Bacterial STIs
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Dr. Victoria Mobley

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Hello, my name is Doctor Victoria Mobley and I am a medical epidemiologist with the North Carolina Division of Public Health. This unit of the Communicable Disease course will cover the bacterial sexually transmitted infections that are reportable in North Carolina. Today I will cover the basic clinical information about each infection including the recommended first-line therapy and how to locate any additional information you may need.

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At the end of this talk you should be able to list all of NC's reportable STIs; have a basic understanding of the clinical course of the reportable bacterial STIs; identify the CDC approved treatment regimens; easily locate where you can access the case definitions as well as guidance on how to report the STIs to North Carolina's statewide Electronic Disease Surveillance System.

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There are 12 reportable sexually transmitted infections in North Carolina, four of which are caused by viruses (HIV, HAV, HBV and HCV), which will be covered in separate lectures. Also, although syphilis is a reportable bacterial STI, due to the complexities involved in the clinical diagnosis and treatment of syphilis infections, it will be covered it in a separate presentation for this course. You may have also noticed that this list does not include the most common STIs that bring individuals into health departments and STD clinics such as trichomoniasis, genital herpes and human papilloma virus also known as HPV. Although these infections are more prevalent in the US, they are not reportable in North Carolina.

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Alright, so **Chlamydia** tops the list. Chlamydia is the most frequently reported bacterial infection in the US and in North Carolina. In 2012, North Carolina reported 50,606 cases of chlamydia to CDC. Chlamydia is caused by a gram-negative bacterium called Chlamydia trachomatis and usually presents as cervicitis, urethritis or proctitis. The majority of chlamydial infections are asymptomatic which can result in missed or late diagnoses, resulting significant morbidity -especially in women. Complications related to untreated chlamydial infections

include upper genital tract disease, also known as Pelvic Inflammatory Disease or PID which will be discussed later in this presentation. Pregnant women can also transmit chlamydia to the newborn infant at delivery, causing severe infections including pneumonia and a conjunctivitis called ophthalmia neonatorum. Chlamydia is typically diagnosed by nucleic acid amplification testing, or NAAT. First line treatment for uncomplicated chlamydial infection is either 1 gram of azithromycin or doxycycline 100 mg twice daily for 7 days. Given the high rate of reinfection, individuals diagnosed with chlamydia should be retested in 3 months. In general, a test of cure (TOC) should not be done except in pregnant women (who should be retested 3-4 weeks after completing therapy).

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Gonorrhea is the second most prevalent reportable bacterial STI in North Carolina behind Chlamydia. In 2012, North Carolina reported 14,322 gonococcal infections to the CDC. Gonorrhea is caused by Neisseria gonorrhoeae, a gram negative diplococci, and can present as urethritis, cervicitis, pharyngitis or proctitis. Whereas gonococcal infection in women often presents asymptomatically, men are more likely to manifest symptoms, hence the commonly used description of gonococcal infection as “the drip” which refers to purulent fluid leaking out of the urethral opening in the penis. Complications of untreated gonorrhea includes Pelvic Inflammatory Disease and rarely a disseminated gonococcal infection (which typically manifests as one or more hot and swollen joints but can also cause a life threatening infection). Also, like chlamydia, pregnant women can transmit gonorrhea to their newborns at the time of delivery, resulting in a severe eye infection. Gonorrhea can be diagnosed in multiple ways, including visualization of gram negative diplococci on gram stain analysis of urethral discharge from symptomatic men, nucleic acid amplification testing of urethral, rectal or oropharyngeal swab specimens from both men and women, and culturing of the organism (which is actually the preferred diagnostic method if there is any concern for antibiotic resistance). It is currently recommended that gonorrhea be treated with dual therapy to reduce the risk of antibiotic resistance developing. First line therapy is a combination of 250 mg IM of ceftriaxone plus either 1 gram of azithromycin or a 7 day course of doxycycline 100mg twice daily. Repeat infections are common, so like chlamydia, repeat gonorrhea testing is recommended 3 months after treatment of the initial infection. If a non-first line therapeutic regimen is used, a test of cure should be performed 1 week after completion, with a culture preferably or NAAT if culture is not available – though experts suggest waiting 2 weeks for TOC if a NAAT is used.

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Pelvic Inflammatory Disease. Most often a complication of untreated lower genital tract infections caused by organisms like chlamydia and gonorrhea. The spread of these organisms from the lower to upper genital tract can result in infections of the uterus, called endometritis, and fallopian tubes, called salpingitis. This can lead to scarring and damage to the fallopian tubes which in turn increases the risk of ectopic pregnancies and results in infertility in up to

15% of women. PID can also cause tubo-ovarian abscesses and pelvic peritonitis (depicted in this picture of a woman with peritonitis and a large pelvic abscess that required surgical intervention), and a rare perihepatitis called Fitz Hugh Curtis syndrome. The presentation of PID can range from mild to severe and symptoms can include lower abdominal pain, abnormal vaginal bleeding or discharge and pain during sex.

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There is no simple diagnostic test for PID. Diagnosis is usually made on a clinical basis. Given the severe consequences of missing a PID diagnosis, clinical suspicion in women manifesting one or more of the following symptoms is enough to warrant empiric treatment for PID: cervical motion tenderness, uterine tenderness or adnexal tenderness on pelvic exam. Mild cases of PID can be treated with 250 mg IM of ceftriaxone plus doxycycline 100 mg twice daily for 2 weeks. Metronidazole 500 mg twice daily for 2 weeks can also be added to the regimen for better coverage of anaerobic organisms. A physician should be consulted for moderate or severe PID cases to assess the need for hospitalization and intravenous antibiotic therapy.

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Non-gonococcal urethritis (NGU). NGU can be caused by numerous organisms including chlamydia, mycoplasma and ureaplasma species, trichomonas vaginalis and herpes simplex virus. In 2012, there were 5,662 NGU cases reported in North Carolina. NGU is diagnosed when a male presents with clinical evidence of urethritis but no gram negative diplococci are seen on gram stain OR another organism is identified as the causative agent by nucleic acid amplification testing. Chlamydia is the only reportable causative organism among the list of potential causes but there is presently no public health funding in North Carolina aimed at the routine testing of men for chlamydia. First-line therapy for NGU includes a 1 gram dose of azithromycin or a seven day course of doxycycline 100 mg twice daily. In patients in whom symptoms recur or persist, the potential for reinfection as is the case when sexual partners are not treated at the same time or possible medication non-compliance should be assessed. Clinicians should also consider the need to treat for organisms that may not have been originally covered by which ever first line agent was used, for example, neither azithromycin or doxycycline treat trichomonas or herpes simplex virus.

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Lymphogranuloma venereum. LGV is caused by three different Chlamydia trachomatis strains, and is associated with self-limited genital or rectal ulcers or papules at the site where inoculation occurs. LGV is also associated with tender inguinal lymphadenopathy called buboes, which are usually, but not always, unilateral. Rectal exposure to LGV can result in proctocolitis in both men and women. LGV is a relatively rare sexually transmitted infection in the US, and there were no reported cases in North Carolina in 2012. Due to limited availability of nucleic acid amplification testing able to distinguish between the different chlamydia strains, LGV is usually a diagnosis of exclusion – meaning rule out other more likely causes of symptoms, before empirically treating for this infection. First line treatment of LGV is three weeks of twice daily doxycycline and patients should be followed clinically until their symptoms have resolved.

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Granuloma Inguinale (Donovanosis). Donovanosis is caused by Klebsiella granulomatis, an intracellular gram negative bacterium. This infection is extremely rare in the US and there were no cases reported in North Carolina in 2012. It presents as painless but slowly progressive ulcerative genital or perineal lesions that are locally destructive and pseudobuboes, or subcutaneous granulomas, may occur. Untreated, granuloma inguinale can also extend to extragenital sites and autoinoculation can occur. Diagnosis is made by identifying Donovan bodies in infected tissues, which are rod-shaped inclusions within macrophages. Granuloma inguinale is treated with at least 3 weeks of twice daily doxycycline –and should be continued until all lesions have completely healed. Clinicians should be aware that even after effective therapy, relapse can occur between 6-18 months later.

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Chancroid. It is a reportable genital ulcerative condition that is rarely seen in NC, there was only one case reported in 2012. Chancroid is caused by a gram negative bacterium called Haemophilus ducreyi and presents as painful genital ulcers and enlarged lymph nodes (or buboes). Diagnostic testing for Chancroid is not readily available; therefore the diagnosis is usually made clinically after ruling out other, more common causes of genital ulcers such as HSV or syphilis. Chancroid can be treated with multiple antibiotics including azithromycin, ceftriaxone, ciprofloxacin and erythromycin. All patients should receive follow up at 3 and 7 days after treatment initiation to ensure that improvement is occurring. If no improvement is seen, possible co-infection with another organism not covered by the treating antibiotic should be considered.

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Information on all reportable bacterial STIs in North Carolina can be found on the North Carolina Public Health website –highlighted in blue here. This includes a full list of reportable diseases and conditions and their specific case definitions and investigatory steps.

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A link to the disease reporting forms can also be found on the North Carolina Public Health website. Additionally, there is an Epidemiologist on call 24/7 who can assist you with questions on investigation or the reporting of communicable diseases, and the number can be found on the same website circled in red here. That concludes this presentation on reportable bacterial STIs; I hope you found it informative. Thank you.