Virginia Department of Health, Office of Epidemiology
Division of Disease Prevention

August 15, 2012

Virginia GISP Data Report 2011

Gonococcal Isolate Surveillance Project Overview

The Gonococcal Isolate Surveillance Project (GISP) is a national sentinel surveillance system which was established by the Centers for Disease Control and Prevention (CDC) in 1986. The purpose of GISP is to monitor trends in antimicrobial susceptibilities of *Neisseria gonorrhoeae* (i.e. gonorrhea) strains in the United States. That is, GISP tracks gonorrhea resistance to various antibiotics.

GISP is a collaborative project among selected sexually transmitted disease (STD) clinics, five regional laboratories, and the CDC. There are currently approximately 25-30 sentinel STD clinics participating in GISP. Data collected for this project are used to establish a rational basis for the selection of gonococcal therapies, and help inform CDC's STD Treatment recommendations.

As part of GISP activities, urethral isolates are collected from the first 25 male patients with symptoms of gonorrhea who attend participating STD clinics each month. These *N. gonorrhoeae* isolates are sent to regional laboratories where the susceptibilities of the isolates to antimicrobial agents are determined by agar dilution. Antimicrobials tested include: penicillin, tetracycline, spectinomycin, ciprofloxacin, ceftriaxone, cefixime, and azithromycin.

Virginia became a GISP sentinel site in late 2007. In 2011, STD clinics in three Virginia localities participated in GISP activities, including Richmond City, Henrico County, and Chesterfield County (hereafter the 'Richmond area')

GISP Participating Sentinel Sites & Regional Laboratories, United States, 2010

Source: CDC, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Division of STD Prevention

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Gonococcal Isolate Surveillance Project Report

Gonorrhea in the Richmond Area

Gonorrhea (*Neisseria gonorrhoeae* infection) is the second most commonly reported notifiable disease in the United States. In Virginia, the 2010 gonorrhea rate was 89.6 per 100,000 population, compared to a national gonorrhea rate of 100.8 per 100,000.

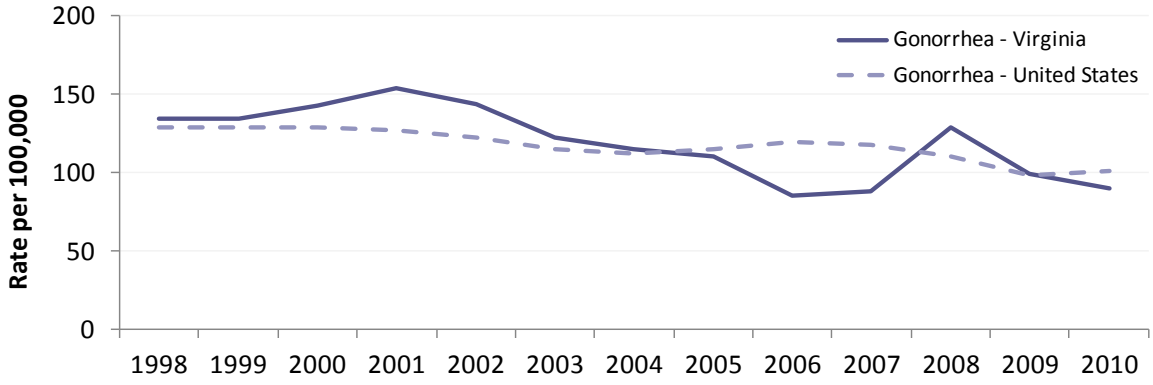
Gonorrhea rates have remained mostly stable with only a slight downward trend over the past decade (Figure 1).

The city of Richmond has historically had high gonorrhea rates, and there are large disparities in STD rates between Richmond and the surrounding localities (Figure 2). There are approximately 1,000 cases of gonorrhea diagnosed in the Richmond area each year.

In 2010 the gonorrhea rate for the city of Richmond was 340.8 per 100,000, significantly higher than the 102.0 and 71.5 per 100,000 observed in Henrico and Chesterfield counties, respectively. That is, Richmond's gonorrhea rate was 3.3 times that of Henrico County and 4.8 times that of Chesterfield County.

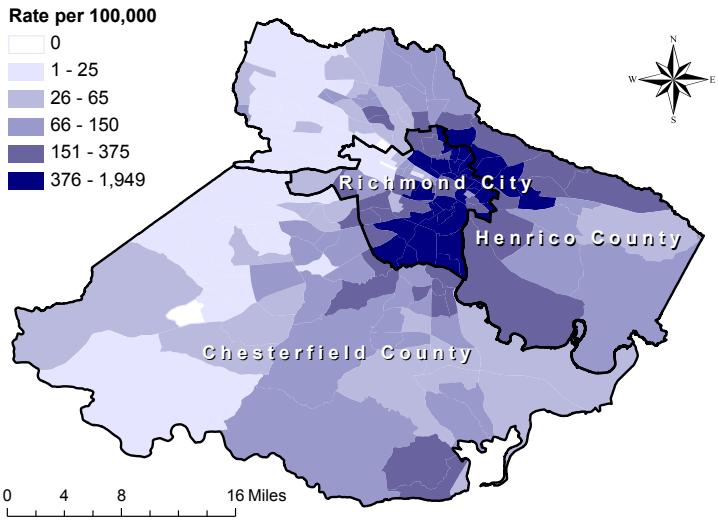
For more information on national STD data, see the CDC's report, *Sexually Transmitted Disease Surveillance, 2010*: http://www.cdc.gov/std/stats10/

Figure 1. Annual Gonorrhea Rates, 1998-2010



Source: CDC's 2010 Sexually Transmitted Disease Surveillance Report & VDH gonorrhea surveillance data

Figure 2. 5-Year Average Gonorrhea Rates by Census Tract, Richmond Area, 2006-2010



Source: VDH surveillance data and US Census Bureau population estimates

Fast Facts

- Gonorrhea is the second most commonly reported STD in the US
- There are over 300,000 cases of gonorrhea reported each year in the US
- Gonorrhea rates are highest among adolescents and young adults
- In 2010, the gonorrhea rate among blacks was 18.7 times higher than the rate among whites (432.5 compared to 23.1 cases per 100,000)

Managing GISP Activities in Virginia

GISP activities in Virginia are coordinated by Health Informatics and Integrated Surveillance Systems (HIISS) staff within the Division of Disease Prevention (DDP) at the Virginia Department of Health's central office. Data management and quality assurance activities also occur at the central office.

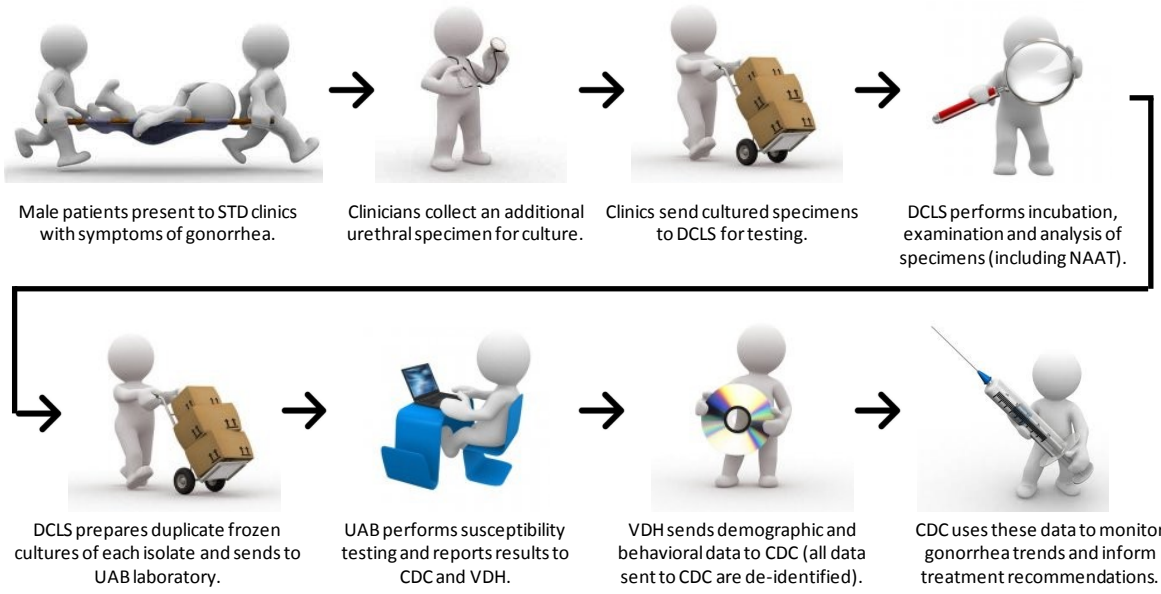
GISP activities involve collaboration with the health department STD clinics in 3 Virginia localities (Richmond City, Chesterfield County, and Henrico County), as well as the Division of Consolidated Laboratory Services (DCLS).

Clinical staff at the participating local STD clinics collect an additional urethral specimen from male patients presenting to the clinic with symptoms of gonorrhea. These specimens are sent to the state laboratory (DCLS) for culture and confirmation testing, and all *Neisseria gonorrhoeae* positive isolates are then forwarded to the University of Alabama-Birmingham (UAB) laboratory for antimicrobial susceptibility testing.

Patients visiting participating STD clinics are also asked to complete self-administered interview forms during the registration process as part of the STD Surveillance Network (SSuN) project. These completed interview forms are sent to the central office for data entry into the SSuN data system, and certain questions are then pulled out of this system and matched to GISP isolate data.

This matching allows for the assessment of enhanced data not routinely collected through traditional surveillance methods. For example, information on patient risk behaviors, such as intravenous drug use and men who have sex with men (MSM), can be matched to antimicrobial susceptibility results.

Figure 3. Diagram of GISP Procedures in Virginia



The Centers for Disease Control and Prevention's complete Gonococcal Isolate Surveillance Project protocol can be found at: http://www.cdc.gov/std/gisp/GISP-Protocol07-15-2010.pdf

National Trends in Antimicrobial Resistance

Neisseria gonorrhoeae (NG) has demonstrated the ability to progressively develop antibiotic resistance. Gonorrheal antimicrobial resistance undermines treatment success, heightens risk of complications, and facilitates transmission of infection.

Penicillin was first used to treat NG infections in 1943 during World War II. However, by the 1970s gonorrhea strains resistant to penicillin began to emerge, and by the 1980s the CDC noted an increasing frequency of penicillin-, tetracycline-, and spectinomycin-resistant strains of gonorrhea.

In 1993 the CDC recommended the use of broad-spectrum cephalosporins or fluoroquinolones for primary treatment of uncomplicated gonorrhea. Resistance to ciprofloxacin (a fluoroquinolone antimicrobial) was first identified at GISP sites in 1991.

Since 1999, fluoroquinolone-resistant *Neisseria gonorrhoeae* (QRNG) prevalence steadily increased, first in Hawaii and the Pacific Islands, then in the Western states, then among MSM, and eventually among all populations in all regions of the United States. Since April 2007, the CDC has advised against the use of fluoroquinolones for the treatment of gonorrhea.

Third generation cephalosporins (including ceftriaxone and cefixime) are the last class of antibiotic available to treat gonorrhea. Gonococcal isolate minimum inhibitory concentrations (MICs) to cefixime and ceftriaxone have increased recently, with increases primarily occurring in the western United States and among MSM, much like the pattern observed prior to the emergence of fluoroquinolone resistance.

Treatment Recommendations

The current recommended treatment regimen for uncomplicated gonococcal infections of the cervix, urethra, and rectum is as follows:*

Ceftriaxone 250 mg as a single intramuscular dose

PLUS

Azithromycin 1 g orally in a single dose
or
Doxycycline 100 mg orally 2x daily for 7 days

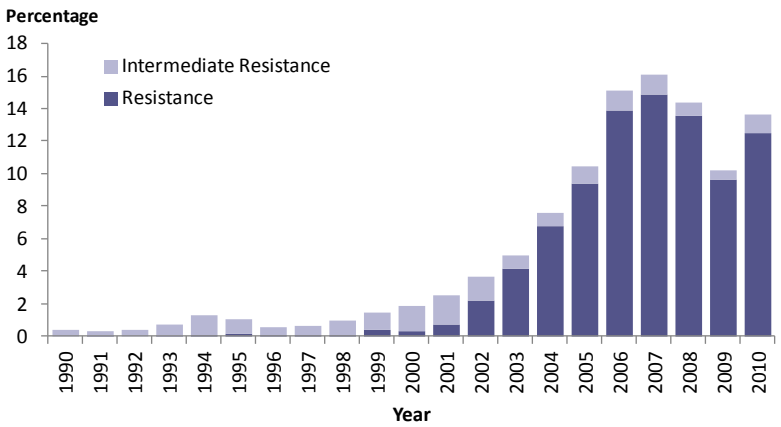
For more information and alternative regimens, see: http://www.cdc.gov/std/treatment/2010/gonococcal-infections.htm

* Treatment recommendations current as of August 9, 2012. This regimen is recommended for all adult and adolescent patients, regardless of travel history or sexual behavior.

Antimicrobial Resistance

- Since April 2007, the CDC has advised against the use of fluoroquinolones for the treatment of gonorrhea, based on data indicating widespread drug resistance in the US.
- In 2010, 12.5% of the isolates tested for susceptibility were resistant to ciprofloxacin.

Figure 4. Percentage of GISP Isolates with Resistance or Intermediate Resistance to Ciprofloxacin, 1990-2010



Source: CDC's 2010 Sexually Transmitted Disease Surveillance Report-Gonorrhea

National GISP Data Summary, 2010

Antimicrobial Resistance in the United States

The prevalence of flouroquinolone-resistant *Neisseria gonorrhoeae* (QRNG) among GISP isolates peaked in 2007 at 14.8%. This proportion decreased to 9.6% by 2009, and increased to 12.5% in 2010.

The prevalence of QRNG in isolates from men who have sex with men (MSM) peaked at 38.9% in 2006. In 2010, 23.9% of isolates from MSM and 7.9% of isolates from men who have sex exclusively with women were identified as QRNG.

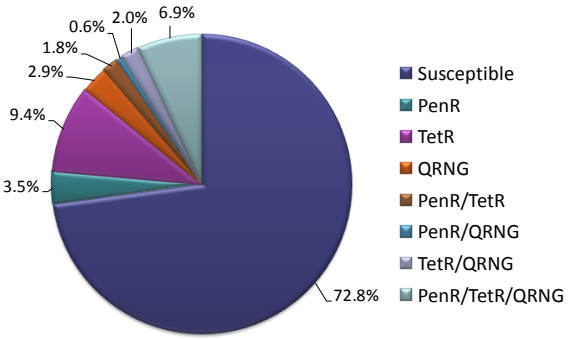
Overall, 27.2% of isolates collected from GISP sites in 2010 were resistant to penicillin, tetracycline, ciprofloxacin, or some combination of those antibiotics (Figure 4).

No NG isolates with decreased susceptibility to ceftriaxone (MIC ≥ 0.5 µg/ml) were seen in 2010.

Since 2000, GISP has reported 20 isolates with decreased susceptibility to cefixime (MICs of 0.5 µg/ml). Nine isolates with decreased susceptibility to cefixime were reported in 2010 - 7 were from the West and 2 were from the Midwest. In 2010, eight (88.9%) isolates with decreased susceptibility to cefixime were from MSM.

In 2010, 17 isolates were identified with decreased susceptibilty to azithromycin (MIC ≥ 8.0 µg/ml). Of these 17 isolates, 76.5% were from the West and 82.4% were from MSM.

Figure 5. Penicillin, Tetracycline, and Ciprofloxacin Resistance Among GISP Isolates, United States, 2010



Note: PenR = penicillinase producing *Neisseria gonorrhoeae* (NG) and chromosomally mediated penicillin-resistant NG; TetR = chromosomally and plasmid mediated tetracycline-resistant NG; and QRNG = quinolone-resistant NG.

Source: CDC's 2010 Sexually Transmitted Disease Surveillance Report

Antimicrobial Treatments Given for Gonorrhea

The current recommended treatment for uncomplicated gonococcal infections of the urethra, cervix, or rectum is 250 mg ceftriaxone plus 1 g azithromycin.

In 2010, 96.5% of GISP patients were treated with cephalosporins. The proportion treated with ceftriaxone (250 mg) increased from 21.6% in 2009 to 37.4% in 2010. The proportion treated with cefixime decreased from 13.2% in 2008 to 7.8% in 2010.

Among patients treated with a cephalosporin, 75.3% were also treated with azithromycin, 23.6% were also treated with doxycycline, 0.1% were also treated with another antibiotic, and 1.1% did not receive a second antibiotic.

During 2010, 0.5% of GISP patients were treated with fluoroquinolones (ciprofloxacin, ofloxacin, or levofloxacin) and 1.7% were treated with azithromycin monotherapy.

Note: The data in this summary were extracted from the *2010 National STD Surveillance Report*. More information may be found online at: **www.cdc.gov/std/Gisp/**

Gonococcal Isolate Surveillance Project Report

Virginia GISP Data Summary, 2007-2011

Characteristics of GISP Patients

A total of 228 *Neisseria gonorrhoeae* isolates were collected from symptomatic males who attended Richmond area STD clinics from 2007 through 2011 (Figure 6). The majority of these GISP participants were non-Hispanic blacks (94%), between 20-29 years of age (55%), and heterosexual (61%). Only 11% of isolates were collected from men who reported having sex with men (MSM) (Figure 7).

Approximately 38% of GISP patients reported a previous history of gonorrhea infection, and 12% had at least one episode of gonorrhea in the previous year.

GISP participants reported the following risk behaviors:

- 40% used non-injection drugs in the previous 60 days (mostly marijuana)
- 4% gave or received drugs or money for sex in the previous 60 days
- 2% reported injection drug use in the previous 60 days

Figure 6. Count of GISP Isolates Collected in Virginia, 2007-2011

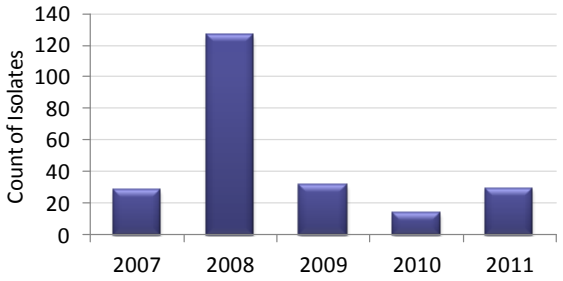


Figure 7. Sexual Orientation of GISP Patients in Virginia, 2007-2011

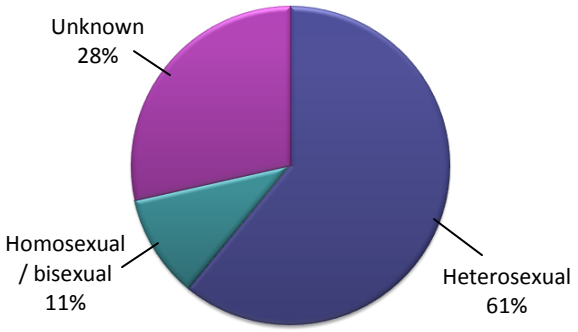


Table 1. Antimicrobial Resistance in Virginia, 2007-2011

	Total	Penicillin Resistant		Tetracycline Resistant		Ciprofloxacin Resistant	
Year	Isolates	Count	Percent	Count	Percent	Count	Percent
2007	28	1	3.6%	2	7.1%	5	17.9%
2008	126	0	0.0%	0	0.0%	27	21.4%
2009	31	1	3.2%	0	0.0%	5	16.1%
2010	14	2	14.3%	3	21.4%	1	7.1%
2011	29	4	13.8%	7	24.1%	3	10.3%
Total	228	8	3.5%	12	5.3%	41	18.0%

Summary of Antimicrobial Resistance in Virginia, 2007-2011

- **18.0% of isolates were resistant to ciprofloxacin**
- **3.5% of isolates were resistant to penicillin**
- **5.3% of isolates were resistant to tetracycline**
- **No isolates have been resistant to either cephalosporins or azithromycin**

For questions or comments regarding this report or Virginia gonorrhea data, please contact the VDH GISP Coordinator:
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