydia and gonorrhea outline criteria sufficient for reporting a case to public health. These criteria are listed in the following.

#### Chlamydia (CSTE, 2009a)

1. Healthcare record contains a diagnosis of infection caused by *C. trachomatis*.
2. Isolation of *C. trachomatis* by culture of a clinical specimen.
3. Detection of *C. trachomatis* antigen by direct fluorescent antibody staining in a clinical specimen.
4. Detection of *C. trachomatis* antigen by enzyme-linked immunosorbent assay in a clinical specimen.
5. Detection of *C. trachomatis* nucleic acid by hybridization with a nucleic acid probe in a clinical specimen.
6. Detection of *C. trachomatis* by nucleic acid amplification (e.g., polymerase chain reaction) in a clinical specimen.

#### Gonorrhea (CSTE, 2013, 2009b)

1. Healthcare record contains a diagnosis of infection or illness caused by *N. gonorrhoeae* (from the 2009 Position Statement only).
2. Isolation of *N. gonorrhoeae* by culture of a clinical specimen.
3. Microscopic visualization of *N. gonorrhoeae* (gram-negative intracellular diplococci of typical morphology associated with neutrophils) in a urethral specimen from men.
4. Detection of *N. gonorrhoeae* by nucleic acid amplification (e.g., polymerase chain reaction) in a clinical specimen.
5. Detection of *N. gonorrhoeae* nucleic acid by hybridization with a nucleic acid probe in a clinical specimen.

6. Detection of *N. gonorrhoeae* antigens in a clinical specimen.
7. Microscopic visualization of *N. gonorrhoeae* (gram-negative intracellular diplococci of typical morphology associated with neutrophils) in an endocervical specimen from a woman.

The expert panel understood that the term *diagnosis* in the 2009 statements was meant to indicate that laboratory evidence of the disease existed. Although the latest statement on gonorrhea does not include a diagnosis alone as sufficient for reporting, their consensus was that a clinical diagnosis of *C. trachomatis* or *N. gonorrhoeae* (as evidenced by a SNOMED [Systematized Nomenclature of Human Medicine] or ICD-10 [*International Classifications of Diseases*, 10<sup>th</sup> Rev.] code in the EHR) should trigger a case report being sent to public health, even when a laboratory result is unavailable in the EHR. The public health agency is responsible for determining reportability and case classification (e.g., confirmed, probable, suspect).

The interaction of the case reporting criteria and the trigger codes that are matched to those criteria is not a one-to-one association. Rather, for chlamydia and gonorrhea, a single diagnosis code might match the criteria while in another case two codes representing the laboratory test and the test result might together match the criteria. The expert panel determined the single- and two-factor criteria displayed in Table 1 for reporting cases of chlamydia and gonorrhea. The table also indicates possible code combinations that should not trigger a case report. These criteria are the basis of the trigger decision logic model and trigger code value sets in Appendix A.

Each factor alone or in a pair that would trigger a case report is defined by a set of codes called a *value set*. For example, the decision logic of a single-factor trigger based on a diagnosis of *C. trachomatis* represented in Criterion 1 of Table 1 corresponds to a value set that might include the following SNOMED-Clinical Terms codes:

- 131418003 (*Chlamydia* species [organism]),
- 63938009 (*C. trachomatis* [organism])
- 115289001 (*C. trachomatis*, serotype A [organism])

Scenarios based on two-factor trigger logic require two value sets, one for each factor. Each condition requires a value set of trigger codes for each factor in the scenarios in which a case report should be sent (rows 1, 2, and 3 in Table 1). This results in eight separate value sets — four for chlamydia and four for gonorrhea.

In theory, a case report might be triggered by a laboratory test and its positive quantitative result. However, the value of quantitative results that indicates a positive test varies from test to test. Therefore, not one value or code exists that can be matched against to trigger a report. One option is to trigger on the abnormal flag that an EHR creates to indicate an abnormal result. However, because few such tests exist or are reported, the panel decided to not trigger on quantitative test results, but to rely on the ELR to capture these cases.

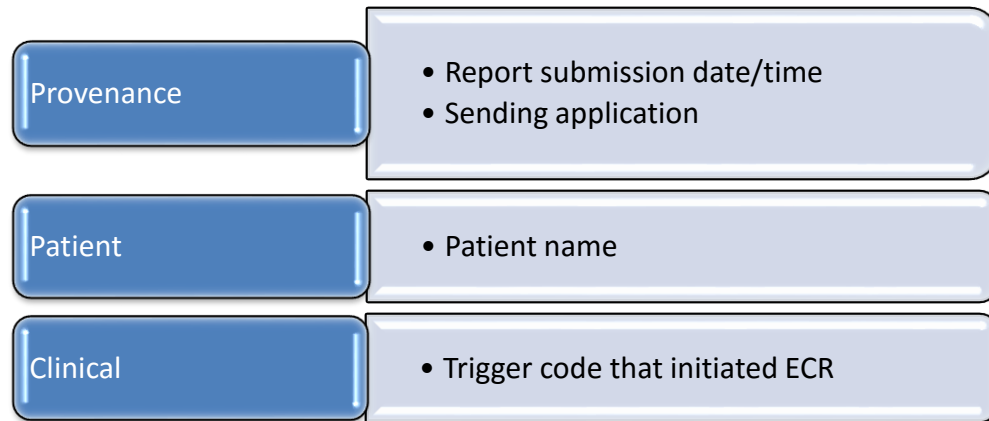
**Table 1. Single- and two-factor criteria for case reporting of chlamydia and gonorrhea**

Criterion	Factor 1	Factor 2	Type*	Action
1	Code for diagnosis specific to <i>Chlamydia trachomatis</i> or <i>Neisseria gonorrhoeae</i>	None	Single-factor	Trigger report
2	Code for a positive laboratory result indicating organism name	None	Single factor	Trigger report
3	Code for laboratory test yielding qualitative result	Code for a positive laboratory result (qualitative indicating presence)	Two-factor	Trigger report
4	Code for laboratory test yielding quantitative result	No code available; potential for abnormal flag	Two-factor	Does not trigger report
5	Code for laboratory test (qualitative or quantitative result)	Code for a negative laboratory result	Two-factor	Does not trigger report
6	Code for laboratory test yielding qualitative result	Code for other laboratory result (e.g., indeterminate, abnormal)	Two-factor	Does not trigger report
7	Code for treatment for chlamydia or gonorrhea	None	Single-factor	Does not trigger report
* A single-factor trigger is based on one value (e.g., a diagnosis code). A two-factor trigger is based on two values that share an association (e.g., a laboratory test name and the test result).				

## Case Report Data Elements

After a trigger code is located in a patient's record, the EHR builds the case report. The Advancing ECR of STI Project expert panel reviewed the CSTE Initial Case Report Task Force's (CSTE, 2015) proposed data elements and categorized each element as *required*, *required if available*, or *optional*.

A case report should include all required elements plus any of the required if available elements that exist in the patient record. The optional elements might also be included. The elements are designated as being of three potential types — provenance, patient, and clinical. The expert panel suggested six elements be required; however, only four of the elements are consistent with the case detection logic. These are the minimum four elements to be included in an ECR (Figure 3). See Appendix B for more information about expert panel discussions of the data elements.



**Figure 3. Recommended required elements for electronic case reporting of sexually transmitted infections**

The expert panel categorized 49 elements for inclusion in an ECR (Table 2). They also considered additional elements. Appendix B includes the list of elements with comments related to discussions by the expert panel and the additional elements that were considered.

Meanwhile, other public health and standards groups have been vetting the CSTE proposed elements. The final list of data elements for ECR of STI will be aligned with the final set of elements published in the HL7 STU for Public Health Case Reports referenced earlier in this guide.

**Table 2. Data elements to be included in electronic case reports for chlamydia and gonorrhea**

	Element Name	Inclusion	Element Type		Element Name	Inclusion	Element Type
1	Date of the Report	Required if available	Provenance	26	Patient Sex	Required if available	Patient
2	Report Submission Date/Time	Required	Provenance	27	Patient Class	Required if available	Patient
3	Sending Application	Required	Provenance	28	Race	Required if available	Patient
4	Provider ID	*Required if available	Provenance	29	Ethnicity	Required if available	Patient
5	Provider Name	*See Provider ID	Provenance	30	Preferred Language	Required if available	Patient
6	Provider Phone	*See Provider ID	Provenance	31	Occupation	Required if available	Patient
7	Provider Fax	*See Provider ID	Provenance	32	Pregnant	Required if available	Patient
8	Provider Email	*See Provider ID	Provenance	33	Travel history	Optional	Patient
9	Provider Facility/Office Name	*See Provider ID	Provenance	34	Insurance Type	Required if available	Patient
10	Provider Address	*See Provider ID	Provenance	35	Immunization history	Optional	Patient
11	Provider County	Optional	Provenance	36	Visit Date/Time	Required if available	Clinical
12	Facility ID Number	Required if available	Provenance	37	Admission Date/Time	Required if available	Clinical
13	Facility Name	Required if available	Provenance	38	Date of Onset	Required if available	Clinical
14	Facility type	Optional	Provenance	39	Symptoms (list)	Required if available	Clinical
15	Facility Phone	Required if available	Provenance	40	Lab Order Code	Optional	Clinical
16	Facility Address	Required if available	Provenance	41	Placer Order Number	Required if available	Clinical
17	Facility Fax	Optional	Provenance	42	Diagnosis	Required if available	Clinical
18	Hospital Unit	Required if available	Provenance	43	Date of Diagnosis	Required if available	Clinical
19	Patient ID Number	Required if available	Patient	44	Medication provided	Required if available	Clinical
20	Patient Name	Required	Patient	45	Death Date	Required if available	Clinical
21	Parent/Guardian Name	Needs more discussion	Patient	46	Date Discharged	Optional	Clinical
22	Parent/Guardian Phone	Patient: Required if available	Patient	47	Laboratory Results	Required if available	Clinical
23	Parent/Guardian Email	Patient: Required if available	Patient	48	Trigger code that initiated ECR	Required	Clinical
24	Street Address	Required if available	Patient	49	Lab Test(s) Performed	Required if available	Clinical
25	Birth Date	Required if available	Patient				

## Implementation Considerations

Thus far, this guide has focused on implementation of ECR as a direct interaction between a clinical provider and a public health agency. As standards-based systems and processes are adopted by public health and opportunities for participation in shared services like health information exchanges and cloud-based decision support are leveraged, other scenarios are emerging that bring their own implementation caveats to be considered.

Furthermore, this guide does not specify message formats or standards in development that will affect opportunities for ECR soon. As standards like HL7 C-CDAs evolve and new ones like Structured Data Capture (SDC) develop, public health must stay informed about the most robust options for data exchange with health care.

### ECR Implementation Approaches

ECR might be implemented in various ways depending on the presence or absence of any intermediaries like HIEs in a public health jurisdiction.

#### Provider to Public Health

Although public health has legal authority for receiving case reports by whatever means is available to the clinical provider, implementing ECR will involve collaborating with the clinical entity or entities in the jurisdiction and asking them to work with their EHR vendors to implement the requirements for ECR. The clinical entities might not immediately understand the value of expending the time and financial costs necessary to implement ECR. Public health agencies should be prepared to make the value case from the perspective of the clinical entities. Stage 3 Meaningful Use criteria include incentive payments for ECR. In addition, ECR creates opportunities for public health to report back to clinical care about risks and exposures of their patient population.

#### Provider to Intermediary to Public Health

Increasingly, public health agencies are participating in data exchange with clinical entities through such intermediaries as HIE organizations. At a national level, CDC, CSTE, ASTHO, and APHL are working toward cloud-based services supporting data exchange between health care and public health. These opportunities can increase access to ECR for small public health agencies and can reduce costs through increased efficiencies for health care and public health alike. Intermediary technologies for health information exchange and public health reporting have legal implications for what data can be accessed by whom and when. Although many data security concerns have been addressed technologically, the public's trust needs to be built and maintained. Because ECR promises more complete reporting the volume of data to be received, particularly for chlamydia and gonorrhea, must be considered. Using a trigger decision logic that yields a specific result with few false-positives can reduce the burden of data volume on technology and the persons involved alike.

### Electronic Initial Case Report Using HL7 Standards

HL7 is currently in the process of releasing "HL7 CDA R2 Implementation Guide: Public Health Case Report, Release 2". This standard specifies the submission of an electronic initial case report (eICR) using HL7's Clinical Document Architecture Release 2 (CDA R2)

format and includes 40 data elements to be retrieved from the EHR to produce the eICR. Since electronic public health case reporting has been identified as an important option for clinical reporters in Stage 3 of Meaningful Use, the implementation guide will likely be a basis for future EHR certification criteria.

### **Structured Data Capture for Case Follow-Up**

For certain conditions, local health departments might need to request additional data from clinical care providers to initiate a public health response (e.g., an investigation or case management). After receiving the initial case report, a public health agency might need to follow-up with the reporter with a request for additional data items. Structured Data Capture (SDC) is a standard that can be used for providing electronic forms to request and capture such supplemental information. However, given the high volume of chlamydia and gonorrhea case reports, having an algorithm that identifies true cases and minimizes any subsequent requests to clinicians for additional case data for these conditions is highly desirable.

### **Future Efforts**

Next steps for this project include seeking opportunities to pilot test this technical guidance with public health agencies and clinical settings in their jurisdiction. Continued collaboration with national ECR initiatives will also continue. We anticipate this will include comparing pilot projects to examine differences in the sensitivity and specificity of ECR results and how those differences may be influenced by particular ECR implementation approaches described above. In addition, this effort will seek to harmonize with new HL7 standards for public health case reporting and in turn suggest improvements to those standards as indicated by pilot testing.

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## Appendix A: Case Detection

The purpose of this appendix is to describe rules for triggering an electronic case report of chlamydia or gonorrhea so that it may be subsequently populated and sent from an electronic health record system to a public health agency. The value sets presented correspond to the trigger decision logic and trigger rules described below.

This appendix is also available as an electronic spreadsheet at the Public Health Informatics Institute's web site ([phii.org](http://phii.org)). The electronic spreadsheet includes additional information that should facilitate implementation of this case detection logic.

Table 1 of this appendix is intended as orientation to the value sets included in this appendix. Each row represents a discrete logic set for case detection.

Definitions for terms used in Table 1 include the following:

**Condition:** the reportable condition for which the trigger decision logic applies.

**Rule:** If “True”, then an occurrence of any of these evaluating to true always triggers a case report to be generated and sent.

**Factors:** The number of factors (data elements) that must be examined together to evaluate the trigger rule.

**Trigger Category:** Holds a category of rule. These different categories are created to facilitate implementation as each category contains one-to-many code values that are all handled the same way in terms of rule logic. This categorization is intended to facilitate future expansion of this case detection logic to additional conditions or criteria.

D = Coded Diagnosis

R = Coded Laboratory Results (any laboratory test)

L = Coded Laboratory Tests

**Factor 1 Value Set:** A value set that represents the first of 1 or 2 factors used in the logic set. For the value sets described in this document, 2 factors are joined by a Boolean AND statement. The values for each value set are listed later in this appendix.

**Factor 2 Value Set:** A value set that represents the second of 2 factors used in the logic set. For the value sets described in this document, 2 factors are joined by a Boolean AND statement. The values for each value set are listed later in this appendix.

**Table 1. Logic Sets for Chlamydia Trachomatis and Gonorrhea Case Detection**

Condition	Rule	Factors	Trigger Category	Factor 1 Value Set	Factor 2 Value Set	Comment
Chlamydia Trachomatis (CT)	True	1	D = Coded Diagnosis	CT-1D	[none – not applicable]	Rule for diagnosis
Chlamydia Trachomatis (CT)	True	1	R = Coded Laboratory Results (any laboratory test)	CT-1R	[none – not applicable]	Rule for named result (i.e., CT identified) from any lab test
Chlamydia Trachomatis (CT)	True	2	L = Coded Laboratory Tests	CT-2L	CT-2R	Rule for presence vs. absence (lab test requiring result for two-factor evaluation)
Gonorrhea (GC)	True	1	D = Coded Diagnosis	GC-1D	[none – not applicable]	Rule for diagnosis
Gonorrhea (GC)	True	1	R = Coded Laboratory Results (any laboratory test)	GC-1R	[none – not applicable]	Rule for named result (i.e., GC identified) from any lab test
Gonorrhea (GC)	True	2	L = Coded Laboratory Tests	GC-2L	GC-2R	Rule for presence vs. absence (lab test requiring result for two-factor evaluation)

This convention results in the following value sets for chlamydia trachomatis and gonorrhea case detection (Table 2 below). The values included in each value set are listed later in this appendix.

**Table 2. Value Sets for Chlamydia Trachomatis and Gonorrhea Case Detection**

<b>Value Set</b>	<b>Description</b>
CT-1D	Chlamydia Trachomatis Single Factor Diagnosis/Disorder/Problem Trigger Codes
CT-1R	Chlamydia Trachomatis Single Factor Laboratory Result Trigger Codes (any lab test): organism type or subtype, or substance
CT-2L	Chlamydia Trachomatis Two Factor Laboratory Test Trigger Codes: Coded Tests Having Coded Results Presence
CT-2R	Chlamydia Trachomatis Two Factor Laboratory Result Trigger Codes: Coded Results Presence vs. Absence
GC-1D	Gonorrhea Single Factor Diagnosis/Disorder/Problem Trigger Codes
GC-1R	Gonorrhea Single Factor Laboratory Result Trigger Codes (any lab test): organism type or subtype or substance
GC-2L	Gonorrhea Two Factor Laboratory Test Trigger Codes: Coded Tests Having Coded Results Presence
GC-2R	Gonorrhea Two Factor Laboratory Result Trigger Codes: Coded Results Presence vs. Absence

**Table 3. Value Set CT-1D (see electronic version of this appendix for additional details)**

Code	Display Name	Code System
240589008	Chlamydia trachomatis infection (disorder)	SNOMED CT
426247003	Acute genitourinary Chlamydia trachomatis infection (disorder)	SNOMED CT
143511000119105	Perihepatitis due to Chlamydia trachomatis (disorder)	SNOMED CT
10750051000119105	Chlamydia trachomatis infection in mother complicating childbirth (disorder)	SNOMED CT
420910002	Chlamydia trachomatis infection of anus and rectum (disorder)	SNOMED CT
446642005	Infection of anus due to Chlamydia trachomatis (disorder)	SNOMED CT
447372001	Infection of rectum due to Chlamydia trachomatis (disorder)	SNOMED CT
428015005	Chlamydia trachomatis infection of genital structure (disorder)	SNOMED CT
447353001	Infection of cervix due to Chlamydia trachomatis (disorder)	SNOMED CT
446471004	Infection of epididymis due to Chlamydia trachomatis (disorder)	SNOMED CT
446902002	Infection of testis due to Chlamydia trachomatis (disorder)	SNOMED CT
447402003	Infection of vagina due to Chlamydia trachomatis (disorder)	SNOMED CT
446752000	Infection of peritoneum due to Chlamydia trachomatis (disorder)	SNOMED CT
198176005	Female chlamydial pelvic inflammatory disease (disorder)	SNOMED CT
446594000	Infection of pharynx due to Chlamydia trachomatis (disorder)	SNOMED CT
447386002	Infection of vulva due to Chlamydia trachomatis (disorder)	SNOMED CT
240591000	Neonatal chlamydial conjunctivitis (disorder)	SNOMED CT
179101003	Urethritis due to Chlamydia trachomatis (disorder)	SNOMED CT
112121000119105	Venereal disease due to Chlamydia trachomatis (disorder)	SNOMED CT

1621000119101	Chlamydia trachomatis infection in pregnancy (disorder)	SNOMED CT
56009001	Inclusion conjunctivitis of the adult (disorder)	SNOMED CT
367504009	Pelvic inflammatory disease with female sterility due to Chlamydia trachomatis (disorder)	SNOMED CT
A55	Chlamydial lymphogranuloma (venereum)	ICD10CM
A56.00	Chlamydial infection of lower genitourinary tract, unspecified	ICD10CM
A56.01	Chlamydial cystitis and urethritis	ICD10CM
A56.02	Chlamydial vulvovaginitis	ICD10CM
A56.09	Other chlamydial infection of lower genitourinary tract	ICD10CM
A56.11	Chlamydial female pelvic inflammatory disease	ICD10CM
A56.19	Other chlamydial genitourinary infection	ICD10CM
A56.2	Chlamydial infection of genitourinary tract, unspecified	ICD10CM
A56.3	Chlamydial infection of anus and rectum	ICD10CM
A56.4	Chlamydial infection of pharynx	ICD10CM
A56.8	Sexually transmitted chlamydial infection of other sites	ICD10CM
A71.0	Initial stage of trachoma	ICD10CM
A71.1	Active stage of trachoma	ICD10CM
A71.9	Trachoma, unspecified	ICD10CM
A74.0	Chlamydial conjunctivitis	ICD10CM
A74.81	Chlamydial peritonitis	ICD10CM
A74.89	Other chlamydial diseases	ICD10CM
A74.9	Chlamydial infection, unspecified	ICD10CM
P23.1	Congenital pneumonia due to Chlamydia	ICD10CM
J16.0	Chlamydial pneumonia	ICD10CM

**Table 4. Value Set CT-1R (see electronic version of this appendix for additional details)**

Code	Display Name	Code System
63938009	Chlamydia trachomatis (organism)	SNOMED CT
115289001	Chlamydia trachomatis, serotype A (organism)	SNOMED CT
115290005	Chlamydia trachomatis, serotype B (organism)	SNOMED CT
115291009	Chlamydia trachomatis, serotype Ba (organism)	SNOMED CT
115292002	Chlamydia trachomatis, serotype C (organism)	SNOMED CT
115293007	Chlamydia trachomatis, serotype D (organism)	SNOMED CT
115294001	Chlamydia trachomatis, serotype E (organism)	SNOMED CT
115295000	Chlamydia trachomatis, serotype F (organism)	SNOMED CT
115319008	Chlamydia trachomatis, serotype G (organism)	SNOMED CT
115328009	Chlamydia trachomatis, serotype H (organism)	SNOMED CT
115296004	Chlamydia trachomatis, serotype I (organism)	SNOMED CT
115297008	Chlamydia trachomatis, serotype J (organism)	SNOMED CT
442505006	Chlamydia trachomatis, serotype Ja (organism)	SNOMED CT
115298003	Chlamydia trachomatis, serotype K (organism)	SNOMED CT
115299006	Chlamydia trachomatis, serotype L (organism)	SNOMED CT
115300003	Chlamydia trachomatis, serotype L1 (organism)	SNOMED CT
115301004	Chlamydia trachomatis, serotype L2 (organism)	SNOMED CT
115318000	Chlamydia trachomatis, serotype L3 (organism)	SNOMED CT
121181000	Chlamydia trachomatis deoxyribonucleic acid (substance)	SNOMED CT
708219005	Deoxyribonucleic acid of Chlamydia trachomatis L2 (substance)	SNOMED CT
121106008	Chlamydia trachomatis ribosomal ribonucleic acid (substance)	SNOMED CT
121002007	Chlamydia trachomatis antigen (substance)	SNOMED CT
121015003	Chlamydia trachomatis F antigen (substance)	SNOMED CT
121016002	Chlamydia trachomatis G antigen (substance)	SNOMED CT
121017006	Chlamydia trachomatis K antigen (substance)	SNOMED CT

Note that other organism codes for different subspecies of chlamydia were explicitly excluded by request of the State SMEs on Expert Panel.

**Table 5. Value Set CT-2L (see electronic version of this appendix for additional details)**

Code	Display Name	Code System
14464-2	Chlamydia trachomatis [Presence] in Vaginal fluid by Organism specific culture	LOINC
14510-2	Chlamydia trachomatis Ag [Presence] in Vaginal fluid by Immunofluorescence	LOINC
14463-4	Chlamydia trachomatis [Presence] in Cervix by Organism specific culture	LOINC
14465-9	Chlamydia trachomatis [Presence] in Urethra by Organism specific culture	LOINC
14467-5	Chlamydia trachomatis [Presence] in Urine sediment by Organism specific culture	LOINC
45095-7	Chlamydia trachomatis [Presence] in Genital specimen by Organism specific culture	LOINC
6349-5	Chlamydia trachomatis [Presence] in Unspecified specimen by Organism specific culture	LOINC
14461-8	Chlamydia trachomatis [Presence] in Blood by Organism specific culture	LOINC
14462-6	Chlamydia trachomatis [Presence] in Cerebral spinal fluid by Organism specific culture	LOINC
45093-2	Chlamydia trachomatis [Presence] in Anal by Organism specific culture	LOINC
45094-0	Chlamydia trachomatis [Presence] in Conjunctival specimen by Organism specific culture	LOINC
45096-5	Chlamydia trachomatis [Presence] in Nasopharynx by Organism specific culture	LOINC
14509-4	Chlamydia trachomatis Ag [Presence] in Cervix by Immunofluorescence	LOINC
14511-0	Chlamydia trachomatis Ag [Presence] in Urethra by Immunofluorescence	LOINC
14513-6	Chlamydia trachomatis Ag [Presence] in Urine sediment by Immunofluorescence	LOINC
6352-9	Chlamydia trachomatis Ag [Presence] in Stool by Immunofluorescence	LOINC
6355-2	Chlamydia trachomatis Ag [Presence] in Unspecified specimen by Immunofluorescence	LOINC
6351-1	Chlamydia trachomatis Ag [Presence] in Conjunctival specimen by Immunofluorescence	LOINC
6355-2	Chlamydia trachomatis Ag [Presence] in Unspecified specimen by Immunofluorescence	LOINC

14470-9	Chlamydia trachomatis Ag [Presence] in Cervix by Immunoassay	LOINC
14471-7	Chlamydia trachomatis Ag [Presence] in Vaginal fluid by Immunoassay	LOINC
14472-5	Chlamydia trachomatis Ag [Presence] in Urethra by Immunoassay	LOINC
14474-1	Chlamydia trachomatis Ag [Presence] in Urine sediment by Immunoassay	LOINC
6354-5	Chlamydia trachomatis Ag [Presence] in Unspecified specimen by Immunoassay	LOINC
6350-3	Chlamydia trachomatis Ag [Presence] in Conjunctival specimen by Immunoassay	LOINC
45092-4	Chlamydia trachomatis Ag [Presence] in Nasopharynx by Immunoassay	LOINC
16600-9	Chlamydia trachomatis rRNA [Presence] in Genital specimen by DNA probe	LOINC
16601-7	Chlamydia trachomatis rRNA [Presence] in Urine by DNA probe	LOINC
21192-0	Chlamydia trachomatis rRNA [Presence] in Urethra by DNA probe	LOINC
23838-6	Chlamydia trachomatis rRNA [Presence] in Genital fluid by DNA probe	LOINC
45067-6	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Cervix by DNA probe	LOINC
45069-2	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Genital specimen by DNA probe	LOINC
45070-0	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Vaginal fluid by DNA probe	LOINC
45074-2	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Urine by DNA probe	LOINC
45075-9	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Urethra by DNA probe	LOINC
45076-7	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Unspecified specimen by DNA probe	LOINC
45078-3	Chlamydia trachomatis rRNA [Presence] in Cervix by DNA probe	LOINC
45080-9	Chlamydia trachomatis rRNA [Presence] in Vaginal fluid by DNA probe	LOINC
4993-2	Chlamydia trachomatis rRNA [Presence] in Unspecified specimen by DNA probe	LOINC
21188-8	Chlamydia trachomatis rRNA [Presence] in Conjunctival specimen by DNA probe	LOINC



45072-6	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Anal by DNA probe	LOINC
45085-8	Chlamydia trachomatis rRNA [Presence] in Nasopharynx by DNA probe	LOINC
45089-0	Chlamydia trachomatis rRNA [Presence] in Anal by DNA probe	LOINC
42931-6	Chlamydia trachomatis rRNA [Presence] in Urine by Probe and target amplification method	LOINC
43304-5	Chlamydia trachomatis rRNA [Presence] in Unspecified specimen by Probe and target amplification method	LOINC
47362-9	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Unspecified specimen from donor by Probe and target amplification method	LOINC
50387-0	Chlamydia trachomatis rRNA [Presence] in Cervix by Probe and target amplification method	LOINC
50411-8	Chlamydia trachomatis rRNA [Presence] in Unspecified specimen from donor by Probe and target amplification method	LOINC
53925-4	Chlamydia trachomatis rRNA [Presence] in Urethra by Probe and target amplification method	LOINC
53926-2	Chlamydia trachomatis rRNA [Presence] in Vaginal fluid by Probe and target amplification method	LOINC
57287-5	Chlamydia trachomatis rRNA [Presence] in Anal by Probe and target amplification method	LOINC
57288-3	Chlamydia trachomatis rRNA [Presence] in Nasopharynx by Probe and target amplification method	LOINC
21187-0	Chlamydia trachomatis DNA [Presence] in Conjunctival specimen by Probe and target amplification method	LOINC
21189-6	Chlamydia trachomatis DNA [Presence] in Cervical mucus by Probe and target amplification method	LOINC
21190-4	Chlamydia trachomatis DNA [Presence] in Cervix by Probe and target amplification method	LOINC
21191-2	Chlamydia trachomatis DNA [Presence] in Urethra by Probe and target amplification method	LOINC
21613-5	Chlamydia trachomatis DNA [Presence] in Unspecified specimen by Probe and target amplification method	LOINC
36902-5	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Unspecified specimen by Probe and target amplification method	LOINC
42931-6	Chlamydia trachomatis rRNA [Presence] in Urine by Probe and target amplification method	LOINC
43304-5	Chlamydia trachomatis rRNA [Presence] in Unspecified specimen by Probe and target amplification method	LOINC

44806-8	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Urine by Probe and target amplification method	LOINC
44807-6	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Genital specimen by Probe and target amplification method	LOINC
45068-4	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Cervix by Probe and target amplification method	LOINC
45084-1	Chlamydia trachomatis DNA [Presence] in Vaginal fluid by Probe and target amplification method	LOINC
45086-6	Chlamydia trachomatis DNA [Presence] in Nasopharynx by Probe and target amplification method	LOINC
45090-8	Chlamydia trachomatis DNA [Presence] in Anal by Probe and target amplification method	LOINC
47211-8	Chlamydia trachomatis L2 DNA [Presence] in Unspecified specimen by Probe and target amplification method	LOINC
47362-9	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Unspecified specimen from donor by Probe and target amplification method	LOINC
50311-0	Chlamydia trachomatis DNA [Presence] in Unspecified specimen from donor by Probe and target amplification method	LOINC
50387-0	Chlamydia trachomatis rRNA [Presence] in Cervix by Probe and target amplification method	LOINC
50411-8	Chlamydia trachomatis rRNA [Presence] in Unspecified specimen from donor by Probe and target amplification method	LOINC
51578-3	Chlamydia trachomatis DNA [Presence] in Semen by Probe and target amplification method	LOINC
53925-4	Chlamydia trachomatis rRNA [Presence] in Urethra by Probe and target amplification method	LOINC
53926-2	Chlamydia trachomatis rRNA [Presence] in Vaginal fluid by Probe and target amplification method	LOINC
57287-5	Chlamydia trachomatis rRNA [Presence] in Anal by Probe and target amplification method	LOINC
57288-3	Chlamydia trachomatis rRNA [Presence] in Nasopharynx by Probe and target amplification method	LOINC
6356-0	Chlamydia trachomatis DNA [Presence] in Genital specimen by Probe and target amplification method	LOINC

**Table 6. Value Set CT-2R (see electronic version of this appendix for additional details)**

Code	Display Name	Code System
373066001	Yes (qualifier value)	SNOMED CT
260348001	Present ++ out of ++++ (qualifier value)	SNOMED CT
43261007	Abnormal presence of (qualifier value)	SNOMED CT
441517005	Present two plus out of three plus (qualifier value)	SNOMED CT
52101004	Present (qualifier value)	SNOMED CT
260350009	Present ++++ out of ++++ (qualifier value)	SNOMED CT
260351008	Just noticeable (qualifier value)	SNOMED CT
260411009	Presence findings (qualifier value)	SNOMED CT
441614007	Present one plus out of three plus (qualifier value)	SNOMED CT
10828004	Positive (qualifier value)	SNOMED CT
260347006	Present + out of ++++ (qualifier value)	SNOMED CT
260408008	Weakly positive (qualifier value)	SNOMED CT
260349009	Present +++ out of ++++ (qualifier value)	SNOMED CT
260405006	Trace (qualifier value)	SNOMED CT
46651001	Isolated (qualifier value)	SNOMED CT
441521003	Present three plus out of three plus (qualifier value)	SNOMED CT
260373001	Detected (qualifier value)	SNOMED CT
260976002	Presence of infection (qualifier value)	SNOMED CT

**Table 7. Value Set GC-1D (see electronic version of this appendix for additional details)**

Code	Display Name	Code System
15628003	Gonorrhea (disorder)	SNOMED CT
235861001	Abscess gonococcal (disorder)	SNOMED CT
240573005	Gonococcal Bartholin's gland abscess (disorder)	SNOMED CT
236687008	Gonococcal urethral abscess (disorder)	SNOMED CT
444834005	Abscess of urethral gland due to Neisseria gonorrhoeae (disorder)	SNOMED CT
240578001	Gonococcal Littre gland abscess (disorder)	SNOMED CT
17305005	Acute gonorrhea of genitourinary tract (disorder)	SNOMED CT
30168008	Acute gonococcal epididymo-orchitis (disorder)	SNOMED CT
111806005	Acute gonococcal prostatitis (disorder)	SNOMED CT
65049003	Acute gonococcal seminal vesiculitis (disorder)	SNOMED CT
54825009	Acute gonorrhea of lower genitourinary tract (disorder)	SNOMED CT
80604007	Acute gonococcal Bartholinitis (disorder)	SNOMED CT
20943002	Acute gonococcal cervicitis (disorder)	SNOMED CT
24868007	Acute gonococcal cystitis (disorder)	SNOMED CT
29864006	Acute gonococcal urethritis (disorder)	SNOMED CT
2390000	Acute gonococcal vulvovaginitis (disorder)	SNOMED CT
50970007	Acute gonorrhea of upper genitourinary tract (disorder)	SNOMED CT
65295003	Acute gonococcal endometritis (disorder)	SNOMED CT
45377007	Acute gonococcal salpingitis (disorder)	SNOMED CT
27681008	Chronic gonorrhea (disorder)	SNOMED CT
28572009	Chronic gonorrhea of genitourinary tract (disorder)	SNOMED CT
35526001	Chronic gonococcal epididymo-orchitis (disorder)	SNOMED CT
60893000	Chronic gonococcal prostatitis (disorder)	SNOMED CT
23975003	Chronic gonococcal seminal vesiculitis (disorder)	SNOMED CT
186915005	Chronic gonorrhea lower genitourinary tract (disorder)	SNOMED CT
12373006	Chronic gonococcal Bartholinitis (disorder)	SNOMED CT
76802005	Chronic gonococcal cervicitis (disorder)	SNOMED CT
88813005	Chronic gonococcal cystitis (disorder)	SNOMED CT

44412000	Chronic gonococcal urethritis (disorder)	SNOMED CT
11906007	Chronic gonococcal vulvovaginitis (disorder)	SNOMED CT
80388004	Chronic gonorrhea of upper genitourinary tract (disorder)	SNOMED CT
31999004	Chronic gonococcal endometritis (disorder)	SNOMED CT
53529004	Chronic gonococcal salpingitis (disorder)	SNOMED CT
186931002	Gonococcal anal infection (disorder)	SNOMED CT
46699001	Gonococcal bursitis (disorder)	SNOMED CT
240584003	Gonococcal cellulitis (disorder)	SNOMED CT
240576002	Gonococcal Cowperitis (disorder)	SNOMED CT
197848003	Gonococcal cystitis (disorder)	SNOMED CT
236766009	Gonococcal epididymitis (disorder)	SNOMED CT
236772009	Gonococcal epididymo-orchitis (disorder)	SNOMED CT
240581006	Gonococcal female pelvic infection (disorder)	SNOMED CT
237083000	Gonococcal cervicitis (disorder)	SNOMED CT
237069002	Gonococcal endometritis (disorder)	SNOMED CT
240579009	Gonococcal paraurethral gland abscess (disorder)	SNOMED CT
237038001	Gonococcal salpingitis (disorder)	SNOMED CT
240574004	Gonococcal Skenitis (disorder)	SNOMED CT
237046000	Gonococcal tubo-ovarian abscess (disorder)	SNOMED CT
237095000	Gonococcal vulvovaginitis (disorder)	SNOMED CT
237096004	Neonatal gonococcal vulvovaginitis (disorder)	SNOMED CT
9241004	Gonococcal heart disease (disorder)	SNOMED CT
61048000	Gonococcal endocarditis (disorder)	SNOMED CT
235863003	Gonococcal hepatitis (disorder)	SNOMED CT
35876006	Gonococcal infection of eye (disorder)	SNOMED CT
231858009	Gonococcal conjunctivitis (disorder)	SNOMED CT
28438004	Gonococcal conjunctivitis neonatorum (disorder)	SNOMED CT
111807001	Gonococcal endophthalmitis (disorder)	SNOMED CT
342381000119109	Gonococcal iritis (disorder)	SNOMED CT
9091006	Gonococcal iridocyclitis (disorder)	SNOMED CT
40149008	Gonococcal keratitis (disorder)	SNOMED CT
44743006	Gonococcal infection of joint (disorder)	SNOMED CT

406581000	Gonococcal infection of the central nervous system (disorder)	SNOMED CT
151004	Gonococcal meningitis (disorder)	SNOMED CT
60335002	Gonococcal keratosis (disorder)	SNOMED CT
240577006	Gonococcal Littritis (disorder)	SNOMED CT
238419002	Gonococcal lymphangitis of penis (disorder)	SNOMED CT
90428001	Gonococcal pericarditis (disorder)	SNOMED CT
194910001	Acute gonococcal pericarditis (disorder)	SNOMED CT
237042003	Gonococcal perihepatitis (disorder)	SNOMED CT
186939000	Gonococcal peritonitis (disorder)	SNOMED CT
307423008	Gonococcal pelvic peritonitis (disorder)	SNOMED CT
1087061000119106	Gonococcal pneumonia (disorder)	SNOMED CT
197967000	Gonococcal prostatitis (disorder)	SNOMED CT
301990003	Gonococcal seminal vesiculitis (disorder)	SNOMED CT
53664003	Gonococcal spondylitis (disorder)	SNOMED CT
266138002	Gonococcal synovitis or tenosynovitis (disorder)	SNOMED CT
240582004	Gonococcal synovitis (disorder)	SNOMED CT
240039005	Gonococcal tenosynovitis (disorder)	SNOMED CT
240575003	Gonococcal Tysonitis (disorder)	SNOMED CT
236682002	Gonococcal urethritis (disorder)	SNOMED CT
5085001	Gonococcemia (disorder)	SNOMED CT
272006008	Gonococcal arthritis dermatitis syndrome (disorder)	SNOMED CT
74372003	Gonorrhea of pharynx (disorder)	SNOMED CT
42746002	Gonorrhea of rectum (disorder)	SNOMED CT
186932009	Gonococcal rectal infection (disorder)	SNOMED CT
240572000	Gonorrhea with local complication (disorder)	SNOMED CT
199161008	Maternal gonorrhea during pregnancy, childbirth and the puerperium (disorder)	SNOMED CT
35255008	Gonorrhea in mother complicating pregnancy, childbirth AND/OR puerperium (disorder)	SNOMED CT
10754031000119105	Gonorrhea in mother complicating childbirth (disorder)	SNOMED CT
199163006	Maternal gonorrhea during pregnancy - baby delivered (disorder)	SNOMED CT

199165004	Maternal gonorrhea during pregnancy - baby not yet delivered (disorder)	SNOMED CT
199164000	Maternal gonorrhea in the puerperium - baby delivered during current episode of care (disorder)	SNOMED CT
199166003	Maternal gonorrhea in the puerperium - baby delivered during previous episode of care (disorder)	SNOMED CT
240571007	Neonatal gonococcal infection (disorder)	SNOMED CT
A54.00	Gonococcal infection of lower genitourinary tract, unspecified	ICD10CM
A54.01	Gonococcal cystitis and urethritis, unspecified	ICD10CM
A54.02	Gonococcal vulvovaginitis, unspecified	ICD10CM
A54.03	Gonococcal cervicitis, unspecified	ICD10CM
A54.09	Other gonococcal infection of lower genitourinary tract	ICD10CM
A54.1	Gonococcal infection of lower genitourinary tract with periurethral and accessory gland abscess	ICD10CM
A54.21	Gonococcal infection of kidney and ureter	ICD10CM
A54.22	Gonococcal prostatitis	ICD10CM
A54.23	Gonococcal infection of other male genital organs	ICD10CM
A54.24	Gonococcal female pelvic inflammatory disease	ICD10CM
A54.29	Other gonococcal genitourinary infections	ICD10CM
A54.30	Gonococcal infection of eye, unspecified	ICD10CM
A54.31	Gonococcal conjunctivitis	ICD10CM
A54.32	Gonococcal iridocyclitis	ICD10CM
A54.33	Gonococcal keratitis	ICD10CM
A54.39	Other gonococcal eye infection	ICD10CM
A54.40	Gonococcal infection of musculoskeletal system, unspecified	ICD10CM
A54.41	Gonococcal spondylopathy	ICD10CM
A54.42	Gonococcal arthritis	ICD10CM
A54.43	Gonococcal osteomyelitis	ICD10CM
A54.49	Gonococcal infection of other musculoskeletal tissue	ICD10CM
A54.5	Gonococcal pharyngitis	ICD10CM

A54.6	Gonococcal infection of anus and rectum	ICD10CM
A54.81	Gonococcal meningitis	ICD10CM
A54.82	Gonococcal brain abscess	ICD10CM
A54.83	Gonococcal heart infection	ICD10CM
A54.84	Gonococcal pneumonia	ICD10CM
A54.85	Gonococcal peritonitis	ICD10CM
A54.86	Gonococcal sepsis	ICD10CM
A54.89	Other gonococcal infections	ICD10CM
A54.9	Gonococcal infection, unspecified	ICD10CM
O98.211	Gonorrhea complicating pregnancy, first trimester	ICD10CM
O98.212	Gonorrhea complicating pregnancy, second trimester	ICD10CM
O98.213	Gonorrhea complicating pregnancy, third trimester	ICD10CM
O98.219	Gonorrhea complicating pregnancy, unspecified trimester	ICD10CM
O98.22	Gonorrhea complicating childbirth	ICD10CM
O98.23	Gonorrhea complicating the puerperium	ICD10CM



**Table 8. Value Set GC-1R (see electronic version of this appendix for additional details)**

Code	Display Name	Code System
68704007	Neisseria gonorrhoeae (organism)	SNOMED CT
414809001	Neisseria gonorrhoeae, beta lactamase negative (organism)	SNOMED CT
83410001	Gram-negative diplococcus (organism)	SNOMED CT
277503000	Cephalosporin-resistant Neisseria gonorrhoeae (organism)	SNOMED CT
409805000	Fluoroquinolone-resistant Neisseria gonorrhoeae (organism)	SNOMED CT
277501003	Penicillinase-producing Neisseria gonorrhoeae (organism)	SNOMED CT
277504006	Spectinomycin-resistant Neisseria gonorrhoeae (organism)	SNOMED CT
277502005	Tetracycline-resistant Neisseria gonorrhoeae (organism)	SNOMED CT
703483000	Neisseria gonorrhoeae deoxyribonucleic acid (substance)	SNOMED CT
121172006	Neisseria gonorrhoeae ribosomal ribonucleic acid (substance)	SNOMED CT
120977006	Neisseria gonorrhoeae antigen (substance)	SNOMED CT

**Table 9. Value Set GC-2L (see electronic version of this appendix for additional details)**

Code	Display Name	Code System
688-2	Neisseria gonorrhoeae [Presence] in Cervix by Organism specific culture	LOINC
691-6	Neisseria gonorrhoeae [Presence] in Genital specimen by Organism specific culture	LOINC
14127-5	Neisseria gonorrhoeae [Presence] in Anal by Organism specific culture	LOINC
30099-6	Neisseria gonorrhoeae [Presence] in Conjunctival specimen by Organism specific culture	LOINC
690-8	Neisseria gonorrhoeae [Presence] in Endometrium by Organism specific culture	LOINC
692-4	Neisseria gonorrhoeae [Presence] in Genital lochia by Organism specific culture	LOINC
693-2	Neisseria gonorrhoeae [Presence] in Vaginal fluid by Organism specific culture	LOINC
694-0	Neisseria gonorrhoeae [Presence] in Semen by Organism specific culture	LOINC
695-7	Neisseria gonorrhoeae [Presence] in Synovial fluid by Organism	LOINC

	specific culture	
696-5	Neisseria gonorrhoeae [Presence] in Throat by Organism specific culture	LOINC
697-3	Neisseria gonorrhoeae [Presence] in Urethra by Organism specific culture	LOINC
698-1	Neisseria gonorrhoeae [Presence] in Unspecified specimen by Organism specific culture	LOINC
21414-8	Neisseria gonorrhoeae DNA [Presence] in Cervical mucus by Probe and target amplification method	LOINC
21415-5	Neisseria gonorrhoeae DNA [Presence] in Urethra by Probe and target amplification method	LOINC
21416-3	Neisseria gonorrhoeae DNA [Presence] in Urine by Probe and target amplification method	LOINC
24111-7	Neisseria gonorrhoeae DNA [Presence] in Unspecified specimen by Probe and target amplification method	LOINC
32198-4	Neisseria gonorrhoeae rRNA [Presence] in Cervix by DNA probe	LOINC
32199-2	Neisseria gonorrhoeae rRNA [Presence] in Urethra by DNA probe	LOINC
32705-6	Neisseria gonorrhoeae DNA [Presence] in Vaginal fluid by Probe and target amplification method	LOINC
33904-4	Neisseria gonorrhoeae rRNA [Presence] in Conjunctival specimen by DNA probe	LOINC
35735-0	Neisseria gonorrhoeae DNA [Presence] in Conjunctival specimen by Probe and target amplification method	LOINC
36902-5	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Unspecified specimen by Probe and target amplification method	LOINC
43305-2	Neisseria gonorrhoeae rRNA [Presence] in Unspecified specimen by Probe and target amplification method	LOINC
43403-5	Neisseria gonorrhoeae DNA [Presence] in Unspecified specimen by Probe and signal amplification method	LOINC
43406-8	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Unspecified specimen by Probe and signal amplification method	LOINC
44806-8	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Urine by Probe and target amplification method	LOINC
44807-6	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Genital specimen by Probe and target amplification method	LOINC
45067-6	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Cervix by DNA probe	LOINC
45068-4	Chlamydia trachomatis+Neisseria gonorrhoeae DNA [Presence] in Cervix by Probe and target amplification method	LOINC
45069-2	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Genital specimen by DNA probe	LOINC

45070-0	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Vaginal fluid by DNA probe	LOINC
45072-6	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Anal by DNA probe	LOINC
45073-4	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Tissue by DNA probe	LOINC
45074-2	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Urine by DNA probe	LOINC
45075-9	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Urethra by DNA probe	LOINC
45076-7	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Unspecified specimen by DNA probe	LOINC
47362-9	Chlamydia trachomatis+Neisseria gonorrhoeae rRNA [Presence] in Unspecified specimen from donor by Probe and target amplification method	LOINC
47387-6	Neisseria gonorrhoeae DNA [Presence] in Genital specimen by Probe and target amplification method	LOINC
5028-6	Neisseria gonorrhoeae rRNA [Presence] in Unspecified specimen by DNA probe	LOINC
50326-8	Neisseria gonorrhoeae DNA [Presence] in Unspecified specimen from donor by Probe and target amplification method	LOINC
50388-8	Neisseria gonorrhoeae rRNA [Presence] in Cervix by Probe and target amplification method	LOINC
50412-6	Neisseria gonorrhoeae rRNA [Presence] in Unspecified specimen from donor by Probe and target amplification method	LOINC

**Table 10. Value Set GC-2R (see electronic version of this appendix for additional details)**

Code	Display Name	Code System
373066001	Yes (qualifier value)	SNOMED CT
260348001	Present ++ out of ++++ (qualifier value)	SNOMED CT
43261007	Abnormal presence of (qualifier value)	SNOMED CT
441517005	Present two plus out of three plus (qualifier value)	SNOMED CT
52101004	Present (qualifier value)	SNOMED CT
260350009	Present ++++ out of ++++ (qualifier value)	SNOMED CT
260351008	Just noticeable (qualifier value)	SNOMED CT
260411009	Presence findings (qualifier value)	SNOMED CT
441614007	Present one plus out of three plus (qualifier value)	SNOMED CT
10828004	Positive (qualifier value)	SNOMED CT
260347006	Present + out of ++++ (qualifier value)	SNOMED CT
260408008	Weakly positive (qualifier value)	SNOMED CT
260349009	Present +++ out of ++++ (qualifier value)	SNOMED CT
260405006	Trace (qualifier value)	SNOMED CT
46651001	Isolated (qualifier value)	SNOMED CT
441521003	Present three plus out of three plus (qualifier value)	SNOMED CT
260373001	Detected (qualifier value)	SNOMED CT
260976002	Presence of infection (qualifier value)	SNOMED CT

## Appendix B. Case Report Contents

Case report elements with comments from expert panel discussion.

Provenance/Provider/Facility Data Elements			
No.	Element Name	Inclusion	Comments
1	Date of the Report	Required if available	
2	Report Submission Date/Time	Required	
3	Sending Application	Required	
4	Provider ID	*Required if available	*The group agreed that at least one Provider identifier/ contact variable must be required, but did not care which one. How and whether this caveat could be implemented needs further discussion.
5	Provider Name	*See Provider ID	
6	Provider Phone	*See Provider ID	
7	Provider Fax	*See Provider ID	
8	Provider Email	*See Provider ID	
9	Provider Facility/Office Name	*See Provider ID	
10	Provider Address	*See Provider ID	
11	Provider County	Optional	
12	Facility ID Number	Required if available	
13	Facility Name	Required if available	
14	Facility type	Optional	
15	Facility Phone	Required if available	
16	Facility Address	Required if available	
17	Facility Fax	Optional	
18	Hospital Unit	Required if available	Most state/locals did not expect to need this for STI. Some might want it for Hospital Acquired Infections.

Patient Data Elements			
No.	Element Name	Inclusion	Comments
19	Patient ID Number	Required if available	Would need metadata to determine what type of ID is being provided (SSN, MRN, etc).
20	Patient Name	Required	
21	Parent/Guardian Name	Needs more discussion	There are legal implications here. A “required” designation could trump a doctor’s legal responsibilities to protect patient privacy especially for emancipated minors. Could we redefine “if available” to mean the data is in the EHR and it is OK to include with respect to law, regulations, etc?
22	Parent/Guardian Phone	Patient:  Required if available	The Parent/Guardian variables should be separated as two discrete elements. No decision was made about the Guardian variables because of the emancipated minor issues mentioned above. Need to consider other communication modes, devices.
23	Parent/Guardian Email	Patient:  Required if available	Parent/Guardian: needs more discussion
24	Street Address	Required if available	
25	Birth Date	Required if available	
26	Patient Sex	Required if available	HL7 makes a distinction between “administrative” and “biological” sex, the latter requiring a blood test. The sex noted in the EHR is likely administrative as it is probably recorded based on observation by a clerical person. Harmonize with other HL7 practices for recording sex.
27	Patient Class	Required if available	
28	Race	Required if available	Need to determine which vocabulary, Centers for Disease Control and Prevention (CDC) (Public Health Information Network Vocabulary Access and Distribution System); White House Office of Management and Budget (OMB)/HL7; Office of the National Coordinator (ONC) Common Clinical Data Set (CCDS). Should be designed to roll up to the OMB standard because “unknown” is not in the OMB standard, but is in CDC’s designations.
29	Ethnicity	Required if available	See comment for race.
30	Preferred language	Required if available	See ONC CCDS, but also consider specifying spoken versus written language.
31	Occupation	Required if available	
32	Pregnant	Required if available	
33	Travel history	Optional	
34	Insurance type	Required if available	Changed from original element of <i>insurance</i> . Clarify Insurance type or status versus insurance carrier (first is priority).
35	Immunization history	Optional	Changed from original element <i>immunization status</i> . Using “immunization” corresponds to wording in the CCDS, which is prudent.

Clinical elements			
No.	Element name	Inclusion	Comments
36	Visit /Time	Required if available	The group agreed that this is an ambiguous variable. More relevant dates might be “specimen collection date” or “laboratory test date.”
37	Admission Date/Time	Required if available	
38	Date of Onset	Required if available	Data quality concerns. Patients often do not have symptoms of chlamydia or gonorrhea or cannot recall when symptoms started, or the discovery of the infection is a result of a routine screening.
39	Symptoms (list)	Required if available	The group was unsure how the data are recorded in the EHR, whether it is structured data with a value set and if public health would only receive symptoms associated with the event of interest. Also discussed were asymptomatic patients. Providers would prefer a dichotomous asymptomatic indicator (e.g., a checkbox).
40	Laboratory order code	Optional	Comorbidity information is desirable, especially if human immunodeficiency virus-infected. Might be more interested in laboratories performing tests rather than those ordered.
41	Placer order number	Required if available	
42	Diagnosis	Required if available	Changed from “diagnoses.” The group decided that if the patient had comorbid conditions, they would want one electronic case report per reportable condition. Concern was expressed about legal authority if public health receives all diagnoses or all related diagnoses (e.g., pelvic inflammatory disease).
43	Date of diagnosis	Required if available	
44	Medication provided	Required if available	Changed from “medication administered (list).” Want medication, dosage, and date. CCDS data element name is “medications” and references RXNorm (National Library of Medicine, <a href="https://www.nlm.nih.gov/research/umls/rxnorm/">https://www.nlm.nih.gov/research/umls/rxnorm/</a> ) as the standard.
45	Death date	Required if available	
46	Date discharged	Optional	
47	Laboratory results	Required if available	Added to original list; while the expert panel elected to make this a required element, the designation of required if available is consistent with the case detection logic and a scenario where the medical record has a diagnosis code but no record of laboratory results.
48	Trigger code that initiated electronic case report	Required	Added to original list. Given the high volume of chlamydia and gonorrhea case reports, having an algorithm that identifies true cases and minimizes any subsequent requests to clinicians for additional case data for these conditions is highly desirable.
49	Laboratory test(s) performed	Required if available	Added to original list; while the expert panel elected to make this a required element, the designation of required if available is consistent with the case detection logic and a scenario where the medical record has a diagnosis code but no record of laboratory tests performed.

Additional data elements considered:

Proposed data element	Comments
HIV status	Should be “positive” or “unknown.” Could this be collected as supplemental data after eICR, through Structured Data Capture? How would this be defined in terms of data available in the electronic health record? “Date of recent HIV test and result”?
Partner management	Include expedited partner therapy. This is problematic in terms of where or if this is documented in the electronic health record. Including it might convey standards of care to the provider. Could be provided as supplemental Structured Data Capture.
Preexposure prophylaxis (PrEP)	Could this be a proxy for HIV status?
Date laboratory results received	
Emancipated minor	
Specimen collection date	More specific than visit date
Asymptomatic checkbox, yes/no	Could this be captured as supplemental data with Structured Data Capture?