Potential Emergence of Multi-Drug Resistant Gonorrhea

A call for action
Gonorrhea, caused by a bacterium called *Neisseria gonorrhoeae*, is the second most commonly reported communicable disease in the United States with 309,341 cases reported to CDC in 2010. These reported cases represent only a fraction of actual cases; CDC estimates that more than 600,000 persons in the U.S. become infected with gonorrhea each year.

Untreated gonorrhea is usually asymptomatic but can have serious health consequences, such as pelvic inflammatory disease (PID) and infertility, and can cause potentially life-threatening diseases, such as ectopic pregnancy in women and increase a person’s risk for acquiring HIV.

Gonorrhea: a very complex bacteria
Treatment has been complicated by the ability of *Neisseria gonorrhoeae* to develop resistance to almost every antibiotic recommended for treatment: first the sulfonamides, then tetracycline, penicillin and most recently the fluoroquinolones.

CDC now recommends dual therapy based on only one class of antibiotics, called cephalosporins – the preferred cephalosporin is ceftriaxone (administered via injection) --together with another antibiotic, azithromycin.

Findings from recent studies signal the potential emergence of resistance to cephalosporins, the last line of defense for treating gonorrhea. CDC’s gonorrhea antimicrobial resistance laboratory surveillance program is now showing disturbing trends of decreasing susceptibility to oral cephalosporins. Actual treatment failures have been reported in other parts of the world raising concerns that strains of gonorrhea with decreased susceptibility can be imported into the U.S. by travelers. It is now more critical than ever to be vigilant to identify resistance in this country.

These treatment failures and the past experience with gonorrhea’s ability to mutate and develop resistance, coupled with recent laboratory surveillance findings, suggest that cephalosporin-resistant strains of gonorrhea are likely to develop in the United States in the coming years. The question we do not know the answer to is when, but we do know we must be better prepared.

The emergence of cephalosporin resistance would substantially limit treatment options and would be a significant public health concern, in particular because untreated gonorrhea can lead to costly and severe public health consequences.
Scope of the problem
Multi-drug resistant gonorrhea would have substantial health and economic consequences in the United States. First, there would be an increase in gonorrhea in the population because people with gonorrhea will remain infectious for a longer period of time. This increase in gonorrhea would lead to increases in PID in women and epididymitis in men. Second, because gonorrhea can facilitate the acquisition and transmission of HIV, the increase in gonorrhea prevalence could lead to increases in new HIV infections as well.

Impact
Multi-drug resistant gonorrhea increases the economic burden on the entire healthcare system since resistant infections cost more to treat and can prolong healthcare use. Modeling studies\(^1\) suggests that gonorrhea prevalence in the population could increase by 7% to 40% per year as a result of antimicrobial resistance developing in a population without additional therapies, and these increases could last for about seven years before leveling off. Gonorrhea rates seven years after onset of antimicrobial resistance would be 4.3 times higher than they are now. Over 7 years, there would be an additional 5.9 million cases of gonorrhea as a result of drug resistance.

Costs of the additional gonorrhea cases
The additional 5.9 million cases of untreatable gonorrhea would result in 255,000 cases of PID in women (which includes about 51,000 cases of tubal-factor infertility) at a cost of $585 million and 50,000 cases of epididymitis in men at a cost of $15 million.

There could be an additional 775 cases of HIV over 7 years as a result of the increase in gonorrhea, at a cost of $180 million. These additional cases of HIV would likely have the heaviest impact on populations that already have substantial disparities in HIV morbidity: Non-Hispanic blacks and men who have sex with men.

Research and development needs
There is an urgent need to develop new and effective antibiotic treatments for gonorrhea. CDC is collaborating with the National Institute of Allergy and Infectious Diseases to test new antibiotic combinations for the bacteria. However, these studies take time before suitable treatment options can be found.