Acknowledgments

Publication of this report would not have been possible without the contributions of participating state and local health departments, sexually transmitted disease clinics, public health laboratories, and regional laboratories.

This report was prepared by:

Robert Kirkcaldy and Alesia Harvey, Surveillance and Data Management Branch of the Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention.

Copyright Information

All material contained in this report is in the public domain and may be used and reprinted without special permission; however, citation as to source is appreciated.

Suggested Citation


Web Site

The online version of this report is available at https://www.cdc.gov/std/gisp.
Gonococcal Isolate Surveillance Project (GISP) Supplement and Profiles, 2014

Introduction

Although gonorrhea is an ancient disease that has affected humans for centuries and effective therapy has been available since the early twentieth century, this sexually transmitted disease (STD) remains prevalent: gonorrhea is the second most commonly reported notifiable disease in the United States and 350,062 cases were reported in 2014. As with other STDs, the reporting of gonorrhea is incomplete and the Centers for Disease Control and Prevention (CDC) estimates that approximately 820,000 cases of gonorrhea occur yearly in the United States. Infections due to Neisseria gonorrhoeae are a major cause of pelvic inflammatory disease (PID) in the United States. PID can lead to serious reproductive outcomes in women, such as tubal infertility, ectopic pregnancy, and chronic pelvic pain.

The cornerstone of public health gonorrhea control is detection and treatment of gonorrhea, so as to prevent sequelae and limit disease transmission. For decades, gonorrhea has been easily treated with a single dose of a single antimicrobial agent. However, N. gonorrhoeae has progressively developed resistance to each antimicrobial used for treatment of gonorrhea. In the last decade, development of fluoroquinolone resistance resulted in the availability of only a single class of antimicrobials that met CDC’s efficacy standards – the cephalosporins. Recently, declining susceptibility to cefixime resulted in a change to the CDC treatment guidelines, so that dual therapy with ceftriaxone and azithromycin is the only CDC-recommended treatment regimen for uncomplicated gonorrhea. Continued surveillance of N. gonorrhoeae antimicrobial susceptibility is critical.

Gonococcal Isolate Surveillance Project (GISP) Overview

The Gonococcal Isolate Surveillance Project (GISP) was established in 1986 to monitor trends in antimicrobial susceptibilities of N. gonorrhoeae strains in the United States to establish an evidence-based rationale for selection of gonococcal therapies. GISP is a sentinel surveillance system and collaboration between participating STD clinics and their state or local public health authorities, GISP regional laboratories, and CDC.

N. gonorrhoeae isolates are collected monthly from up to the first 25 men with gonococcal urethritis attending participating STD clinics. Clinical and demographic data are abstracted from medical records. Isolates are shipped from participating clinics to the GISP regional laboratories for agar dilution antimicrobial susceptibility testing. Isolates are tested to determine minimum inhibitory concentrations (MICs) of penicillin, tetracycline, spectinomycin, ceftriaxone, cefixime, ciprofloxacin, and azithromycin. Cefixime susceptibility testing was discontinued in 2007 and re-started in 2009. Cefpodoxime susceptibility testing was conducted during 2009–2012.

information on GISP and links to recent publications can be found on the GISP website: http://www.cdc.gov/std/gisp/.

2014 GISP Sites and Regional Laboratories


Antimicrobial susceptibility testing was conducted by Emory University (Atlanta, Georgia), Johns Hopkins University (Baltimore, Maryland), Texas Department of State Health Services (Austin, Texas), University of Alabama at Birmingham (Birmingham, Alabama), and University of Washington (Seattle, Washington).

Site Profiles

The Site Profiles consist of figures depicting the demographic and clinical data of the men who submitted specimens for GISP and the antimicrobial susceptibility results of the N. gonorrhoeae isolates submitted. Each figure is labeled with the participating site and the number of isolates on which the site’s data are based. The maximum number of isolates submitted by each site annually is 300. The number of isolates submitted is lower for some sites located in areas with low gonorrhea morbidity.

Definitions of terms and abbreviations used in the site-specific figures

**Figure A:** Cases with unknown age were excluded.

**Figure B:** Cases with unknown race were excluded. The “Other” category includes participants who selected more than one race category. The “Other” category is not used in national gonorrhea reporting.

**Figure C:** Men who self-identified as gay or bisexual or reported recent male sex partners were categorized as men who have sex with men

**Figure D:** Other=other less frequently used drugs, including azithromycin

**Figure E:** Azi/Ery=azithromycin/erythromycin; Doxy/Tet=doxycycline/tetracycline
**Figure F:** PenR= penicillinase-producing *N. gonorrhoeae* and chromosomally mediated penicillin-resistant *N. gonorrhoeae*; TetR=chromosomally and plasmid-mediated tetracycline-resistant *N. gonorrhoeae*; QRNG=ciprofloxacin-resistant *N. gonorrhoeae*

**GISP Antimicrobial Susceptibility Criteria**

Antimicrobial susceptibility criteria used in GISP in 2014 are as follows:

- Ceftriaxone, minimum inhibitory concentration (MIC) ≥0.5 µg/ml (decreased susceptibility)*
- Ceftriaxone, MIC ≥0.125 µg/ml (elevated MIC)*
- Cefixime, MIC ≥0.5 µg/ml (decreased susceptibility)*
- Cefixime, MIC ≥0.25 µg/ml (elevated MIC)*
- Azithromycin, MIC ≥2.0 µg/ml (elevated MIC)*
- Spectinomycin, MIC ≥128.0 µg/ml (resistance)
- Ciprofloxacin, MIC 0.125–0.5 µg/ml (intermediate resistance)
- Ciprofloxacin, MIC ≥1.0 µg/ml (resistance)
- Penicillin, MIC ≥2.0 µg/ml (resistance)
- Tetracycline, MIC ≥2.0 µg/ml (resistance)

The majority of these criteria are also recommended by the Clinical and Laboratory Standards Institute (CLSI).

* Resistance to cefixime and ceftriaxone, and resistance and susceptibility to azithromycin are not defined by CLSI

**Additional resources**

Additional information on GISP, as well as useful resources and links, can be found on the CDC Division of STD Prevention (DSTD) Antimicrobial Resistant Gonorrhea website: [https://www.cdc.gov/std/Gonorrhea/arg/default.htm](https://www.cdc.gov/std/Gonorrhea/arg/default.htm)

Other United States surveillance data on *N. gonorrhoeae* and other STDs and additional data from GISP may be found on the CDC DSTD Surveillance and Statistics website: [https://www.cdc.gov/std/stats/](https://www.cdc.gov/std/stats/)


**References**


Figure 1. Distribution of Cefixime Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2010-2014
Figure 2. Distribution of Ceftriaxone Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2010-2014

MICs (µg/ml) vs Percentage
Figure 3. Distribution of Azithromycin Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2010-2014

Percentage

MICs (µg/ml)

- <=0.03
- 0.06
- 0.125
- 0.25
- 0.5
- 1.0
- 2.0
- >=4.0

Year:
- 2010
- 2011
- 2012
- 2013
- 2014
Figure 4. Percentage of *Neisseria gonorrhoeae* Isolates that are Ciprofloxacin-Resistant by Reported Sex of Sex Partner, Gonococcal Isolate Surveillance Project, 1995-2014

*MSM*=men who have sex with men; *MSW*=men who have sex with women only.
Table 1. Distribution of Cefixime Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project, 2010–2014

<table>
<thead>
<tr>
<th>Year</th>
<th>≤0.015 n (%)</th>
<th>0.030 n (%)</th>
<th>0.060 n (%)</th>
<th>0.125 n (%)</th>
<th>0.250 n (%)</th>
<th>0.500 n (%)</th>
<th>1.000 n (%)</th>
<th>Total n</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>4113 (72.3)</td>
<td>1102 (19.4)</td>
<td>313 (5.5)</td>
<td>88 (1.6)</td>
<td>68 (1.2)</td>
<td>9 (0.2)</td>
<td>0 (0.0)</td>
<td>5693</td>
</tr>
<tr>
<td>2011</td>
<td>3930 (71.9)</td>
<td>1054 (19.3)</td>
<td>319 (5.8)</td>
<td>90 (1.7)</td>
<td>71 (1.3)</td>
<td>3 (0.1)</td>
<td>0 (0.0)</td>
<td>5467</td>
</tr>
<tr>
<td>2012</td>
<td>3951 (71.9)</td>
<td>1083 (19.7)</td>
<td>298 (5.4)</td>
<td>111 (2.0)</td>
<td>49 (0.9)</td>
<td>2 (0.0)</td>
<td>1 (0.0)</td>
<td>5495</td>
</tr>
<tr>
<td>2013</td>
<td>4165 (70.1)</td>
<td>1250 (21.0)</td>
<td>402 (6.8)</td>
<td>103 (1.7)</td>
<td>25 (0.4)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>5945</td>
</tr>
<tr>
<td>2014</td>
<td>3132 (61.5)</td>
<td>1282 (25.2)</td>
<td>482 (9.5)</td>
<td>159 (3.1)</td>
<td>36 (0.7)</td>
<td>2 (0.0)</td>
<td>0 (0.0)</td>
<td>5093</td>
</tr>
</tbody>
</table>

Note: Percentages represent row percentages.
Table 2. Distribution of Ceftriaxone Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project, 2010–2014

<table>
<thead>
<tr>
<th>Year</th>
<th>≤0.008 n (%)</th>
<th>0.015 n (%)</th>
<th>0.030 n (%)</th>
<th>0.060 n (%)</th>
<th>0.125 n (%)</th>
<th>0.250 n (%)</th>
<th>0.500 n (%)</th>
<th>Total n</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>4539 (79.7)</td>
<td>659 (11.6)</td>
<td>338 (5.9)</td>
<td>138 (2.4)</td>
<td>16 (0.3)</td>
<td>3 (0.1)</td>
<td>0 (0.0)</td>
<td>5693</td>
</tr>
<tr>
<td>2011</td>
<td>4161 (76.1)</td>
<td>830 (15.2)</td>
<td>289 (5.3)</td>
<td>166 (3.0)</td>
<td>20 (0.4)</td>
<td>1 (0.0)</td>
<td>0 (0.0)</td>
<td>5467</td>
</tr>
<tr>
<td>2012</td>
<td>4241 (77.2)</td>
<td>779 (14.2)</td>
<td>331 (6.0)</td>
<td>129 (2.4)</td>
<td>14 (0.3)</td>
<td>0 (0.0)</td>
<td>1 (0.0)</td>
<td>5495</td>
</tr>
<tr>
<td>2013</td>
<td>4491 (75.5)</td>
<td>880 (14.8)</td>
<td>463 (7.8)</td>
<td>108 (1.8)</td>
<td>3 (0.1)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>5945</td>
</tr>
<tr>
<td>2014</td>
<td>3650 (71.7)</td>
<td>839 (16.5)</td>
<td>437 (8.6)</td>
<td>160 (3.1)</td>
<td>5 (0.1)</td>
<td>2 (0.0)</td>
<td>0 (0.0)</td>
<td>5093</td>
</tr>
</tbody>
</table>

Note: Percentages represent row percentages.
Table 3. Distribution of Azithromycin Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project, 2010–2014

<table>
<thead>
<tr>
<th>Year</th>
<th>≤0.030 n (%)</th>
<th>0.060 n (%)</th>
<th>0.125 n (%)</th>
<th>0.250 n (%)</th>
<th>0.500 n (%)</th>
<th>1.000 n (%)</th>
<th>2.000 n (%)</th>
<th>4.000 n (%)</th>
<th>8.000 n (%)</th>
<th>≥16.00 n (%)</th>
<th>Total n</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>603 (10.6)</td>
<td>643 (11.3)</td>
<td>1314 (23.1)</td>
<td>1627 (28.6)</td>
<td>1211 (21.3)</td>
<td>268 (4.7)</td>
<td>9 (0.2)</td>
<td>1 (0.0)</td>
<td>9 (0.2)</td>
<td>8 (0.1)</td>
<td>5693</td>
</tr>
<tr>
<td>2011</td>
<td>518 (9.5)</td>
<td>663 (12.1)</td>
<td>1242 (22.7)</td>
<td>1801 (32.9)</td>
<td>1046 (19.1)</td>
<td>181 (3.3)</td>
<td>7 (0.1)</td>
<td>3 (0.0)</td>
<td>5 (0.1)</td>
<td>1 (0.0)</td>
<td>5467</td>
</tr>
<tr>
<td>2012</td>
<td>369 (6.7)</td>
<td>567 (10.3)</td>
<td>1421 (25.9)</td>
<td>1963 (35.7)</td>
<td>1041 (18.9)</td>
<td>119 (2.2)</td>
<td>7 (0.1)</td>
<td>1 (0.0)</td>
<td>2 (0.1)</td>
<td>5 (0.1)</td>
<td>5495</td>
</tr>
<tr>
<td>2013</td>
<td>353 (5.9)</td>
<td>498 (8.4)</td>
<td>1465 (24.6)</td>
<td>2257 (38.0)</td>
<td>1157 (19.5)</td>
<td>182 (3.1)</td>
<td>22 (0.4)</td>
<td>2 (0.0)</td>
<td>6 (0.1)</td>
<td>3 (0.0)</td>
<td>5945</td>
</tr>
<tr>
<td>2014</td>
<td>323 (6.3)</td>
<td>464 (9.1)</td>
<td>1077 (21.2)</td>
<td>1782 (35.0)</td>
<td>1086 (21.3)</td>
<td>236 (4.6)</td>
<td>50 (1.0)</td>
<td>37 (0.7)</td>
<td>28 (0.6)</td>
<td>10 (0.2)</td>
<td>5093</td>
</tr>
</tbody>
</table>

Note: Percentages represent row percentages.