Common organisms: *Bacteroides fragilis*, *Prevotella sp*, *Mobiluncus sp*, *Gardnerella vaginalis*, *Mycoplasma hominis*

- Treat **all** symptomatic women
- BV increases risk of adverse pregnancy outcomes
- Follow-up not needed if symptoms resolve
# Bacterial vaginosis: treatment

<table>
<thead>
<tr>
<th>Non-pregnant women</th>
<th>Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metronidazole</strong> 500 mg po bid x 7 days</td>
<td><strong>Metronidazole</strong> 500 mg po bid x 7 days</td>
</tr>
<tr>
<td><strong>Metronidazole</strong> gel intravaginally x 5 days</td>
<td><strong>Metronidazole</strong> 250 mg po tid x 7 days</td>
</tr>
<tr>
<td><strong>Clindamycin</strong> cream† intravaginally x 7 days</td>
<td><strong>Clindamycin</strong> 300 mg po bid x 7 days</td>
</tr>
</tbody>
</table>

† in case of allergy or intolerance to metronidazole
BV: alternative therapy

- Tinidazole 2 g po once daily x 2 days
- Tinidazole 1 g po once daily x 5 days
- Clindamycin 300 mg po bid x 7 days
- Clindamycin ovules 100 g intravaginally x 3 days

Clindamycin cream & ovules (oil-based) may weaken latex condoms & diaphragms for up to 5 days after use
BV treatment: adverse effects

Metronidazole
- Generally well tolerated
- Nausea/epigastric discomfort
- Unpleasant metallic taste
- Disulfiram-like reaction – avoid alcohol during tx and 24 hours after

Clindamycin
- Diarrhea
- *Clostridium difficile* colitis (diarrhea, abdominal pain and fever)
## Chlamydial infections

Due to *C. trachomatis*

<table>
<thead>
<tr>
<th>Population</th>
<th>Preferred treatment</th>
<th>Alternative treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents &amp; adults</td>
<td><strong>Azithromycin</strong> po once OR <strong>Doxycycline</strong> po x 7 days</td>
<td><strong>Erythromycin</strong> po OR <strong>Ofloxacin</strong> po OR <strong>Levofloxacin</strong> po x 7 days</td>
</tr>
<tr>
<td>Pregnant women</td>
<td><strong>Azithromycin</strong> po once OR <strong>Amoxicillin</strong> po x 7 days</td>
<td><strong>Erythromycin</strong> po x 7–14 days</td>
</tr>
</tbody>
</table>
Chlamydial infections

- Retest 3 months after treatment (3 weeks in pregnant women)
- Erythromycin may be less effective than azithromycin or doxycycline
- Azithromycin should be available to treat patients with questionable compliance
- Tell patients to abstain from sexual intercourse until 7 days after treatment is completed
Chlamydia therapy: AEs

**Macrolides**
- GI – diarrhea
- Cholestatic hepatitis (rare)
- CYP 450 3A4 inhibitors (not azithromycin)

**Amoxicillin**
- Hypersensitivity reactions
- Rash

**Doxycycline**
- Discoloration of teeth – avoid in pregnancy and children < 8 yo
- Photosensitization
- Esophageal ulcers

**Fluoroquinolones**
- Tendonitis & rupture
- CI in pregnancy & pediatrics – cartilage damage
- Glucose excursions
- Phototoxicity
- QT prolongation
- DI with caffeine (P4501A2 inhibition) and di-/trivalent cations (dairy products, antacids)
Gonococcal infections* Due to *N. gonorrhoeae*

- **Ceftriaxone** 250 mg IM single dose OR, if not an option
- **Cefixime** 400 mg po single dose
- Due to emerging gonococcal resistance, the CDC recommends ceftriaxone 250 mg IM PLUS azithromycin 1 g po

- **Ceftriaxone** 1 g IM/IV q24h
- Hospitalize for initial therapy
- Continue IV for 24–48 hours after improvement; then switch to cefixime po to complete at least one week of therapy
- Treat presumptively for concurrent *C. trachomatis* infection

Uncomplicated gonococcal infections (cervicitis, urethritis, rectal)

Disseminated gonococcal infection in adults
Cephalosporins generally well tolerated
~ 5% “cross-sensitivity” with penicillins

Pregnant women infected with *N. gonorrhoeae* should be treated with a recommended or alternate cephalosporin

Patients should be instructed to refer their sex partners for evaluation and treatment
<table>
<thead>
<tr>
<th>Indication</th>
<th>Primary therapy</th>
<th>Alternative therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary and secondary syphilis</td>
<td>Adults, infants &amp; children: benzathine penicillin G IM single dose <em>(Bicillin LA)</em></td>
<td>If penicillin allergic (adults): <strong>tetracycline</strong> or <strong>doxycycline</strong> po x 14 days OR <strong>ceftriaxone</strong> IM/IV once daily x 8–10 days</td>
</tr>
<tr>
<td>Early latent syphilis (&lt;1 year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late latent or latent syphilis of unknown duration (tertiary)</td>
<td>Adults, infants &amp; children: benzathine penicillin G IM weekly x 3 <em>(Bicillin LA)</em></td>
<td>If penicillin allergic (adults): <strong>tetracycline</strong> or <strong>doxycycline</strong> po x 4 weeks</td>
</tr>
</tbody>
</table>
Treatment of neurosyphilis

- Aqueous crystalline penicillin G IV q4h or as a continuous infusion x 10–14 days
- If compliance assured: Procaine penicillin IM once daily PLUS Probenecid x 10–14 days

- Some experts add benzathine penicillin IM weekly for up to 3 weeks after neurosyphilis regimen for duration comparable to therapy for late syphilis
Tell patients about fever, headache, & myalgia within 24 hours of treatment (Jarisch-Herxheimer reaction)

Desensitize and treat with penicillin if penicillin-allergic

Test all patients for HIV

No proven alternatives to PCN are available for children

Pregnant patients allergic to penicillin should be desensitized and treated with penicillin
Chancroid infection: therapy

- Azithromycin po single dose OR
- Ceftriaxone IM single dose OR
- Ciprofloxacin po x 3 days OR
- Erythromycin base x 7 days

Contraindicated in pregnancy/lactation/pediatric patients – why?
Due to the protozoan *Trichomonas vaginalis*, treatment is straightforward:

- Metronidazole 2 g po single dose (including pregnant women) **OR**
- Tinidazole 2 g po single dose

If treatment failure with metronidazole single dose, use metronidazole 500 mg po bid x 7 days

For repeated failure, use tinidazole or metronidazole at 2 g po daily x 5 days

Abstinence from alcohol use should continue for 24 h after completion of metronidazole or 72 h after completion of tinidazole
<table>
<thead>
<tr>
<th>Indication</th>
<th>Therapy</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>First episode genital herpes</td>
<td>Acyclovir po OR Famciclovir po OR Valacyclovir po x 7–10 days or until clinically resolved</td>
<td>Treat first clinical episode or severe recurrent episode during pregnancy with oral acyclovir</td>
</tr>
<tr>
<td>Severe infection</td>
<td>Acyclovir IV 2–7 d or until clinical improvement, then PO therapy to complete at least 10 days</td>
<td>IV acyclovir recommended for pregnant women with severe herpes infection</td>
</tr>
</tbody>
</table>
## Genital herpes simplex virus

<table>
<thead>
<tr>
<th>Indication</th>
<th>Therapy</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Episodic therapy for recurrent episodes | **Acyclovir** po x 2–5 d  
**Famciclovir** po x 1–5 d  
**Valacyclovir** po x 3–5 d | Treatment must be initiated during prodrome or w/i 1 day of onset of lesions for patient to experience benefit from therapy |
| Daily suppressive therapy         | **Acyclovir** po bid  
**Famciclovir** po bid  
**Valacyclovir** po once daily | ↓ frequency of recurrences 70%–80% in patients who have frequent recurrences |
Antiviral therapy: AEs

- Palliative *NOT* curative
- Well tolerated
- Headache, nausea, diarrhea
- All three drugs are FDA Pregnancy Category B
HPV – Human papillomavirus

Prevention with recombinant vaccine

- Both vaccines (Cervarix & Gardasil) protect against HPV types that cause 70% of cervical cancer
- Gardasil also protects against types that cause 90% of genital warts
- Routine vaccination is recommended for girls 11–12 years of age but may be administered as early as nine years of age
- Females 13–26 years of age should also be vaccinated, ideally before onset of sexual activity
- Gardasil can be given to males 9–26 years of age to prevent genital warts and anal cancer
HPV: treatment

Anal warts
- Cryotherapy with liquid nitrogen OR
- Trichloroacetic acid (TCA) or bichloracetic acid (BCA) 80%–90% applied to warts; can repeat weekly OR
- Surgical removal

Vaginal warts
- Cryotherapy OR TCA or BCA

External genital/perianal warts
Patient applied:
- Podoflox† OR Imiquimod† OR Sinecatechins†
Provider–administered:
- Cryotherapy OR
- Podophyllin† OR
- TCA or BCA OR
- Surgical removal

† Not in pregnancy
HPV: treatment AEs

- Hypo/hyperpigmentation occurs commonly with ablative modalities and has also been described with imiquimod
- Podofilox (antimitotic): mild – moderate pain or local irritation
- Imiquimod (stimulates production of interferon & other cytokines): local inflammatory reactions, including redness, irritation, induration, ulceration/erosions, and vesicles
- Sinecatechins (green tea extract): erythema, pruritis/burning, pain, ulceration, edema, induration, and vesicular rash; may weaken condoms and diaphragms
- Cryotherapy: pain after application of the liquid nitrogen, followed by necrosis and sometimes blistering
Granuloma Inguinale (Donovanosis): treatment

- Caused by the intracellular gram-negative bacterium *Klebsiella granulomatis *
- Primary regimen: **Doxycycline** po x 3 weeks until all lesions have completely healed
- Alternatives: azithromycin, ciprofloxacin, erythromycin (preferred in pregnancy) and TMP/SMX all po for 3 weeks
Lymphogranuloma Venereum

- Due to *C. trachomatis*
- Doxycycline po x 21 days or Erythromycin base po x 21 days (pregnancy)
Parasitic infections: Pediculosis pubis

Primary therapy

- **Permethrin 1% creme rinse** applied to affected areas & washed off in 10 minutes
- **Pyrethrins with piperonyl butoxide** applied to affected areas & washed off in 10 minutes
- Evaluate & retreat in 1 week if symptoms or lice/eggs persist

Alternate therapy

- **Malathion 0.5% lotion** applied for 8–12 hours and washed off
- **Ivermectin po** repeated in 2 weeks

Machine wash & dry or dry clean clothing & bedding or remove from body contact for ≥72 hours. Malathion may be effective in treatment failures secondary to resistance. Treat sex partners within past month.
Parasitic infections: *Sarcopes scabiei*

- **Primary therapy**
  - Permethrin cream 5% applied to all areas of the body from the neck down and washed off after 8–14 hours *OR*
  - Ivermectin po repeated in 2 weeks

- **Alternate therapy**
  - Lindane 1% applied to all areas of the body from the neck down and washed off thoroughly after 8 hours
Parasitic infections

- Do not use lindane in pregnancy/lactation (use permethrin or pyrethrins with piperonyl butoxide), or children <2 years old
- Seizures & aplastic anemia linked to lindane exposure
- Do not use lindane right after bathing or if extensive dermatitis
- Use permethrin in pregnancy/lactation or children <2 years old
- Do not use ivermectin in pregnancy/lactation or in children who weigh <15 kg
- Pruritus may persist for up to 2 weeks
- Treat entire population at risk in institutional epidemics
- Examine and treat sexual & close personal/household contacts within past month