2018 Updates on STD Management: Practical Approaches to the Most Common STD Clinic Patient Concerns

A Monthly Webinar Series

Webinars occur 12-1 pm EST
One Tuesday per month
January – November 2018
Learner Objectives

At the conclusion of this webinar series, participants should be able to:

• Accurately identify patients at risk for STIs and then test, diagnose, and treat according to CDC STD Treatment Guidelines.
Continuing Education Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and the Policies of the Accreditation Council for Continuing Medical Education through the joint providership of the University of Alabama School of Medicine and the Sylvie Ratelle STD/HIV Prevention Training Center.

The University of Alabama School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for participants.

The University of Alabama designates this webinar for a maximum of 1.0 AMA PRA Category 1 Credit™. Participants should claim only the credit commensurate with the extent of their participation in the activity.

These credits are also applicable for registered nurses.
After Today’s Webinar

• You will receive an auto-generated email from the National Network of STD Clinical Training Centers to complete a brief evaluation of today’s presentation.

• Within that email, you will find instructions on how to register for and receive CME credits through the University of Alabama School of Medicine.

• Webinars will be archived and available for viewing at [www.RatellePTC.org](http://www.RatellePTC.org). CME credits will also be available for archived webinars.
# Save The Dates: 2018 STD Webinar Schedule

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<th>Date</th>
<th>Title</th>
<th>Speaker(s)</th>
<th>Affiliations</th>
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<tr>
<td>Jan 16</td>
<td>Vaginitis: Bacterial Vaginosis, Yeast Vaginitis, Trichomoniasis</td>
<td>Katherine Hsu, MD, MPH</td>
<td>MDPH/Boston Univ. Med. Ctr.</td>
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<td>Mar 20</td>
<td>Motivational Interviewing for STI/HIV Prevention</td>
<td>Thomas Creger, PhD, MPH</td>
<td>Univ. of Alabama at Birmingham</td>
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<td>Apr 17</td>
<td>Pregnancy and STIs</td>
<td>Candice McNeil, MD, MPH</td>
<td>Wakeforest Univ.</td>
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<td>Jun 19</td>
<td>Clinician-Health Department Partnerships: Partner Management, Disease Reporting, Presumptive Treatment</td>
<td>Marjorie Kirsch, MD</td>
<td>FL DOH Wakulla County</td>
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Save The Dates: 2018 STD Webinar Schedule (cont’d)

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<tr>
<td>Jul 17</td>
<td>Genital Lesions: HSV, HPV, Syphilis</td>
<td>Nicholas Van Wagoner, MD, PhD</td>
<td>Univ. of Alabama Sch. of Med.</td>
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<td>Sept 11</td>
<td>Genital Dermatology</td>
<td>Nicholas Van Wagoner, MD, PhD</td>
<td>Univ. of Alabama Sch. of Med.</td>
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<td>Oct 16</td>
<td>Approaches with Special Populations: Youth, GLBT</td>
<td>Katherine Hsu, MD, MPH and Nicholas Van Wagoner, MD, PhD</td>
<td>MDPH/Boston Univ. Med. Ctr. and Univ. of Alabama Sch. of Med.</td>
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<td>Nov 13</td>
<td>Update on PrEP</td>
<td>Ulyee Choe, DO</td>
<td>FL DOH Pinellas County/Univ. of S. Florida College of Med.</td>
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</table>
VAGINITIS!

Katherine Hsu, MD, MPH*
Director, STD/HIV Prevention Training Center of New England
Medical Director, Division of STD Prevention
Massachusetts Department of Public Health

Slides developed by Drs. Ratelle, Dunne, Mitchell, and Hsu*

*No commercial disclosures or conflicts of interest
Objectives

• Review normal vaginal ecosystem
• Review three main causes of vaginitis, including current diagnostics, treatment, and management of recurrences
  – Bacterial vaginosis
  – Yeast vaginitis
  – Trichomoniasis
Today’s Questions

- What questions on ...
  - History (symptoms)
  - Exam (signs)
  - Labs (office point of care tests)

… can we ask to rule in or rule out specific causes of vaginitis?
Background

• 3 out of 4 women have some type of vaginitis in their lifetime

• 1 of the top 7 reasons women seek health care
  – 10 million office visits annually
  – Procedures are billable!

• Diagnosis limited by:
  – Poor patient recognition
  – Poor provider-patient telephone triage
  – Poor provider office based prediction
    • Under-utilization of pH and microscopy

Allen-Davis J 2002 Ob Gyn
Weisenfeld 1999 Am J ObGyn
Landers 2004 Am J ObGyn
Normal Vaginal Ecosystem

= 

Mature vaginal squamous epithelium 
+ 
Mucus 
+ 
Normal vaginal flora  

(≈10^9 bacterial colony forming units per gram of fluid) 
= 

Clear to white, odorless, high viscosity discharge
Mature Vaginal Squamous Epithelium

The epithelium is composed of:

- multiple layers of superficial cells (S)
- multiple layers of intermediate cells (I)
- several layers of parabasal cells (PB)
- a basal layer (B)

...that accumulate glycogen under the influence of estrogen stimulation.

Source: Sharon Hillier, PhD
Protective Role of Mucus

- Provides lubrication
- Traps pathogens
- Delivers anti-microbial agents
- Constantly shed
What Is Normal Vaginal Flora?

Predominantly *Lactobacillus* (95%)

The other 5% …

- Streptococci sp.
- *Staphylococcus epidermidis*
- Diphtheroid sp.
- *Gardnerella vaginalis*
- Peptostreptococci sp.
- Bacteroides sp.
- Anaerobic *Lactobacillus*
- *Ureaplasma urealyticum*
- *Mycoplasma hominis*

Adapted from D. Eschenbach, MD, “Overview and Epidemiology of Vaginal Infections”, Dallas 12/06/98
Functions of Lactobacilli

- Produce hydrogen peroxide
  - viricidal, inhibits growth of many other bacteria such as *G. vaginalis*, anaerobes, *N. gonorrhea*
- Produce lactic acid
- Resultant vaginal pH <4.5
- Produce bacteriocidin
- Interfere with bacterial adhesion to epithelial cells

Adapted from D. Eschenbach, MD, “Overview and Epidemiology of Vaginal Infections”, Dallas 12/06/98
Dairy Food Strains DON’T Colonize and Persist in the Vagina

- Three studies from US, Japan and Italy using DNA homology for identification of lactobacilli show that the most common vaginal species are *L. crispatus* and *L. jensenii* (not *L. acidophilus*)
- When women are followed over several months, H$_2$O$_2$-producing strains of *L. crispatus* and *L. jensenii* are the most likely to persist

Vallor et al., JID 2001
Source: Sharon Hillier, PhD
Wet Prep:
Lactobacilli and Epithelial Cells

Saline: 40X objective

Source: CDC and Seattle STD/HIV Prevention Training Center at the University of Washington
Wet Prep: RBCs, Sperm, PMNs, and More

Saline: 40X objective

Source: CDC and Seattle STD/HIV Prevention Training Center at the University of Washington
## Etiologies of Vaginitis

<table>
<thead>
<tr>
<th></th>
<th>National</th>
<th>Anderson et al.</th>
</tr>
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<tbody>
<tr>
<td>Yeast</td>
<td>20-25%</td>
<td>17-39%</td>
</tr>
<tr>
<td>BV</td>
<td>40-50%</td>
<td>22-50%</td>
</tr>
<tr>
<td>Trich</td>
<td>15-20%</td>
<td>4-35%</td>
</tr>
<tr>
<td>Undiagnosed</td>
<td>30%</td>
<td>7-72%</td>
</tr>
</tbody>
</table>

Etiologies of Vaginal Discharge

- Infectious 90%
  - Bacterial vaginosis
  - Candida species
  - *T. vaginalis*
  - Cervicitis
    - *N. gonorrhoeae*
    - *C. trachomatis*
  - HSV
  - Staph/Strep (TSS)
  - Group B streptococci

- Non-Infectious 10%
  - Cervical caps
  - Detergent spermicides
  - Retained foreign bodies
  - “Drying” agents
  - Allergies (latex, etc.)
  - Chemical (douching)
  - Fragranced liners/tampons
  - Cytolytic vaginitis
Less Common Causes of Vaginal Complaints

- GC and chlamydia
  - Association with vaginal discharge is UNCONFIRMED!
  - BUT age group <25 years has the peak incidence
- HSV
- Mycoplasma and ureaplasma?
- Chemical irritation
  - Latex
  - Semen
  - Douching
- Mechanical irritation
Bacterial Vaginosis

Homogeneous, white discharge
Bacterial Vaginosis

Seattle STD/HIV Prevention Training Center
Source: University of Washington
Bacterial Vaginosis

• Most frequent cause of abnormal vaginal discharge

• Prevalence estimates from 2-30% general population; 40-50% women in STD clinics
Risk Factors for BV

• More common among African American and older women
• Douching
  – Recent douching (OR=2.1), frequent douching, douching for hygiene or symptoms
• IUD: 2-fold more likely to have BV
• Two or more sex partners in previous six months
• New sex partner
• Female sex partners*
• Past history of BV*
• Others??

Sobel JD et al. Obstet Gynecol 2006; 194;1283-9
Bradshaw CS et al. JID 2006;193:1478-86
BV Pathogenesis

• Flora in healthy vaginas
  – Lactobacilli (95%)
  – Other (5%)
    • Streptococci sp.
    • *Staphylococcus epidermidis*
    • Diphtheroid sp.
    • *Gardnerella vaginalis*
    • Peptostreptococci sp.
    • Bacteroides sp.
    • Anaerobic *Lactobacillus*
    • *Ureaplasma urealyticum*
    • *Mycoplasma hominis*

• Flora in BV
  – Gardnerella- up 17x
  – Bacteroides- up 15x
  – Peptostreptococci- up 10x
  – Mycoplasma/Ureaplasma- up 15x
  – Lactobacilli- < 5%
Pathogenesis

• Lack/paucity of lactobacilli (<5%)
• Ratio of anaerobes: aerobes greatly increases
  – Overgrowth of Gardnerella vaginalis, genital mycoplasmas, anaerobic GNRs, and Mobiluncus species
• Gardnerella probably necessary but not sufficient (experimental data)
  – Synergistic process with anaerobes probably responsible
• BV pts have a higher number of sialidase-producing bacteria
  – 84% of women with BV have elevated levels of sialidase activity in their vaginal fluid (Briselden et al 1992)
  – Mainly produced by Prevotella and Bacteroides spp.
Clinical Manifestations

• 50% report malodorous vaginal discharge
  – more common after unprotected vaginal intercourse and after menses

• 50% are asymptomatic:
  – may have increased discharge
  – pruritus may or may not be present
Clinical Signs

- Elevated pH $>4.7$
  - surrogate for reduced numbers of lactobacilli
- Clue cells
  - an indication of increased numbers of bacteria and binding of the bacteria to the epithelial cells
- Amine odor
  - an indication that high levels of anaerobic gram negative rods are present
- Homogenous discharge
  - caused by degradation of mucins by anaerobic gram negative rods
## Sensitivity & Specificity of Clinical Criteria

<table>
<thead>
<tr>
<th>Condition</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Thin homogenous discharge</td>
<td>79%</td>
<td>54%</td>
</tr>
<tr>
<td>2. pH ≥ 4.5</td>
<td>89%</td>
<td>74%</td>
</tr>
<tr>
<td>3. Positive amine test</td>
<td>67%</td>
<td>93%</td>
</tr>
<tr>
<td>4. Clue cells (&gt;20%)</td>
<td>74%</td>
<td>86%</td>
</tr>
<tr>
<td>pH ≥ 4.5 and discharge</td>
<td>69%</td>
<td>86%</td>
</tr>
<tr>
<td>pH ≥ 4.5 and amine odor</td>
<td>64%</td>
<td>95%</td>
</tr>
<tr>
<td>pH ≥ 4.5 and clue cells</td>
<td>69%</td>
<td>92%</td>
</tr>
<tr>
<td>Clue cells and amine odor</td>
<td>63%</td>
<td>95%</td>
</tr>
<tr>
<td>Clue cells and discharge</td>
<td>61%</td>
<td>91%</td>
</tr>
<tr>
<td>Amine odor and discharge</td>
<td>58%</td>
<td>94%</td>
</tr>
<tr>
<td>Amsel criteria (≥ 3 of 4)</td>
<td>69%</td>
<td>93%</td>
</tr>
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Wet Prep: Bacterial Vaginosis

Saline: 40X objective

Clue cells

NOT a clue cell

Source: Seattle STD/HIV Prevention Training Center at the University of Washington
Bacterial Vaginosis Diagnosis: Amsel Criteria

Amsel Criteria: Must have at least three of the following findings:

- Vaginal pH >4.5
- Presence of >20% per HPF of "clue cells" on wet mount examination
- Positive amine or "whiff" test
- Homogeneous, non-viscous, milky-white discharge adherent to the vaginal walls
Lab Tests for Diagnosis of Bacterial Vaginosis

- Affirm VP III system (Becton-Dickinson)
  Non-amplified nucleic acid for detection of $>10^7$ CFU/g of *G. vaginalis* (*T. vaginalis* and *Candida* species).

<table>
<thead>
<tr>
<th>Clinical Criteria</th>
<th>Clue Cells</th>
</tr>
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<tbody>
<tr>
<td>97% sensitive</td>
<td>90% sensitive</td>
</tr>
<tr>
<td>71% specific</td>
<td>97% specific</td>
</tr>
</tbody>
</table>

Could be surrogate for wet mount examination of clue cells
Use in conjunction with vaginal pH and presence of amine odor
(Briselden et al 1994. JCM;2:148-52)
Lab Tests for Diagnosis of Bacterial Vaginosis

- FemExam pH/amine test card (Quidel)
  - Colorimetric pH and amine test on a card
- BVBlue Test (OSOM – Genzyme – CLIA Moderate)
  - 10 minute colorimetric test requiring incubation based on detection of sialidase activity

**Gram Stain Score:**
91.7% sensitive
97.8% specific

Immerse the head of the cotton swab into the solution. Gently swirl the mixture.

Place the testing vessel containing the cotton swab into an incubator, temperature controlled at 37°C (98.6°F) for 10 minutes.

Add one drop of the Developer Solution to the testing vessel containing the cotton swab. Gently swirl the mixture.

Interpret the results immediately (within 3 minutes) after adding the Developer Solution.

For more information on our rapid test products, visit us at genzymediagnostics.com
Treatment Benefits: Non-Pregnant Patients

- Relieve symptoms
- Reduce post-infection rates following hysterectomy and abortion
- May reduce STD/HIV acquisition

**THEREFORE:**

- Treat all non-pregnant women with symptoms
- Consider screening and treatment of asymptomatic women
  - prior to abortion, hysterectomy, or other invasive upper genital tract procedure
Treatment Benefits: Pregnant Patients

- Relieve symptoms
- Reduce postpartum endometritis, post C-section wound infection
- Reduce preterm labor in high-risk women?
  - 7 studies done as of 1/2012
    - 4 showed benefit, 2 no change, 1 harm- conflicting results

THEREFORE:

• Treat all women with symptoms

To screen or not to screen?

• CDC- not enough evidence
• USPSTF- not enough evidence
• Cochrane Review- evidence to support screening high risk women, then treating them with systemic therapy only

CDC 2010 STD Treatment Guidelines
USPSTF 2010 Ann Int Med
McDonald 2005 Cochrane Database
Recurrent BV

• Recurrent disease remains common
  – Rates up to 70% within 3 months
• Reasons for recurrence unclear
  – Re-infection
  – Failure of lactobacilli to re-colonize
  – Inadequate length of therapy
  – Persistence of unidentified host factor
• Despite comparable early cure rates, higher recurrence rates associated with shorter treatment
  – Single-dose 2 g metronidazole
  – 3-day clindamycin course
Recurrent BV: Management

• More antibiotic is better: higher cumulative doses (longer therapy, 10-14 days) with subsequent suppression is most effective
  – Metronidazole gel, twice weekly (Sobel 2006)
  – Emerging data support ↑response of initial BV with higher vaginal doses of MTZ (Sanchez 2004)

• Prevent sexual transmission (condoms, no shared toys): Alkaline pH of sperm (7.5) vs. reinfection? (Trabert 2007; Sanchez 2004)

• Boric acid: 7 d MTZ PO, 21 d vaginal BA (600 mg qHS) followed by MTZ vaginal gel biweekly for 16 weeks was encouraging: cure post-BA 88%-92% (Reichman 2009)
Adherent Biofilms in Bacterial Vaginosis

G. vaginalis

Fig. 4. A continuous biofilm can be detected histologically on the vaginal epithelial surface in patients with bacterial vaginosis (Brown-Hopps modification of the Gram stain). Original magnifications: left panel, x100 (A); right panel, x250 (B). Note the desquamation of surface epithelial cells containing the biofilm that can be detected as “clue cells” in the vaginal smear (arrows).

Swidsinski, Biofilms in Bacterial Vaginosis, Obstet Gynecol 2005.

Slide courtesy of Marrazzo, IDSA 2011
Treatment

• Recommended
  – Metronidazole 500 mg PO bid x 7 days OR
  – Metrogel 0.75% 5 g intravaginally qhs x 5 days OR
  – Clindamycin cream 2% 5 g intravaginally qhs x 7 days
    • Oil-based, might weaken latex condoms and diaphragms for 5 days after use
• Alternative
  – Tinidazole 2 g PO qd x 2 days
  – Tinidazole 1 g PO qd x 5 days
  – Clindamycin 300 mg PO bid x 7 days OR
  – Clindamycin ovules 100 mg intravaginally qhs x 3 days
    • Oil-based, might weaken latex condoms and diaphragms for 5 days after use
• Pregnant
  – Same as recommended regimens for non-pregnant women
• Suppressive treatment:
  – Metrogel 0.75% twice weekly for 4-6 months
  – Oral nitroimidazole course, followed by boric acid 600 mg intravaginally for 21 days and suppressive metronidazole gel for 4-6 months (limited data)

2015 CDC STD Treatment Guidelines
Partner Management

• Routine treatment of male sexual partners of women with BV is not recommended

• Data from clinical trials indicate that a woman’s response to therapy and the likelihood of relapse or recurrence are not affected by treatment of her sex partner(s)

• Female partners of women with BV could be examined and treated if BV is present, but this approach has not been validated
  – Increase awareness of signs & symptoms of BV in women
  – Encourage healthy sex practices: avoid shared sex toys, clean sex toys, use barriers
Vulvovaginal Candidiasis
Yeast Vulvitis

Source: http://www.brooksidepress.org/Products/OBGYN_101
Yeast Vaginitis

Source:http://www.brooksidepress.org/Products/OBGYN_101/
Epidemiology and Causes

• Infection is common
  – 75% at least once
  – 40% to 45% two or more
  – < 5% recurrent VVC

• Not sexually transmitted
  – may be associated with frequency of intercourse, but not # of partners

• Most infections caused by
  – Candida albicans (85%)
  – C. glabrata (5% - 15%)
  – Misc. species (1% - 5%)
Pathogenesis

- Candida species are normal flora of the skin and vagina
- Symptomatic clinical infection is caused by overgrowth of *C. albicans* or other non-albicans species
- Yeast grows as oval budding yeast cells or as a chain of cells (pseudohyphae)
- Disruption of normal vaginal ecology or host immunity can predispose to vaginal yeast infections
Clinical Manifestations

• Intense itching and irritation of vulva
  – Not specific
• Thick, non-odorous discharge
  – Not sensitive
• External dysuria
• Exam
  – Thick, clumpy, adherent, white discharge
  – Erythema and edema of vulva, vagina
  – Sometimes see satellite lesions or shallow linear fissures or excoriations around posterior introitus
Diagnosis

• Based upon clinical presentation, signs, and office tests
  – pH < 4.5; negative amine test
  – Wet mount shows pseudohyphae and/or mycelial elements
    • 10% KOH prep improves visualization by disrupting cells that might be obscuring yeast

• When to use culture?
  – Symptoms present, pH normal, but yeast not seen on wet mount
  – Recurrent VVC (to confirm diagnosis)
  – To identify unusual species
    • C. glabrata buds, but doesn’t form pseudohyphae or hyphae, so it’s harder to see on wet mount
  – No improvement with therapy
  – Relapse within 2 months
Wet Prep: PMNs and Yeast Buds

Saline: 40X objective

Source: CDC and Seattle STD/HIV Prevention Training Center at the University of Washington
Wet Prep: PMNs and Pseudohyphae

Saline: 40X objective

Yeast pseudohyphae

Yeast buds

PMNs

Squamous epithelial cells

Source: CDC and Seattle STD/HIV Prevention Training Center at the University of Washington
Classification

• **Uncomplicated VVC**
  – Sporadic or infrequent
  – Mild to moderate symptoms
  – Likely to be *C. albicans*
  – Normal host

• **Complicated VVC**
  – Recurrent
  – Severe symptoms
  – Non-*C. albicans*
  – Immunosuppressed host
    • Uncontrolled diabetes
    • Pregnancy
    • HIV
    • Immunosuppressive therapy
  – *Not* associated with
    • nylons, type of underwear
    • colored toilet paper, tampons
    • wiping back to front

2006 CDC STD Treatment Guidelines
Principles of Treatment: Uncomplicated Infections

• Treat only symptomatic women
• No need to treat sex partners unless sx
• Topical azole drugs (clotrimazole, miconazole, butonconazole, etc.) more effective than nystatin
• Treatment with azole results in cure rates of 80-90% in women who comply with regimen
Treatment

• Uncomplicated VVC
  – Multiple topical azoles for 1-14 days* OR
  – Single-dose fluconazole 150 mg PO**

• Recurrent VVC
  – Induction:
    • Multiple topical azoles for 7-14 days* OR
    • Fluconazole 100-200 mg PO every 72 hrs x 3**
  – Maintenance to decrease recurrence
    • First-line: Fluconazole 100-200 mg orally weekly** OR
    • Other topical treatments used intermittently
    • Discontinue and re-assess after 6 months

*All oil-based and may weaken condoms
**Not to be used in pregnancy

2015 CDC STD Treatment Guidelines
Treatment:
Severe and Non- *C. albicans* VVC

**Severe VVC**

- Lower response rates to shorter courses of treatment
- 7 to 14 days of non-fluconazole topical therapy, OR
- Fluconazole 150 mg x 2 doses (second dose 3 days after first dose)

**Non- *C. albicans* VVC**

- Optimal treatment unknown
- Confirm with culture
- 7 to 14 days of non-fluconazole topical therapy
- For recurrences: boric acid 600 mg intravaginally daily x 14 days
  (70% clinical and mycologic cure rates)

2015 CDC STD Treatment Guidelines
List of Topical Azoles

- Butoconazole 2% cream 5g intravag x 3 days * or
  Butoconazole 2% cream 5g (sustained release), intravag once or

- Clotrimazole 1% cream 5g intravag x 7-14 days* or
  Clotrimazole 2% cream 5g intravag x 3 days* or
  Clotrimazole 100 mg vaginal tablet x 7 days or
  Clotrimazole 100 mg vaginal tabs, 2 tabs x 3 days

- Miconazole 2% cream 5 g intravag x 7 days* or
  Miconazole 4% cream 5 g intravag x 3 days* or
  Miconazole 100 mg vaginal suppository, one x 7 days* or
  Miconazole 200 mg vaginal suppository, one x 3 days*
  Miconazole 1,200 mg vaginal suppository x 1 dose*

- Tioconazole 6.5% ointment 5 g intravag once* or

- Terconazole 0.4% cream 5 g intravag x 7 days or
  Terconazole 0.8% cream 5 g intravag x 3 days or
  Terconazole 80 mg vaginal suppository, one x 3 days

* Available Over-The-Counter
Partner Management

- VVC is not usually acquired through sexual intercourse
- Treatment of sex partners is not recommended but may be considered in women who have recurrent infection
- A minority of male sex partners may have balanitis and may benefit from treatment with topical antifungal agents to relieve symptoms

Source: CDC
Trichomoniasis

- Frothy vaginal discharge
- “Strawberry cervix” or *colpitis macularis*
Trichomonas Vaginitis

Source: http://www.brooksidepress.org/Products/OBGYN_101
Strawberry Cervix due to Trichomoniasis

Source: PHIL, CDC
Trichomonas vaginalis

- Pear-shaped, flagellated, anaerobic protozoa
- Four anterior flagella
- Undulated membrane
- Posterior axostile
- Wet mount: jerky, swaying motion; increased PMNs
- Other Trichomonas species (body site specific):
  - T. tenax (oral commensal)
  - T. hominis (rare, GI tract)
Epidemiology

- **Most common curable STD**
- Estimated 7.4 million cases/yr ($375 million) in the U.S.
- Estimated prevalence:
  - 50%-60% in female prison inmates and commercial sex workers
  - 18%-50% in females with vaginal complaints
  - 3% in U.S. women 14-49 years of age (NHANES data)*
- **Factors associated with increased likelihood of infection in multivariable analysis**
  - Black, non-Hispanic race/ethnicity
  - Birth in United States
  - Greater number of lifetime sex partners
  - Increasing age
  - Lower educational level
  - Poverty
  - Douching
  - NOT symptoms

*Sutton et al. CID 2007; 45:1319-26
Route of Infection

**Inoculation:**
- Sexual contact
- Incubation 4-28 days
- Long duration of infection (months to years!)
  - 4 months in men
  - 5 years in women (Bowden, 2000)
- Seen in heterosexual and WSW couples

**Transmission:**
- Highly transmissible!
- Male to female: 85%
- Female to male: 20-60% (Krieger, 1995)
  - 70% (Sena, 2003)
Clinical Manifestations

• Women – symptomatic 20-50% of the time
  – profuse, malodorous discharge; genital irritation
  – Erythema of mucosa, profuse frothy discharge
  – Cervical petechiae (“Strawberry cervix”)
  – May also infect Skene's glands and urethra (rare), organism may not be susceptible to topical therapy

• Men – most asymptomatic
  – Non-gonococcal urethritis (etiology in up to 20% of cases)

Schwebke JR, Hook EW 3rd., 2003
Diagnosis

- **Wet mount (saline prep)**
  - Sensitivity 60-70% (highest with symptoms)
  - Motile pear-shaped trichomonad
  - Best read within 5 minutes on warm slide
  - Also see many PMNs

- **pH >4.5** (90% sensitive, not specific)

- **KOH** may have positive whiff (50%)
Wet Prep: Trichomoniasis

Saline: 40X objective

*Trichomonas shown for size reference only: must be motile for identification

Source: Seattle STD/HIV Prevention Training Center at the University of Washington
Newer Testing Options for Trich

- Microscopy is inferior to new options, including
  - Rapid antigen testing (OSOM)
  - Nucleic acid amplification testing
    - APTIMA TMA *Trichomonas vaginalis* assay
    - BD ProbeTec TV Q Amplified DNA assay
    - May use same specimen types as used with gc/chl NAATs (i.e. vaginal swab, endocervical swab, urine)

Huppert CID 2007

<table>
<thead>
<tr>
<th>Test</th>
<th>Sens</th>
<th>Spec</th>
</tr>
</thead>
<tbody>
<tr>
<td>APTIMA TMA</td>
<td>98%</td>
<td>98%</td>
</tr>
<tr>
<td>OSOM</td>
<td>90%</td>
<td>100%</td>
</tr>
<tr>
<td>Culture</td>
<td>83%</td>
<td>100%</td>
</tr>
<tr>
<td>Wet prep</td>
<td>56%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 3. Differences in test sensitivity stratified by the presence or absence of vaginal symptoms.

<table>
<thead>
<tr>
<th>Test method</th>
<th>Sensitivity, % (95% CI)</th>
<th>Sensitivity, % (95% CI)</th>
<th>Sensitivity, % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All patients (n = 330)</td>
<td>Vaginal symptoms present (n = 210)</td>
<td>Vaginal symptoms absent (n = 120)</td>
</tr>
<tr>
<td>Wet mount</td>
<td>50.8 (37.7–63.9)</td>
<td>57.5 (40.8–72.8)</td>
<td>38.1 (18.1–61.5)</td>
</tr>
<tr>
<td>Culture</td>
<td>75.4 (62.7–85.5)</td>
<td>77.5 (61.5–89.1)</td>
<td>71.4 (47.8–88.7)</td>
</tr>
<tr>
<td>Rapid test</td>
<td>82.0 (70.0–90.6)</td>
<td>92.5 (79.6–98.4)</td>
<td>61.9 (38.4–81.9)</td>
</tr>
<tr>
<td>TMA</td>
<td>98.4 (91.2–99.9)</td>
<td>97.5 (86.9–99.9)</td>
<td>100 (83.8–100)</td>
</tr>
</tbody>
</table>

NOTE: The comparator was any test result positive for *Trichomonas vaginalis* infection. TMA, transcription-mediated amplification.
Trichomoniasis: Diagnosis

Nucleic Acid Amplification Tests (Vaginal swab)
- BD Probe Tec Qx
- Hologic APTIMA
Both FDA approved
Sens/Spec: 96-98%, 98-100%

Saline Wet Mount
- Motile trichomonads
- pH > 4.5
- Whiff test may be positive
Sens/Spec: 35-82%, 99-100%

Point-of-care tests
- OSOM trichomonas rapid test (Genzyme)
- Affirm VP III (BD)
OSOM Sens/Spec: 82-95%, 99-100%
Affirm VP Sens/Spec: 83-90 %, ~100%

Culture (InPouch TV, BioMed Diagnostics)
Sensitivity: 75-87%
Specificity: 100%

Miller and Nyirjesy, Curr Infect Dis Rep 2011 13:595-603;
Schwebke JCM Dec 2011; p4106-4111
Trich Testing in Men

- No approved point of care tests
  - Wet prep not sensitive
- Culture available- urethral swab, semen or urine
  - No conclusive studies on sensitivity/specificity
- Urine and urethral swab NAAT offered through certain labs using analyte-specific reagents (check before sending)

**MSM- T. vaginalis does not infect oral sites, rectal prevalence low. Do not test these sites.**
Treatment Benefits

• In women
  – Infection is associated with HIV acquisition and transmission
  – Treatment of trich reduces HIV in vaginal secretions
    • Viral RNA decreased from 4677 to 1122 (Wang, 2001)
  – Infection is predictive of *N. gonorrhea* infection

<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>% with GC TV +</th>
<th>TV -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fouts, 1980</td>
<td>400 sx women</td>
<td>37 vs</td>
<td>22</td>
</tr>
<tr>
<td>Wolner-Hanssen, 1989</td>
<td>779 women</td>
<td>31 vs</td>
<td>11</td>
</tr>
<tr>
<td>Huppert, 2004</td>
<td>92 sx teens</td>
<td>61 vs</td>
<td>17</td>
</tr>
</tbody>
</table>
Treatment

- **Recommended regimens**
  - Metronidazole 2 g PO x 1 dose OR
  - Tinidazole 2 g PO x 1 dose
- **Alternative regimen**
  - Metronidazole 500 mg PO bid x 7 days
- **Pregnancy:**
  - Metronidazole 2 g orally in a single dose
    - No evidence of teratogenicity (pregnancy category B)
    - Tinidazole pregnancy category C, not recommended
- **HIV-infected**
  - Metronidazole 500 mg PO bid x 7 days
    - More effective than single-dose therapy

- **Note:** Topical vaginal therapy is ineffective

2015 CDC STD Treatment Guidelines
Partner Management

• Sex partners should be treated

• Patients should be instructed to avoid sex until they and their sex partners are cured (when therapy has been completed and patient and partner(s) are asymptomatic)
# SUMMARY: Differential Diagnosis of Vaginitis

<table>
<thead>
<tr>
<th>Diagnostic Criteria</th>
<th>Normal</th>
<th>Bacterial Vaginosis</th>
<th>Candida Vulvovaginitis</th>
<th>Trichomonas Vaginitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal pH</td>
<td>3.8 - 4.2</td>
<td>&gt; 4.5</td>
<td>≤ 4.5 (usually)</td>
<td>&gt; 4.5</td>
</tr>
<tr>
<td>Discharge</td>
<td>White, clear, flocculent</td>
<td>Thin, homogeneous, white, gray, adherent, often increased</td>
<td>White, curdy, “cottage cheese” like, sometimes increased</td>
<td>Yellow, green, frothy, adherent, increased</td>
</tr>
<tr>
<td>Amine odor (KOH “whiff” test)</td>
<td>Absent</td>
<td>Present (fishy)</td>
<td>Absent</td>
<td>Present (fishy), (not always)</td>
</tr>
<tr>
<td>Microscopic</td>
<td>Lactobacilli</td>
<td>Clue cells, coccoid bacteria, no WBC’s</td>
<td>Mycelia, budding yeast, pseudo-hyphae w/KOH prep</td>
<td>Trichomonads, WBC’s &gt; 10hpf</td>
</tr>
<tr>
<td>Common patient complaints</td>
<td>None</td>
<td>Discharge, bad odor, itching may be present</td>
<td>Itching/burning, discharge</td>
<td>Frothy discharge, bad odor, vulvar pruritus, dysuria</td>
</tr>
</tbody>
</table>
SUMMARY:
Utility of Hx and Exam for Vaginitis

- No single symptom has enough predictive power to confidently diagnose any of 3 main causes of vaginitis

- Symptoms & signs can suggest a dx
  - Yeast: assoc w/ itching, cheesy d/c, redness and self-dx; watery d/c or odiferous d/c makes it less likely
  - BV: assoc w/ sensation of increased d/c and c/o of odor; absent d/c makes it less likely
  - Inflammation relatively specific for yeast, but not always there, and sometimes assoc w/ trich

SUMMARY: Office Lab Tests for Vaginitis

• Wet mount often remains best way to make dx
  – No yeast or trich on microscopy does not mean no yeast or trich as cause
  – Presence of clue cells makes yeast unlikely
  – Lack of lactobacilli and presence of bacilli with corkscrew motility highly assoc with BV

• Use pH testing
  – Yeast: normal pH!!!

Obtaining Vaginal Samples

- How to obtain pH
  - Swab lateral wall of vagina 1/3-1/2 way in
  - Roll swab on narrow range pH paper (3.8-5.5)
  - Compare color to reference
  - Note - pH may be affected by cervical mucus, blood, sperm
Obtaining and Preparing Vaginal Samples (1)

• Wet mount method #1
  – Swab lateral vaginal wall and place in 0.5 cc room-temperature saline
  – Agitate swab in saline to mix; place drop on slide, add coverslip and read under microscope

• Wet mount method #2
  – Place drop of saline on slide
  – Collect sample from vagina, mix into saline

• KEY POINT: keep sample warm and wet on the way to the microscope!
Obtaining and Preparing Vaginal Samples (2)

- KOH preparations
  - swab lateral wall of vagina
  - roll swab onto slide
  - add 10% KOH and mix with swab
  - whiff immediately- fishy odor is “positive”
  - add coverslip and wait 2-5 minutes for KOH to digest cells
Why is recurrent BV so common?

- Is it due to inappropriate treatment of the biofilm?
- Is it recurrence or re-infection?
- Is it due to a pathogen phenotype or a host phenotype?
If vaginal colonization with *Candida albicans* is present in up to 30% of women, why don’t they all have symptoms? What prompts development of the inflammatory response?

- Is it different strains of yeast?
- Differences in host immune response?
- Differences in environmental triggers?

Mitchell, 2017
Unknown #3

- Is the optimal microbiota the same for everyone?
- How do we promote an optimal vaginal microbiota?

Mitchell, 2017
2018 Updates on STD Management: Practical Approaches to the Most Common STD Clinic Patient Concerns

A Monthly Webinar Series

Webinars occur 12-1 pm EST
One Tuesday per month
January – November 2018
Learner Objectives

At the conclusion of this webinar series, participants should be able to:

• Accurately identify patients at risk for STIs and then test, diagnose, and treat according to CDC STD Treatment Guidelines.
Continuing Education Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and the Policies of the Accreditation Council for Continuing Medical Education through the joint providership of the University of Alabama School of Medicine and the Sylvie Ratelle STD/HIV Prevention Training Center.

The University of Alabama School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for participants.

The University of Alabama designates this webinar for a maximum of 1.0 AMA PRA Category 1 Credit™. Participants should claim only the credit commensurate with the extent of their participation in the activity.

These credits are also applicable for registered nurses.
After Today’s Webinar

• You will receive an auto-generated email from the National Network of STD Clinical Training Centers to complete a brief evaluation of today’s presentation.

• Within that email, you will find instructions on how to register for and receive CME credits through the University of Alabama School of Medicine.

• Webinars will be archived and available for viewing at www.RatellePTC.org. CME credits will also be available for archived webinars.
# Save The Dates: 2018 STD Webinar Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Speaker(s)</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 16</td>
<td>Vaginitis: Bacterial Vaginosis, Yeast Vaginitis, Trichomoniasis</td>
<td>Katherine Hsu, MD, MPH</td>
<td>MDPH/Boston Univ. Med. Ctr.</td>
</tr>
<tr>
<td>Mar 20</td>
<td>Motivational Interviewing for STI/HIV Prevention</td>
<td>Thomas Creger, PhD, MPH</td>
<td>Univ. of Alabama at Birmingham</td>
</tr>
<tr>
<td>Apr 17</td>
<td>Pregnancy and STIs</td>
<td>Candice McNeil, MD, MPH</td>
<td>Wakeforest Univ.</td>
</tr>
<tr>
<td>Jun 19</td>
<td>Clinician-Health Department Partnerships: Partner Management, Disease Reporting, Presumptive Treatment</td>
<td>Marjorie Kirsch, MD</td>
<td>FL DOH Wakulla County</td>
</tr>
</tbody>
</table>
## Save The Dates:
### 2018 STD Webinar Schedule (cont’d)

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<th>Date</th>
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<th>Affiliations</th>
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</thead>
<tbody>
<tr>
<td>Jul 17</td>
<td>Genital Lesions: HSV, HPV, Syphilis</td>
<td>Nicholas Van Wagoner, MD, PhD</td>
<td>Univ. of Alabama Sch. of Med.</td>
</tr>
<tr>
<td>Sept 11</td>
<td>Genital Dermatology</td>
<td>Nicholas Van Wagoner, MD, PhD</td>
<td>Univ. of Alabama Sch. of Med.</td>
</tr>
<tr>
<td>Oct 16</td>
<td>Approaches with Special Populations: Youth, GLBT</td>
<td>Katherine Hsu, MD, MPH and Nicholas Van Wagoner, MD, PhD</td>
<td>MDPH/Boston Univ. Med. Ctr. and Univ. of Alabama Sch. of Med.</td>
</tr>
<tr>
<td>Nov 13</td>
<td>Update on PrEP</td>
<td>Ulyee Choe, DO</td>
<td>FL DOH Pinellas County/Univ. of S. Florida College of Med.</td>
</tr>
</tbody>
</table>