Vaginitis and STIs
Causes, Work-up, Treatment

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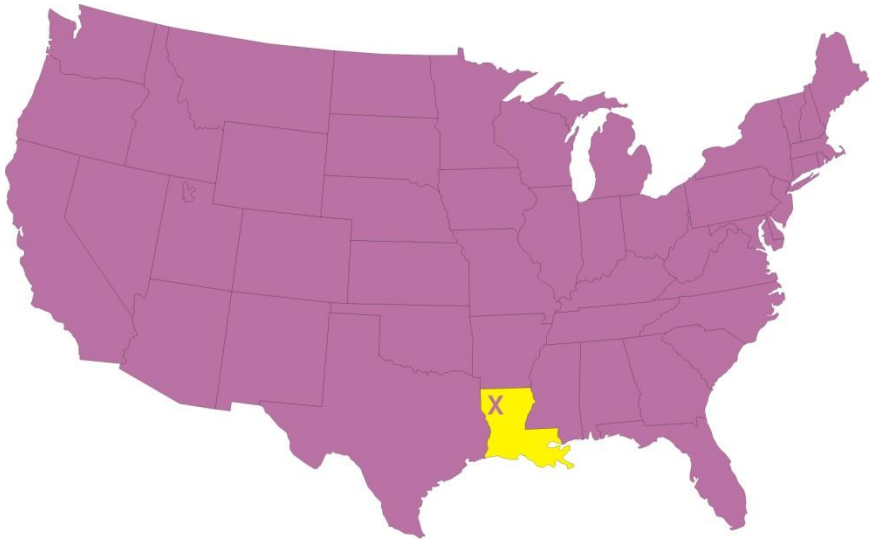
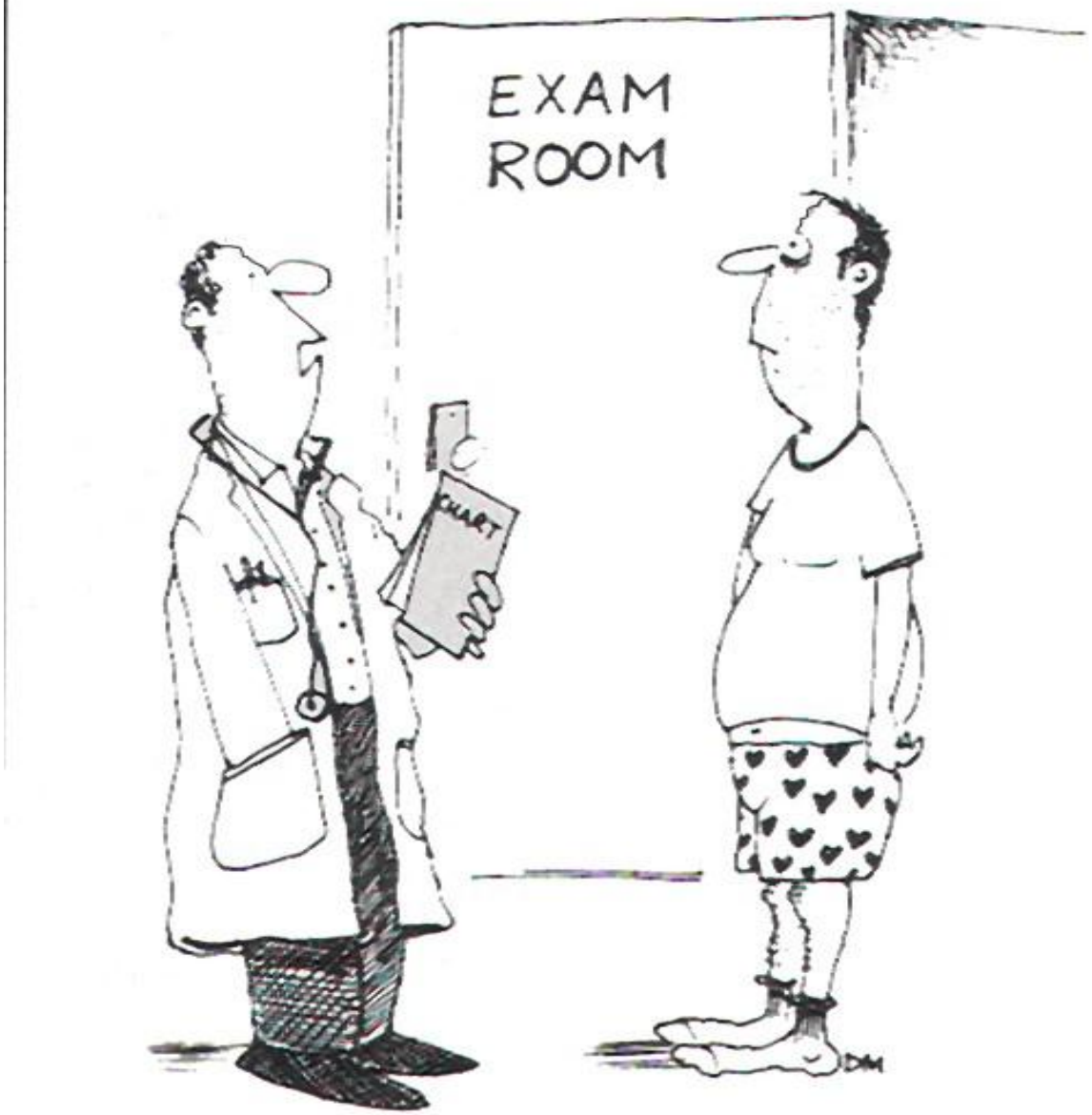
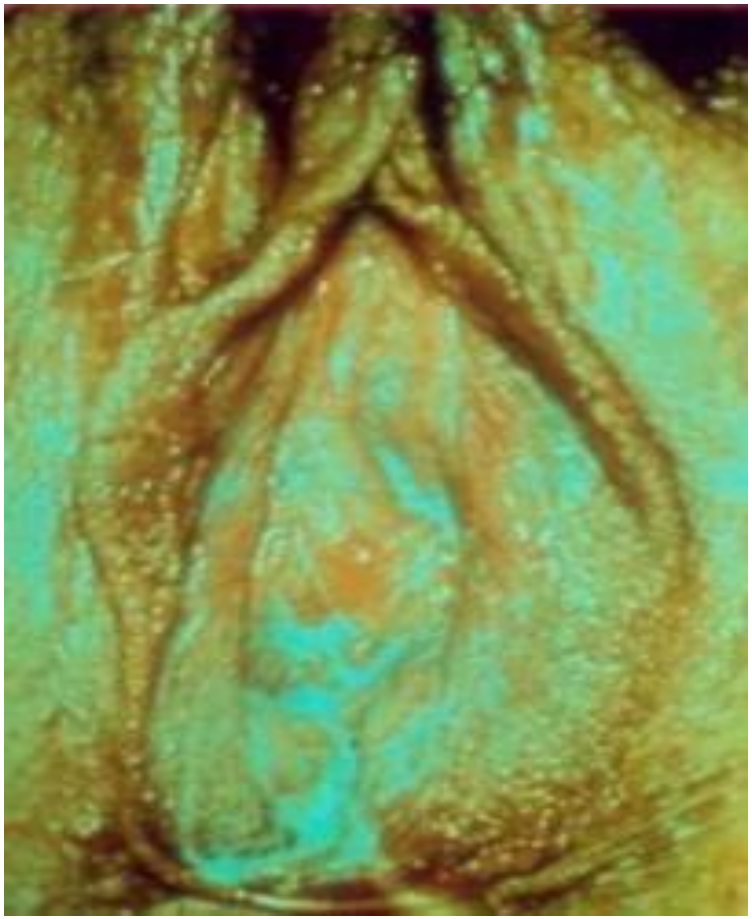




"According to your chart, Mr. Brown, apparently what happens in **Rotorua** doesn't always stay in **Rotorua.**

Introduction - Vaginitis

- **Vaginal inflammation**
- **Vaginal discharge, itching, & irritation**
  - **Patient self-diagnosis often incorrect**



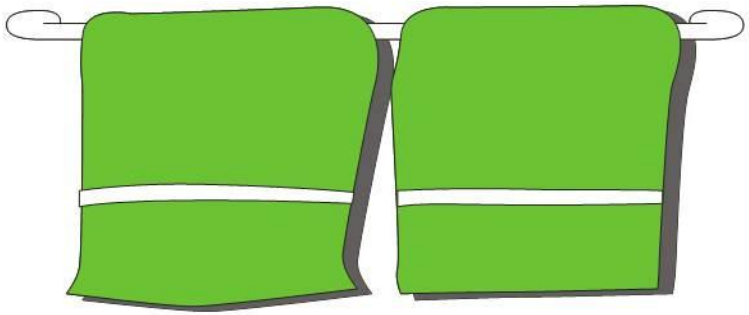
Courtesy of Dr. E.J. Mayeaux, Jr.

Noninfectious Vaginitis

- Irritants
  - Scented liners
  - Spermicides
  - Povidone-iodine
  - Soaps
  - Perfumes
- Topical Allergens
  - Latex condoms
  - Topical antifungals
  - Seminal fluid
  - Chemical preservatives
  - Acute and chronic hypersensitivity

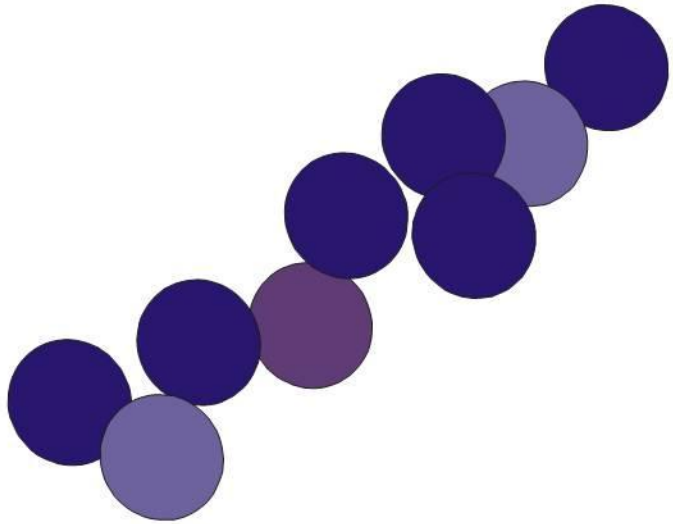
Introduction

- **Determine if patient douched**
  - **Lowers diagnostic test yield**
  - **Increases risk of PID & ectopic**
    - **Zhang J. Am J Public Health 1997; 87:1207-11**
- **Wiping vagina with a soapy wash-cloth**



Introduction

- **With a discharge in a child, consider:**
  - **Foreign object**
  - **Hygiene issues**
  - **Pin worms**
  - **Streptococcus**
  - **Physiologic**



Introduction

- **PE includes inspection of genitalia**
- **Speculum exam for discharge**
- **Chlamydia, GC, and wet prep in sexually active females**
- **Bimanual exam for cervical, uterine, or adnexal tenderness**

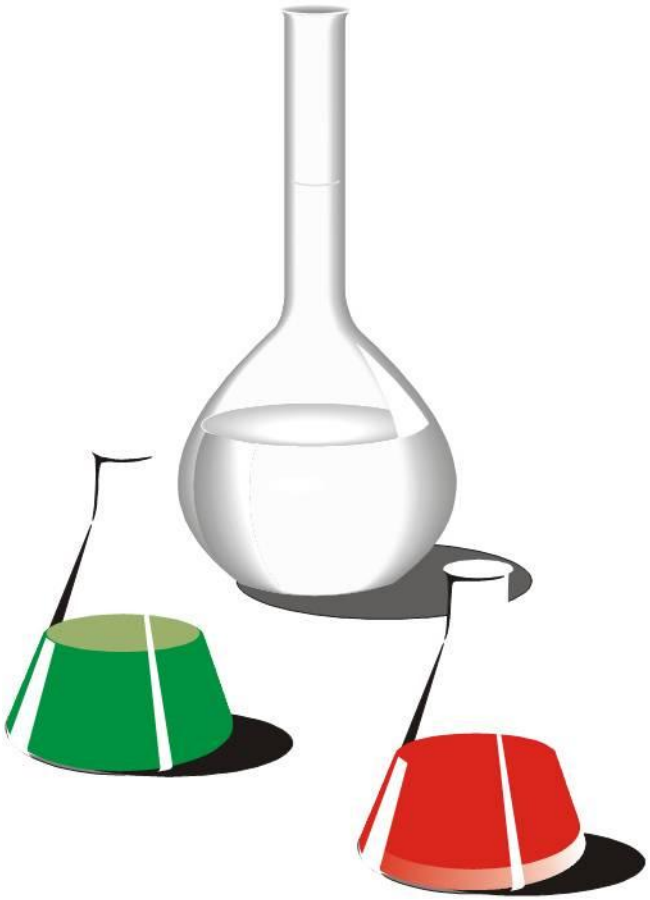
Diagnostic Values for Vaginal Infections

Diagnostic Criteria	Normal	Bacterial Vaginosis	Trichomonas Vaginitis	Candida Vulvovaginitis
Vaginal pH	3.8 to 4.2	> 4.5	4.5	< 4.5 (usually)
Discharge	White, thin, flocculent	Thin, white, gray	Yellow, green, frothy	White, curdy, "cottage cheese"
Amine odor "whiff" test	Absent	Fishy	Fishy	Absent
Microscopic	Lactobacilli, epithelial cells	Clue cells, adherent cocci, no WBCs	Trichomonads, WBCs >10/hpf	Budding yeast, hyphae, pseudohyphae

Vaginal pH

- **Estrogen causes deposition of glycogen in epithelial cells**
- **Converted by bacteria to glucose**
- **Anaerobically fermented to lactic acid, vaginal pH = 3.5 to 4.5**
  - **pH >4.5 seen with menopause, trichomonas, or bacterial vaginosis**

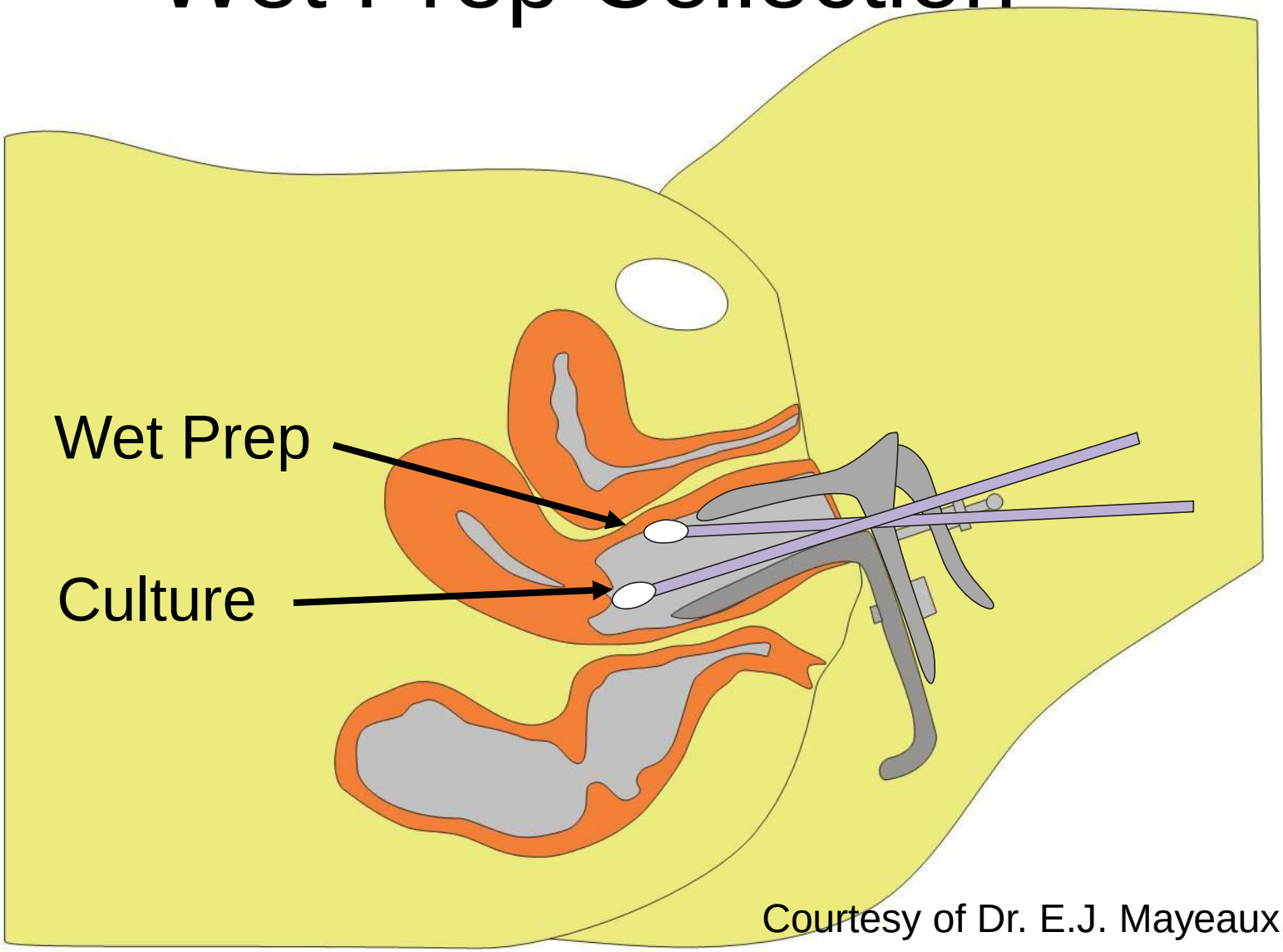
Vaginal pH



Touch pH paper to side-wall or via an applicator

No cervical mucus – high pH

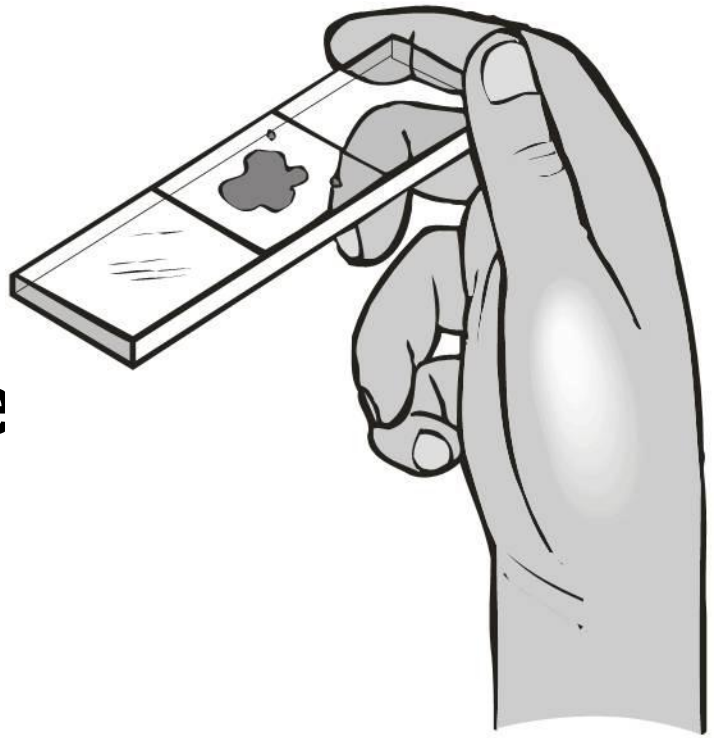
Wet Prep Collection



Courtesy of Dr. E.J. Mayeaux, Jr.

Wet Prep

- **Swab from vaginal side-wall into saline (not water)**
- **Put a drop onto slide cover slip, examine**
- **WBCs, clue cells, organisms**



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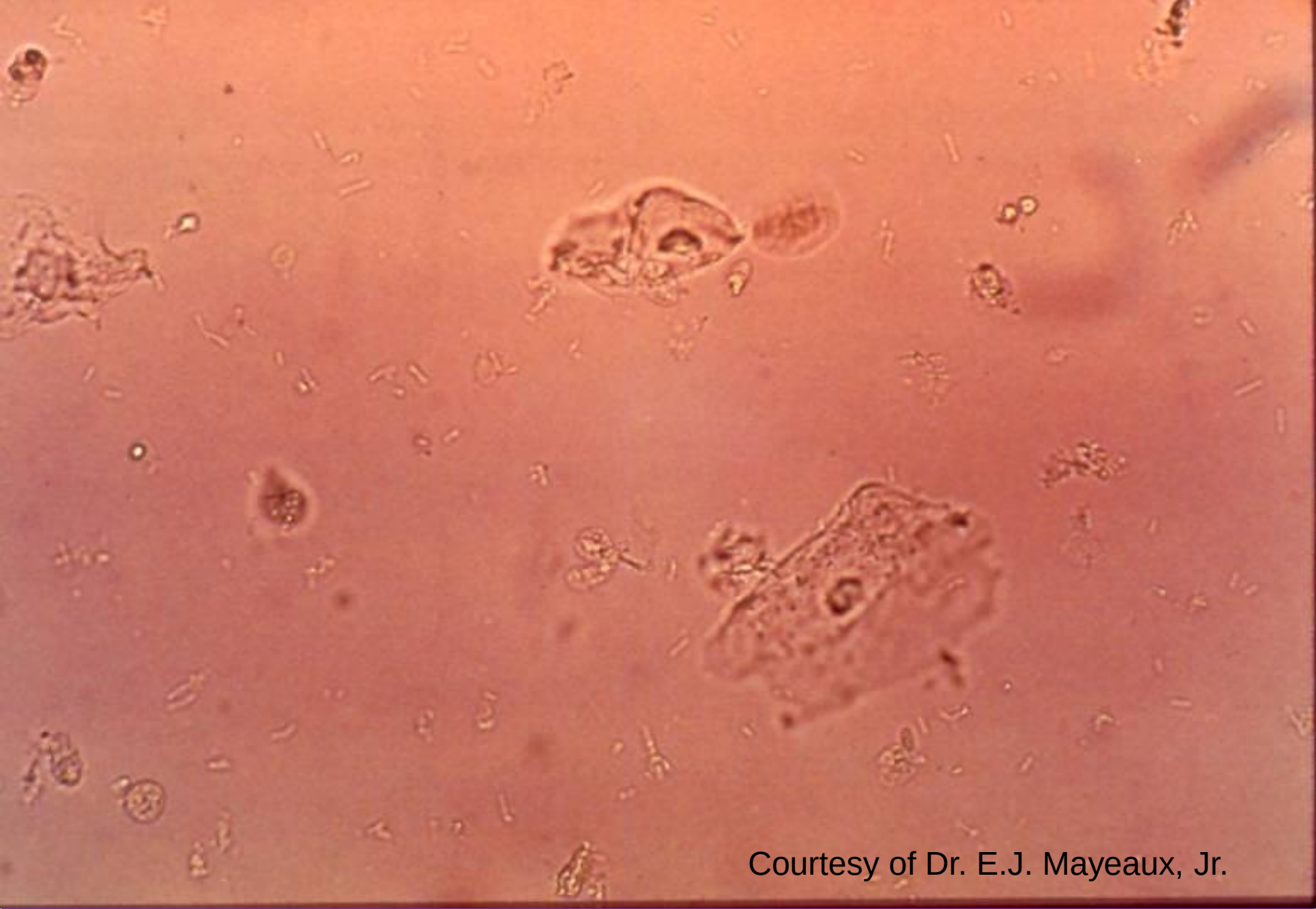


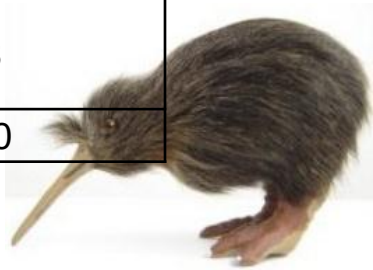
Courtesy of Dr. E.J. Mayeaux, Jr.

Nucleic Acid Amplification Tests

- **NAATs are highly sensitive tests**
  - **N. gonorrhoeae and chlamydia**
- **Genital specimens and urine**
- **Now approved in males and females in US**
  - **Allows testing without a pelvic exam**

WHO Estimated STI Prevalence & Annual Incidence by Region, 1999

Region	Adult population (millions)[1]	Infected adults (millions)	Infected adults per 1,000 population	New infections in 1999 (millions)
North America	156	3	19	14
Western Europe	203	4	20	17
North Africa & Middle East	165	3.5	21	10
Eastern Europe & Central Europe	205	6	29	22
Sub-Saharan Africa	269	32	119	69
South & Southeast Asia	955	48	50	151
East Asia & Pacfic	815	6	7	18
Australia & New Zealand	11	0.3	27	1
Latin America & Carribean	260	18.5	71	38
Total	3040	116.5	-	340



Things Happen…

Chlamydia trachomatis

- Most frequently reported STI
- Highest in persons aged ≤ 25 years
  - Can result in PID, ectopic, and infertility
- Need screening tests to detect
  - Asymptomatic infection common
- Annual screening of all sexually active women ≤ 25 years and with risk factors
  - USPSTF recommends ≤ 24 years

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

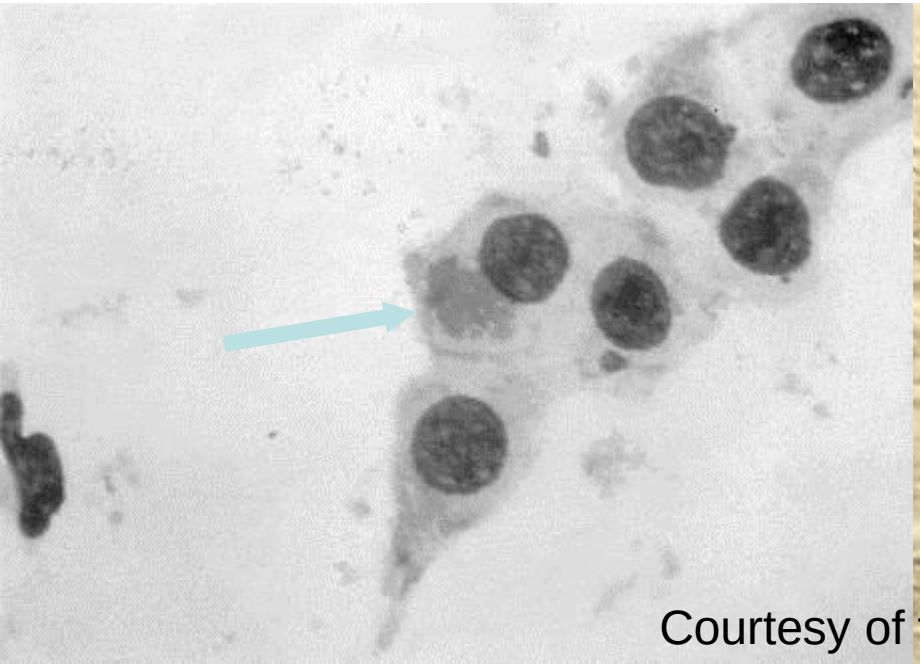
Chlamydia Diagnosis

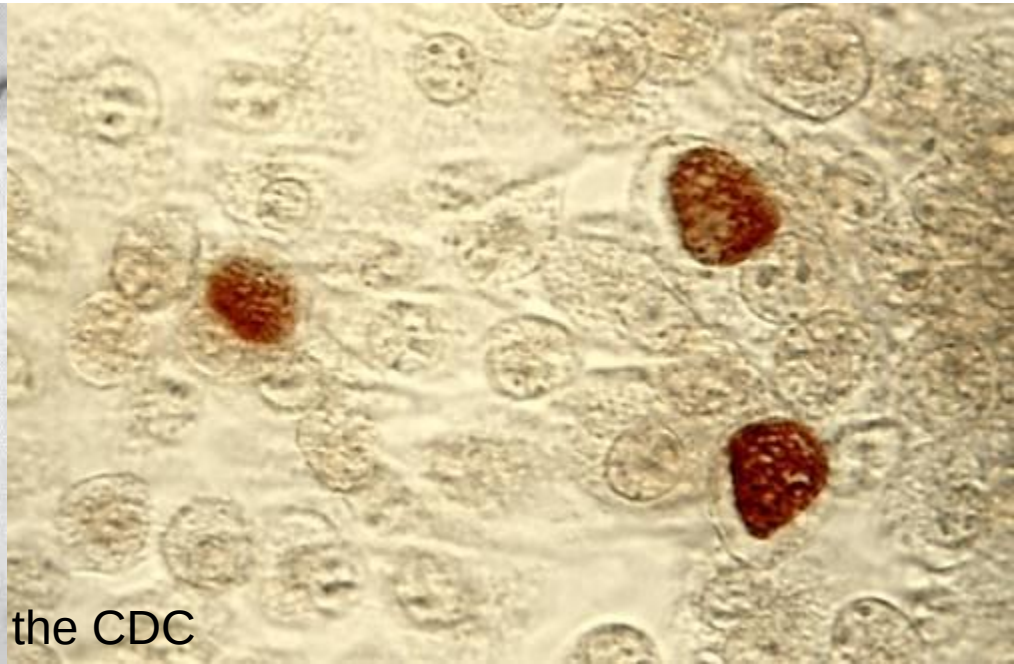
- Diagnosed by urine or swab[1]
  - Cervical, urethral, rectal, or oropharyngeal
    - Rectal and oropharyngeal use not FDA approved
- NAATs, cell culture, immunofluorescence, EIA, & nucleic acid hybridization
  - NAATs most sensitive and urine use
  - NAATs self-collected vaginal swab specimens
  - Liquid-based cytology specimens
  - Test for other STDs
  - Sensitivity 80 – 97% and specificity 99.5 - 99.6% [2]

1. CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.
2. Cook, RL, et al. Systematic review: noninvasive testing for Chlamydia trachomatis and Neisseria gonorrhoeae. Ann Intern Med 2005; 142:914.

Chlamydia trachomatis

- Intracellular parasite with two-stage life cycle
  - Infectious stage (elementary body) and metabolic-reproductive stage (inclusion body)

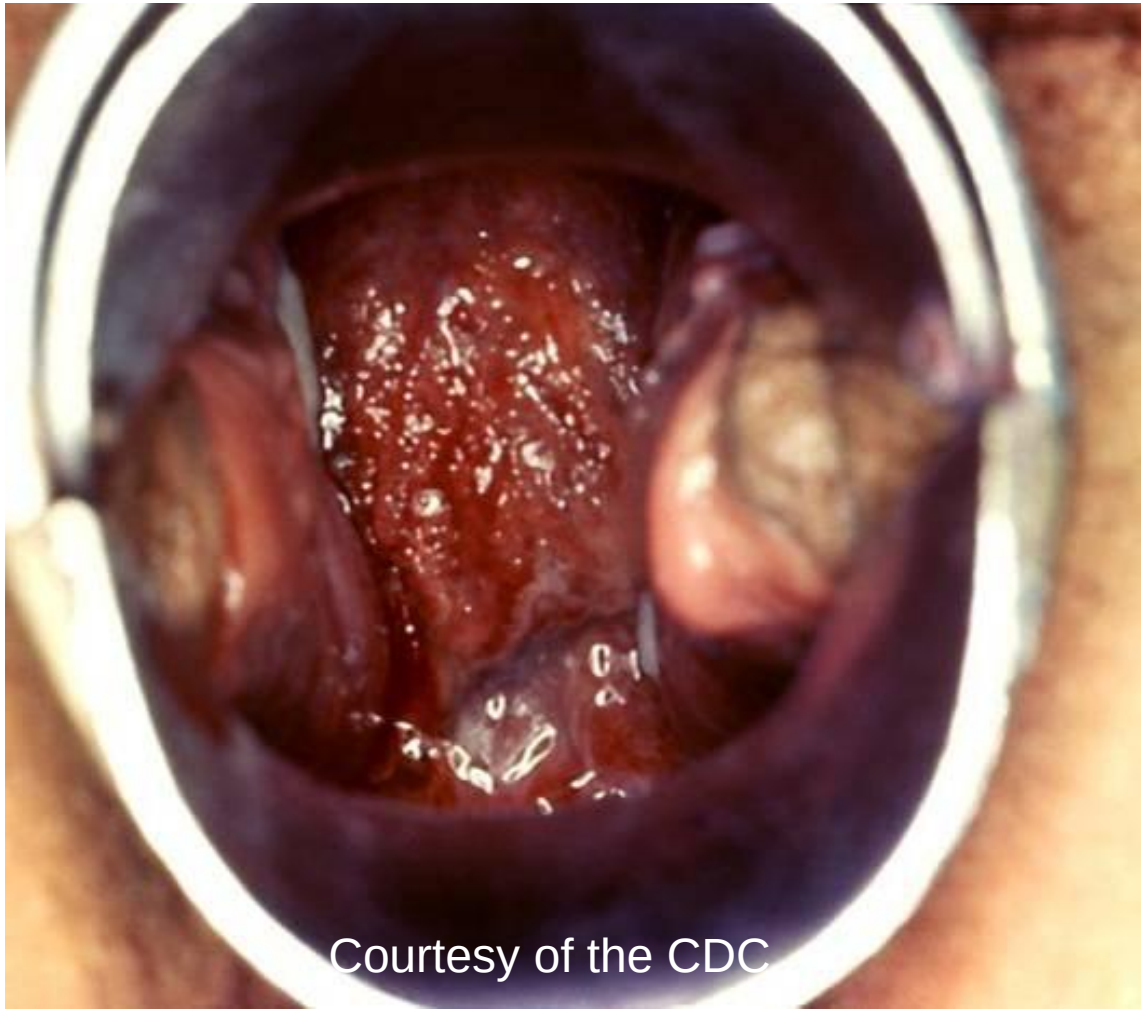


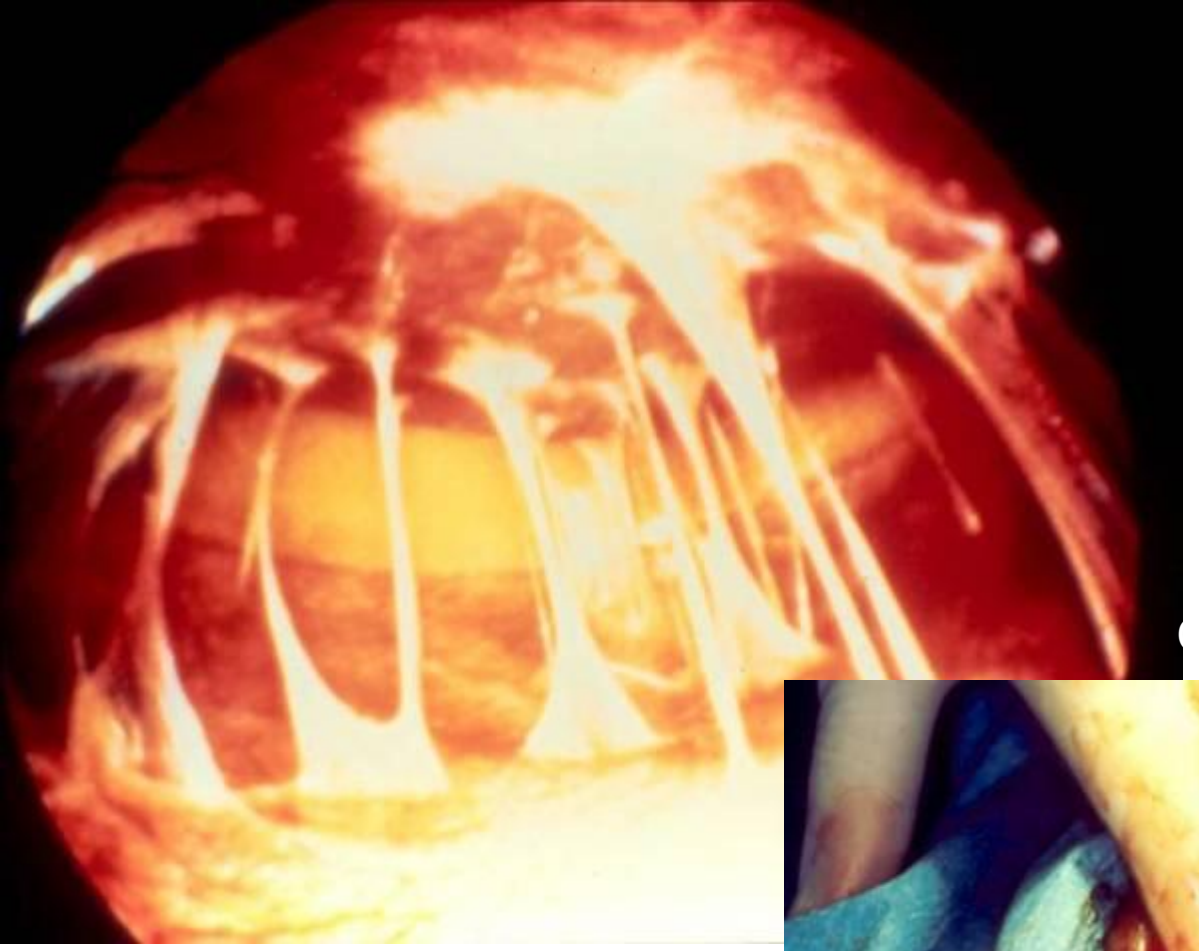


Courtesy of the CDC

Chlamydia Diagnosis

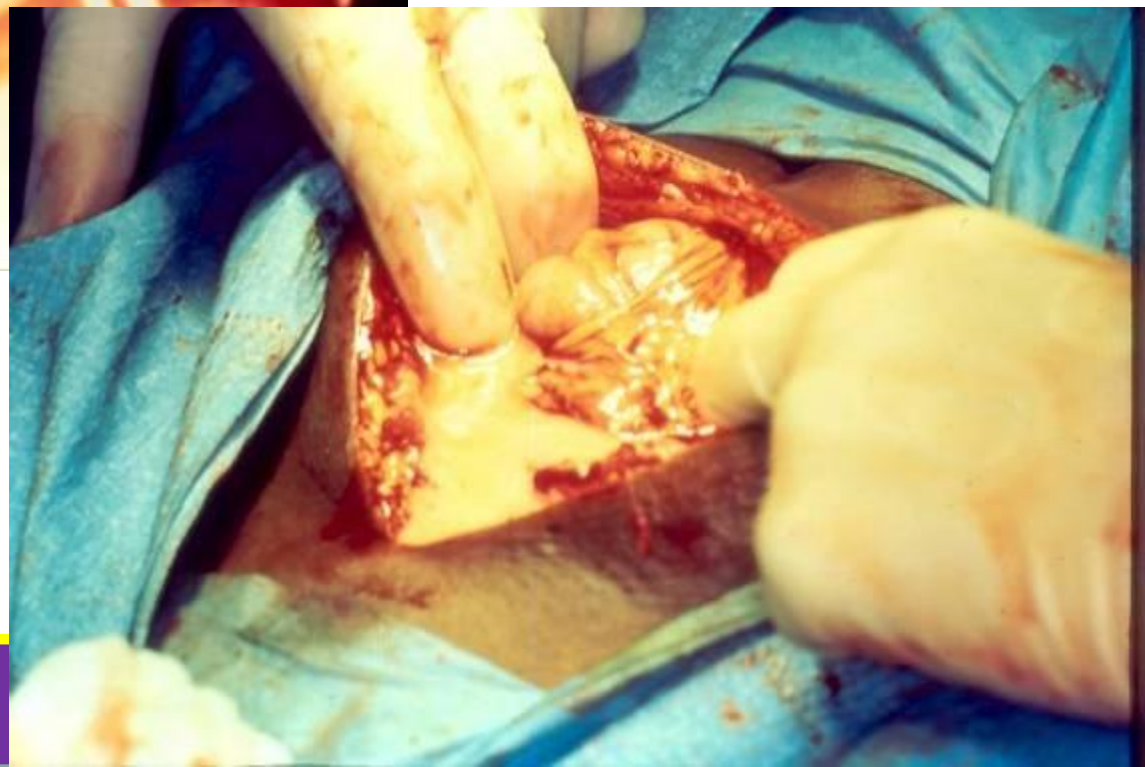
- Cervix manifests signs of erosion and erythema due to chlamydial infection





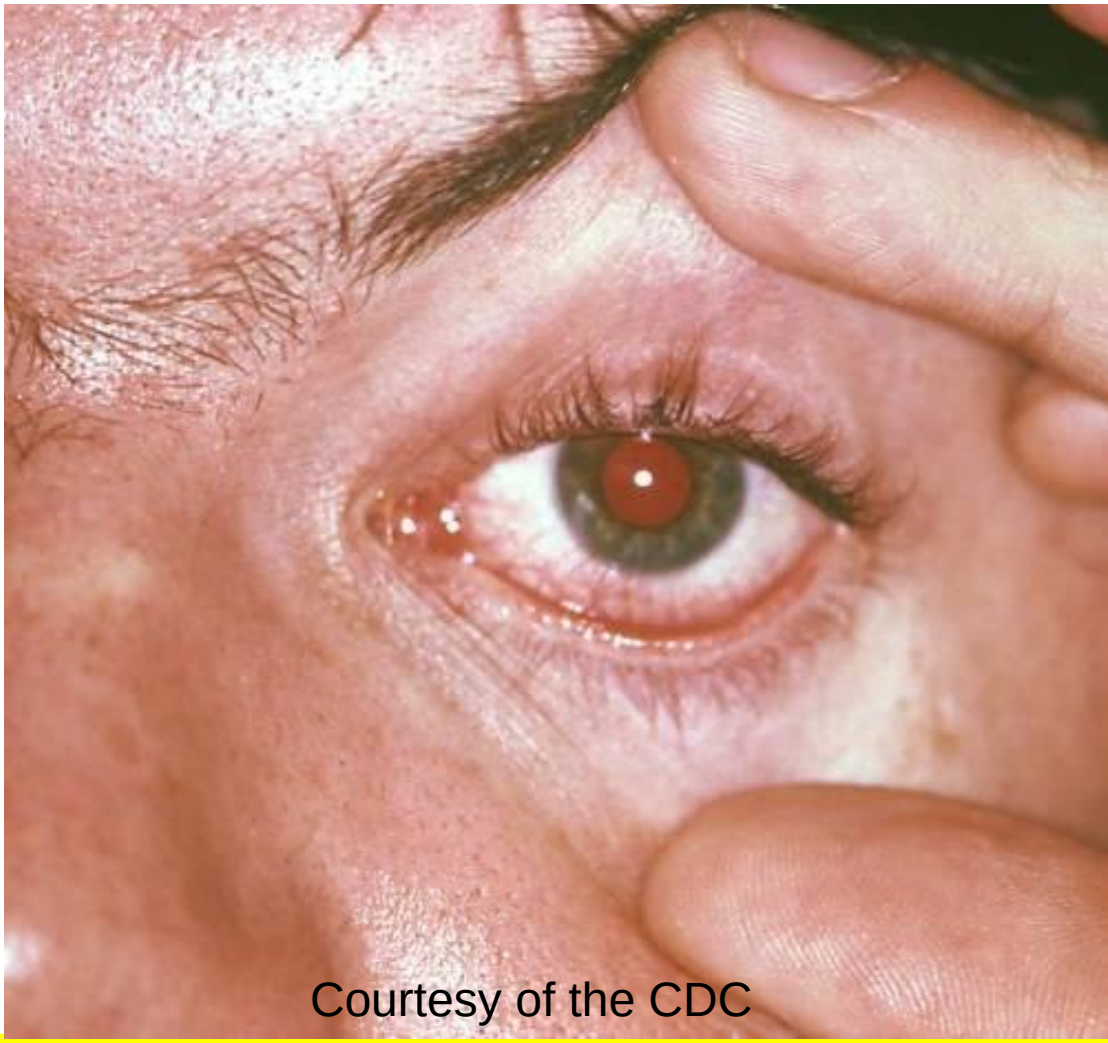
PID (Fitz-Hugh-Curtis syndrome - adhesions on Laproscope)

PID (Mixed Tubo-ovarian Abscess)



Reiter's Syndrome

- 3 main symptoms
  - Arthritis
  - Conjunctivitis
  - Urethritis



Courtesy of the CDC

CDC Rec Treatment of Chlamydia trachomatis Infection

Regimen	Agent	Dosage
Nonpregnant women		
Recommended	Azithromycin (Zithromax)	1 g orally once
	Doxycycline (Vibramycin)	100 mg orally twice daily for seven days
Alternative	Erythromycin base	500 mg orally four times daily for seven days
	Erythromycin ethylsuccinate	800 mg orally four times daily for seven days
	Ofloxacin	300 mg orally twice daily for seven days
	Levofloxacin (Levaquin)	500 mg orally daily for seven days

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

CDC Rec Treatment of Chlamydia Infection

Regimen	Agent	Dosage
Pregnant women		
Recommended	Azithromycin	1 g orally once
	Amoxicillin	500 mg three times daily for seven days
Alternative	Erythromycin base	500 mg four times daily for seven days *or* 250 mg four times daily for 14 days
	Erythromycin ethylsuccinate	800 mg four times daily for seven days *or* 400 mg four times daily for 14 days

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

Gonococcal Infections

- 2nd most common bacterial STI
- Male urethral infections produce burning - seek curative treatment
- Women, often asymptomatiic until complications (PID, infertility or ectopic)
- Targeted screening of women < 25 years at increased risk for infection

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

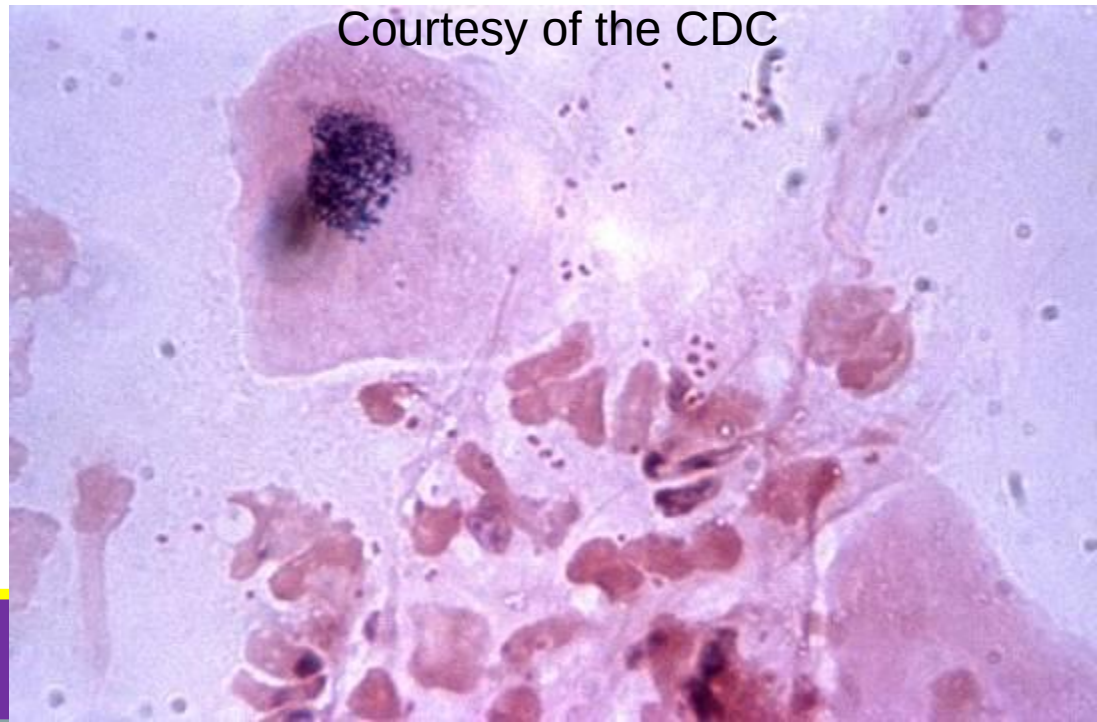
Gonococcal Diagnosis

- Male urethral Gram stain diagnostic
  - A negative Gram stain does not ruling out
  - >99% specificity and > 95% sensitivity
- Culture, NA hybridization, and NAATs
  - Culture and nucleic acid hybridization tests require female swab specimens
  - NAATS of endocervical, vaginal, and urethral swabs, and urine
    - Not FDA-cleared for use in the rectum, pharynx, and conjunctiva

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

Neisseria Gonorrhea

- Gram-negative diplococcus - most commonly infects the endocervix



Courtesy of the CDC

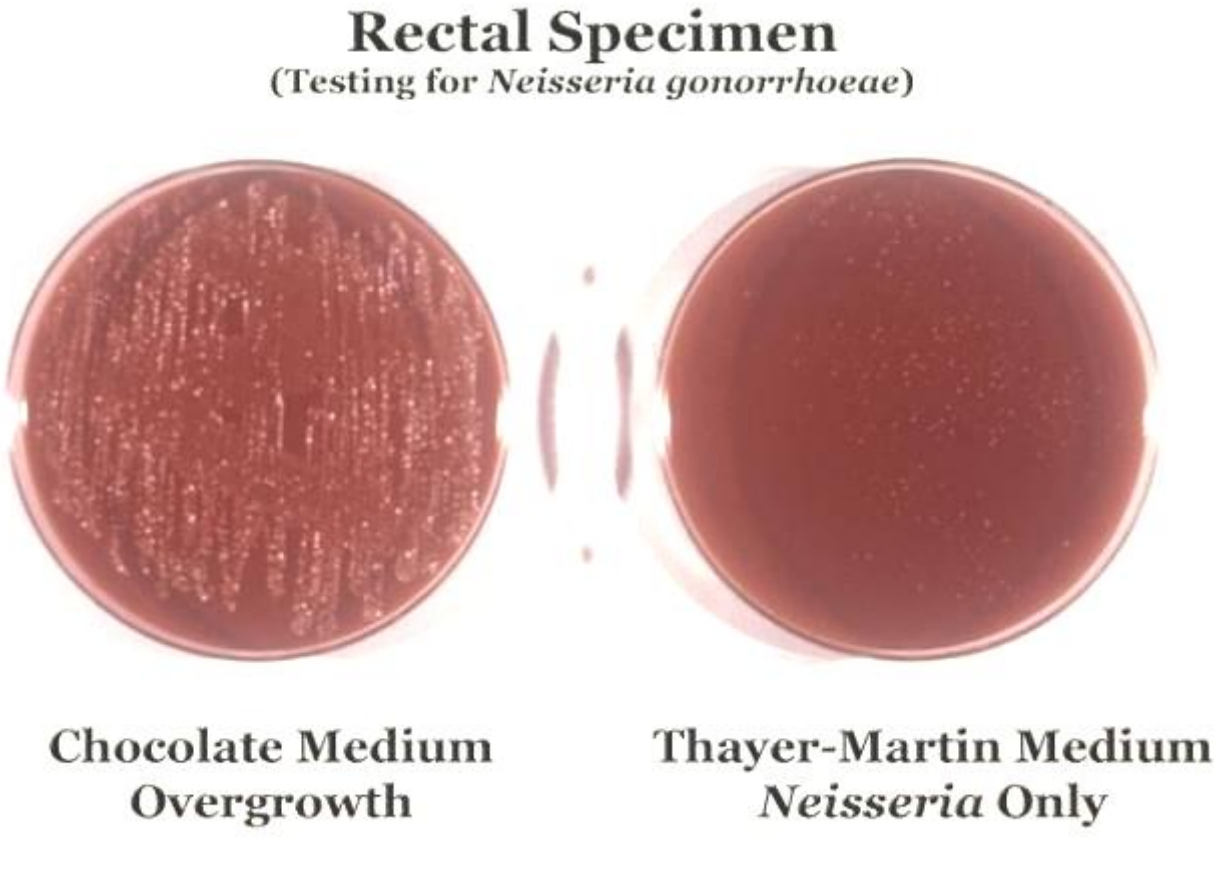
Gonococcal Diagnosis - NAATs

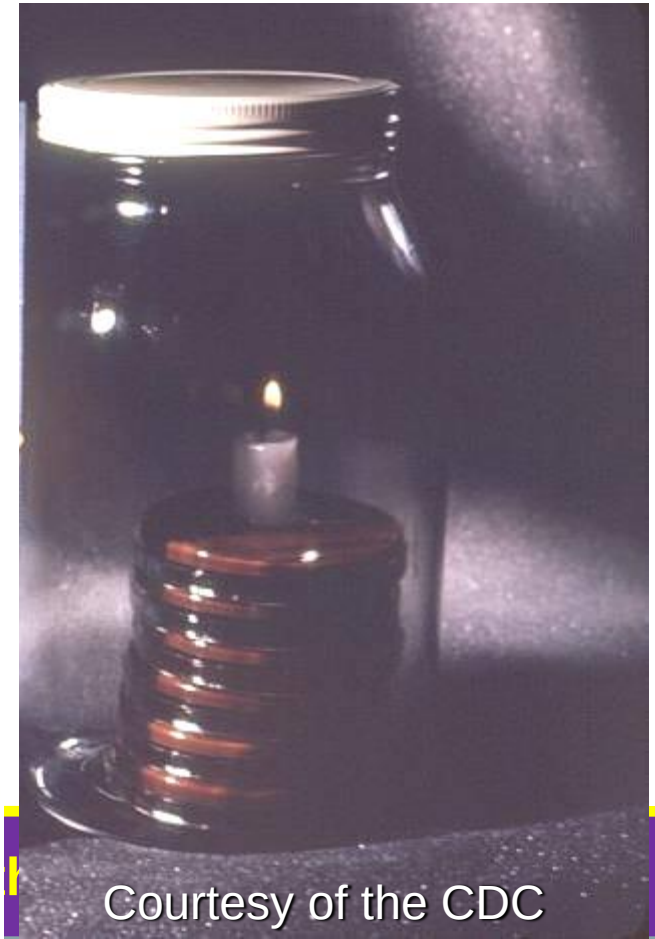
- DNA amplification techniques
- Amplifies N. gonorrhoeae DNA or RNA
- Theoretically detect 1 organism / sample
  - Conventional methods is ~1000 organisms
- Sensitivities > 95%, specificity high
- Swabs, liquid PAPs, and urine
- NAATs and other nonculture methods not FDA approved in nongenital sites

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

GC Diagnosis

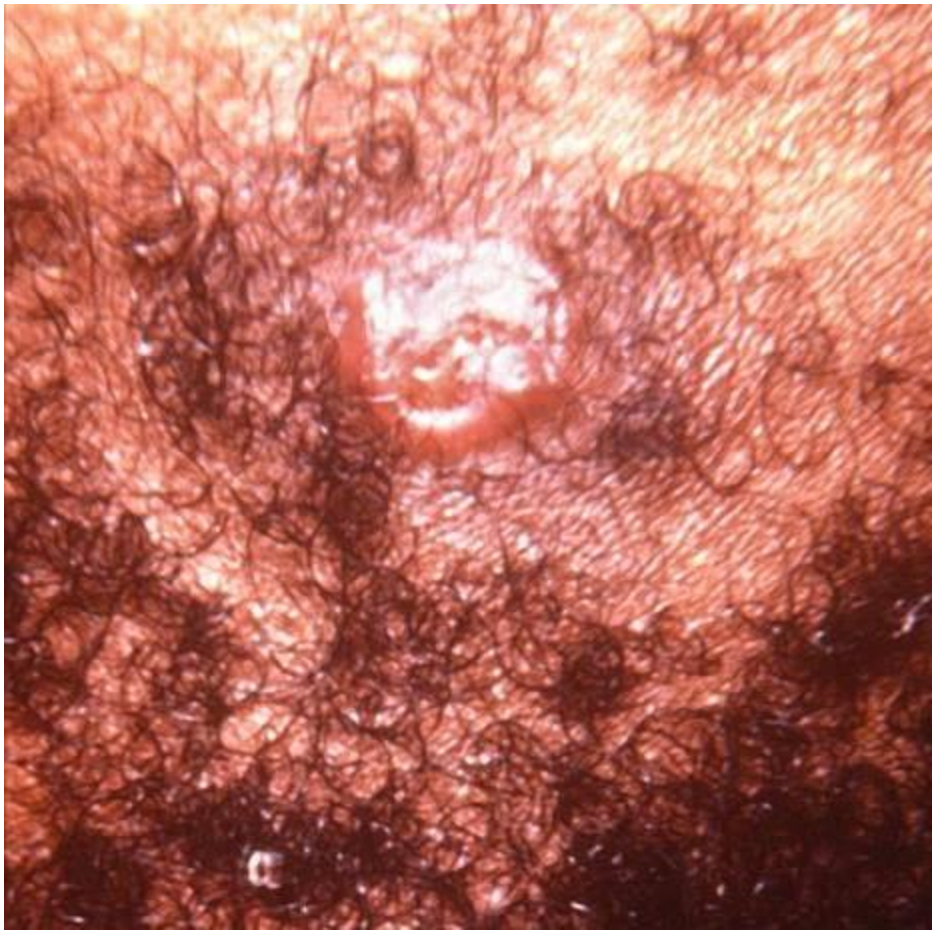
- **Culture - anaerobic**





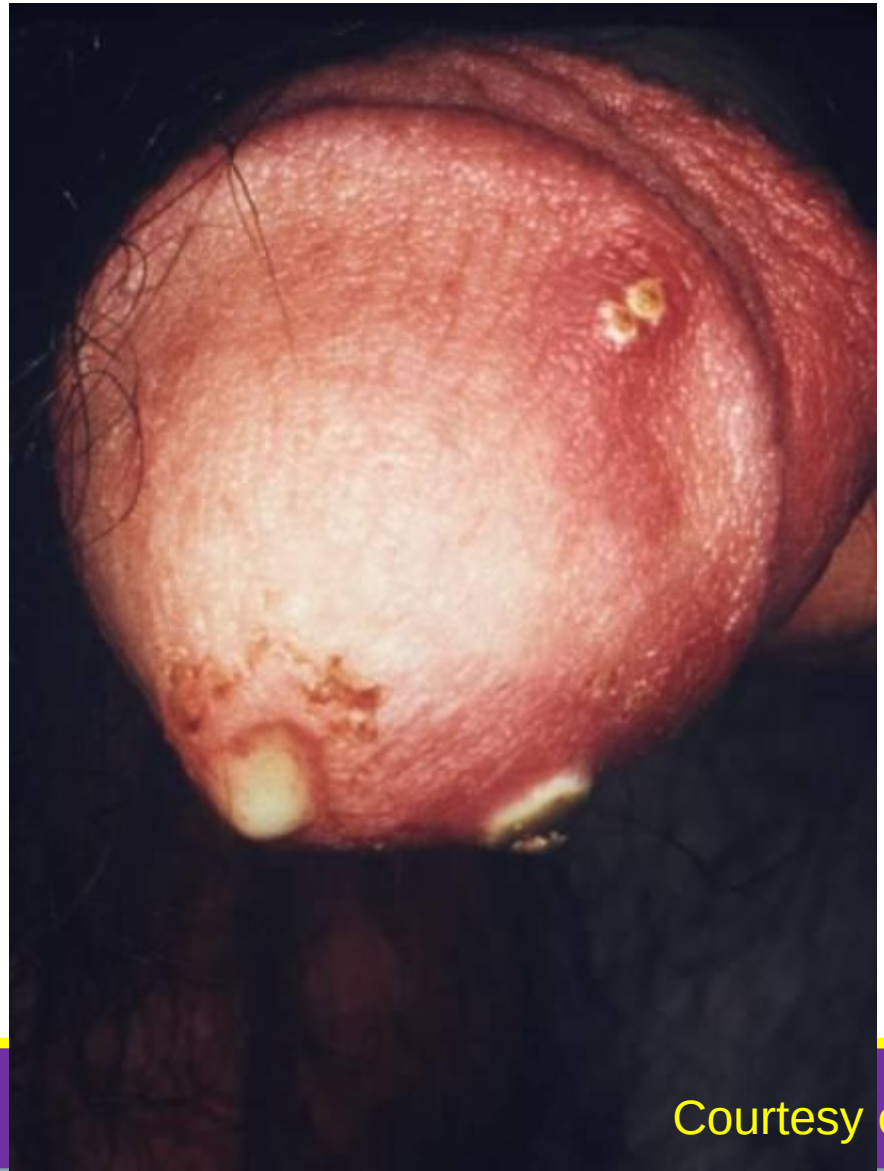
Neisseria Gonorrhea

- Can lead to TOA, salpingitis, sterility
- Systemic symptoms
  - Fever, arthritis, dermatitis, peri- or endocarditis, meningitis



Courtesy of the CDC

Neisseria gonorrhea



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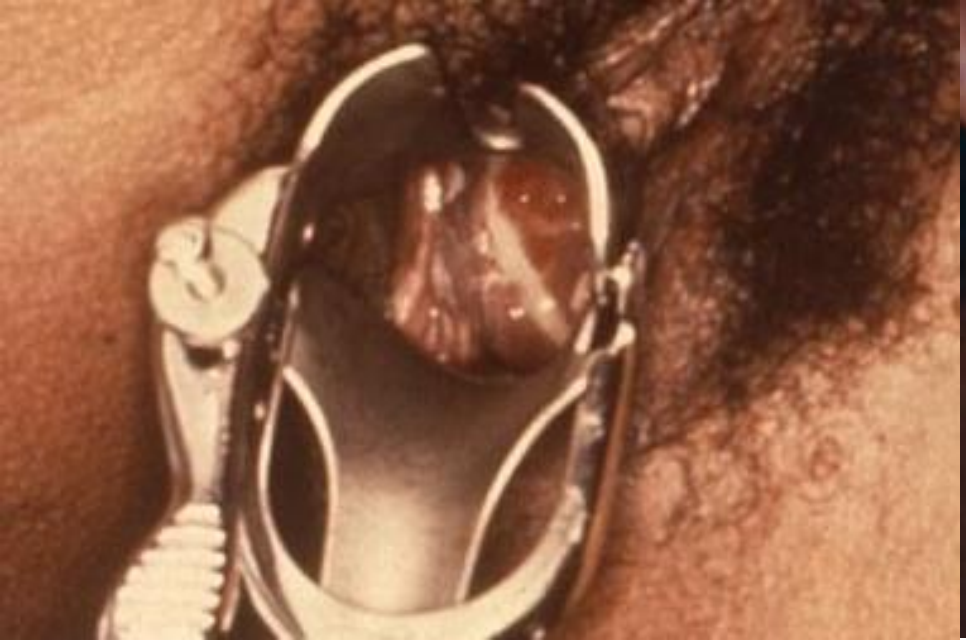
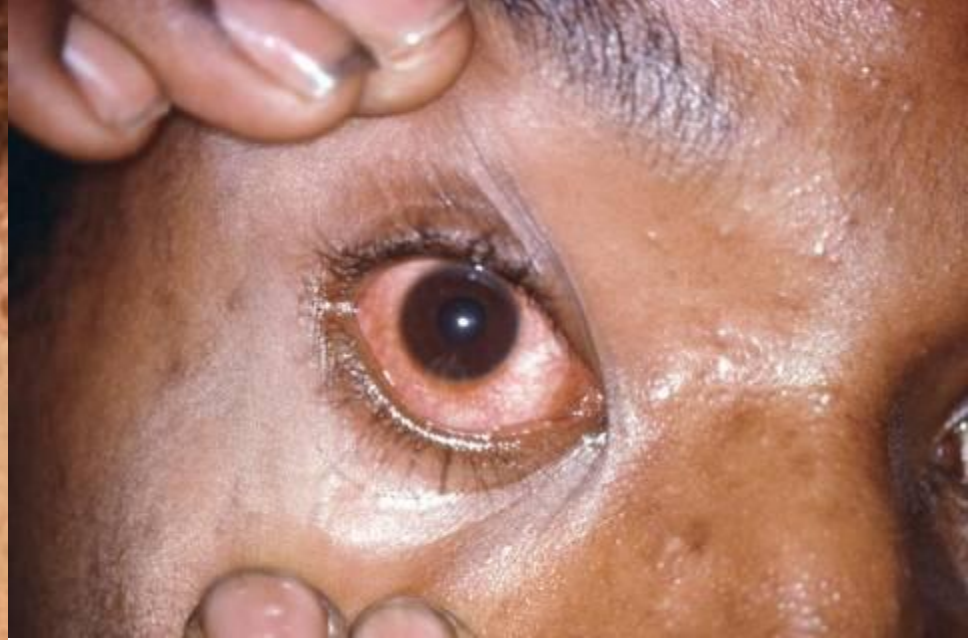
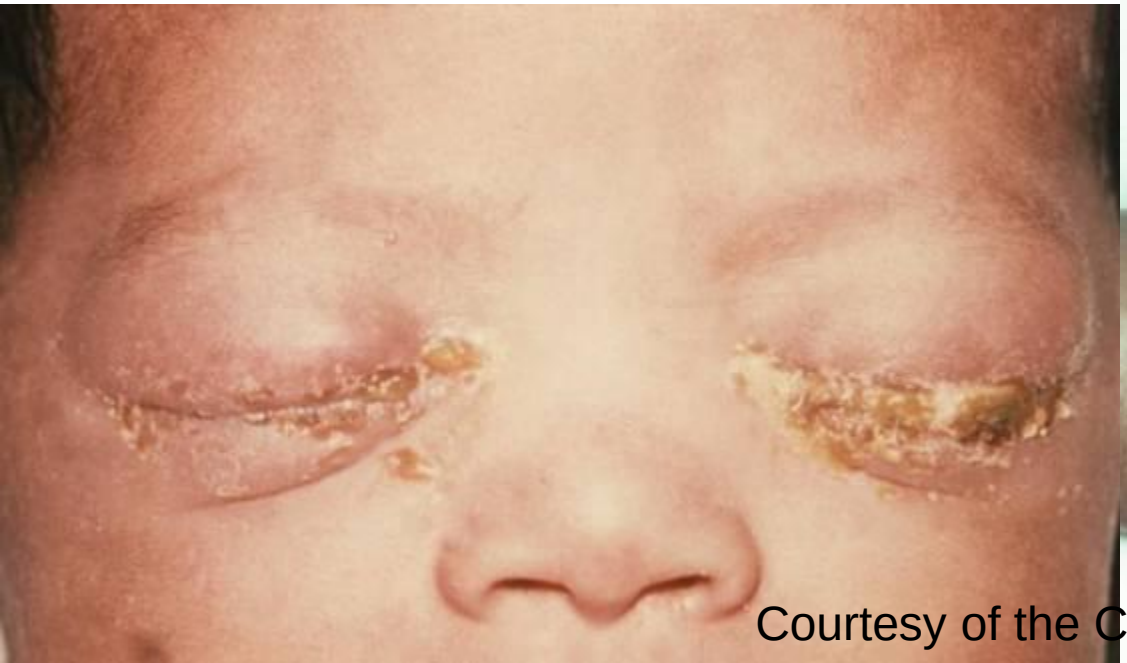
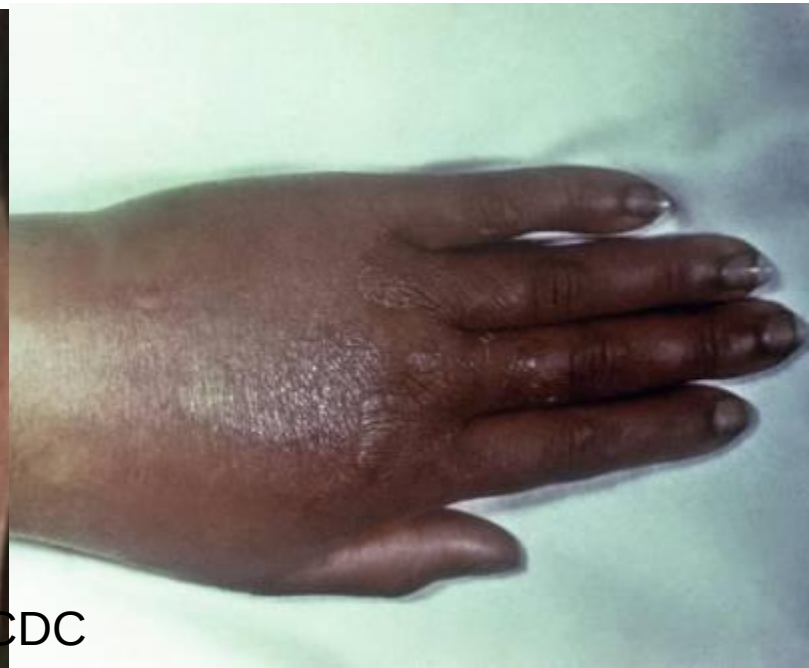




Neisseria gonorrhea





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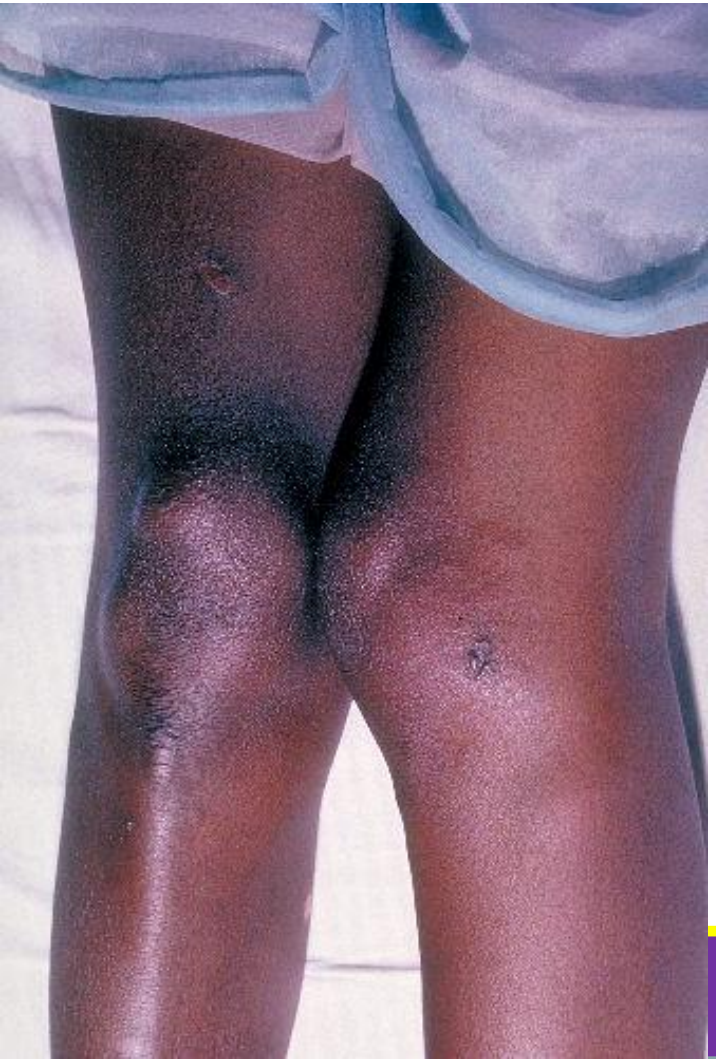
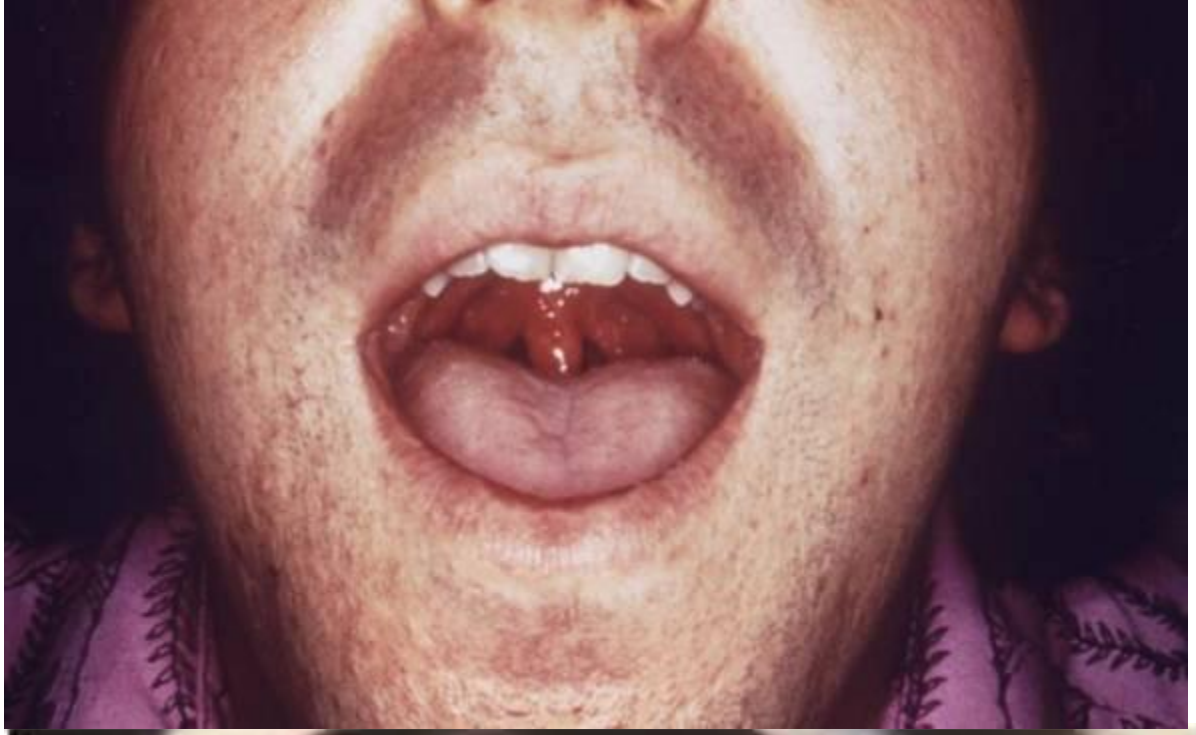
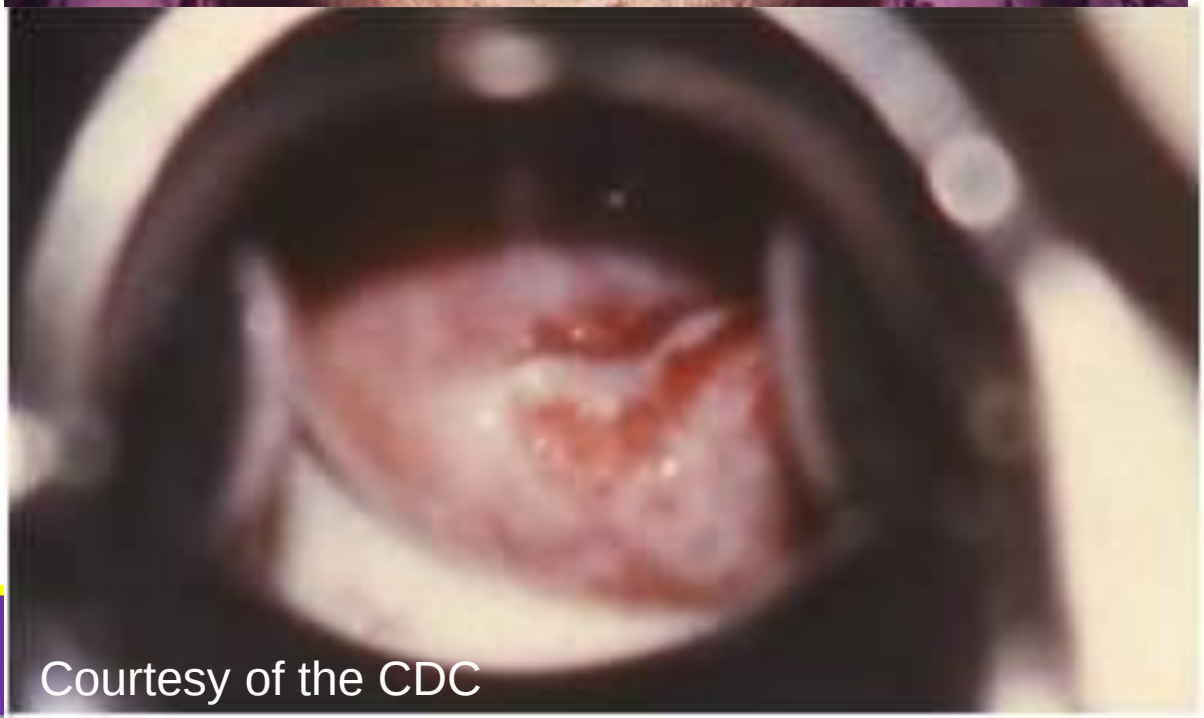
Neisseria gonorrhea







Courtesy of the CDC

CDC Rec Treatment of GC Infection

Location	Agent Dosage
Cervical, urethral, or rectal infection	Ceftriaxone (Rocephin) **250** mg IM once
	Cefixime (Suprax)400 mg orally once
	Single-dose injectible cephalosporin + Azithromycin 1g orally in a single dose
	Doxycycline 100 mg a day for 7 days
Pharyngeal	Ceftriaxone 250 mg IM in a single dose + Azithromycin 1g orally in a single dose
	Doxycycline 100 mg a day for 7 days
Conjunctivitis	Ceftriaxone 1 g IM in a single dose
Meningitis and Endocarditis	Ceftriaxone 1–2 g IV every 12 hours

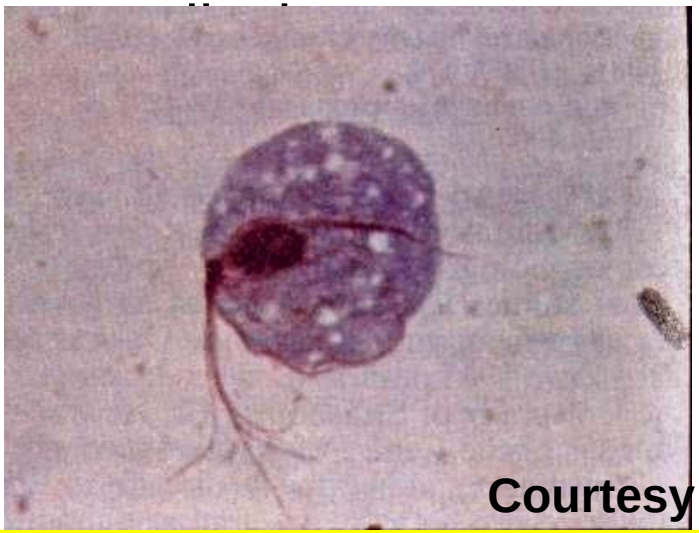
CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

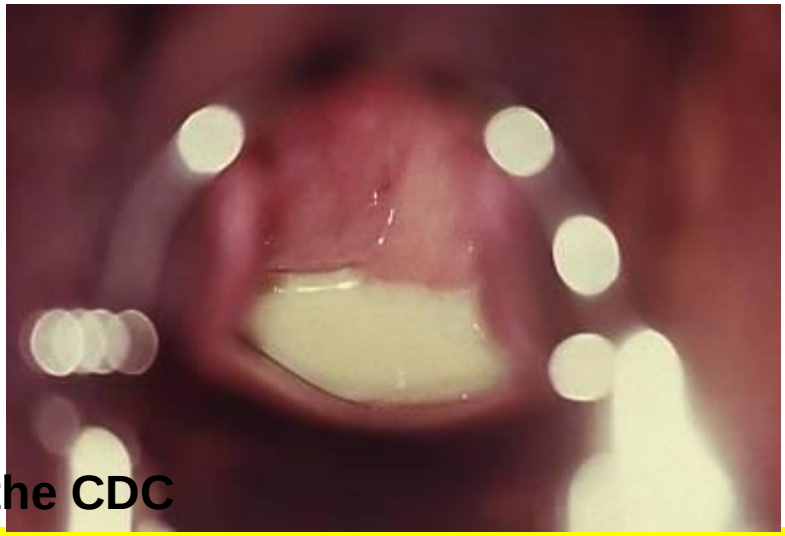
Quinolone-Resistant GC

- **Has continued to increase throughout the United States**
  - **Previous recommendations focused on the high levels of resistance in areas of Asia and the Pacific, California, Hawaii, and men who have sex with men**
- **Current guidelines no longer recommending quinolones as treatment for N. gonorrhoeae**

Trichomoniasis

- Protozoan T. vaginalis
- Infected men have NGU or no symptoms
- Women have diffuse, malodorous, yellow-green vaginal discharge with vulvar irritation
  - Many women have minimal or no symptoms
  - Testing should be performed with vaginal

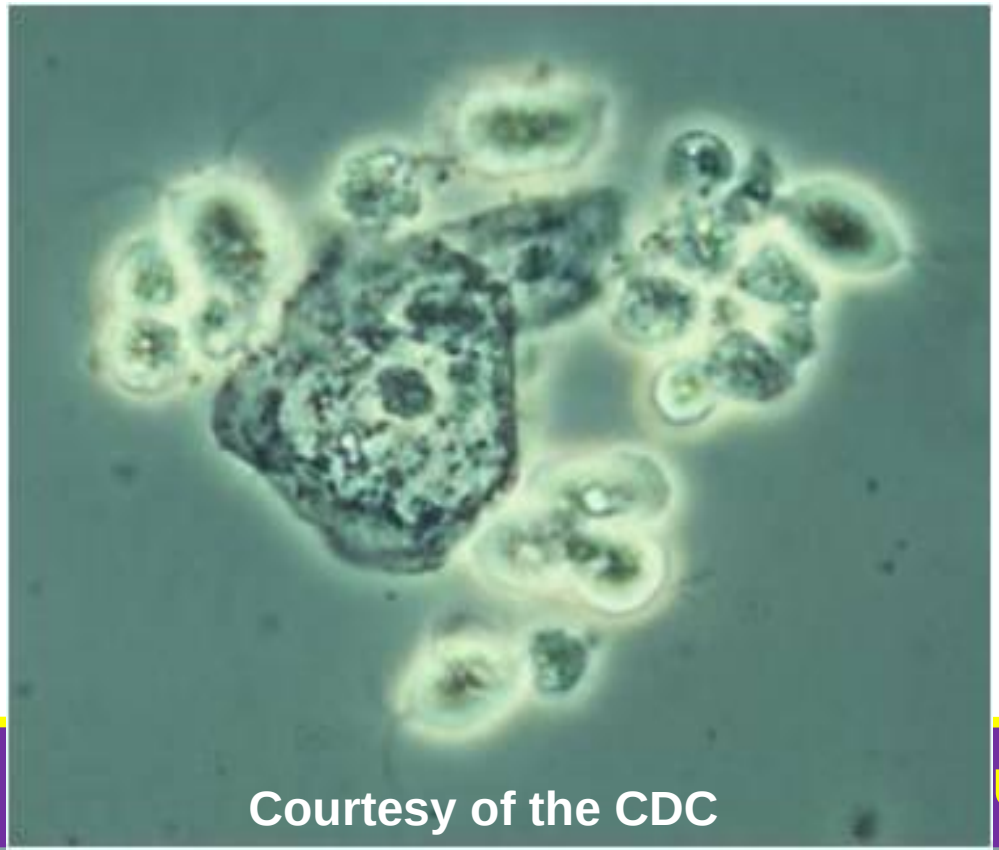




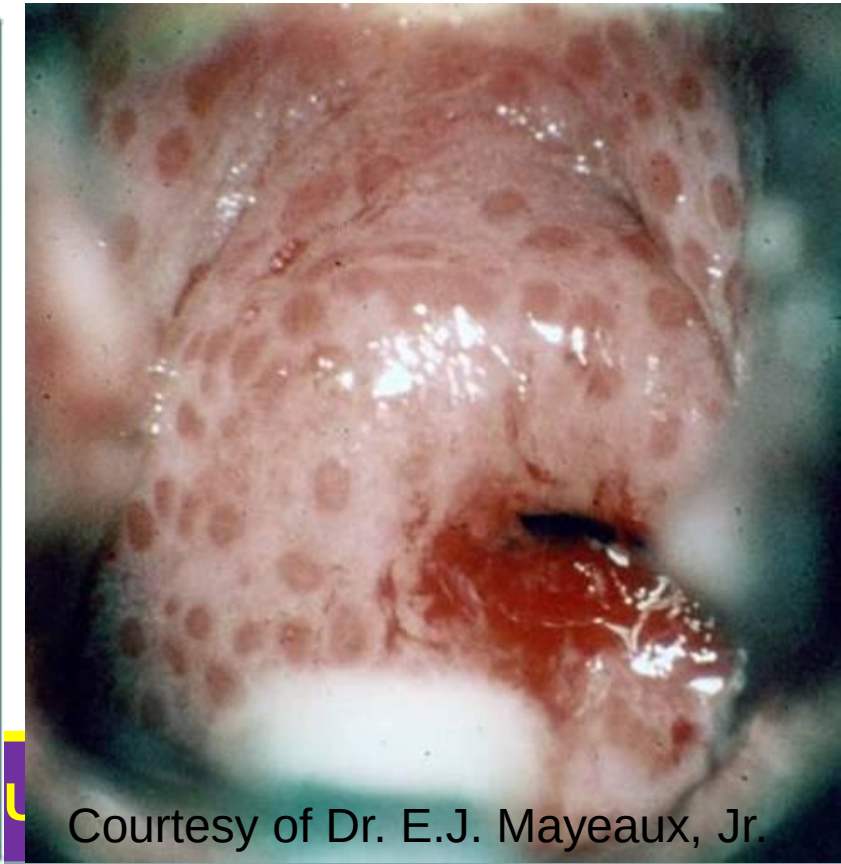
Courtesy of the CDC

Wet Prep

- **Trichomonads**
  - Motile pear-shaped organisms with flagella
  - Cervix is red with strawberry spots



Courtesy of the CDC



Courtesy of Dr. E.J. Mayeaux, Jr.

Trichomoniasis Diagnosis

- Microscopy of vaginal secretions
  - Sensitivity of only 60%–70%
  - Requires immediate evaluation of wet preparation slide
- FDA-cleared tests
- Culture is sensitive and highly specific
- Sensitivity of a Pap test for T. vaginalis is poor and false+ tests can occur

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

FDA-cleared POC Trich Tests

- OSOM Trichomonas Rapid Test (Genzyme Diagnostics, Cambridge, Massachusetts), an immunochromatographic capillary flow dipstick technology
  - Results available in approximately 10 minutes
- Affirm VP III (Becton Dickenson, San Jose, California), a nucleic acid probe test that evaluates for T. vaginalis, G. vaginalis, and C. albicans.
  - Results are available within 45 minutes
- On vaginal secretions, sensitivity of > 83% and specificity of > 97%
- False+, especially with a low prevalence of disease.

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

Trichomoniasis Diagnosis

- FDA-cleared PCR assay GC and chlamydial (Amplicor, Roche Diagnostics) has been modified for T. vaginalis in swabs and urine
  - Sensitivity 88%–97% and specificity 98%–99%
- APTIMA T. ASR can detect T. vaginalis RNA using same platforms available for the FDA-cleared APTIMA Combo2 assay for diagnosis of gonorrhea and chlamydial infection
  - Sensitivity from 74%–98% and specificity of 87%–98%

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

Trichomonas Vaginitis

- **Predominantly sexually transmitted**
- **Organism can survive up to 48 hours at 50^{o} F, making possible transmission from shared undergarments or infected spas**
- **Can produce PROM and preterm delivery**

CDC Rec Treatment of Trich

Regimen	Agent	Dosage
Recommended	Metronidazole (Flagyl)*	2 g orally once
	Tinidazole (Tindamax)*†	2 g orally once
Alternative	Metronidazole*	500 mg orally twice daily for seven days

*Patients should be advised to avoid consuming alcohol during, and 24 hours after completion of metronidazole or 72 hours after completion of tinidazole.
†-Tinidazole is U.S. Food and Drug Administration pregnancy category C; its safety during pregnancy has not been well evaluated.

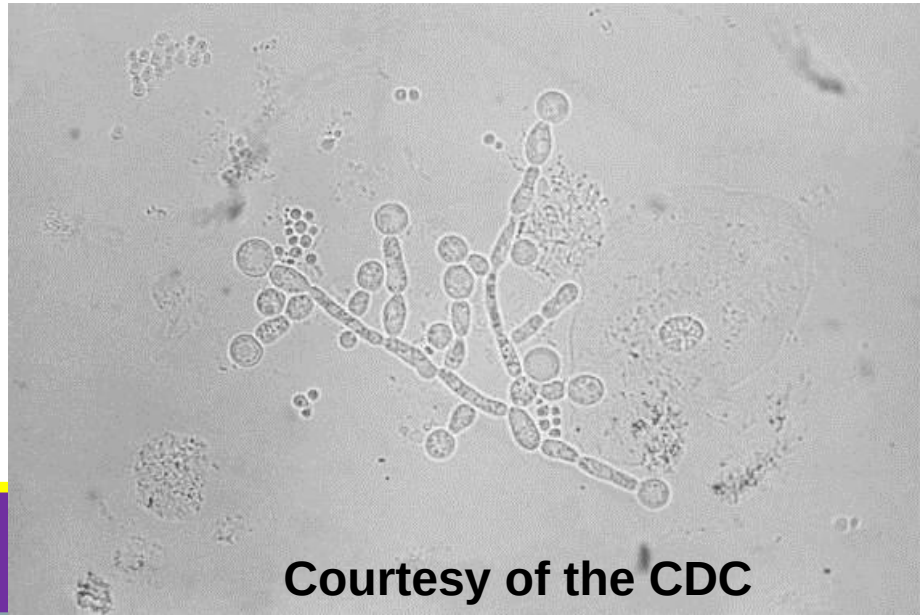
Vulvovaginal Candidiasis

- Usually is caused by C. albicans
  - Occasionally caused by other Candida sp.
- Symptoms = pruritus, vaginal soreness, dysuria, dyspareunia, and vaginal D/C
- ~75% of women at least one episode
- 40%–45% 2 or more episodes
- ~10%–20% will have complicated VVC
  - Diagnostic and therapeutic considerations

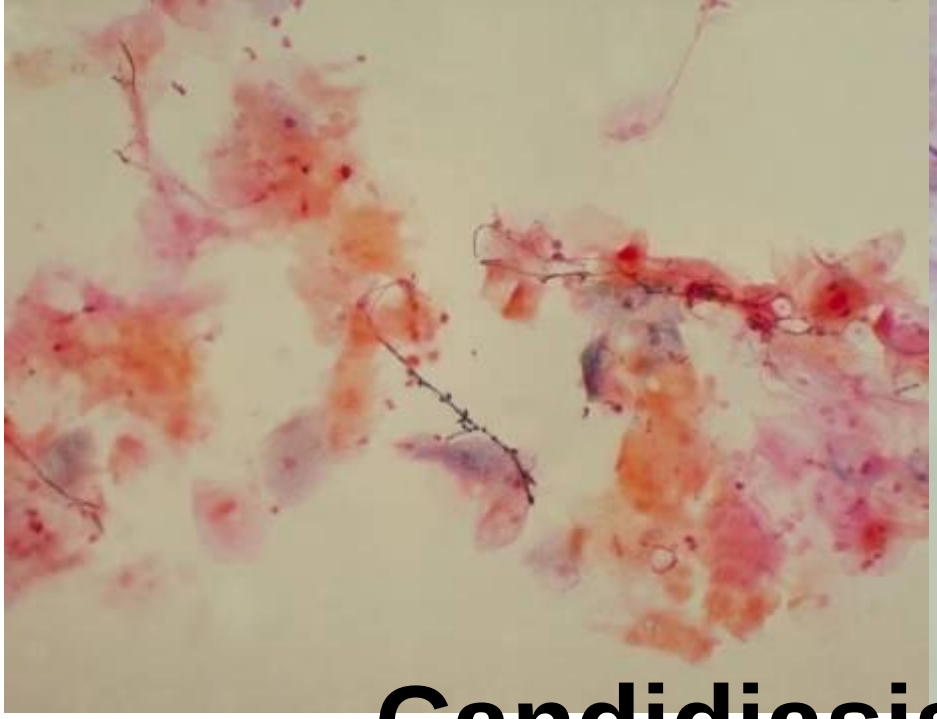
CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

Vulvovaginal Candidiasis Diagnosis

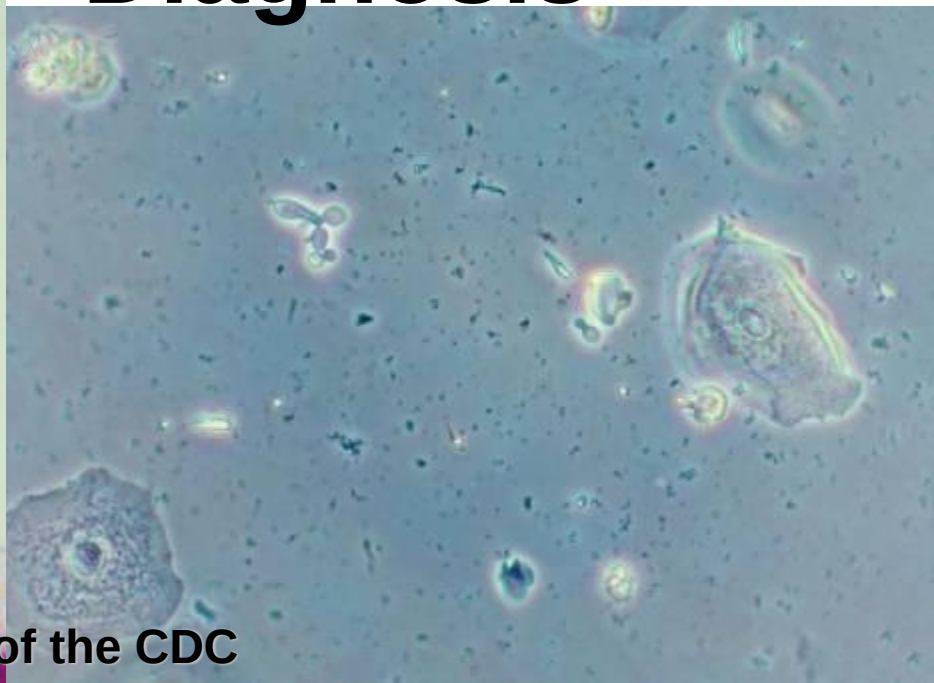
- Signs = vulvar edema, fissures, excoriations, or thick, curdy vaginal discharge
- Wet preparation (saline, 10% KOH) or Gram stain
  - Demonstrates yeasts, hyphae, or pseudohyphae
  - 10% KOH in wet preparations improves visualization
- Women with negative wet mounts who are symptomatic may need vaginal cultures for Candida or empiric tx



Courtesy of the CDC

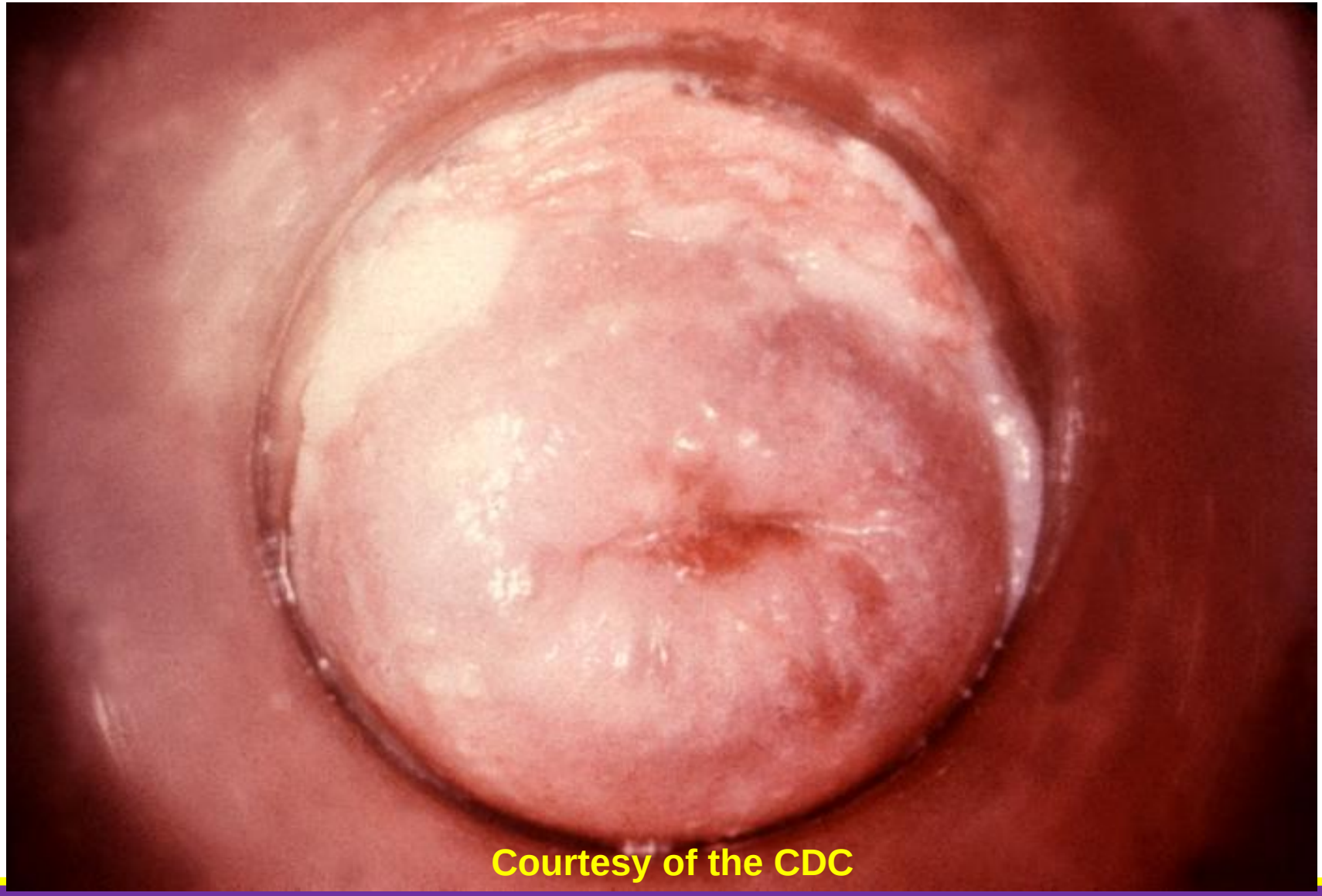


Candidiasis - Diagnosis



Courtesy of the CDC

Candidiasis - Diagnosis



Vulvovaginal Candidiasis Treatment

- Prescription Agents
  - Butoconazole 2% cream (single dose bioadhesive product), 5 g once
  - Nystatin 100,000-unit vaginal tablet, one tablet for 14 days
  - Terconazole 0.4% cream 5 g for 7 days
  - Terconazole 0.8% cream 5 g for 3 days
  - Terconazole 80 mg suppository for 3 days
  - Fluconazole 150 mg orally single dose

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

Bacterial Vaginosis

- **Clinical syndrome resulting from alteration of the vaginal ecosystem**
- **Replacement of normal vaginal lactobacilli with anaerobic bacteria**
- **Most common cause of vaginal discharge or odor**
  - **Especially in young women**
- **High occurrence in WSW**

Bacterial Vaginosis

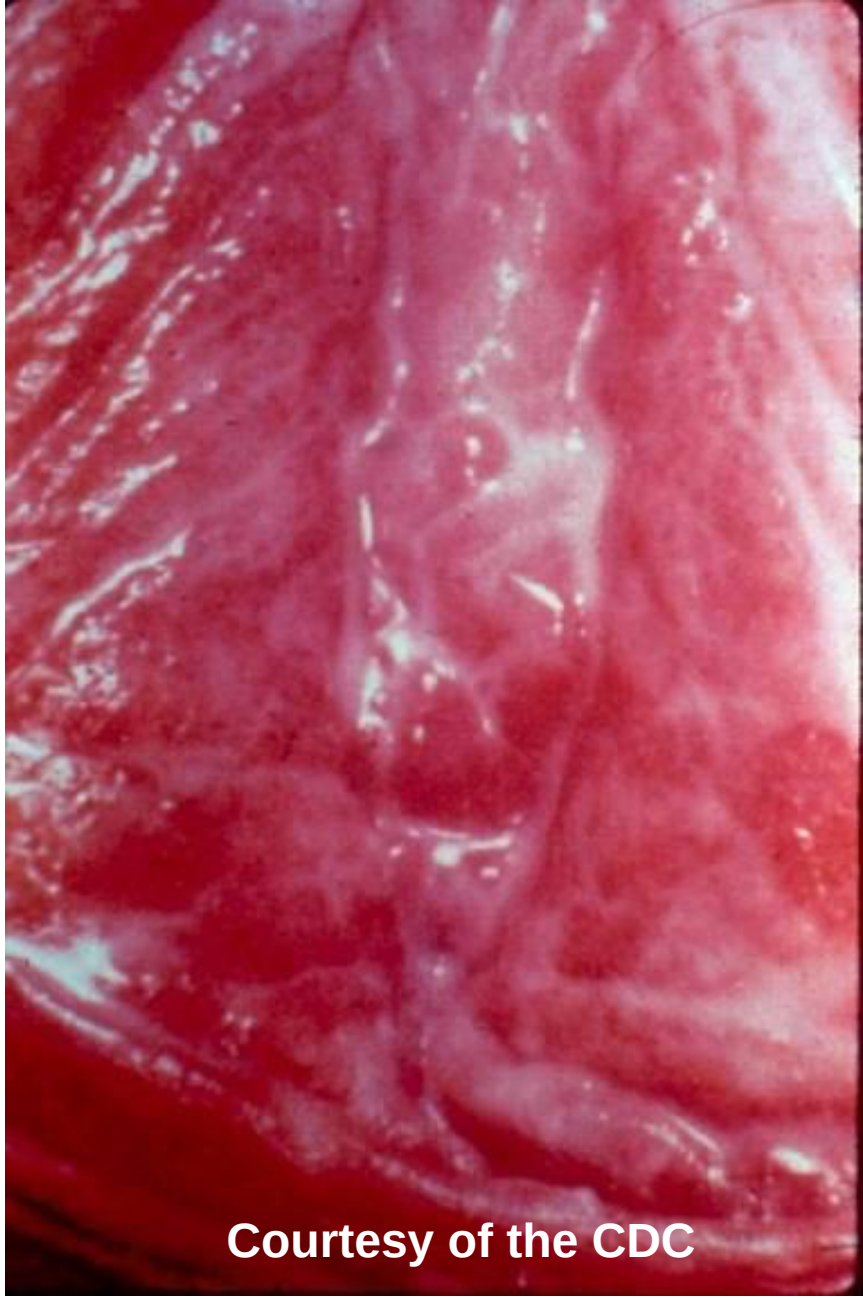
- **Lactobacillus is normal vaginal flora**
  - **Hydrogen peroxide-producing lactobacilli are found in 95% of women with normal flora, versus only 35% of women with bacterial vaginosis**
- **Called a vaginosis, because of superficial involvement of the tissues**
- **>1/2 of women are asymptomatic**

BV Diagnosis

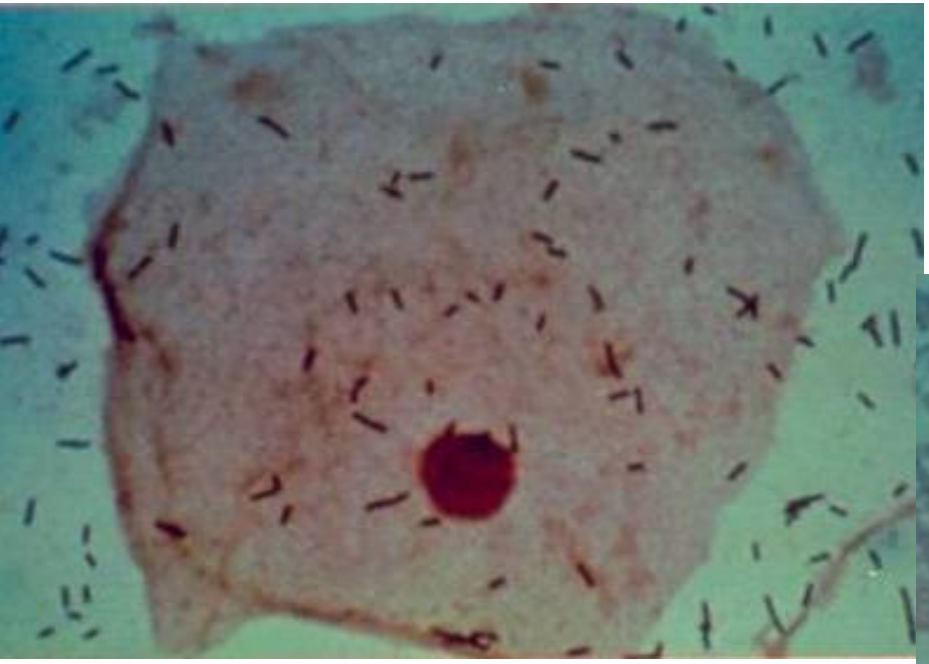
- **Amsel criteria: 3 of 4 required**
  - **Homogeneous, off-white, creamy discharge that adheres to vaginal walls**
  - **Clue cells - generally, more than 20% to 25% of epithelial cells**
  - **pH >4.5**
  - **Fishy odor before or after the addition of 10% KOH (whiff test)**

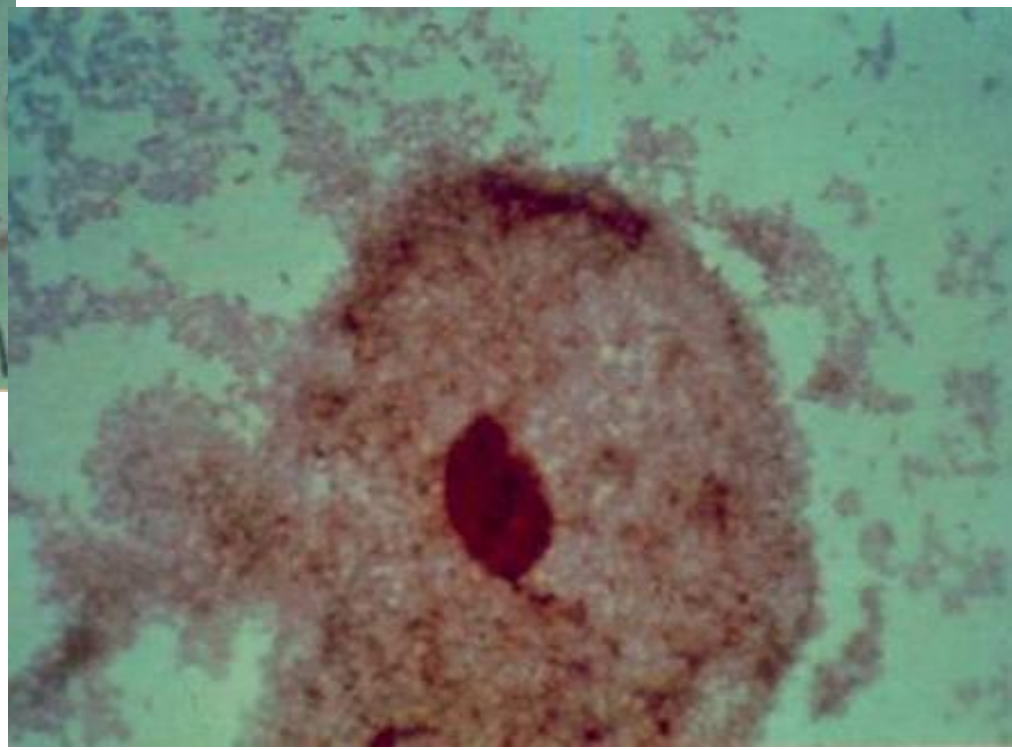
BV Diagnosis

Classic Discharge



BV Diagnosis - Clue cells





Courtesy of Dr. E.J. Mayeaux, Jr.

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Bacterial Vaginosis Diagnosis

- DNA probe-based test for high concentrations of G. vaginalis (Affirm VP III, Becton Dickinson, Sparks, Maryland)
- Prolineaminopeptidase test card (Pip Activity TestCard, Quidel, San Diego, California)
- OSOM BV Blue test have acceptable performance characteristics
- Although a card is available for elevated pH and trimethylamine, it has low sensitivity and specificity and therefore is not recommended

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

Bacterial Vaginosis Treatment

- Metronidazole 500 mg orally BiD for 7 days
- Metronidazole gel 1 applicator daily x5 days
  - Alcohol should be avoided for 24 hours
- Clindamycin crm 1 applicator daily x7 days
  - Oil-based: weakens latex condoms / diaphragms
- Alternative Regimens
  - Tinidazole 2 g orally once daily for 3 days
  - Tinidazole 1 g orally once daily for 5 days
  - Clindamycin 300 mg orally twice daily for 7 days
  - Clindamycin ovules 100 mg vaginally hs for 3 days

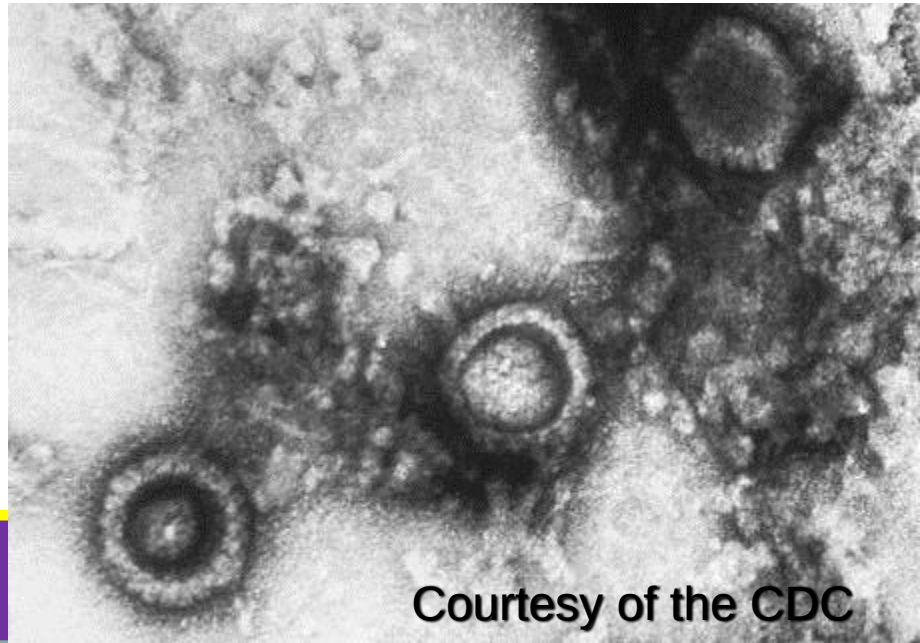
CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

Pregnancy BV Treatment

- Tx recommended for all symptomatic women
- BV associated with adverse outcomes
  - Premature rupture of membranes, preterm labor, preterm birth, intra-amniotic infection, and postpartum endometritis
  - Only established benefit of BV therapy women is reduction of symptoms and signs
- Pregnant Women
  - Metronidazole 500 mg orally BiD for 7 days
  - Metronidazole 250 mg orally TiD for 7 days
  - Clindamycin 300 mg orally twice a day for 7 days

Genital HSV Infections

- Chronic, life-long viral infection
- HSV-1 and (mostly) HSV-2
  - ~50 million persons in the U.S. infected with HSV-2 (147).
- Most persons infected not been diagnosed
  - Have mild / unrecognized infections - shed virus
- 3 presentations
  - Primary
  - Non-primary
  - Recurrent



CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

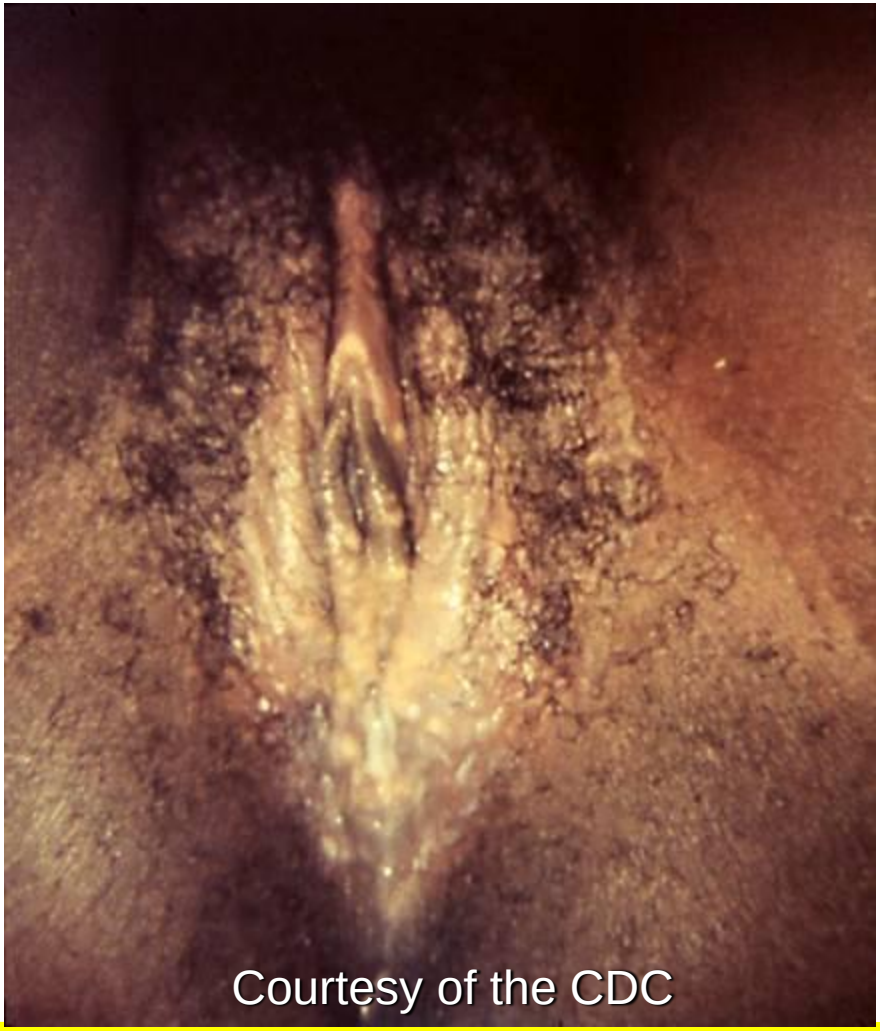
HSV Diagnosis

- Nonsensitive and nonspecific
- PE: may have classical painful multiple vesicular or ulcerative lesions
  - Recurrences less frequent for genital HSV-1
- Confirmed by virologic or serologic tests
  - Cell culture and PCR are preferred virologic HSV tests for persons who seek medical treatment
  - PCR assays more sensitive and increasingly used
  - Failure to detect HSV by culture or PCR does not indicate an absence of HSV infection, because viral shedding intermittent

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

HSV Primary Infection

- Systemic symptoms may include fever, malaise, myalgia, and headache
- Symptoms last about 2 weeks, healing 1-2 weeks, viral shedding 2-3 weeks



HSV Perinatal Infection

- Primary infection at vaginal delivery results in 50% infected and 60% mortality
- 50% of survivors have significant sequelae

Courtesy of the CDC

HSV Treatment

Drug	Primary Infection Dosage	Recurrent Infection Dosage	Chronic Suppressive Therapy
Acyclovir (Zovirax)	200 mg 5 times daily or 400 mg 3 times daily for 7-10 days	200 mg 5 times daily for 5 days or 800 mg twice daily for 5 days or 400 mg 3 times a day for 5 days** or 800 mg 3 times a day for 2 days	400 mg PO twice daily*
Famciclovir (Famvir)	250 mg 3 times daily for 10 days	125 mg twice daily for 5 days*** or 1000 mg twice daily for 1 day or 500 mg once, followed by 250 mg twice daily for 2 days	250 mg PO twice daily*
Valacyclovir (Valtrex)	1 g twice daily for 10 days*	500 mg twice daily for 3 days or 1 g once a day for 5 days**	500 mg to 1 gram PO daily*

CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR . 2010 Dec 17;59 (RR-12):1-110.

CDC says cheap beer spreads sexually transmitted diseases

An Associated Press report

ATLANTA – Cheap beer is a leading contributor to the spread of sexually transmitted diseases, according to a government report that says raising the tax on a six-pack by 20 cents could reduce gonorrhea by up to 9 percent.

The Centers for Disease Control and Prevention study, released Thursday, compared changes in gonorrhea rates with changes in alcohol policy in all states from 1981 to 1995. In years following beer tax increases, gonorrhea rates usually dropped among young people. The same happened when the drinking age went up — as it did in many states during the 1980s.

"Alcohol has been linked to risky sexual behavior among youth. It influences a person's judgment, and they are more likely to have sex without a condom, with multiple partners or with high-risk partners," said Harrell Chesson, a health economist with the CDC.

Beer industry lobbyists, however, said recent statistics show young people are already drinking more responsibly, thanks in part to efforts by brewers.

"Excise taxes have little or nothing to do with alcohol abuse in society," said Lori Levy of The Beer Institute, in Washington. "I think that our members understand the importance of educating young people about how to make responsible choices once they're old enough, and they put a lot of money and effort into those programs."

Gonorrhea, one of the most common venereal diseases, was examined in the CDC study because long-term statistics are available and the disease is more evenly spread among states.

The CDC analyzed the drops in gonorrhea rates following different tax increases and came up with the estimate that a 20-cent increase per six-pack would lead to a 9 percent drop in gonorrhea rates.

Chesson cited the example of a 16-cent per gallon — about 9 cents per six-pack — tax increase in California in 1991. Gonorrhea rates in the 15 to 19 age group dropped about 30 percent the following year. Drops in other states were not as dramatic.

During the study, various states raised beer taxes 36 times. Gonorrhea rates in the 15 to 19 age group dropped in 24 of those instances, and rates among those 20 to 24 dropped 26 times.

In both age groups, men seem to be more affected than women by higher beer prices.

Most instances of raising the legal drinking age were also followed by a decrease in the gonorrhea rate, especially in the 15 to 19 age group.

About 3 million teenagers are infected with sexually transmitted diseases each year, Chesson said. Gonorrhea usually can be treated with antibiotics, although some drug-resistant strains have been developed.

"Mr. Osborne, may I be excused? My brain is full."

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