

Sexually Transmitted Disease Surveillance 2022: Gonococcal Isolate Surveillance Project Profile

**Division of STD Prevention
April 2024**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR HIV, VIRAL HEPATITIS, STD, AND TB PREVENTION
DIVISION OF STD PREVENTION
ATLANTA, GEORGIA 30329-4027**

Acknowledgments

Publication of this report would not have been possible without the contributions of all participating state and local health departments, sexually transmitted disease clinics, public health laboratories, and regional laboratories. Contributions from eight locations were received through the Strengthening the US Response to Resistant Gonorrhea (SURRG) project led by Emily Learner and Kerry Mauk, Behavioral Science and Epidemiology Branch, Division of STD Prevention, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention.

This report was prepared by:

Sammie Haskin, Alesia Harvey, Rebekah Frankson, LaShondra Berman, Kristen Kreisel, and Luke Shouse, Surveillance and Data Science Branch of the Division of STD Prevention, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention.

Additional contributions by Matthew Schmerer, Myriam Bélanger, and Ellen Kersh, STD Laboratory Reference and Research Branch of the Division of STD Prevention, National Center for HIV, 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

Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance 2022: Gonococcal Isolate Surveillance Project National Profile*. Atlanta: U.S. Department of Health and Human Services; 2024.

Web Site

The online version of this report is available at <https://www.cdc.gov/std/statistics/gisp-profiles/default.htm>.

Technical Note

Antimicrobial susceptibility data presented in this report are based on criteria established by the Clinical & Laboratory Standards Institute (CLSI).

2022 Gonococcal Isolate Surveillance Project
Clinical Sites and Years Participated

Albuquerque, New Mexico (1987–2022)	Greensboro, North Carolina (2002–2022)	Philadelphia, Pennsylvania (1987–2022)
Anchorage, Alaska (1987–2003, 2018–2022)	Honolulu, Hawaii (1987–2022)	Phoenix, Arizona (1987–2022)
Birmingham, Alabama (1987–2022)	Indianapolis, Indiana (2013–2022)	Pittsburgh, Pennsylvania (2021–2022)
Baltimore, Maryland (1987–2013, 2019–2022)	Kansas City, Missouri (1991–2001, 2007–2022)	Pontiac, Michigan (2012–2022)
Buffalo, New York (2014–2022)	Las Vegas, Nevada (2002–2022)	Portland, Oregon (1987–2022)
Camden, New Jersey (2019–2022)	Los Angeles, California (2003–2022)	San Diego, California (1987–2022)
Chicago, Illinois (1996–2022)	Milwaukee, Wisconsin (2018–2022)	San Francisco, California (1987–2022)
Cleveland, Ohio (1991–2022)	Minneapolis, Minnesota (1992–2022)	Seattle, Washington (1987–2022)
Columbus, Ohio (2012–2022)	New Orleans, Louisiana (1987–2022)	Tripler Army Medical Center, Hawaii (2001–2022)
Dallas, Texas (2000–2022)	New York, New York (2006–2022)	Washington, District of Columbia (2018–2022)
Denver, Colorado (1987–2013, 2018–2022)	Orange County, California (1991–2022)	

2022 Gonococcal Isolate Surveillance Project
Regional Laboratories

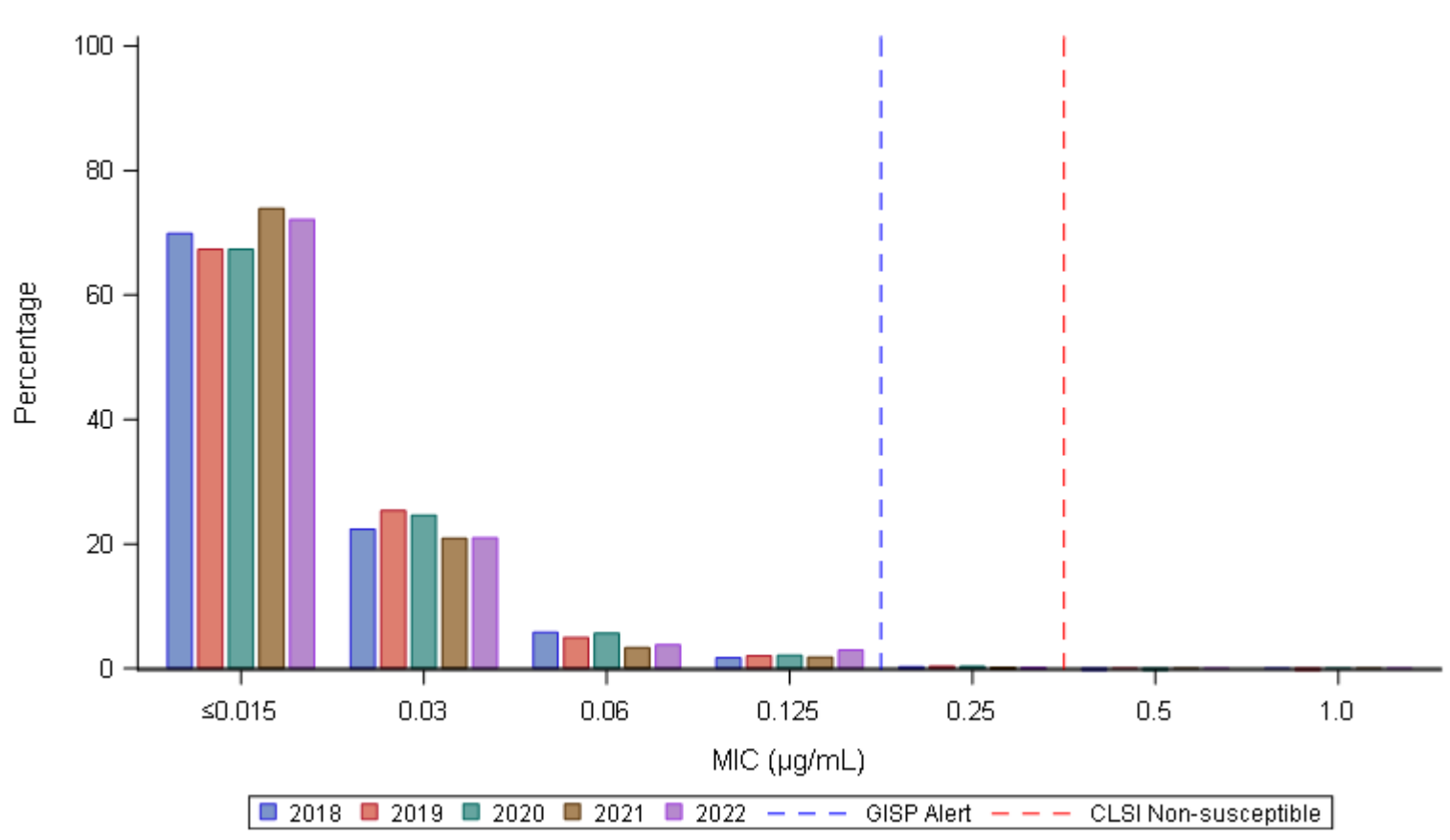
Maryland Department of Health and Mental Hygiene <i>Baltimore, Maryland</i>
Tennessee Department of Health <i>Nashville, Tennessee</i>
Utah Department of Health <i>Salt Lake City, Utah</i>
Washington State Department of Health <i>Seattle, Washington</i>

2022 Enhanced Gonococcal Isolate Surveillance Project Profiles

Table of Contents

Figure 1.	Number of <i>Neisseria gonorrhoeae</i> Isolates by Anatomic Site of Infection and by Gender and Gender of Sex Partners, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	5
Figure 2.	Distribution of Cefixime Minimum Inhibitory Concentrations (MICs) Among <i>Neisseria gonorrhoeae</i> Isolates by Anatomic Site of Infection, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	6
Figure 3.	Distribution of Ceftriaxone Minimum Inhibitory Concentrations (MICs) Among <i>Neisseria gonorrhoeae</i> Isolates by Anatomic Site of Infection, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	7
Figure 4.	Distribution of Azithromycin Minimum Inhibitory Concentrations (MICs) Among <i>Neisseria gonorrhoeae</i> Isolates by Anatomic Site of Infection, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	8
Figure 5.	Distribution of Ciprofloxacin Minimum Inhibitory Concentrations (MICs) Among <i>Neisseria gonorrhoeae</i> Isolates by Anatomic Site of Infection, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	9
Figure 6.	Distribution of Gentamicin Minimum Inhibitory Concentrations (MICs) Among <i>Neisseria gonorrhoeae</i> Isolates by Anatomic Site of Infection, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	10
Figure 7.	Distribution of Penicillin Minimum Inhibitory Concentrations (MICs) Among <i>Neisseria gonorrhoeae</i> Isolates by Anatomic Site of Infection, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	11
Figure 8.	Distribution of Tetracycline Minimum Inhibitory Concentrations (MICs) Among <i>Neisseria gonorrhoeae</i> Isolates by Anatomic Site of Infection, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	12
Figure 9.	Percentage of <i>Neisseria gonorrhoeae</i> Isolates with an Elevated Minimum Inhibitory Concentration (MIC) to Cefixime by Site of Infection and by Gender and Gender of Sex Partners, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	13
Figure 10.	Percentage of <i>Neisseria gonorrhoeae</i> Isolates with an Elevated Minimum Inhibitory Concentration (MIC) to Ceftriaxone by Site of Infection and by Gender and Gender of Sex Partners, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	14
Figure 11.	Percentage of <i>Neisseria gonorrhoeae</i> Isolates with an Elevated Minimum Inhibitory Concentration (MIC) to Azithromycin by Site of Infection and by Gender and Gender of Sex Partners, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	15
Figure 12.	Percentage of <i>Neisseria gonorrhoeae</i> Isolates with Resistance to Ciprofloxacin by Site of Infection and by Gender and Gender of Sex Partners, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	16
Figure 13.	Percentage of <i>Neisseria gonorrhoeae</i> Isolates with Resistance to Penicillin by Site of Infection and by Gender and Gender of Sex Partners, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	17
Figure 14.	Percentage of <i>Neisseria gonorrhoeae</i> Isolates with Resistance to Tetracycline by Site of Infection and by Gender and Gender of Sex Partners, Enhanced Gonococcal Isolate Surveillance Project (eGISP), 2020–2022.....	18

Figure 1. Distribution of Cefixime Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2018-2022



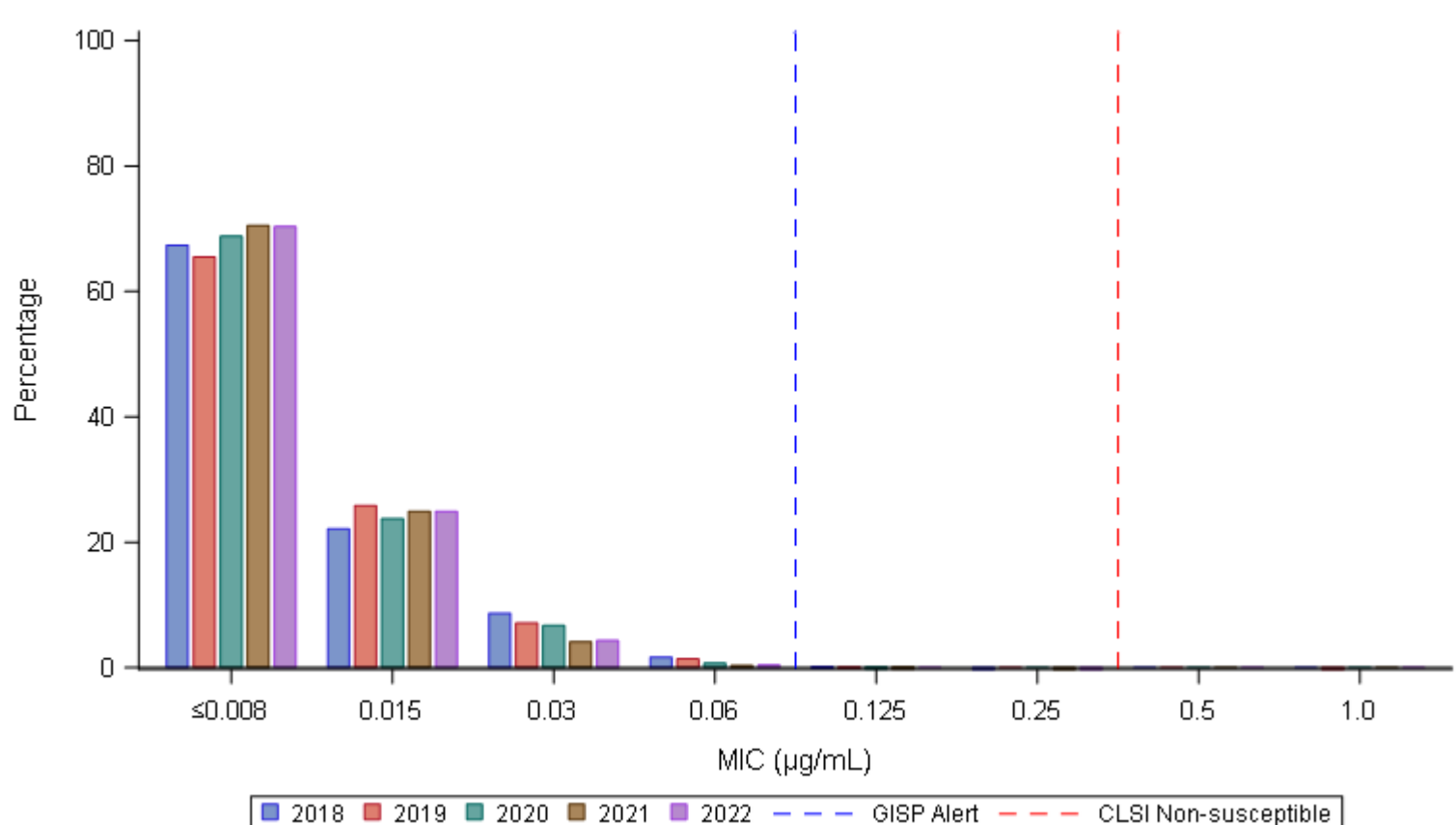
Year	≤0.015 n (%)	0.03 n (%)	0.06 n (%)	0.125 n (%)	0.25 n (%)	0.5 n (%)	1.0 n (%)	Total
2018	3605 (69.9)	1155 (22.4)	297 (5.8)	88 (1.7)	13 (0.3)	2 (0.0)	0 (0.0)	5160
2019	3690 (67.3)	1388 (25.3)	273 (5.0)	110 (2.0)	18 (0.3)	0 (0.0)	1 (0.0)	5480
2020	2519 (67.3)	921 (24.6)	212 (5.7)	77 (2.1)	11 (0.3)	1 (0.0)	0 (0.0)	3741
2021	2824 (73.9)	798 (20.9)	126 (3.3)	69 (1.8)	6 (0.2)	0 (0.0)	0 (0.0)	3823
2022	2658 (72.1)	773 (21.0)	140 (3.8)	108 (2.9)	5 (0.1)	0 (0.0)	0 (0.0)	3684

GISP Alert Value = cefixime MIC ≥0.25 µg/mL; CLSI Non-susceptible = cefixime MIC ≥0.5 µg/mL.

CLSI = Clinical & Laboratory Standards Institute.

Non-susceptible = Category used for isolates when only a susceptible breakpoint has been designated and the MIC is above the susceptible breakpoint. As of the end of 2022, the CLSI has not established a cefixime resistance breakpoint for *N. gonorrhoeae*.

Figure 2. Distribution of Ceftriaxone Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2018-2022



Year	≤0.008 n (%)	0.015 n (%)	0.03 n (%)	0.06 n (%)	0.125 n (%)	0.25 n (%)	0.5 n (%)	1.0 n (%)	Total
2018	3477 (67.4)	1141 (22.1)	447 (8.7)	86 (1.7)	8 (0.2)	1 (0.0)	0 (0.0)	0 (0.0)	5160
2019	3590 (65.5)	1417 (25.9)	390 (7.1)	75 (1.4)	7 (0.1)	0 (0.0)	0 (0.0)	1 (0.0)	5480
2020	2573 (68.8)	889 (23.8)	250 (6.7)	26 (0.7)	3 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	3741
2021	2696 (70.5)	953 (24.9)	158 (4.1)	12 (0.3)	3 (0.1)	1 (0.0)	0 (0.0)	0 (0.0)	3823
2022	2591 (70.3)	918 (24.9)	159 (4.3)	15 (0.4)	0 (0.0)	1 (0.0)	0 (0.0)	0 (0.0)	3684

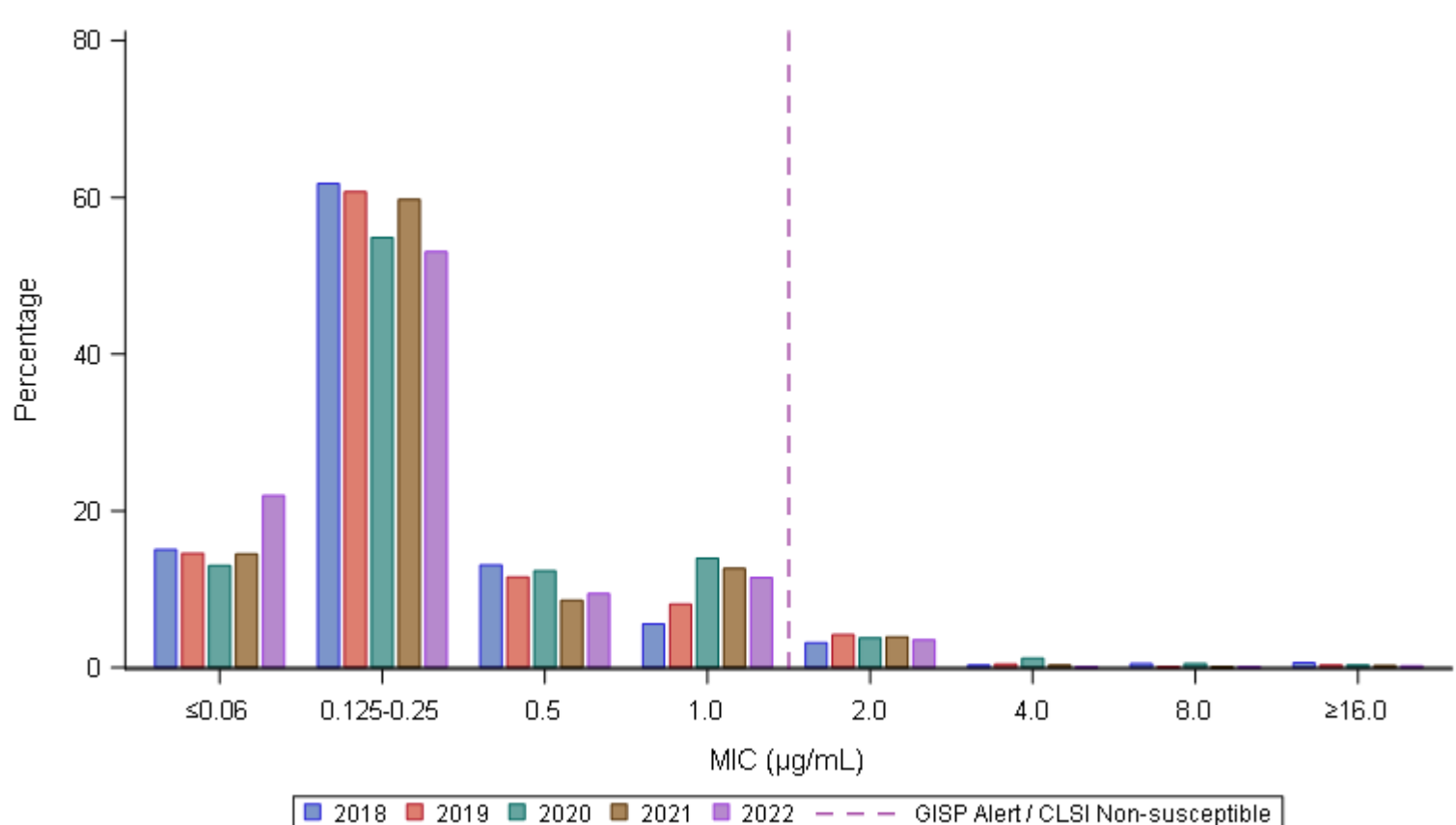
GISP Alert Value = ceftriaxone MIC ≥0.125 µg/mL; CLSI Non-susceptible = ceftriaxone MIC ≥0.5 µg/mL.

CLSI = Clinical & Laboratory Standards Institute.

Non-susceptible = Category used for isolates when only a susceptible breakpoint has been designated and the MIC is above the susceptible breakpoint.

As of the end of 2022, the CLSI has not established a ceftriaxone resistance breakpoint for *N. gonorrhoeae*.

Figure 3. Distribution of Azithromycin Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2018-2022



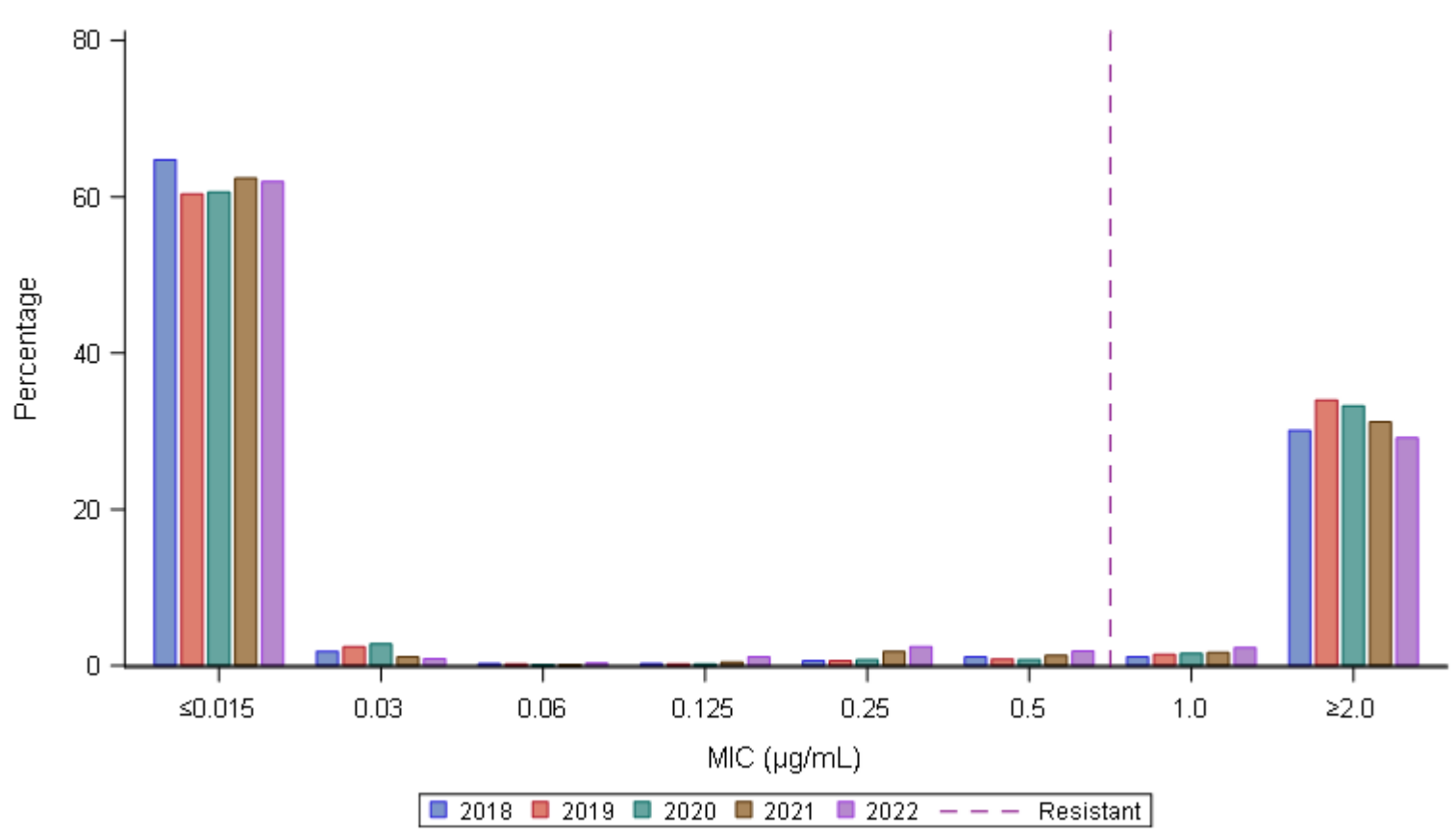
Year	≤0.06 n (%)	0.125-0.25 n (%)	0.5 n (%)	1.0 n (%)	2.0 n (%)	4.0 n (%)	8.0 n (%)	≥16.0 n (%)	Total
2018	777 (15.1)	3186 (61.7)	675 (13.1)	287 (5.6)	163 (3.2)	16 (0.3)	25 (0.5)	31 (0.6)	5160
2019	799 (14.6)	3326 (60.7)	632 (11.5)	442 (8.1)	229 (4.2)	24 (0.4)	9 (0.2)	19 (0.3)	5480
2020	486 (13.0)	2053 (54.9)	462 (12.3)	522 (14.0)	142 (3.8)	44 (1.2)	19 (0.5)	13 (0.3)	3741
2021	553 (14.5)	2284 (59.7)	327 (8.6)	483 (12.6)	150 (3.9)	12 (0.3)	4 (0.1)	10 (0.3)	3823
2022	809 (22.0)	1955 (53.1)	347 (9.4)	423 (11.5)	130 (3.5)	6 (0.2)	6 (0.2)	8 (0.2)	3684

GISP Alert Value: azithromycin MIC ≥2.0 µg/mL; CLSI Non-susceptible = azithromycin MIC ≥2.0 µg/mL.

CLSI = Clinical & Laboratory Standards Institute.

Non-susceptible = Category used for isolates when only a susceptible breakpoint has been designated and the MIC is above the susceptible breakpoint. As of the end of 2022, the CLSI has not established an azithromycin resistance breakpoint for *N. gonorrhoeae*.

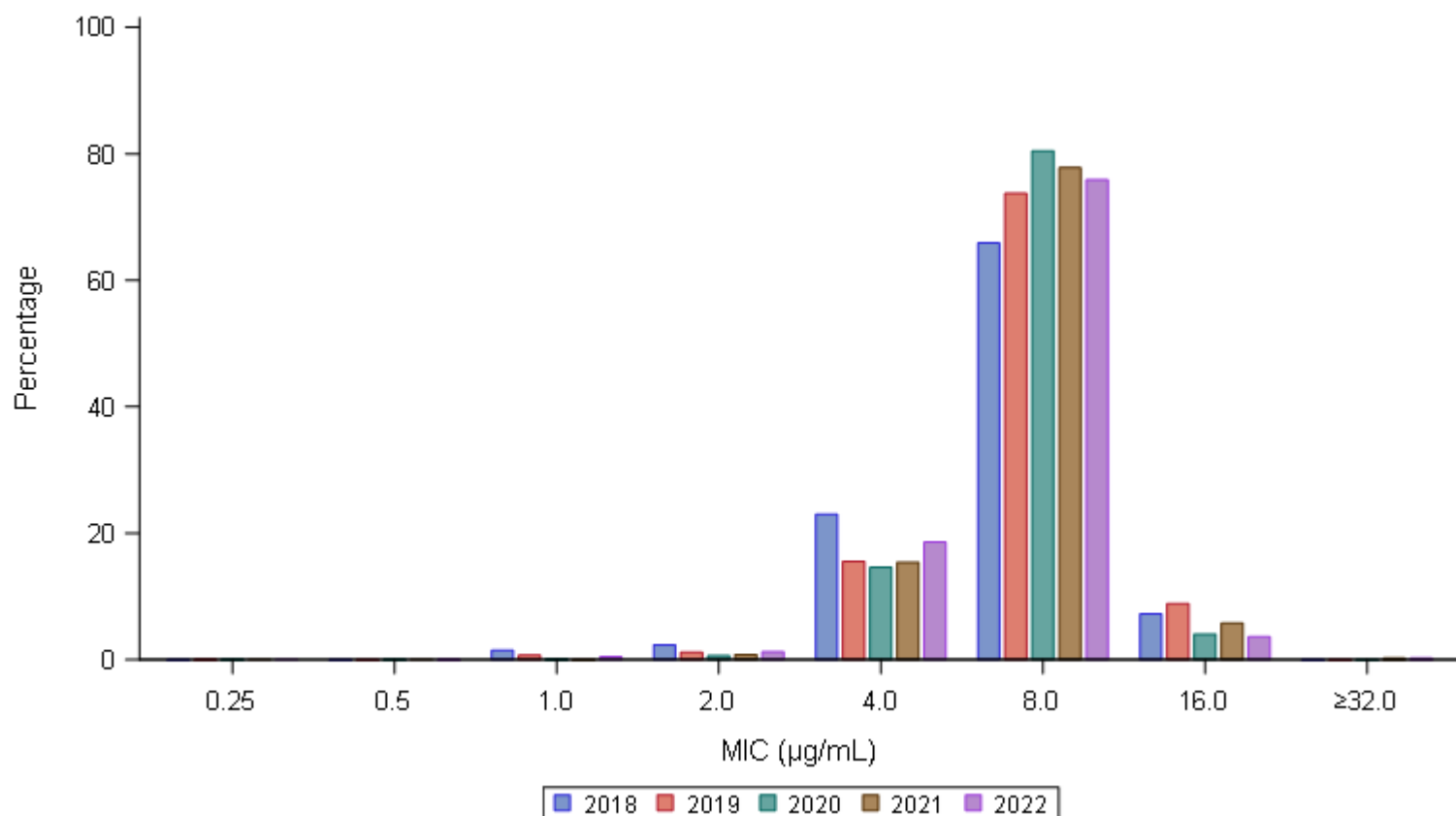
Figure 4. Distribution of Ciprofloxacin Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2018-2022



Year	≤0.015 n (%)	0.03 n (%)	0.06 n (%)	0.125 n (%)	0.25 n (%)	0.5 n (%)	1.0 n (%)	≥2.0 n (%)	Total
2018	3341 (64.7)	94 (1.8)	12 (0.2)	12 (0.2)	33 (0.6)	57 (1.1)	57 (1.1)	1554 (30.1)	5160
2019	3307 (60.3)	131 (2.4)	10 (0.2)	12 (0.2)	33 (0.6)	46 (0.8)	78 (1.4)	1863 (34.0)	5480
2020	2268 (60.6)	103 (2.8)	5 (0.1)	7 (0.2)	28 (0.7)	29 (0.8)	58 (1.6)	1243 (33.2)	3741
2021	2385 (62.4)	42 (1.1)	6 (0.2)	17 (0.4)	69 (1.8)	49 (1.3)	63 (1.6)	1192 (31.2)	3823
2022	2282 (61.9)	33 (0.9)	12 (0.3)	41 (1.1)	90 (2.4)	68 (1.8)	84 (2.3)	1074 (29.2)	3684

Ciprofloxacin resistance MIC ≥1.0 µg/mL.

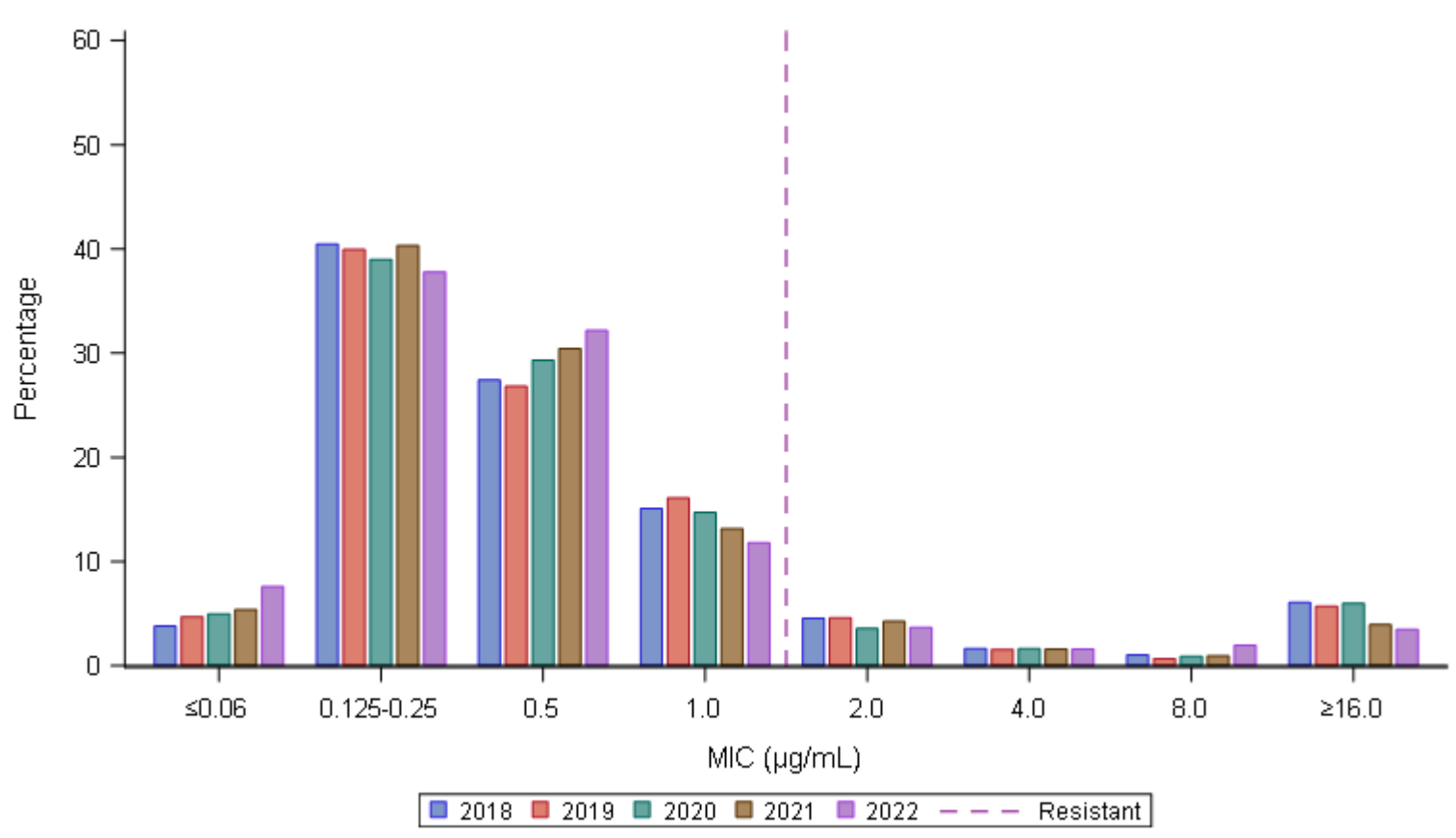
Figure 5. Distribution of Gentamicin Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2018-2022



Year	0.25 n (%)	0.5 n (%)	1.0 n (%)	2.0 n (%)	4.0 n (%)	8.0 n (%)	16.0 n (%)	≥32.0 n (%)	Total
2018	1 (0.0)	1 (0.0)	76 (1.5)	121 (2.3)	1186 (23.0)	3400 (65.9)	374 (7.2)	1 (0.0)	5160
2019	3 (0.1)	1 (0.0)	37 (0.7)	62 (1.1)	851 (15.5)	4040 (73.7)	485 (8.9)	1 (0.0)	5480
2020	2 (0.1)	2 (0.1)	6 (0.2)	23 (0.6)	546 (14.6)	3010 (80.5)	151 (4.0)	1 (0.0)	3741
2021	0 (0.0)	0 (0.0)	1 (0.0)	31 (0.8)	589 (15.4)	2974 (77.8)	220 (5.8)	8 (0.2)	3823
2022	0 (0.0)	2 (0.1)	16 (0.4)	46 (1.2)	685 (18.6)	2795 (75.9)	132 (3.6)	8 (0.2)	3684

As of the end of 2022, the Clinical & Laboratory Standards Institute (CLSI) criteria for susceptibility and resistance to gentamicin have not been established for *N. gonorrhoeae*. A GISP alert value for gentamicin has not been determined.

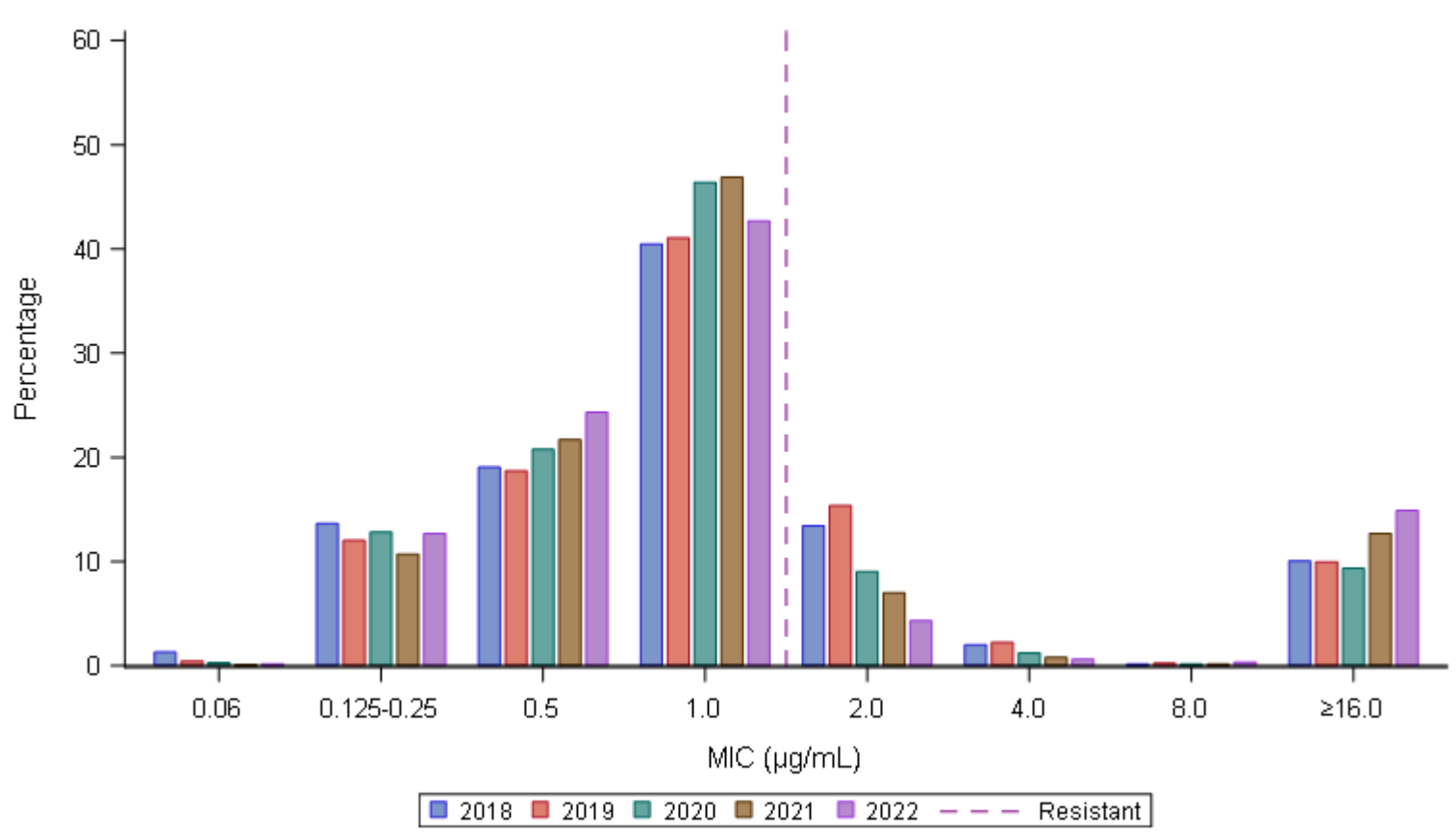
Figure 6. Distribution of Penicillin Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2018-2022



Year	≤0.06 n (%)	0.125-0.25 n (%)	0.5 n (%)	1.0 n (%)	2.0 n (%)	4.0 n (%)	8.0 n (%)	≥16.0 n (%)	Total
2018	195 (3.8)	2088 (40.5)	1414 (27.4)	778 (15.1)	235 (4.6)	85 (1.6)	53 (1.0)	312 (6.0)	5160
2019	257 (4.7)	2189 (39.9)	1469 (26.8)	882 (16.1)	250 (4.6)	85 (1.6)	37 (0.7)	311 (5.7)	5480
2020	186 (5.0)	1459 (39.0)	1097 (29.3)	550 (14.7)	133 (3.6)	60 (1.6)	33 (0.9)	223 (6.0)	3741
2021	206 (5.4)	1541 (40.3)	1164 (30.4)	503 (13.2)	162 (4.2)	61 (1.6)	36 (0.9)	150 (3.9)	3823
2022	280 (7.6)	1392 (37.8)	1185 (32.2)	434 (11.8)	134 (3.6)	59 (1.6)	72 (2.0)	128 (3.5)	3684

Penicillin resistance based on Clinical & Laboratory Standards Institute (CLSI) MIC criteria only (MIC ≥2.0 µg/mL). Additional data on β-lactamase positivity are not depicted.

Figure 7. Distribution of Tetracycline Minimum Inhibitory Concentrations (MICs) Among *Neisseria gonorrhoeae* Isolates, Gonococcal Isolate Surveillance Project (GISP), 2018-2022



Year	0.06 n (%)	0.125-0.25 n (%)	0.5 n (%)	1.0 n (%)	2.0 n (%)	4.0 n (%)	8.0 n (%)	≥16.0 n (%)	Total
2018	66 (1.3)	703 (13.6)	982 (19.0)	2087 (40.4)	693 (13.4)	102 (2.0)	8 (0.2)	519 (10.1)	5160
2019	24 (0.4)	659 (12.0)	1025 (18.7)	2250 (41.1)	842 (15.4)	122 (2.2)	12 (0.2)	546 (10.0)	5480
2020	11 (0.3)	480 (12.8)	777 (20.8)	1735 (46.4)	337 (9.0)	46 (1.2)	5 (0.1)	350 (9.4)	3741
2021	4 (0.1)	409 (10.7)	830 (21.7)	1792 (46.9)	267 (7.0)	30 (0.8)	6 (0.2)	485 (12.7)	3823
2022	6 (0.2)	467 (12.7)	896 (24.3)	1573 (42.7)	158 (4.3)	23 (0.6)	13 (0.4)	548 (14.9)	3684

Tetracycline resistance MIC ≥2.0 µg/mL.

Table 1: Antimicrobial Minimum Inhibitory Concentration Parameters
by 5-Year Periods in the Gonococcal Isolate Surveillance Project (GISP), 1998-2022

1A. Cefixime

Time Range	MIC 50* (µg/mL)	MIC 90** (µg/mL)	Min MIC (µg/mL)	Max MIC (µg/mL)	% with MIC ≥0.25	% with MIC ≥0.5
1998-2002	0.015	0.03	0.002	1.0	0.3	<0.1
2003-2007	0.008	0.03	0.001	0.5	<0.1	<0.1
2008-2012	0.015	0.03	0.002	1.0	1.1	<0.1
2013-2017	0.015	0.03	0.002	0.5	0.5	<0.1
2018-2022	0.015	0.03	0.002	1.0	0.3	<0.1

1B. Ceftriaxone

Time Range	MIC 50* (µg/mL)	MIC 90** (µg/mL)	Min MIC (µg/mL)	Max MIC (µg/mL)	% with MIC ≥0.125	% with MIC ≥0.5
1998-2002	0.004	0.015	0.001	0.25	0.3	0
2003-2007	0.008	0.015	0.001	0.25	<0.1	0
2008-2012	0.008	0.015	0.001	0.5	0.3	<0.1
2013-2017	0.008	0.03	0.001	0.25	0.2	0
2018-2022	0.008	0.015	0.001	1.0	0.1	<0.1

1C. Azithromycin

Time Range	MIC 50* (µg/mL)	MIC 90** (µg/mL)	Min MIC (µg/mL)	Max MIC (µg/mL)	% with MIC ≥1.0	% with MIC ≥2.0	% with MIC ≥16.0
1998-2002	0.125	0.25	0.001	8.0	0.4	0.2	0
2003-2007	0.125	0.5	0.004	16.0	2.8	0.4	<0.1
2008-2012	0.25	0.5	0.015	64.0	4.6	0.3	<0.1
2013-2017	0.25	0.5	0.008	64.0	7.3	2.6	0.3
2018-2022	0.25	1.0	0.008	16.0	14.7	4.8	0.4

*MIC 50: lowest concentration of an antimicrobial that inhibits the growth of 50% of the isolates.

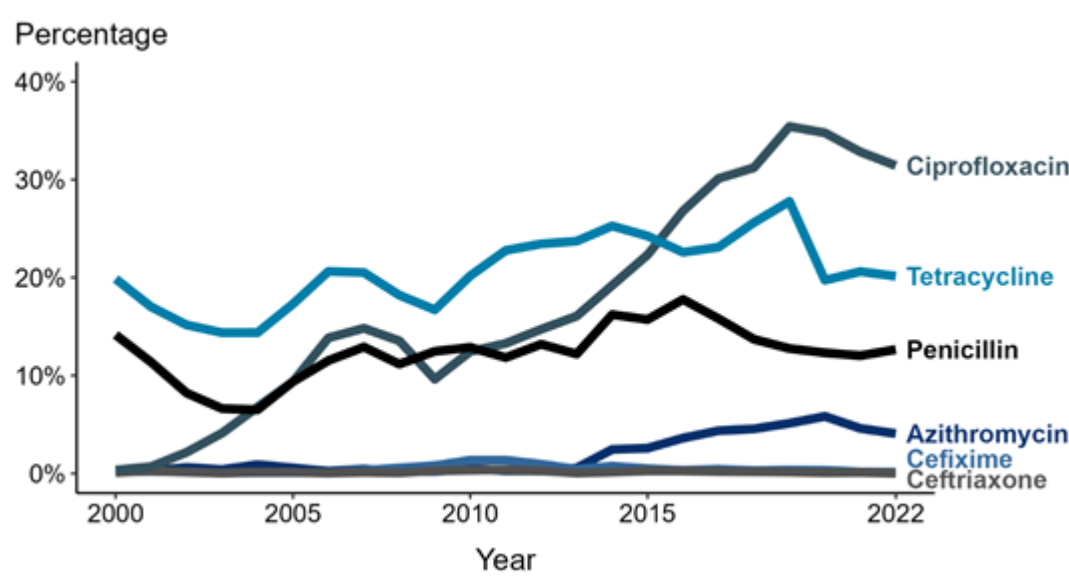
**MIC 90: lowest concentration of an antimicrobial that inhibits the growth of 90% of the isolates.

All MICs reported in GISP for each antimicrobial were combined for the noted time period.

Cefixime susceptibility was not tested in 2007 and 2008.

Azithromycin alert MIC changed from 1.0 µg/mL to 2.0 µg/mL starting in 2005 due to a media change.

Figure 8. Percentage of Tetracycline, Penicillin, or Ciprofloxacin Resistance* or Elevated Cefixime, Ceftriaxone, or Azithromycin Minimum Inhibitory Concentrations (MICs)[†] by Year, Gonococcal Isolate Surveillance Project (GISP), 2001-2022



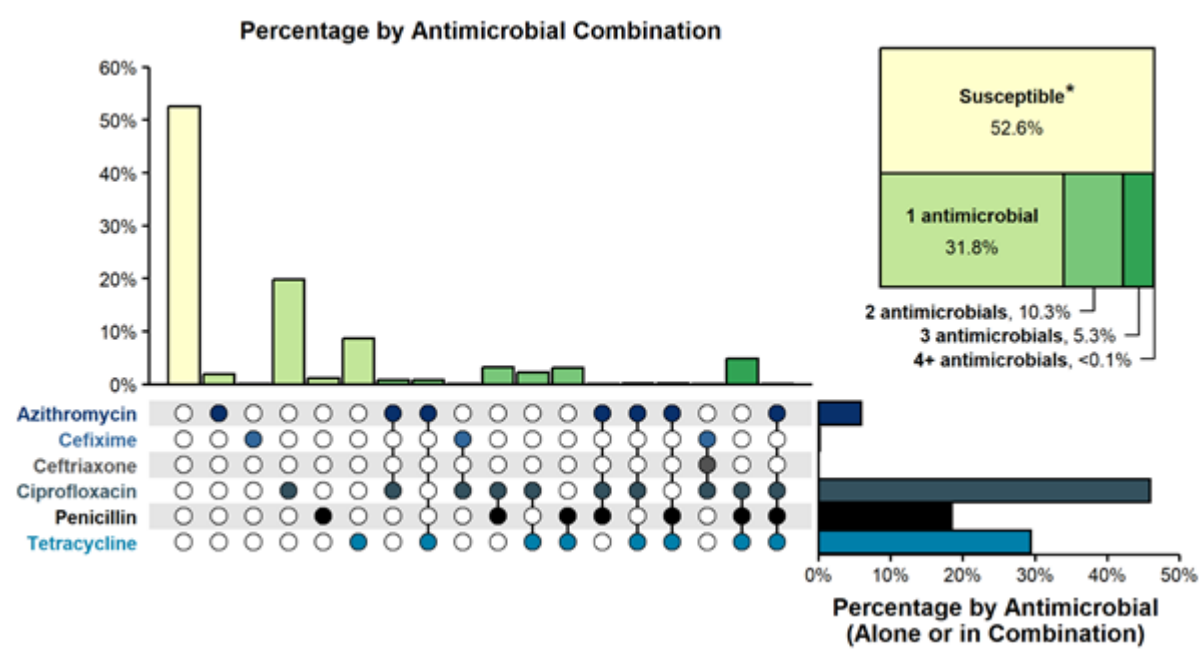
Antimicrobials	2000 n (%)	2001 n (%)	2002 n (%)	2003 n (%)	2004 n (%)	2005 n (%)	2006 n (%)	2007 n (%)	2008 n (%)	2009 n (%)	2010 n (%)
Azithromycin	19 (0.3)	15 (0.3)	33 (0.6)	26 (0.4)	57 (0.9)	35 (0.6)	14 (0.2)	27 (0.4)	11 (0.2)	12 (0.2)	27 (0.5)
Cefixime	10 (0.2)	12 (0.2)	9 (0.2)	4 (0.1)	6 (0.1)	6 (0.1)	5 (0.1)	N/A	N/A	45 (0.8)	77 (1.4)
Ceftriaxone	5 (0.1)	16 (0.3)	7 (0.1)	3 (0.0)	9 (0.1)	8 (0.1)	3 (0.0)	7 (0.1)	4 (0.1)	16 (0.3)	19 (0.3)
Ciprofloxacin	19 (0.3)	38 (0.7)	116 (2.2)	270 (4.1)	429 (6.8)	581 (9.4)	843 (13.8)	891 (14.8)	775 (13.5)	542 (9.6)	709 (12.5)
Penicillin	773 (14.2)	622 (11.4)	441 (8.2)	434 (6.6)	411 (6.5)	581 (9.4)	702 (11.5)	776 (12.9)	639 (11.2)	702 (12.5)	733 (12.9)
Tetracycline	1085 (19.9)	931 (17.0)	814 (15.2)	942 (14.4)	909 (14.4)	1073 (17.3)	1256 (20.6)	1233 (20.5)	1010 (18.2)	941 (16.7)	1149 (20.2)

Antimicrobials	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)
Azithromycin	16 (0.3)	15 (0.3)	33 (0.6)	125 (2.5)	133 (2.6)	190 (3.6)	221 (4.4)	235 (4.6)	281 (5.1)	218 (5.8)	176 (4.6)
Cefixime	74 (1.4)	52 (0.9)	25 (0.4)	38 (0.7)	25 (0.5)	17 (0.3)	22 (0.4)	15 (0.3)	19 (0.3)	12 (0.3)	6 (0.2)
Ceftriaxone	21 (0.4)	15 (0.3)	3 (0.1)	7 (0.1)	14 (0.3)	14 (0.3)	10 (0.2)	9 (0.2)	8 (0.1)	3 (0.1)	4 (0.1)
Ciprofloxacin	726 (13.3)	809 (14.7)	955 (16.1)	978 (19.2)	1149 (22.3)	1409 (26.8)	1524 (30.1)	1611 (31.2)	1941 (35.4)	1301 (34.8)	1255 (32.8)
Penicillin	647 (11.8)	725 (13.2)	725 (12.2)	826 (16.2)	809 (15.7)	934 (17.8)	800 (15.8)	707 (13.7)	699 (12.8)	461 (12.3)	460 (12.0)
Tetracycline	1245 (22.8)	1288 (23.4)	1410 (23.7)	1287 (25.3)	1248 (24.2)	1187 (22.6)	1169 (23.1)	1322 (25.6)	1522 (27.8)	738 (19.7)	788 (20.6)

* Resistance: ciprofloxacin MIC ≥ 1.0 $\mu\text{g/mL}$; penicillin MIC ≥ 2.0 $\mu\text{g/mL}$ or β -lactamase positive; tetracycline MIC ≥ 2.0 $\mu\text{g/mL}$.

[†] Elevated MICs: azithromycin MIC ≥ 1.0 $\mu\text{g/mL}$ (2000–2004), MIC ≥ 2.0 $\mu\text{g/mL}$ (2005–2022); ceftriaxone MIC ≥ 0.125 $\mu\text{g/mL}$; cefixime MIC ≥ 0.25 $\mu\text{g/mL}$. Cefixime susceptibility was not tested in 2007 and 2008.

Figure 9. Resistance or Elevated Minimum Inhibitory Concentration (MIC) Patterns of *Neisseria gonorrhoeae* Isolates to Antimicrobials, Gonococcal Isolate Surveillance Project (GISP), 2022



Total # Antimicrobials	Azithromycin	Cefixime	Ceftriaxone	Ciprofloxacin	Penicillin	Tetracycline	Isolate Count	% Total Isolates
0*							1936	52.6
1	✓						72	2.0
1		✓					3	0.1
1				✓			732	19.9
1					✓		43	1.2
1						✓	321	8.7
2	✓			✓			31	0.8
2	✓					✓	31	0.8
2		✓		✓			1	0.0
2				✓	✓		120	3.3
2				✓		✓	83	2.3
2					✓	✓	115	3.1
3	✓			✓	✓		3	0.1
3	✓			✓		✓	7	0.2
3	✓				✓	✓	5	0.1
3		✓	✓	✓			1	0.0
3				✓	✓	✓	179	4.9
4	✓			✓	✓	✓	1	0.0

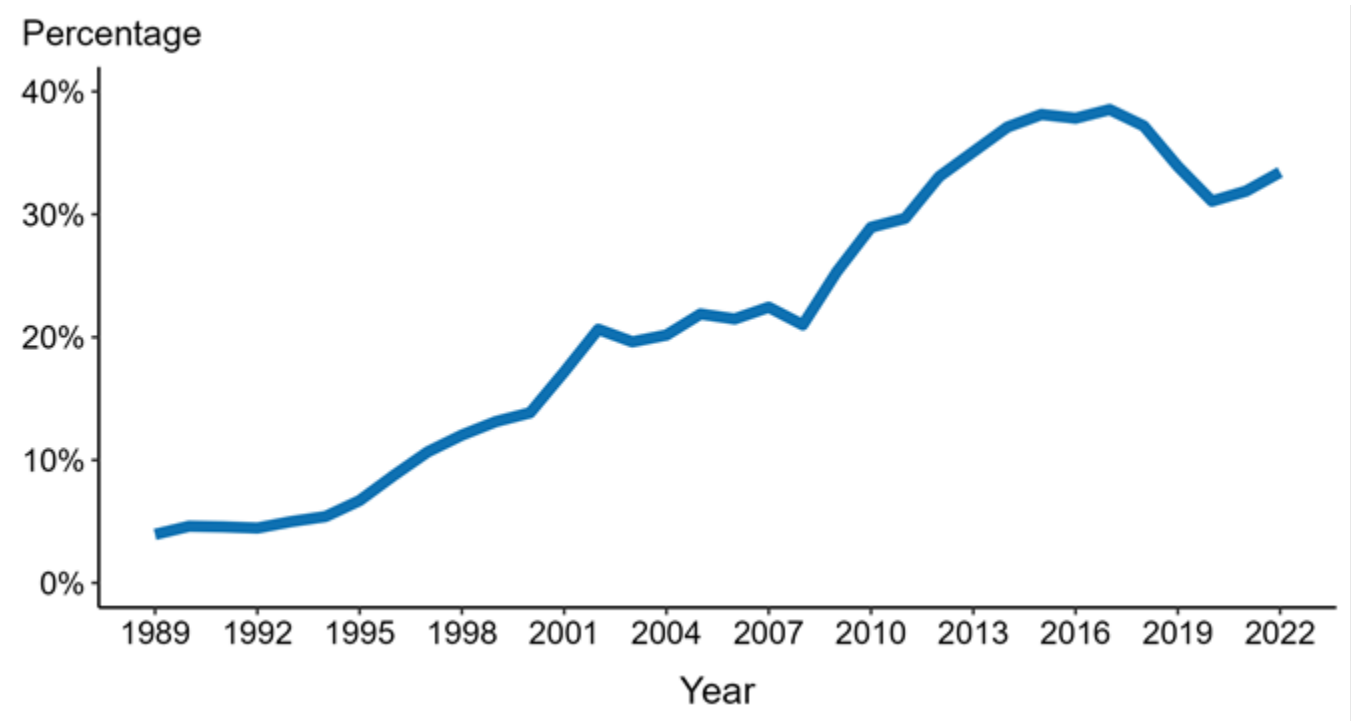
* Susceptible category includes isolates with penicillin (or β -lactamase negative), tetracycline, and ciprofloxacin MIC values that are not considered resistant (i.e., susceptible and intermediate resistant) based on Clinical & Laboratory Standards Institute criteria and isolates with ceftriaxone, cefixime, and azithromycin MIC values that are not considered elevated based on GISP "alert" values.

Elevated MICs = ceftriaxone MIC ≥ 0.125 $\mu\text{g/mL}$; cefixime MIC ≥ 0.25 $\mu\text{g/mL}$; azithromycin MIC ≥ 2.0 $\mu\text{g/mL}$.

Resistance = tetracycline MIC ≥ 2.0 $\mu\text{g/mL}$; ciprofloxacin MIC ≥ 1.0 $\mu\text{g/mL}$; penicillin MIC ≥ 2.0 $\mu\text{g/mL}$ or β -lactamase positive.

In the figure or table, respectively, a filled circle or check mark reflects resistance or an elevated MIC to a specific antimicrobial; only antimicrobial combinations with non-zero percentages are shown.

Figure 10. Percentage of Isolates Obtained from MSM Attending Participating STD Clinics, Gonococcal Isolate Surveillance Project (GISP), 1989-2022



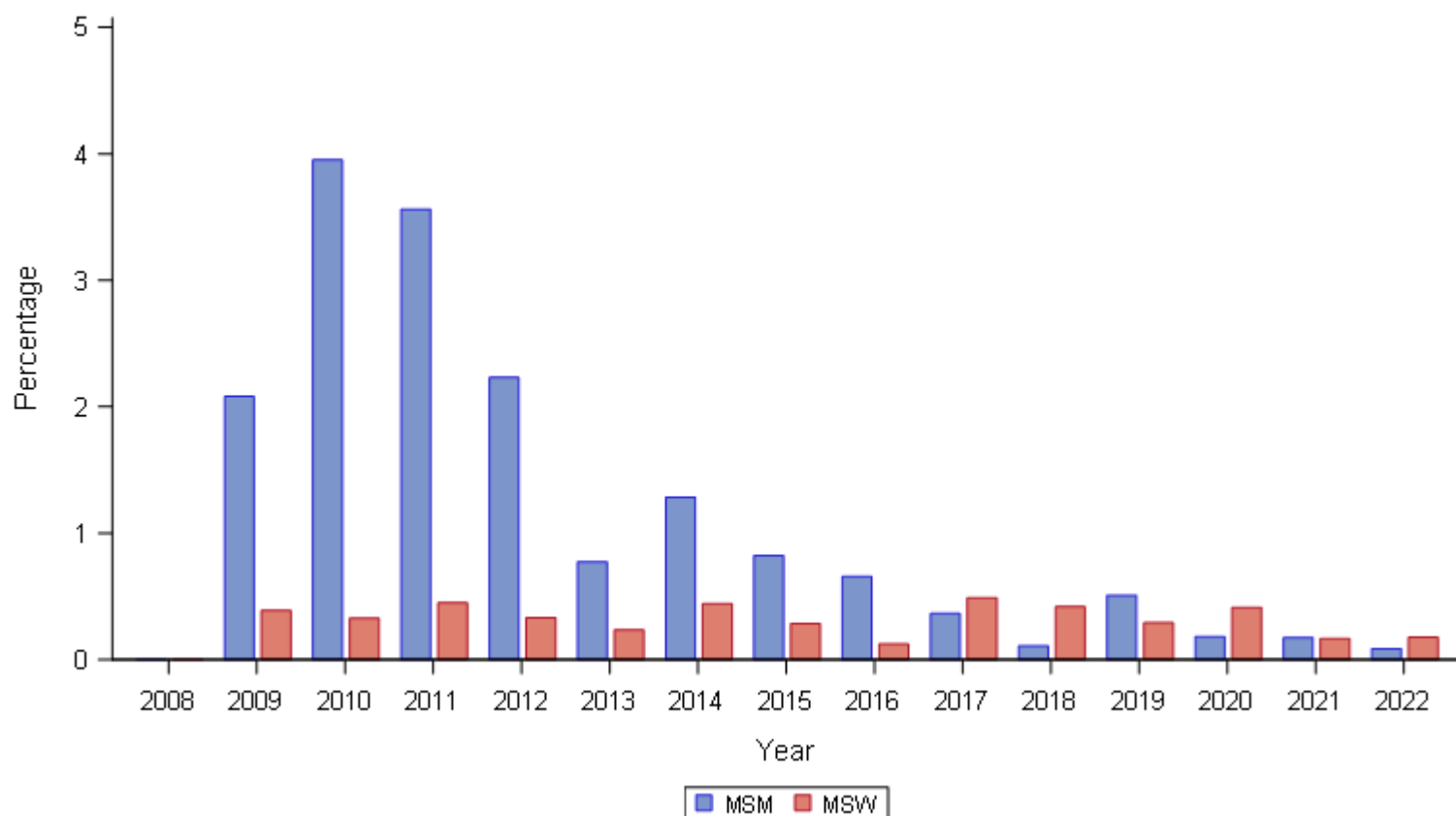
1989 n (%)	1990 n (%)	1991 n (%)	1992 n (%)	1993 n (%)	1994 n (%)	1995 n (%)	1996 n (%)	1997 n (%)	1998 n (%)	1999 n (%)	2000 n (%)	2001 n (%)	2002 n (%)	2003 n (%)	2004 n (%)	2005 n (%)
174 (3.9)	191 (4.6)	221 (4.6)	228 (4.5)	239 (5.0)	248 (5.4)	305 (6.7)	389 (8.7)	441 (10.7)	503 (12.0)	613 (13.1)	690 (13.8)	896 (17.2)	1069 (20.6)	1253 (19.6)	1202 (20.2)	1335 (21.9)

2006 n (%)	2007 n (%)	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)
1281 (21.5)	1316 (22.4)	1173 (21.0)	1393 (25.3)	1619 (28.9)	1599 (29.7)	1792 (33.1)	2070 (35.1)	1867 (37.1)	1944 (38.1)	1974 (37.8)	1922 (38.5)	1842 (37.2)	1767 (33.9)	1096 (31.1)	1143 (31.9)	1152 (33.4)

MSM = Gay, bisexual, and other men who have sex with men.

Results for 2022 are based on data obtained from participants in all participating GISP jurisdictions except for Pittsburgh due to missing data.

Figure 11. Percentage of *Neisseria gonorrhoeae* Isolates with an Elevated Minimum Inhibitory Concentration (MIC) to Cefixime by Reported Gender of Sex Partners, Gonococcal Isolate Surveillance Project (GISP), 2008-2022



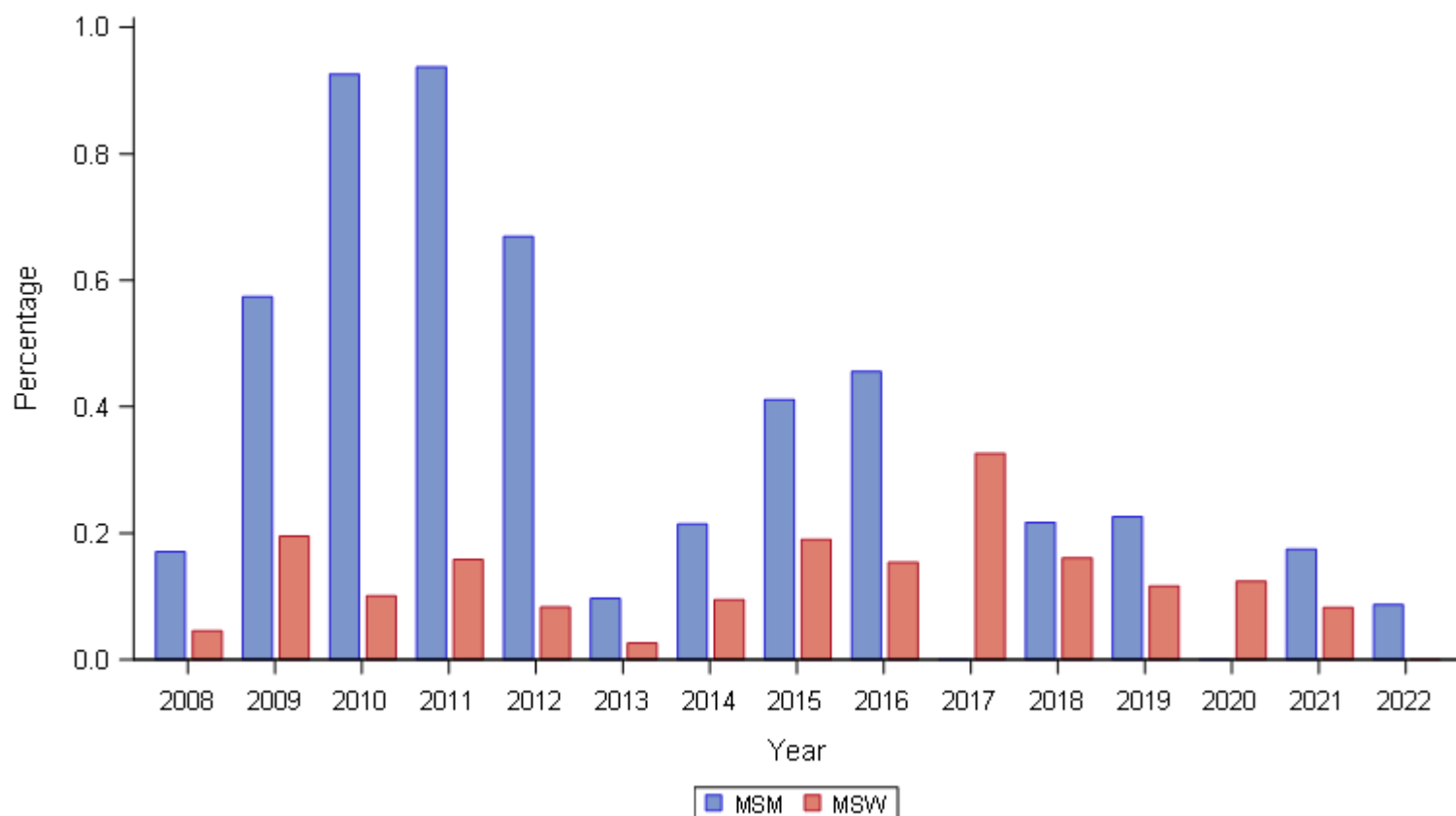
Gender of Sex Partners	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)
MSM	N/A	29 (2.1)	64 (4.0)	57 (3.6)	40 (2.2)	16 (0.8)	24 (1.3)	16 (0.8)	13 (0.7)	7 (0.4)	2 (0.1)	9 (0.5)	2 (0.2)	2 (0.2)	1 (0.1)
MSW	N/A	16 (0.4)	13 (0.3)	17 (0.4)	12 (0.3)	9 (0.2)	14 (0.4)	9 (0.3)	4 (0.1)	15 (0.5)	13 (0.4)	10 (0.3)	10 (0.4)	4 (0.2)	4 (0.2)

MSM = Gay, bisexual, and other men who have sex with men; MSW = Men who have sex with women only.

Isolates were not tested for cefixime susceptibility in 2008. Cefixime elevated MIC ≥ 0.25 $\mu\text{g/mL}$.

Results for 2022 are based on data obtained from participants in all participating GISP jurisdictions except for Pittsburgh due to missing data.

Figure 12. Percentage of *Neisseria gonorrhoeae* Isolates with an Elevated Minimum Inhibitory Concentration (MIC) to Ceftriaxone by Reported Gender of Sex Partners, Gonococcal Isolate Surveillance Project (GISP), 2008-2022



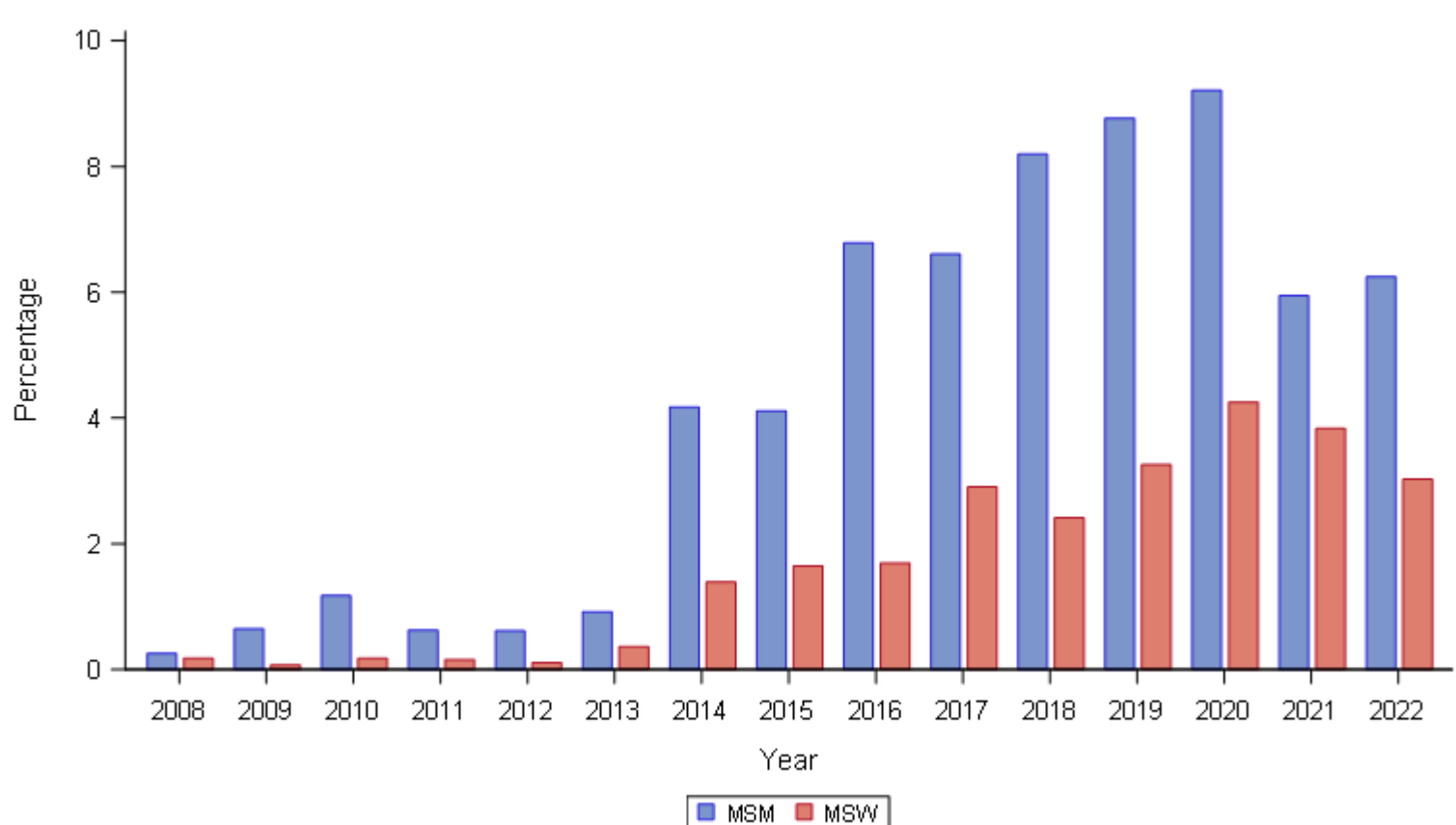
Gender of Sex Partners	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)
MSM	2 (0.2)	8 (0.6)	15 (0.9)	15 (0.9)	12 (0.7)	2 (0.1)	4 (0.2)	8 (0.4)	9 (0.5)	0 (0.0)	4 (0.2)	4 (0.2)	0 (0.0)	2 (0.2)	1 (0.1)
MSW	2 (0.0)	8 (0.2)	4 (0.1)	6 (0.2)	3 (0.1)	1 (0.0)	3 (0.1)	6 (0.2)	5 (0.2)	10 (0.3)	5 (0.2)	4 (0.1)	3 (0.1)	2 (0.1)	0 (0.0)

MSM = Gay, bisexual, and other men who have sex with men; MSW = Men who have sex with women only.

Ceftriaxone elevated MIC ≥ 0.125 $\mu\text{g/mL}$.

Results for 2022 are based on data obtained from participants in all participating GISP jurisdictions except for Pittsburgh due to missing data.

Figure 13. Percentage of *Neisseria gonorrhoeae* Isolates with an Elevated Minimum Inhibitory Concentration (MIC) to Azithromycin by Reported Gender of Sex Partners, Gonococcal Isolate Surveillance Project (GISP), 2008-2022



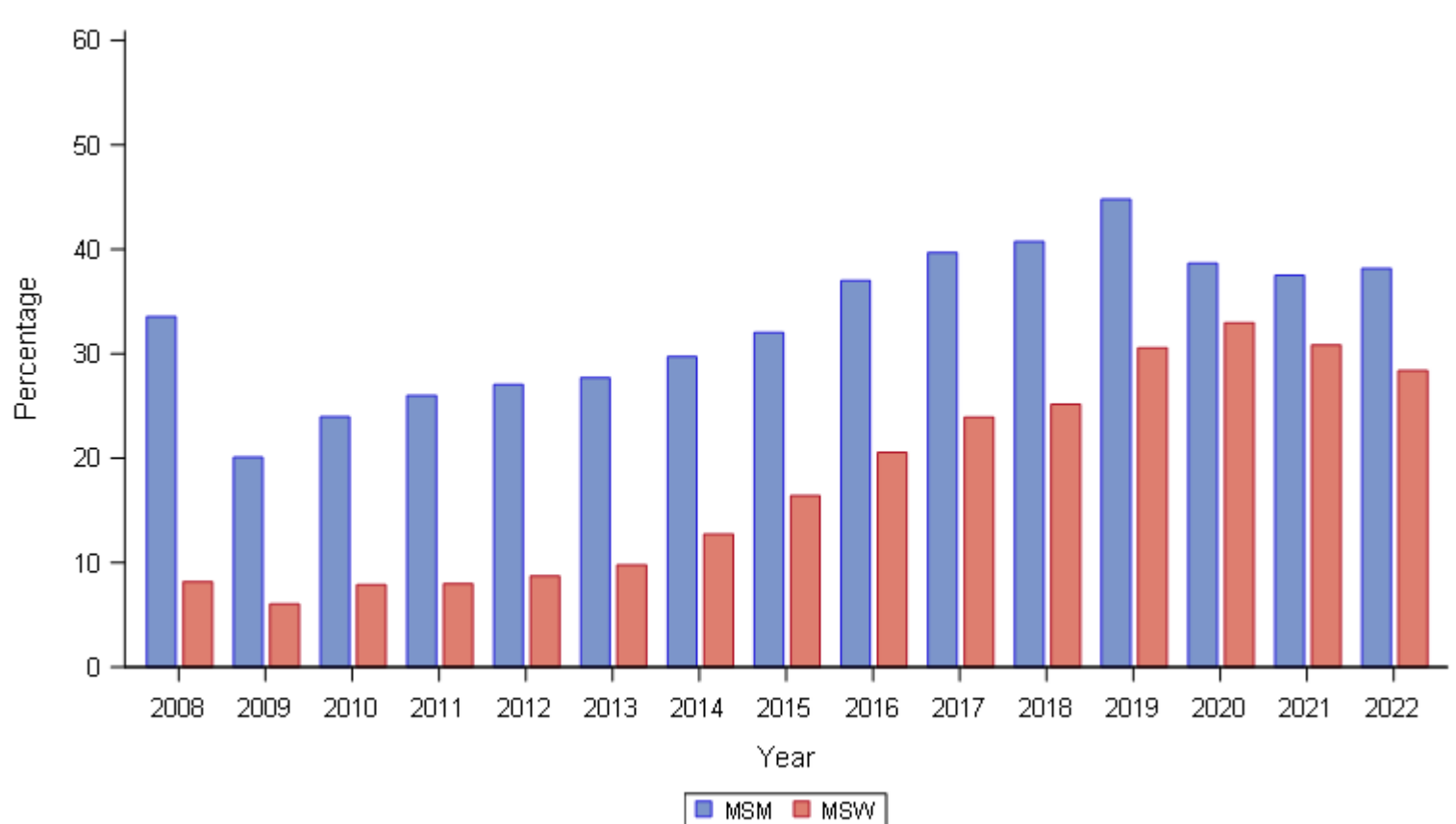
Gender of Sex Partners	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)
MSM	3 (0.3)	9 (0.6)	19 (1.2)	10 (0.6)	11 (0.6)	19 (0.9)	78 (4.2)	80 (4.1)	134 (6.8)	127 (6.6)	151 (8.2)	155 (8.8)	101 (9.2)	68 (5.9)	72 (6.2)
MSW	8 (0.2)	3 (0.1)	7 (0.2)	6 (0.2)	4 (0.1)	14 (0.4)	44 (1.4)	52 (1.6)	55 (1.7)	89 (2.9)	75 (2.4)	112 (3.3)	103 (4.3)	93 (3.8)	69 (3.0)

MSM = Gay, bisexual, and other men who have sex with men; MSW = Men who have sex with women only.

Azithromycin elevated MIC ≥ 2.0 $\mu\text{g/mL}$.

Results for 2022 are based on data obtained from participants in all participating GISP jurisdictions except for Pittsburgh due to missing data.

Figure 14. Percentage of *Neisseria gonorrhoeae* Isolates with Resistance to Ciprofloxacin by Reported Gender of Sex Partners, Gonococcal Isolate Surveillance Project (GISP), 2008-2022



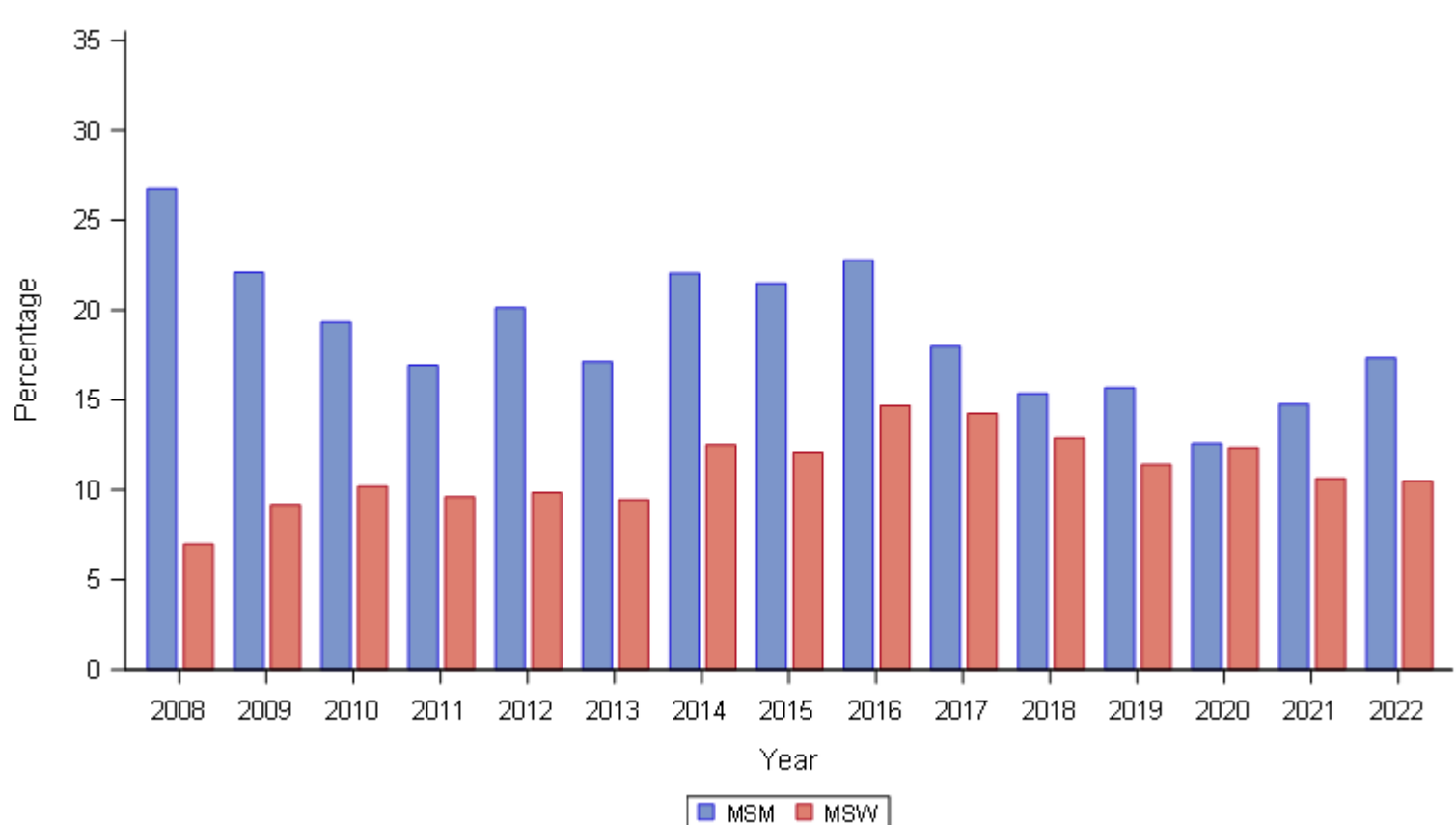
Gender of Sex Partners	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)
MSM	394 (33.6)	280 (20.1)	388 (24.0)	416 (26.0)	485 (27.0)	574 (27.7)	555 (29.7)	623 (32.0)	731 (37.0)	763 (39.7)	751 (40.7)	792 (44.8)	424 (38.7)	429 (37.5)	440 (38.2)
MSW	361 (8.2)	248 (6.0)	313 (7.9)	302 (8.0)	316 (8.7)	375 (9.8)	403 (12.7)	518 (16.4)	667 (20.5)	734 (23.9)	783 (25.2)	1051 (30.6)	799 (33.0)	749 (30.8)	647 (28.4)

MSM = Gay, bisexual, and other men who have sex with men; MSW = Men who have sex with women only.

Ciprofloxacin resistance MIC ≥ 1.0 $\mu\text{g/mL}$.

Results for 2022 are based on data obtained from participants in all participating GISP jurisdictions except for Pittsburgh due to missing data.

Figure 15. Percentage of *Neisseria gonorrhoeae* Isolates with Resistance to Penicillin by Reported Gender of Sex Partners, Gonococcal Isolate Surveillance Project (GISP), 2008-2022



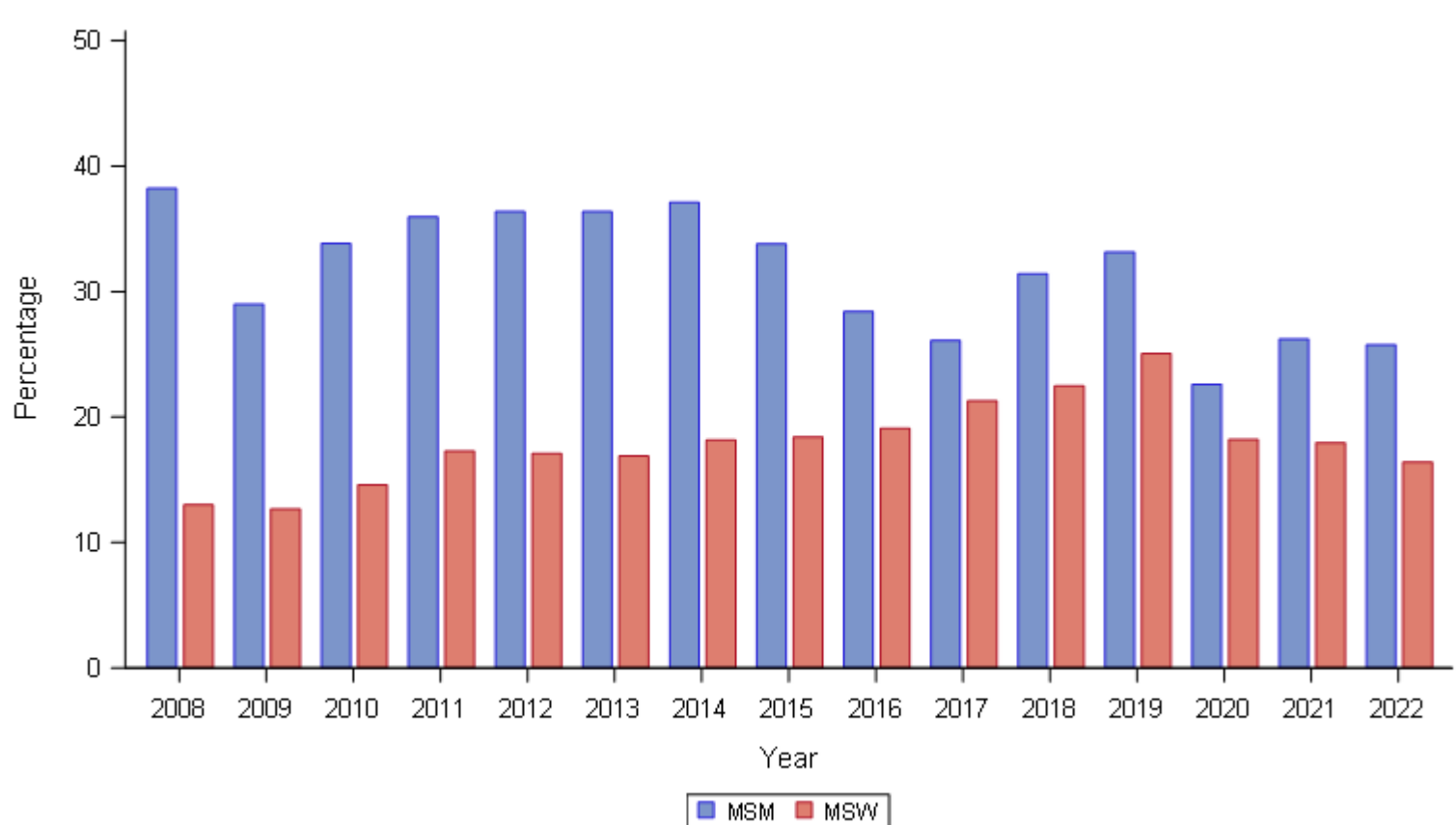
Gender of Sex Partners	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)
MSM	314 (26.7)	308 (22.1)	313 (19.3)	271 (16.9)	361 (20.1)	355 (17.1)	412 (22.1)	418 (21.5)	450 (22.8)	346 (18.0)	283 (15.4)	277 (15.7)	138 (12.6)	169 (14.8)	200 (17.3)
MSW	307 (7.0)	377 (9.2)	405 (10.2)	364 (9.6)	357 (9.8)	362 (9.5)	396 (12.5)	382 (12.1)	477 (14.7)	437 (14.2)	401 (12.9)	392 (11.4)	299 (12.3)	258 (10.6)	239 (10.5)

MSM = Gay, bisexual, and other men who have sex with men; MSW = Men who have sex with women only.

Penicillin resistance ≥ 2.0 $\mu\text{g/mL}$ or β -lactamase positive.

Results for 2022 are based on data obtained from participants in all participating GISP jurisdictions except for Pittsburgh due to missing data.

Figure 16. Percentage of *Neisseria gonorrhoeae* Isolates with Resistance to Tetracycline by Reported Gender of Sex Partners, Gonococcal Isolate Surveillance Project (GISP), 2008-2022



Gender of Sex Partners	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)
MSM	438 (38.2)	404 (29.0)	548 (33.8)	575 (35.9)	652 (36.4)	753 (36.4)	693 (37.1)	657 (33.8)	561 (28.4)	502 (26.1)	579 (31.4)	586 (33.1)	248 (22.6)	300 (26.2)	297 (25.8)
MSW	555 (13.0)	520 (12.7)	580 (14.6)	655 (17.3)	620 (17.1)	647 (16.9)	575 (18.2)	581 (18.4)	620 (19.1)	653 (21.3)	699 (22.5)	861 (25.1)	441 (18.2)	436 (18.0)	374 (16.4)

MSM = Gay, bisexual, and other men who have sex with men; MSW = Men who have sex with women only.

Tetracycline resistance ≥ 2.0 $\mu\text{g/mL}$.

Results for 2022 are based on data obtained from participants in all participating GISP jurisdictions except for Pittsburgh due to missing data.