

# Addressing the Threat of Drug-Resistant Gonorrhea

Antibiotic resistance is threatening the effectiveness of gonorrhea treatment in the United States. Gonorrhea is one of the most common sexually transmitted diseases (STDs), with more than 800,000 infections estimated to occur in the United States each year. Left untreated, it can cause serious health problems, particularly for women, including chronic pelvic pain, life-threatening ectopic pregnancy, and even infertility. And while medication for gonorrhea has been available for decades, the bacteria has grown resistant to nearly every drug ever used to treat it.

In response to the ongoing threat of drug resistance, CDC has repeatedly revised its gonorrhea treatment guidelines to phase out the use of antibiotics that have become less effective in treating the infection. In the United States today, only one recommended treatment option remains – a combination of the antibiotics azithromycin and ceftriaxone.

CDC encourages providers to adhere to the recommended dual therapy treatment guidelines, and urges researchers in the public and private sectors to step up efforts to develop new treatments for this common but potentially serious STD. It's also essential to maintain systems and services across the United States to prevent, diagnose and treat gonorrhea. Effective diagnosis and treatment are essential to protect individual health and stop the spread of infection, including resistant strains.

## Gonorrhea Treatment: A Shrinking Arsenal

Over the years, gonorrhea has developed resistance to nearly every drug ever used to treat it, including sulfonamides, penicillin, tetracycline, and fluoroquinolones. Due to widespread resistance to each of these antibiotics, by 2007, only cephalosporins — including the oral antibiotic cefixime and the injectable antibiotic ceftriaxone — were left to effectively treat gonorrhea.

CDC's Gonococcal Isolate Surveillance Project (GISP) closely monitors for early warning signs of resistance to recommended treatments. In 2012, after evidence from GISP suggested that resistance to cefixime was emerging, CDC issued new guidelines recommending against its use. Evidence indicates that this change helped slow the emergence of cephalosporin resistance, but only one recommended treatment option now remains: ceftriaxone injections combined with oral azithromycin.

While this regimen continues to be effective, recent CDC data indicate that resistance to azithromycin is emerging. This information, coupled with past experience suggests our ability to cure people with gonorrhea will fade unless we take steps now to address growing antibiotic resistance.

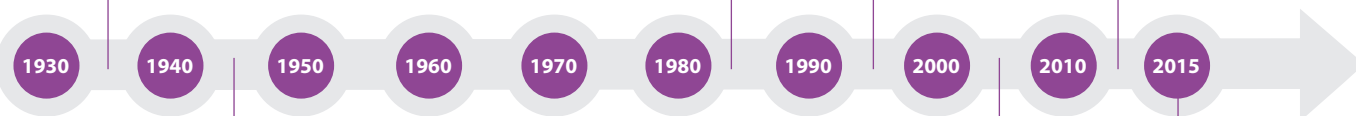
### Historical Trends in Drug Resistance

**1930s:** Introduction of sulfanamide antimicrobials to treat GC

**1980s:** Due to increasing resistance, penicillin and tetracycline no longer recommended to treat GC

**1990s:** Fluoroquinolones become predominant treatment

**2012:** Cefixime no longer recommended as first-line regimen, leaving ceftriaxone-based dual treatment as last recommended treatment



**1940s:** Due to increasing resistance, sulfanamides no longer recommended for GC treatment; penicillin becomes treatment of choice

**2007:** Fluoroquinolones no longer recommended; cephalosporins (incl. injectable ceftriaxone and oral cefixime) become backbone of GC treatment

**2015:** Ceftriaxone plus azithromycin is the only recommended treatment for treating GC



## Monitoring for Drug Resistance

Since 1986, GISP has routinely monitored how *Neisseria gonorrhoeae* – the bacteria that causes gonorrhea – responds to antibiotics. The surveillance system annually collects approximately 5-6,000 *N. gonorrhoeae* samples from men with urethral gonorrhea at STD clinics in approximately 25-30 U.S. cities and measures the concentration of various antibiotics needed to stop the bacteria's growth in the laboratory. A "minimum inhibitory concentration" (MIC) is the lowest concentration of drug needed to stop growth and is an indication of how susceptible the bacteria is to treatment with a given antibiotic. The higher the MIC, the greater the dose of antibiotics required for effective treatment. If MICs become too high, the antibiotic will not work at all.

From 2013 through 2014 the percentage of samples with elevated MICs of azithromycin increased more than 300 percent (from 0.6 percent to 2.5 percent). This is the largest increase since monitoring for this drug began, and increases have occurred across the country. Gonorrhea remains more susceptible to azithromycin than to other antibiotics, such as penicillin (16.2 percent with elevated MICs in 2014) or tetracycline (25.3 percent with elevated MICs in 2014), and azithromycin combined with ceftriaxone is still an effective treatment option for gonorrhea. However, the data suggest time may be running out.

While the currently recommended treatment continues to be effective, there has been at least one reported case outside the country which required increased drug dosing to cure. Increased action to monitor for and prevent increased resistance is essential.

## STD Testing and Treatment Services are Vital for Containing the Threat of Antibiotic Resistant Gonorrhea

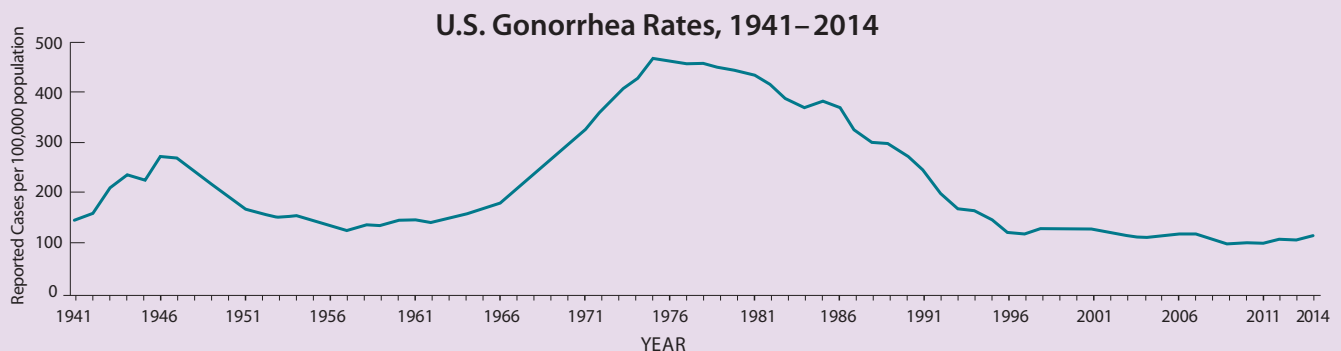
Rates of gonorrhea and several other reportable STDs have been increasing nationwide in recent years. STD prevention services play a vital role in keeping antibiotic resistant gonorrhea, and other STDs, from flourishing in the community by providing critical testing and treatment options. With an estimated 20 million new sexually transmitted infections occurring each year, public health agencies cannot provide services to all those who need them.

The public health and health care systems must work together. CDC is taking action by collaborating with state and local health departments to extend the reach of existing STD prevention services by providing testing services, medications and other resources to STD clinics and health departments, improving STD surveillance and electronic health records management, and training Disease Intervention Specialists for outbreak response.

### About Gonorrhea

Of the more than 800,000 new infections every year, fewer than half are diagnosed – and CDC surveillance data indicates that after decades of declines, new infections are on the rise.

If undiagnosed and untreated, gonorrhea can cause serious health problems. For women, it can increase their risk for a life-threatening ectopic pregnancy. And for men and women, the infection can cause conditions that can lead to infertility. Untreated gonorrhea can also increase a person's risk of acquiring or transmitting HIV. And untreated gonorrhea may be transmitted to others, further accelerating the spread of infection and increasing the risk of an eventual treatment failure.



# Improved Surveillance and Accelerated Drug Development Urgently Needed

As part of the federal government's broader Combating Antibiotic Resistant Bacteria (CARB) Action Plan, CDC specifically addresses the threat of antibiotic resistant gonorrhea by strengthening the timeliness of surveillance systems, working with state and local health departments to enhance their capacity to monitor and test for resistant gonorrhea infections and developing rapid response strategies to effectively contain the spread of resistant gonorrhea, in the event that resistance is detected.

Action from healthcare providers, state and local health departments, and public and private partners is urgently needed to prevent untreatable gonorrhea from becoming a reality:

- **Healthcare Providers** — Physicians and other healthcare providers are on the front lines in the fight against gonorrhea and play a critical role in our response. CDC encourages all providers to:
  - Take a sexual history. This will help you know which STDs to test your patient for and at which anatomic sites.
  - Adhere to CDC's recommendations by always treating gonorrhea promptly with a combination of injectable ceftriaxone and oral azithromycin, including post-treatment testing to confirm cure when recommended ([www.cdc.gov/std/treatment](http://www.cdc.gov/std/treatment))
  - Follow key CDC screening recommendations, including:
    - Screen all sexually active women younger than 25 years, as well as older women with risk factors such as new or multiple sex partners, or a sex partner who has a sexually transmitted infection.
    - Screen sexually active MSM at anatomic sites of possible exposure at least annually.
  - Evaluate and treat all patients' sex partners from the previous 60 days
  - Obtain cultures to test for decreased susceptibility from any patients with suspected or documented gonorrhea treatment failures
  - Report any suspected treatment failure to local or state public health officials within 24 hours, helping to ensure that any potential resistance is recognized early
- **Health Departments and Laboratories** — State and local health departments and other laboratories should enhance or rebuild gonorrhea culture capacity so that antibiotic resistance testing can be performed to ensure resistant infections are quickly detected and reported. If antibiotic resistance testing cannot be performed locally, facilities should identify and partner with other labs that can perform such testing. Health departments should notify CDC of treatment failures immediately. Laboratories should also inform local or state public health officials of any isolates with decreased susceptibility to cephalosporins.
- **Researchers and Drug Developers** — CDC urges scientists and private-sector drug developers to prioritize the identification and study of effective new antibiotic treatments for gonorrhea. With few new drugs in the pipeline, it is important to accelerate research on new drugs or drug combinations now, as it takes years to bring new drugs to market.

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