# CDC’s Division of STD Prevention

# Antibiotic-Resistant Gonorrhea Tabletop Exercise

## Facilitation Guide

**Exercise Date:**

We would like to thank the following people and organizations that contributed to the development of this document.

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## Preface

The Antibiotic-Resistant Gonorrhea (ARGC) Tabletop Exercise (TTX) is sponsored by the Centers for Disease Control and Prevention (CDC), National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP). This Situation Manual was produced with input, advice, and assistance from the CDC exercise planning team, following the guidance set forth in the Federal Emergency Management Agency (FEMA), Homeland Security Exercise and Evaluation Program (HSEEP).

Discussion-based exercises, such as this TTX, center on participant discussion. The purpose of a TTX is to test existing plans, policies, and procedures or develop new plans, policies, and procedures without incurring the costs associated with deploying resources. A TTX uses a hypothetical scenario to provide participating agencies the opportunity to practice group problem solving, familiarize senior officials with a situation, examine contingencies, assess interagency coordination and collaboration, etc. The exercise usually involves senior staff and key personnel in an informal group discussion.

The ARGC Situation Manual provides exercise participants with all the tools necessary for their roles in the exercise. It is tangible evidence of CDC’s commitment to ensure public health through collaborative partnerships that will prepare the CDC and state and local jurisdictions to respond to any emergency.

This TTX is an unclassified exercise. Control of information is based more on public sensitivity regarding the nature of the exercise than on actual exercise content. Some exercise material is intended for the exclusive use of exercise planners, facilitators, and evaluators, but players may view other materials deemed necessary to their performance. The Situation Manual may be viewed by all exercise participants.

All exercise participants should use appropriate guidelines to ensure the proper control of information within their areas of expertise and to protect this material in accordance with current jurisdictional directives. Public release of exercise materials to third parties is at the discretion of the CDC exercise planning team.

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## Purpose

To enhance local and state preparedness for an outbreak of Antibiotic-Resistant Gonorrhea (ARGC) in the United States.

## Scope

The tabletop exercise (TTX) will consist of one day-long emergency response to a local outbreak of antibiotic-resistant gonorrhea. During this exercise participants from local, state, and potentially federal agencies will discuss known gaps and continue the process of identifying other gaps and issues in respective jurisdictional outbreak response plans, and preparedness and response capabilities. The focus of the exercise is the response outbreak plans, priority of functions, processes, and procedures. Discussions will include identification and confirmation of completion of those activities prior to an outbreak, execution of those activities upon notification or when an outbreak occurs, and sustained response and recovery activities.

## Public Health Emergency Preparedness and Response Capabilities

* Community Preparedness
* Community Recovery
* Emergency Operations Coordination
* Emergency Public Information and Warning
* Fatality Management
* Information Sharing
* Mass Care
* Medical Countermeasure Dispensing and Administration
* Medical Materiel Management and Distribution
* Medical Surge
* Non-pharmaceutical Interventions
* Public Health Laboratory Testing
* Public Health Surveillance and Epidemiological Investigation
* Responder Safety and Health
* Volunteer Management

## Preparedness Objectives

* Prevent and/or mitigate threats to the public’s health
* Integrate public health, the healthcare system, and emergency management
* Promote resilient individuals and communities
* Advance surveillance, epidemiology, and laboratory science and service practices
* Increase the application of science to preparedness and response practice
* Strengthen public health preparedness and response infrastructure
* Enhance stewardship of public health preparedness funds
* Improve the ability of the public health workforce to respond to health threats

## ARGC TTX Objectives

* Improve participating state and local jurisdiction’s capacity to effectively respond to an outbreak of ARGC
* Exercise the locally developed Ceftriaxone-Resistant Gonorrhea Outbreak Response Plan
* Review the communications and collaboration processes and procedures—coordinate with and integrate local, state, and federal partners
* Identify outbreak response triggers, decisions, actions, and data requirements
* Document identified response steps and further ARGC outbreak response and preparedness needs

## Scenario

The exercise scenario is a local outbreak of Antibiotic-Resistant Gonorrhea (ARGC) in (*fill in location).* The outbreak is intended to encourage local and state agencies to review their preparedness to respond; enact response plans, procedures, and activities; and consult appropriate federal agencies. Also, the scenario provides the participants opportunities to identify capabilities and target levels of capabilities across mission areas. See Appendix A, ARGC TTX Scenario and Questions, for details and module questions.

## Participants

Participants include (*List participating agencies*) leadership, subject matter experts, and select staff that may be tasked as responders to response activities following an ARGC outbreak. See Appendix B, ARGC TTX Participants, for list of participants and members of the Exercise Control Group.

## Participant Roles and Responsibilities

The term “participant” encompasses many groups of people, not just those playing in the exercise. Groups of participants involved in the exercise, and their respective roles and responsibilities, are as follows:

* **Players**. Players are personnel who have an active role in discussing or performing their regular roles and responsibilities during the exercise. Players discuss or initiate actions in response to the simulated emergency.
* **Observers**. Observers do not directly participate in the exercise. However, they may support the development of player responses to the situation during the discussion by asking relevant questions or providing subject matter expertise.
* **Facilitators**. Facilitators provide situation updates, moderate discussions, and are critical for keeping participants on track toward meeting exercise objectives. They also provide additional information or resolve questions as required. Key Exercise Planning Team members also may assist with facilitation as subject matter experts (SMEs) during the exercise.
* **Evaluators**. Evaluators are assigned to observe and document certain objectives during the exercise. Their primary role is to document player discussions, including how and if those discussions conform to plans, policies, and procedures.

## Location

The exercise will be held in the (*include location of the exercise*).

## Structure and Sequence of Events

The ARGC TTX is a facilitated exercise. Players will participate in three modules to discuss topics and questions across the Mission Areas:

* Module 1: Preparedness – Mission Areas: Prevention/Protection/Mitigation
* Module 2: Response – Mission Area: Response
* Module 3: Recovery – Mission Area: Recovery

Facilitator will describe the scenario and summarize key events occurring within each mission area at the beginning of each session. Following the summary, participants will review the situation and engage in table discussions of provided topics and questions, and other appropriate issues.

### Sample agenda

|  |  |  |
| --- | --- | --- |
| Time | Activity | Who |
| 9:00-9:20 am | Welcome and Introductions | Facilitator |
| 9:20-9:25 am | Opening Comments | Lead Planners and Exercise Director |
| 9:25-9:30 am | Set the Stage/STARTEX | Exercise Director |
| 9:30-10:40 am | Module 1: Preparedness | Facilitator |
| 10:40-10:50 am | Break |  |
| 10:50 am-12:00 pm | Module 2: Response | Facilitator |
| 12:00-1:00 pm | Lunch | Host |
| 1:00-2:00 pm | Module 3: Recovery | Facilitator |
| 2:00-2:15 pm | Break |  |
| 2:15-2:50 pm | Hotwash and Feedback Form | Facilitator |
| 2:50-3:00 pm | Closing Comments | Lead Planners and Exercise Director |

## Mission Areas

### **Mission Areas 1-3:** Prevention/Protection/Mitigation

Prevention/Protection/Mitigation addresses the ability to plan, organize, train, and exercise personnel to perform their assigned missions to standard. Participants will discuss those activities that can be completed prior to an outbreak, which increase the capability of individuals and collective jurisdictions to quickly and effectively respond.

### **Mission Area 4:** Response

Response addresses the ability to direct, manage, and coordinate a response; manage resources; and provide emergency public information. Participants will discuss those activities upon notification or when an outbreak occurs, which decrease time to make meaningful response impact and improve efficiency and effective internal and external partnerships.

### **Mission Area 5:** Recovery

Recovery addresses capabilities necessary to sustain operations and assist communities affected by an incident to effectively recover and return to normal activities. Participants will discuss those activities that affect returning to normalcy, follow-up, and review of performance activities.

## Guidelines

This exercise is designed to be held in an open, low-stress, no-fault environment. Varying viewpoints, even disagreements, are expected.

Respond to the scenario using your knowledge of current plans and capabilities (i.e., you may only use existing assets).

Decisions are not precedent-setting and may not reflect your organization’s final position on a given issue. This exercise is an opportunity to discuss and present multiple options and possible solutions.

Issue identification is not as valuable as suggestions and recommended actions that could improve responder protection, information coordination, and response/recovery efforts. Problem-solving efforts should be the focus.

## Assumptions and Artificialities

As in any exercise, assumptions and artificialities may be necessary to complete play in the time allotted and/or account for logistical limitations. Exercise participants should accept that assumptions and artificialities are inherent in any exercise and should not allow these considerations to negatively impact their participation. During this exercise, the following apply:

* The exercise is conducted in a no-fault learning environment wherein capabilities, plans, systems, and processes will be evaluated.
* Understanding of applicable policies, plans, and procedures
* Incident city, state, and region will be the focus of response.
* The exercise scenario is plausible, and events occur as presented.
* The exercise is limited to the available participants.
* All players receive information at the same time.

## Evaluation

Evaluation of the exercise is based on the exercise objectives, aligned capabilities, capability targets, and critical tasks. The Exercise Facilitator will conduct a Hotwash, after Exercise Director announces end of exercise (ENDEX), with all participants to discuss perspective strengths, successful activities, and areas for improvement. Also, an Exercise Participant Feedback Form will be used for post-exercise feedback. The Lead Evaluator will prepare and distribute an ARGC TTX Summary Report.

## Appendix A: ARGC TTX Scenario

### Antibiotic-Resistant Gonorrhea Tabletop Exercise Scenario

MODULE 1: Preparedness

Scenario:

Over the previous two weeks, the [*insert state name*] State Health Department STD program director was contacted by clinicians from three different community clinics (Clinics A, B, and C) in [*insert location*]. Each clinician described seeing a patient diagnosed with gonorrhea (by nucleic acid amplification test [NAAT]) who returned to the clinic with persistent symptoms, despite having been treated with the CDC-recommended therapy [*insert currently recommended therapy*]. Patients 1 and 2 are cisgender men; Patient 3 is a cisgender woman.

Last week, a previously healthy 34-year-old cisgender man presented to the [insert clinic name] STD clinic and reported a three-day history of purulent urethral discharge and dysuria (painful urination) (Patient 4). He reported condomless insertive vaginal sex and received oral sex (fellatio) from two casual female sex partners during the prior week. The clinician collected a urethral swab for Gram stain, visualized Gram-negative diplococci by microscopy, and diagnosed the patient with gonorrhea. The patient was treated with the CDC-recommended therapy. Seven days later, the patient returned to the clinic. He described worsening urethral symptoms and denied any sexual encounters since his last visit. You are concerned that these patients might have experienced treatment failure due to antibiotic resistance.

Questions:

1. Based on your current ceftriaxone-resistant gonorrhea outbreak plan, would such a scenario trigger any communication between the state health department and the local health department? If not, should they?
2. Would these cases be classified as an outbreak?
3. Next steps
4. What actions would the state health department take, if any?
5. What actions would the local health department take, if any?
6. What guidance, if any, will be provided to these clinicians and to these patients with persistent symptoms?
7. If guidance is provided, who will provide the guidance?

FACILITATOR PROBES for Question 3:

* Are there state and/or local health department protocols for responding to potential gonorrhea treatment failure cases? What are these protocols? Would you follow those protocols in this scenario?
* What action(s), if any, would the state and local health departments take to determine whether these are reinfections or treatment failures due to antimicrobial resistance?
  + Will antimicrobial susceptibility testing be performed on specimens from these patients?
    - If so, how and where will specimen collection and laboratory testing occur?
    - What antibiotics would be included in the laboratory susceptibility testing?
  + Do culture collection materials need to be provided to the clinicians?
    - If so, how and by whom will they be provided?
    - Does transportation of specimens to the laboratory need to be arranged and coordinated?
    - If so, how and by whom?
* How would these patients be clinically managed?
  + Consider whether re-treatment, additional testing at other anatomic sites of exposure or for other infections, or follow-up testing will be performed.
  + Does the anatomic site of infection influence the management approach?
* Will STD disease intervention specialists (DIS) have a role in responding to these cases?
  + If so, what activities will they conduct?
  + What messaging will they provide to patients?
  + What, if any, additional information will they collect from and about these patients and their sex partners?

1. Is there a threshold for triggering a local or state incident command system (ICS) for an outbreak of antibiotic-resistant gonorrhea?
   1. If so, would the local and/or state ICS be triggered at this point?
   2. If so, what components of ICS would be activated at this time at the state level? At the local level?
2. What communication activities, if any, are undertaken? Consider whether to, when, and/or how to communicate with CDC, the local or state health department, local or state government officials, health departments of neighboring counties/states, the general public, local healthcare providers, and the media.
   1. Who will be responsible for leading and/or clearing (approving) messaging?
3. What, if any, other public health activities would this scenario trigger at the state level? At the local level?
   1. Would changes to surveillance be considered (such as implementing and monitoring of test of cure results for cases of gonorrhea, expanded specimen collection for culture and antimicrobial susceptibility testing, initiating molecular surveillance, etc.)?
   2. Would local or state clinical guidance change?

FACILITATOR PROBES for Questions 6:

* Would the health department guidance change for any of the following?
  + Gonorrhea diagnostic screening or testing practices (including testing at different anatomic sites)
  + Antibiotic susceptibility testing
  + Treatment recommendations
  + Recommendations for follow-up care (including tests of cure)
* If so, how would local healthcare providers be notified about these changes?

(Optional)

For an added level of difficulty, the exercise directors can choose to include this additional part of the scenario. If this is included, do not share this erratum with the exercise participants before the exercise, and only share with participants after groups have attempted to respond to questions 1-6 below. Once participants have reviewed the erratum, they can reflect on how this new information might further inform next steps.

This morning, two reporters (one from the [*insert name of news outlet*], and another from Reuters) and one area clinician contacted the health department in [*insert location from above*]. They asked about a recent case of “Super-gonorrhea” identified in [*insert location from above*] that they read about on Twitter. They asked multiple questions including: whether the case is untreatable, who is at risk, how concerned should the public be, who should be tested and where, and how the health department is responding. Apparently, a staff person from Clinic B tweeted that his clinic just saw a patient with untreatable “Super-gonorrhea.” The tweet went out right after the patient returned to the clinic to get a specimen collected for culture and antibiotic susceptibility testing.

**MODULE 2: Response**

3 weeks later

Clinicians at clinics A, B, and C, and the STD clinic collect specimens for culture and repeat gonorrhea NAAT testing from all four index cases (i.e., the 3 patients seen by clinicians at clinics A, B, and C and the 1 patient seen at the STD clinic) at all potentially exposed anatomic sites. Following specimen collection, all patients were re-treated.

Among three of the four patients, culture specimens display growth of *Neisseria gonorrhoeae* (meaning cultures are positive). The *N. gonorrhoeae* isolates undergo antibiotic susceptibility testing (Table 1). All four of the *N. gonorrhoeae* isolates demonstrate very concerning results: ceftriaxone minimum inhibitory concentration (MIC) of 1.0 µg/mL.

STD program leadership consults with CDC. CDC provides the following interpretation of the MIC results:

There is no clearly defined antibiotic resistance cutoff point for ceftriaxone, but treatment failures have been reported with ceftriaxone MICs ≥ 0.5 µg/mL and the Clinical and Laboratory Standards Institute (CLSI) defines ceftriaxone MICs ≥ 0.5 µg/mL as non-susceptible.

For **Patient 2**, the urethral NAAT test detects *N. gonorrhoeae* (is positive for gonorrhea). **Patient 2’s** urethral culture specimen does not grow (culture is negative). So antibiotic susceptibility testing is not done for this patient.

Table 1. Specimen test results of persons with gonorrhea at retreatment visit

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Patient No. | Gender | Anatomic site | NAAT result | Culture results | Antibiotic  Susceptibility Testing  (MIC [µg/mL])  Ceftriaxone |
| 1 | Cisgender male | Urethral | Positive | Positive | 1.0\* |
| 2 | Cisgender male | Urethral | Positive | Negative | -- |
| 3 | Cisgender female | Cervical | Positive | Positive | 1.0\* |
| 3 | Cisgender female | Pharyngeal | Positive | Positive | 1.0\* |
| 4 | Cisgender male | Urethral | Positive | Positive | 1.0\* |

\*Interpretation for ceftriaxone MIC=1 µg/mL: non-susceptible

Note: Gonorrhea culture is not 100% sensitive. In CDC’s Strengthening US Response to Resistant Gonorrhea (SURRG) project, urethral cultures were ~95% sensitive but endocervical and extragenital cultures were <60% sensitive when measured against positive NAAT results performed on specimens from the same anatomic site of the same patient on the same day.

The local health department asks all four patients to come to the local STD clinic for a test of cure (using NAAT and culture) after re-treatment. However, only **Patients 1-3** show up. **Patient 4** does not return for re-testing.

At follow-up, **Patient 2’s** testing show that he’s been cured (had negative NAAT and culture results).

However, **Patients 1 and 3** have not been cured (again test positive by both NAAT and culture at the test of cure visit). **Patients 1 and 3** remain infected despite having been treated twice. Both patients appear to have ceftriaxone-resistant infections.

Table 2. Initial test of cure results for persons with gonorrhea

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Patient | Sex | Anatomic site | NAAT result | Culture results |
| 1 | Male | Urethral | Positive | Positive |
| 2 | Male | Urethral | Negative | Negative |
| 3 | Female | Cervical | Negative | Negative |
| 3 | Female | Pharyngeal | Positive | Positive |
| 4 | Male | -- | -- | -- |

**Key Points:**

* Four patients (**Patients 1–4**) were not cured after initial treatment with CDC-recommended therapy.
* For the 3 patients for whom laboratory antibiotic susceptibility tests are available (**Patients 1, 3, and 4),** their infections are ceftriaxone-resistant. (**Patient 2’s** infection may also be resistant but antibiotic susceptibility results aren’t available to confirm this.)
* Based on testing done at the follow-up visits, **Patient 2** has been cured. **Patients 1 and 3** are still infected due to antibiotic-resistant infections.
* **Patient 4** did not return for follow-up testing. It’s unknown whether he was cured or remains infected.

At this point, the local health department consults with CDC about the clinical management of **Patients 1 and 3**. The local jurisdiction sends isolates from **Patients 1, 3, and 4** to CDC. As a reminder, **Patient 4** was lost to follow-up.

CDC performs additional antibiotic susceptibility testing and confirms that the isolates demonstrate reduced ceftriaxone susceptibility. The isolates also demonstrate resistance or reduced susceptibility to penicillin, gentamicin, ciprofloxacin, azithromycin, and tetracycline. CDC recommends treating both patients with persistent infections (**Patients 1** and **3**) with a higher dosage of ceftriaxone and performing another test of cure (with the timing as per CDC recommendations) after re-treatment. CDC also performs whole genome sequencing on the isolates to identify strain type and any known resistance markers.

**Patients** **1** and **3** are re-treated with the higher ceftriaxone dose.

At the follow-up visits after re-treatment, **Patient** **1** tests negative for gonorrhea by NAAT and culture.

However, **Patient** **3’s** pharyngeal specimen tests positive on both NAAT and culture. Thus, **Patient** **3** remains infected. **Patient 3** denies having had sex in the prior 3 weeks.

The health department again consults with CDC. Because of the challenges faced with treatment of this patient, CDC performs additional susceptibility testing. In light of the inability to cure the infection with ceftriaxone and the new susceptibility results, CDC provides guidance beyond what is in the STD Treatment Guidelines and suggests that the health department arrange for **Patient 3** to receive an intravenous (IV) antibiotic treatment and perform another test of cure after treatment (with timing as per CDC recommendations).

At the follow-up visit, **Patient 3** has a negative pharyngeal culture and NAAT and is considered cured.

Since the initial four cases were reported, six new patients with suspected treatment failures are reported to the local or state health department. Two of the patients are cisgender men who were seen at the local STD clinic and reported recent sex with other men, and recently tested HIV-negative.

Questions:

1. Given this current situation, are there changes to whether an ICS is established at the local or state level, or in which ICS components are stood up?
2. If so, who leads the response?
3. Given the confirmed local presence of ceftriaxone-resistant gonorrhea, what, if any, additional actions would the state and/or local health departments take?
4. What guidance will be provided to local healthcare providers regarding gonorrhea testing, treatment, and follow-up, and who will provide the guidance to healthcare providers?
5. Does the health department conduct efforts to increase local access to specimen collection for GC culture, AST, or molecular surveillance?
6. How are these efforts funded?

FACILITATOR PROBES for Question 5:

* Where can patients have specimens collected for culture?
* Especially if specimens collected for culture in settings other than an STD clinic, how will these activities be organized?
* Who will supply and distribute specimen collection materials and transport media (such as InTray or BBL swabs) to clinicians?
* How will specimens be transported to a laboratory that can perform culture and AST?
* If AST capacity exists at a local or state lab, does that lab have the capacity to increase testing if the outbreak continues to expand?
* Are sufficient supplies and staffing available for expanded testing? If not, what, if any, planning needs to happen now to begin preparing for expanding antibiotic susceptibility testing capacity?
* If there is no current local AST capacity, what other options would the health department consider to facilitate access to AST (e.g., developing capacity, establishing agreements with other laboratories, sending to CDC or a designated regional ARGC laboratory)?

1. How will you arrange intravenous antibiotic drug administration?
2. What role will DIS continue to play with this outbreak? Are any protocol modifications are needed for how DIS respond to these cases?

FACILITATOR PROBES for Question 7:

* Does the jurisdiction need to change any DIS scripts, tasks, data collection processes, and/or protocols to best respond to these cases?
* Will DIS be asked to change their current approach for field investigations?
* Consider what the DIS approach will be when clients or partners do not respond, do not provide locating information about partners, or do not follow-up for care and testing.
* Are the local or state policies to guide the approach?
* Are additional resources needed for DIS to work this outbreak or if the outbreak expands? Where would the additional resources come from?

1. Given the expanding outbreak and involvement of gay, bisexual, and men who have sex with men (MSM), what communication activities would be implemented or modified?
   1. Who leads the communication efforts and any clearing of messaging?

FACILITATOR PROBES for Question 8:

* Think about continued communication/revised messaging with CDC, local and state health department, local government, neighboring state health departments, the general public, local providers, and the media.
* Given that the outbreak has now been identified as involving MSM, what communication efforts would be useful when engaging community healthcare providers, businesses, community leaders, and media who serve the LGBTQ communities?
* Who should develop communication materials and/or clear all related outbreak messaging? How would these messages differ by audience? What draft messages are available already? What communications resources are needed?

1. Are there any other public health activities that would occur at the local and state level?

FACILITATOR PROBES for Question 9:

* Are there any changes to surveillance activities, such as increased gonorrhea screening, increased case monitoring (such as monitoring of test of cure results), expanded culture and susceptibility testing, initiation of molecular surveillance to look for genetic markers of resistance identified in the isolates of resistant cases?
* Would additional community engagement or clinician education/outreach be worthwhile or necessary?
* Who would be responsible for these activities?

**MODULE 3: Recovery**

3 months later

Over the ensuing eight weeks, 12 more treatment failures and/or ceftriaxone-resistant gonorrhea cases are identified (for a total of 22 cases). Some of these cases were identified after they experienced persistent symptoms despite having been treated with CDC recommended treatment. Others were identified through enhanced surveillance activities. All of the cases were cured with the treatment regimen that CDC advised for these resistant cases. All available isolates from these patients had ceftriaxone MICs of 1.0 µg/mL. Additionally, multiple partners were contacted, tested, and treated.

A month passes since the last patient with a resistant infection was identified and cured. No new cases of treatment failure and/or ceftriaxone-resistance have been identified.

Questions:

1. How will you determine when to scale back response activities and determine that the outbreak is over?
2. What management/operational changes will happen at that point?
3. What data would you like to be able to evaluate this response?
4. Would any recommendations for testing, treatment, or surveillance change?
5. Which, if any, new processes or recommendations will be continued?
6. Which, if any, processes or recommendations will revert to those that were in place prior to the outbreak?
7. What, if any, media messages would you distribute when the outbreak is over and to whom?
8. Based on your experience today, do you want to make any changes to your ceftriaxone-resistant gonorrhea outbreak response plans or preparedness activities? If so, whose responsibility will it be to update the plan or implement any other preparedness activities?

## Appendix B: ARGC TTX Participants

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Title | Agency/Office | Role |
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## Appendix C: Glossary

### Antibiotic

A medicine that kills or inhibits the growth of bacteria. In medical usage, antibiotics refer specifically to antibacterial medicines that are produced naturally by a microorganism (such as penicillin).

### Antibiotic-Resistant Gonorrhea (ARGC)

A general designation of a gonococcal infection that demonstrates resistance to at least one antimicrobial agent. While a useful term for communicating with the general public, the clinical and public health importance of the infection is better conveyed to providers and public health officials by labeling the infection with the specific antimicrobials to which the infection is resistant (such as ceftriaxone-resistant *Neisseria gonorrhoeae*; see below)

### Antimicrobial

A broad category of medicines that kill or inhibit the growth of microorganisms, and includes antibacterials, antivirals, and antifungals. Antimicrobials can be produced naturally by a microorganism (referred to as antibiotics) or can be synthetically produced. “Antimicrobial” is more precise than “antibiotic” when describing cefixime, ceftriaxone, and azithromycin; however, “antimicrobial” and “antibiotic” are often used interchangeably.

### Antibiotic Susceptibility Testing (AST)

Laboratory testing of live bacteria (isolates) that involves exposing the bacteria to a series of concentrations of antimicrobials. AST is used to determine which antibiotics and at which antibiotic concentration keep a particular gonococcal infection from growing on an agar plate. Types of *N. gonorrhoeae* AST include disc diffusion, gradient strip testing such as Etest™, and agar dilution. Bacteria are considered to be susceptible to an antimicrobial agent if the bacteria do not grow in the presence of antibiotic. If bacteria grow in the presence of antibiotic, the bacteria may have reduced susceptibility to the antimicrobial agent.

### 

### ARLN

The Antimicrobial Regional Laboratory Network is a network of regional public health laboratories equipped to respond to emerging health threats and provide cutting-edge antimicrobial resistance laboratory support. The ARLN has capacity for culture-based antimicrobial susceptibility testing and genomic sequencing.

### Azithromycin

A widely-used and broad-spectrum macrolide antimicrobial that is recommended for treatment of chlamydia and that was previously recommended to be administered with ceftriaxone for treatment of gonorrhea. Common brands names include Zithromax, AzaSite, and Zmax, and is often prescribed for other infectious conditions as a multiday Zpack.

### CDC

The Centers for Disease Control and Prevention, a federal agency in the Department of Health and Human Services, provide management and financial support for the SURRG program, lead national surveillance of gonococcal resistance, and publish national treatment guidelines for STDs, including gonorrhea.

### Cefixime

An oral cephalosporin antimicrobial that was listed as an alternative treatment for gonorrhea in CDC’s Sexually Transmitted Diseases Treatment Guidelines, 2015. Until 2012, cefixime was a recommended treatment for gonorrhea. A common brand name of cefixime is Suprax.

### Ceftriaxone

An injectable cephalosporin antimicrobial that can be delivered intramuscularly or intravenously. Ceftriaxone is the recommended treatment for gonorrhea. A common brand name is Rocephin.

### Ceftriaxone-Resistant *Neisseria gonorrhoeae*

Although widely-agreed upon criteria for ceftriaxone resistance are lacking, preliminary/working criteria include a gonococcal infection that demonstrates laboratory-based antimicrobial resistance (as evidenced by substantially elevated minimum inhibitory concentrations by AST, such as MICs ≥1.0 µg/ml) and which may have been unsuccessfully treated with recommended ceftriaxone-based therapy.

### Cephalosporin

A large group of broad-spectrum antimicrobials that function by inhibition of bacterial cell wall synthesis. The cephalosporin class includes third-generation cephalosporins ceftriaxone and cefixime.

### Culture

A laboratory method of growing bacteria by letting them reproduce in culture medium under controlled laboratory conditions. Bacterial cultures are used to determine the type of organism, the abundance of organisms in the sample, and the viability of the organism (can help distinguish an active gonococcal infection from residual DNA [detected by NAAT] from a successfully treated infection). *N. gonorrhea* culture provides a specimen for antibiotic susceptibility testing (AST).

### Disease Intervention Specialists (DIS)

A backbone of public health in the United States, DIS confirm treatment, conduct patient interviews, provide patient counseling, conduct partner services (locate sexual partners to cases and link them to testing and treatment), and provide a growing number of other critical public health services, such as linkage to HIV care.

### eGISP

The Enhanced Gonococcal Isolate Surveillance Project strengthens surveillance of resistant gonorrhea and increases state and local capacity to detect and monitor it. In select STD clinics, eGISP collects samples from men with gonococcal urethritis as well as from women and extragenital sites. These specimens are sent to regional laboratories for susceptibility testing.

### Eswab

A collection and transport system that maintains viability of bacteria at room and refrigerator temperature for up to 48 hours prior.

### 

### Etest

Epsilometer test (Etest™) is an ‘exponential gradient’ method of determining of antimicrobial susceptibility. Etest™ consists of a predefined gradient of antibiotic concentrations on a plastic strip and is used to determine the minimum inhibitory concentration (MIC) of antibiotics.

### GISP

The Gonococcal Isolate Surveillance Project monitors U.S. antibiotic resistance trends in gonorrhea. Through the collaborative effort of selected STD clinics and their local laboratories, regional laboratories, and CDC, GISP data helps ensure gonorrhea receives the right antibiotic treatment. GISP monitors antimicrobial susceptibility of approximately 5,000 male gonococcal urethritis cases seen in ~26 STD clinics.

### Health Alert Network (HAN)

CDC’s Health Alert Network (HAN) is CDC’s primary method of sharing cleared information about urgent public health incidents with public information officers; federal, state, territorial, tribal, and local public health practitioners; clinicians; and public health laboratories.

### Incident Command Structure (ICS)

An incident management structure is a predetermined organizational structure used to manage the planning, operational, logistical, financial, and administrative components of an outbreak event. The ICS is an essential tool for command, control, and coordination of resources during an outbreak.

### Multidrug Resistance/Extensively Drug Resistance

Multidrug resistance is antimicrobial resistance shown by a species of microorganism, such as bacteria, to multiple antimicrobial drugs. Extensively drug-resistance (XDR) is a rare type of multidrug-resistance in which bacteria are resistant to first- and second-line treatment options.

### Minimum inhibitory concentrations (MICs)

The lowest antibiotic concentration that inhibits visible growth of bacteria in the laboratory. AST by Etest™ and agar dilution generate results in MICs.

### Nucleic Acid Amplification Testing (NAAT)

Nucleic acid amplification testing is a laboratory technique that can detect very small amounts of DNA or RNA in test samples. NAATs test this DNA or RNA to identify specific bacteria, such as *N. gonorrhoeae* and *C. trachomatis*.

### SURRG

Strengthening the U.S. Response to Resistant Gonorrhea began in 2016 with three goals: 1) enhance domestic antibiotic-resistant gonorrhea surveillance and infrastructure; 2) build capacity for rapid detection and response to resistant gonorrhea through increased culturing and local antibiotic susceptibility testing; and 3) conduct rapid field investigations to stop the spread of resistant infections. The project also aims to gain a better understanding of the epidemiological factors contributing to resistant gonorrhea. As of 2020, eight jurisdictions collected specimens, performed local antibiotic susceptibility testing, and analyzed data as part of SURRG, helping guide national recommendations for the public health response to resistant gonorrhea.

### Test-of-Cure (TOC)

Repeat testing for gonorrhea, either by nucleic acid amplification testing (NAAT) or culture performed within two weeks of diagnosis and treatment, to ensure that an infection was cured. TOC can identify treatment failures in asymptomatic patients.

### Treatment failure

Unsuccessful treatment of gonorrhea despite administration of CDC-recommended treatment with ceftriaxone. Treatment failure may be evident clinically through persistence of symptoms despite treatment, or may be evident through retesting of patients with asymptomatic gonococcal infections.

## Appendix D: List of References

* *Insert State and Local Ceftriaxone-Resistant Gonorrhea Outbreak Response Plan Guides*
* Antibiotic-Resistance Gonorrhea Page, Centers for Disease Control and Prevention https://www.cdc.gov/std/gonorrhea/arg/default.htm
* Antibiotic-Resistant Gonorrhea Basic Information, Centers for Disease Control and Prevention  
  <https://www.cdc.gov/std/gonorrhea/arg/basic.htm>
  + Antibiotic-Resistant Gonorrhea Laboratory Information, Centers for Disease Control and Prevention  
    <https://www.cdc.gov/std/gonorrhea/arg/lab.htm>
  + Combating the Threat of Antibiotic-Resistance Gonorrhea <https://www.cdc.gov/std/gonorrhea/arg/carb.htm>
* Antibiotic-Resistant Gonorrhea Webinar to Prepare for Tabletop Exercise, Centers for Disease Control and Prevention  
  <https://www.cdc.gov/std/program/outbreakresources/documents/ARGC-TTX-Webinar_2021.pptx>
* Ceftriaxone-Resistant Gonorrhea Outbreak Response Plan Guide, Centers for Disease Control and Prevention <https://www.cdc.gov/std/program/outbreakresources/documents/ceftriaxone-resistant-gc-outbreak-response-plan-guidance.docx>
* Expedited Partner Therapy, Centers for Disease Control and Prevention <https://www.cdc.gov/std/ept/default.htm>
* Gonorrhea CDC Fact Sheet (Basic), Centers for Disease Control and Prevention <https://www.cdc.gov/std/gonorrhea/stdfact-gonorrhea.htm>
* Gonorrhea CDC Fact Sheet (Detailed), Centers for Disease Control and Prevention <https://www.cdc.gov/std/gonorrhea/stdfact-gonorrhea-detailed.htm>
* Gonorrhea with Reduced Susceptibility Health Alert Template, Centers for Disease Control and Prevention   
  <https://www.cdc.gov/std/program/outbreakresources/HANtemplate-gono.htm>
* National Network of STD Clinical Prevention Training Centers (NNPTC) STD Clinical Consultation Network  
  <https://www.stdccn.org>
* National Sexually Transmitted Disease Curriculum, University of Washington STD Prevention Training Center and the University of Washington  
  <https://www.std.uw.edu/>
* Sexually Transmitted Diseases Prevention Resources, Centers for Disease Control and Prevention  
  <https://www.cdc.gov/std/publications/STDPreventionResources_WEB.pdf>
* Sexually Transmitted Disease (STD) Treatment Guidelines 2015, Centers for Disease Control and Prevention  
  <https://www.cdc.gov/std/tg2015/gonorrhea.htm>
  + The 2015 STD Treatment (Tx) Guide mobile app is free and available for [Apple devices](https://itunes.apple.com/us/app/std-tx-guide/id655206856?mt=8) and [Android devices](https://play.google.com/store/apps/details?id=gov.cdc.stdtxguide&hl=en)
* Talking Points for Gonorrhea with Reduced Susceptibility, Centers for Disease Control and Prevention   
  <https://www.cdc.gov/std/program/outbreakresources/default.htm>

## Appendix E: Acronyms

|  |  |
| --- | --- |
| AIDS | Acquired Immune Deficiency Syndrome |
| ARGC | Antibiotic-Resistant Gonorrhea |
| ARLN | Antimicrobial Regional Laboratory Network |
| ASD | Adult Services Division |
| AST | Antimicrobial Susceptibility Testing |
| CDC | Centers for Disease Control and Prevention |
| CDIP | Communicable Disease & Immunization Program |
| Ceph-R NG | Cephalosporin-Resistant *Neisseria gonorrhoeae* |
| CLSI | Clinical and Laboratory Standards Institute |
| CPR | Center for Preparedness and Response |
| CUPHD | Champaign-Urbana Public Health District |
| DDID | Deputy Director for Infectious Diseases |
| DDPHSIS | Deputy Director for Public Health Service and Implementation Science |
| DEO | Division of Emergency Operations |
| DEP | Division of Emergency Preparedness |
| DERC | Division of Epidemiology Resources Center |
| DHSVH | Division of HIV, STD, and Viral Hepatitis |
| DIR | Director |
| DIS | Disease Intervention Specialist |
| DMI | Department of Microbiology and Immunology |
| DNA | Deoxyribonucleic Acid |
| DSTDP | Division of Sexually Transmitted Disease Prevention |
| eGISP | Enhanced Gonococcal Isolate Surveillance Project |
| ENDEX | End of Exercise |
| EP | Emergency Preparedness |
| EPI | Epidemiologist |
| EPT | Expedited Partner Therapy |
| ESB | Epidemiology and Statistics Branch |
| Etest | Epsilometer test |
| FEMA | Federal Emergency Management Agency |
| GA | Georgia |
| GC | Gonorrhea |
| GISP | Gonococcal Isolate Surveillance Project |
| HAN | Health Alert Network |
| HIV | Human Immunodeficiency Virus |
| HSEEP | Homeland Security Exercise and Evaluation Program |
| ICS | Incident Command Structure |
| IM | Intramuscular |
| IDPH | Illinois Department of Public Health |
| IL | Illinois |
| IV | Intravenous |
| LRRB | Laboratory Reference and Research Branch |
| MIC | Minimum Inhibitory Concentration |
| MMWR | Morbidity and Mortality Weekly Report |
| MSM | Men who have Sex with Men |
| N | *Neisseria* |
| NAAT | Nucleic Acid Amplification Test |
| NCHHSTP | National Center for HIV/Aids, Viral Hepatitis, STD, and TB Prevention |
| NG | *Neisseria Gonorrhoeae* |
| NNPTC | National Network of STD Clinical Prevention Training Centers |
| OPRHP | Offices of Preparedness and Response and Health Protection |
| POC | Point of Contact |
| PPNG | Penicillinase-Producing *Neisseria gonorrhoeae* |
| PrEP | Pre-exposure Prophylaxis |
| PTEE | Plans, Training, Exercises, and Evaluation Branch |
| QRNG | Fluoroquinolone-Resistant *Neisseria gonorrhoeae* |
| RNA | Ribonucleic Acid |
| SME | Subject Matter Expert |
| STARTEX | Start of Exercise |
| STD | Sexually Transmitted Disease |
| STDPP | STD Prevention Program |
| STI | Sexually Transmitted Infection |
| SURRG | Strengthening the U.S. Response to Resistant Gonorrhea |
| TB | Tuberculosis |
| T&E | Training and Exercises |
| TOC | Test of Cure |
| TTX | Tabletop Exercise |
| XDR | Extreme Drug Resistant |