

**Sexually  
Transmitted  
Disease  
Surveillance  
2014:  
Gonococcal Isolate Surveillance Project (GISP)  
Supplement & Profiles**

**Division of STD Prevention  
February 2016**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
CENTERS FOR DISEASE CONTROL AND PREVENTION  
NATIONAL CENTER FOR HIV/AIDS, VIRAL HEPATITIS, STD, AND TB PREVENTION  
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## **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

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## **Suggested Citation**

Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance 2014: Gonococcal Isolate Surveillance Project (GISP) Supplement and Profiles*. Atlanta: U.S. Department of Health and Human Services; 2016.

## **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.<sup>1</sup> 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.<sup>2</sup> 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.<sup>3</sup> 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.

Findings from GISP have directly contributed to CDC's STD Treatment Guidelines in 1993, 1998, 2002, 2006, 2010, and 2015 and updates in 2000, 2004, 2007, and 2012. Data from GISP have also been presented in multiple scientific papers and conference presentations. Additional

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**

STD clinics affiliated with 24 state or city health departments contributed 5,093 gonococcal isolates to GISP in 2014. Of these sites, 11 current sites have participated continuously since 1987: Albuquerque, New Mexico; Atlanta, Georgia; Birmingham, Alabama; Honolulu, Hawaii; New Orleans, Louisiana; Philadelphia, Pennsylvania; Phoenix, Arizona; Portland, Oregon; San Diego, California; San Francisco, California; and Seattle, Washington. The other current sites are: Boston, Massachusetts (2014); Buffalo, New York (2014); Chicago, Illinois (1996–2014); Cleveland, Ohio (1991–2014); Columbus, Ohio (2012–2014); Dallas, Texas (2000–2014); Greensboro, North Carolina (2002–2014); Indianapolis, Indiana (2013–2014); Kansas City, Missouri (1991–2001, 2007–2014); Los Angeles, California (2003–2014); Las Vegas, Nevada (2002–2014); Minneapolis, Minnesota (1992–2014); New York, New York (2006–2014); Orange County, California (1991–2014); Pontiac, Michigan (2012–2014); and Tripler Army Medical Center, Hawaii (2001–2014).

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)  $\geq 0.5$   $\mu\text{g/ml}$  (decreased susceptibility)\*
- Ceftriaxone, MIC  $\geq 0.125$   $\mu\text{g/ml}$  (elevated MIC)\*
- Cefixime, MIC  $\geq 0.5$   $\mu\text{g/ml}$  (decreased susceptibility)\*
- Cefixime, MIC  $\geq 0.25$   $\mu\text{g/ml}$  (elevated MIC)\*
- Azithromycin, MIC  $\geq 2.0$   $\mu\text{g/ml}$  (elevated MIC)\*
- Spectinomycin, MIC  $\geq 128.0$   $\mu\text{g/ml}$  (resistance)
- Ciprofloxacin, MIC  $0.125$ – $0.5$   $\mu\text{g/ml}$  (intermediate resistance)
- Ciprofloxacin, MIC  $\geq 1.0$   $\mu\text{g/ml}$  (resistance)
- Penicillin, MIC  $\geq 2.0$   $\mu\text{g/ml}$  (resistance)
- Tetracycline, MIC  $\geq 2.0$   $\mu\text{g/ml}$  (resistance)

The majority of these criteria are also recommended by the Clinical and Laboratory Standards Institute (CLSI).<sup>4</sup>

\* 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 (DSTDP) Antimicrobial Resistant Gonorrhea website:

<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 DSTDP Surveillance and Statistics website:

<https://www.cdc.gov/std/stats/>

Data on antimicrobial resistance in *N. gonorrhoeae* and other bacterial pathogens may be found in CDC's report, Antibiotic Resistance Threats in the United States, 2013:

<https://www.cdc.gov/drugresistance/threat-report-2013/>

### **References**

1. CDC. *Sexually Transmitted Diseases Surveillance 2014*. Atlanta: US Department of Health and Human Services; 2015.

2. Satterwhite CL, Torrone E, Meites E, et al. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2008. *Sexually Transmitted Diseases* 2013; 40(3):187–193.
3. CDC. Sexually transmitted diseases treatment guidelines, 2015. *MMWR Recomm Rep* 2015; 64(3):1–137.
4. Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing; Twentieth Informational Supplement, M100-S20. National Committee for Clinical Laboratory Standards, 2010;29(3):84–86.

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

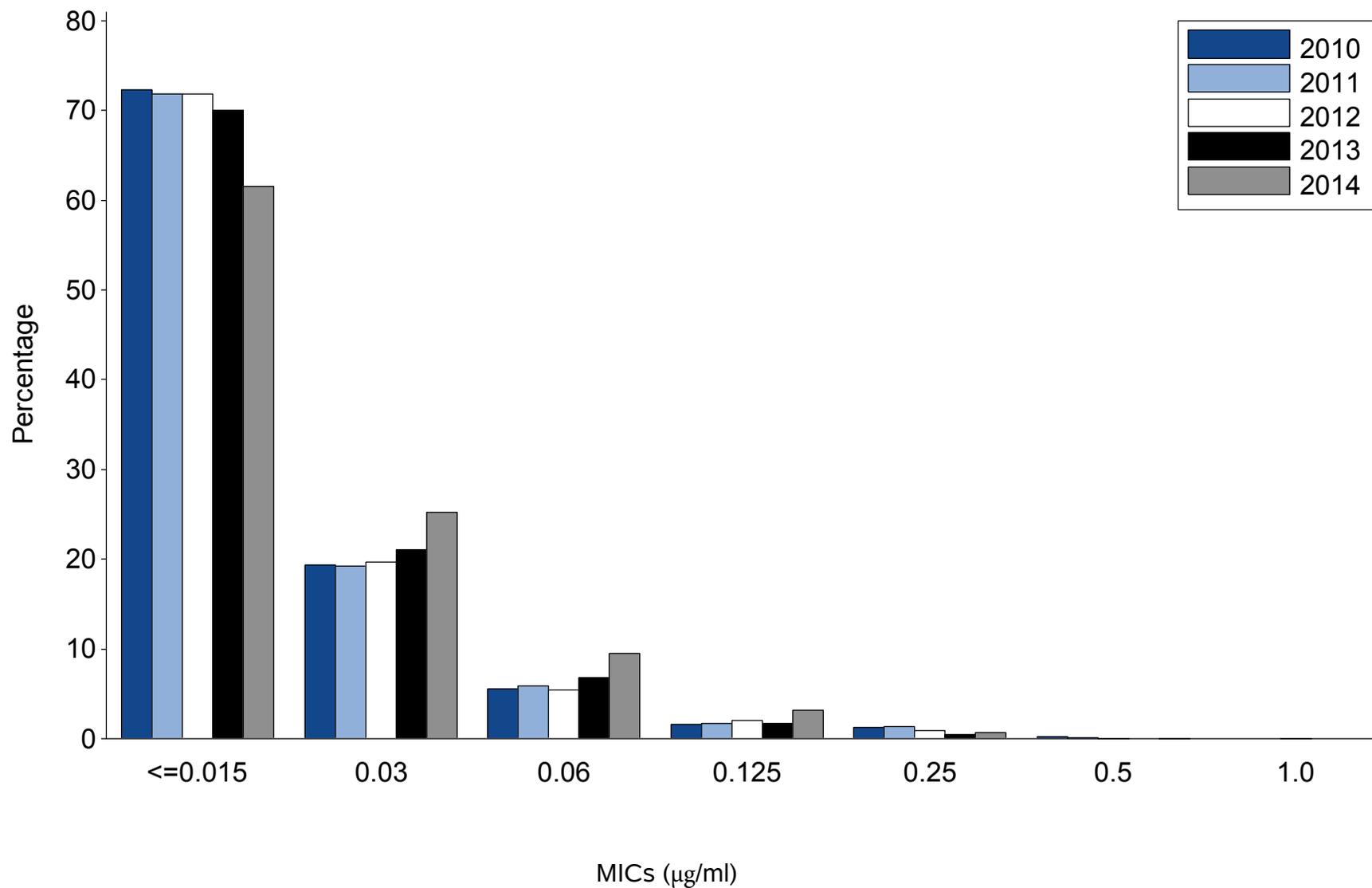


Figure 2. Distribution of Ceftriaxone Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2010-2014

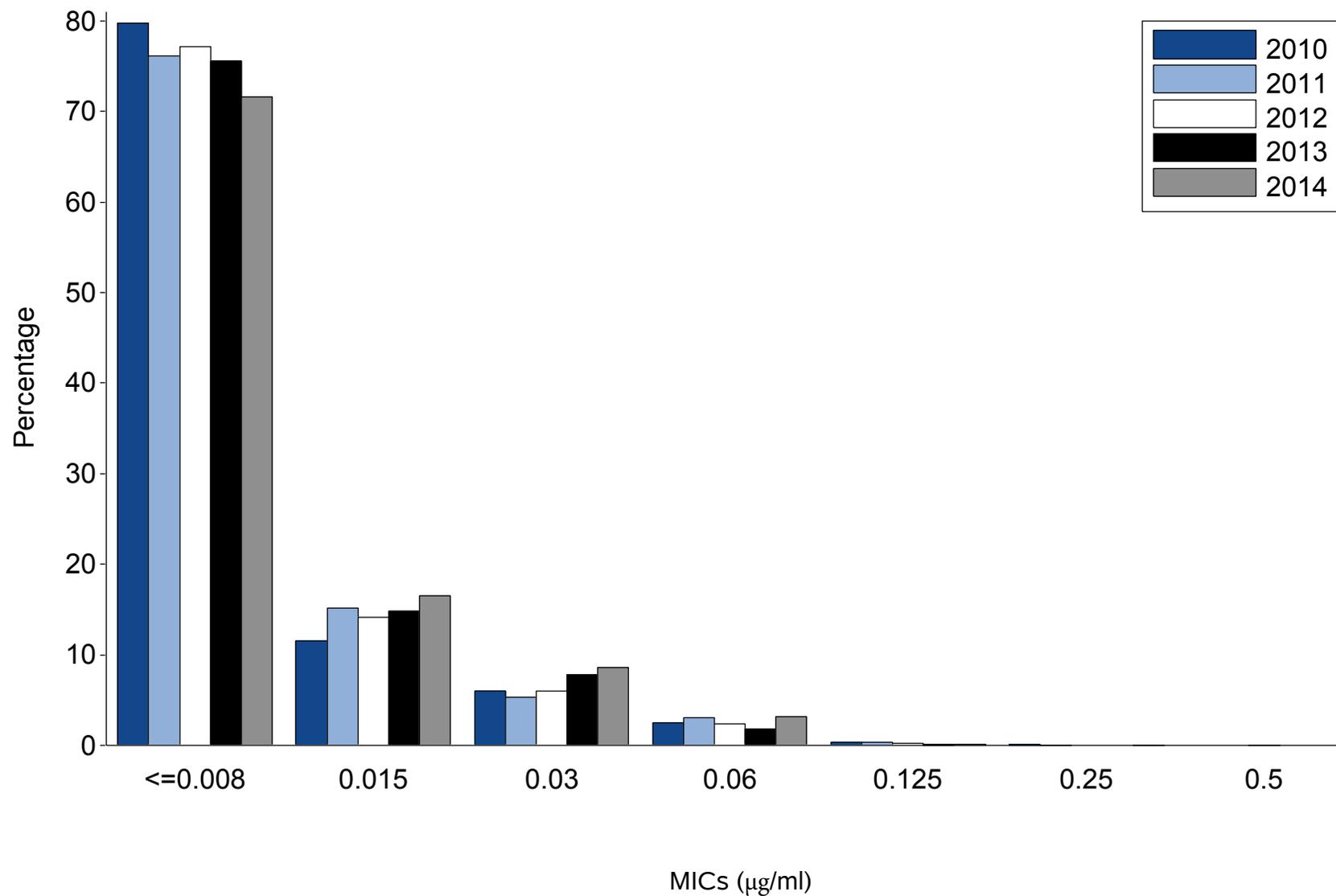


Figure 3. Distribution of Azithromycin Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2010-2014

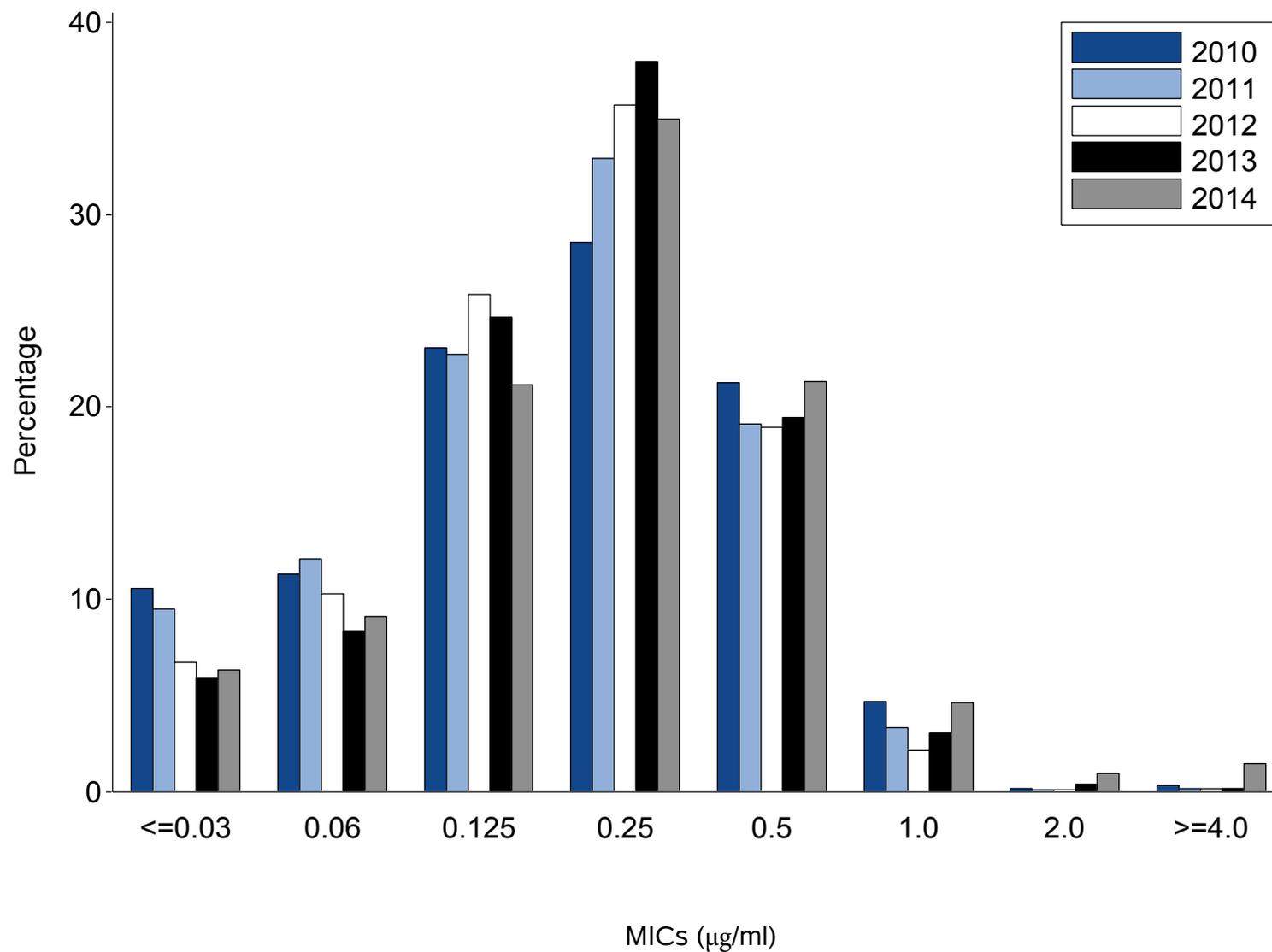
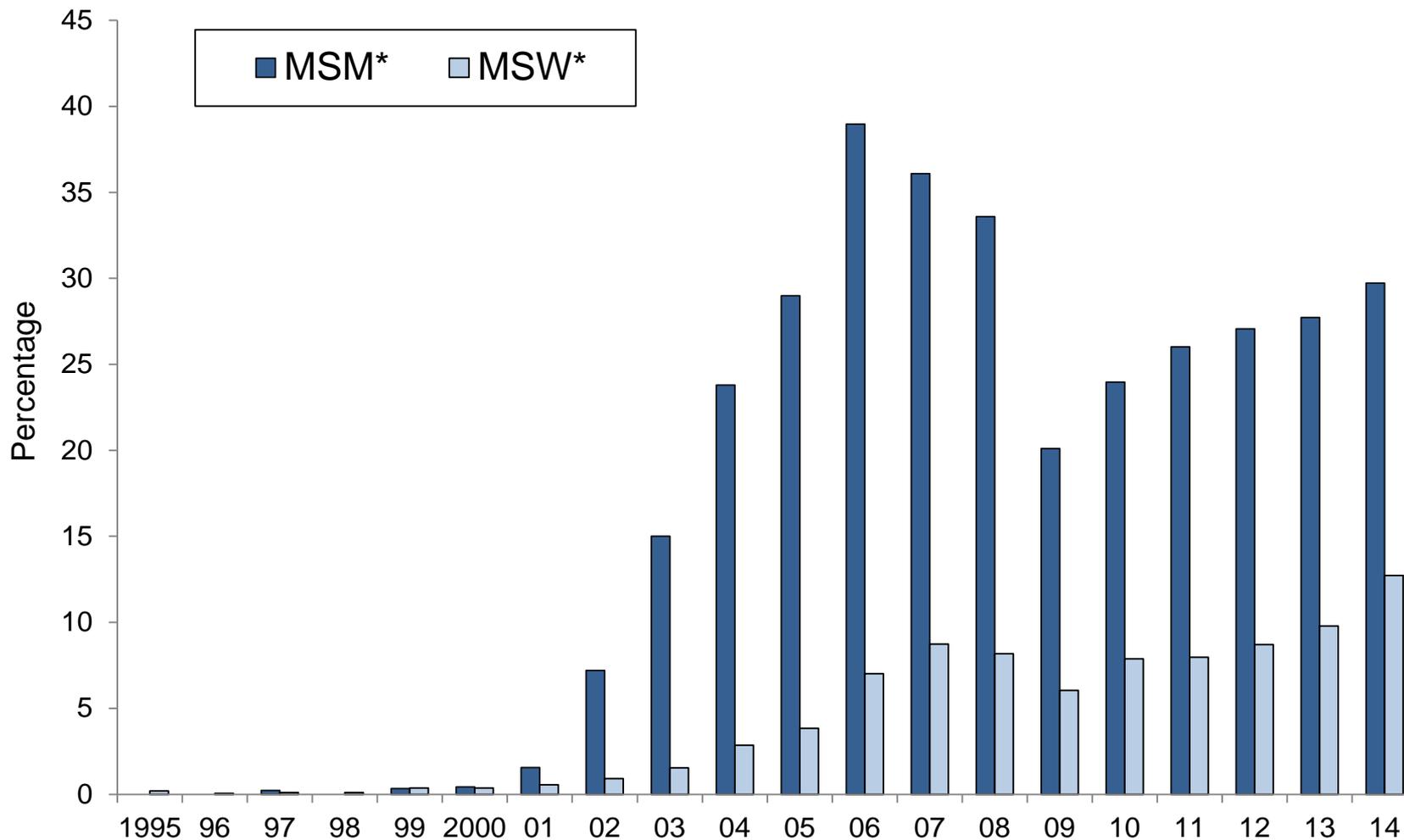


Figure 4. Percentage of *Neisseria gonorrhoeae* Isolates that are Ciprofloxacin-Resistant by Reported Sex of Sex Partner, Gonococcal Isolate Surveillance Project, 1995-2014



\*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

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

Note: Percentages represent row percentages.

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

Year	Minimum Inhibitory Concentrations ( $\mu\text{g/ml}$ )							Total n
	$\leq 0.008$ n (%)	0.015 n (%)	0.030 n (%)	0.060 n (%)	0.125 n (%)	0.250 n (%)	0.500 n (%)	
<b>2010</b>	4539 (79.7)	659 (11.6)	338 (5.9)	138 (2.4)	16 (0.3)	3 (0.1)	0 (0.0)	5693
<b>2011</b>	4161 (76.1)	830 (15.2)	289 (5.3)	166 (3.0)	20 (0.4)	1 (0.0)	0 (0.0)	5467
<b>2012</b>	4241 (77.2)	779 (14.2)	331 (6.0)	129 (2.4)	14 (0.3)	0 (0.0)	1 (0.0)	5495
<b>2013</b>	4491 (75.5)	880 (14.8)	463 (7.8)	108 (1.8)	3 (0.1)	0 (0.0)	0 (0.0)	5945
<b>2014</b>	3650 (71.7)	839 (16.5)	437 (8.6)	160 (3.1)	5 (0.1)	2 (0.0)	0 (0.0)	5093

Note: Percentages represent row percentages.

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

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

Note: Percentages represent row percentages.