CDC 2006: Vaginal Trichomoniasis

- **Recommended regimen**
  - Metronidazole (MTZ) 2 gram PO single dose
  - Tinidazole (Tindamax) 2 gram PO single dose
    » Reserve for intolerance of MTZ side effects or MTZ treatment failure
- **Alternative regimen**
  - Metronidazole 500 mg PO BID x7d
- **Generic MTZ has a fraction of cost ($1-2) of either Flagyl ($12) or Tindamax ($15) and works as well in uncomplicated cases**

Trich Tips: Advice to Clinicians

- Advise the patient that Trich could have been transmitted by any partner since sexual debut
- Evaluate NaCl suspensions pronto (< 5 minutes)
- Use fresh NaCl solutions (≤ 1 month old)
- Question the existence of “dead Trich” on micro
- Single dose MTZ *still* is the treatment of choice
- Tinidazole worth the investment if prior failure or adverse effects (but not urticaria or anaphylaxis)
- Women who are or who may be pregnant can be treated with MTZ
**Model of BV Pathogenesis**

- Antibiotics
  - loss of competitive inhibition
- Viral phage
- Adhesion to Sperm
- Increased pH
- Lactobacillus
  - suppression by amines
- Anaerobes
  - Plus new “BV associated Bacteria”

**BV: Candidates for Treatment**

- Symptomatic non-pregnant women
- Pregnant women, if increased risk of preterm birth
- Women about to have pelvic surgery
  - Induced abortion
  - Hysterectomy
  - Cervical procedure (e.g., LEEP, cryotherapy)
- (?) Non-pregnant asymptomatic women with no surgery planned…BV is associated with
  - Acquisition and transmission of HIV
  - PID, urinary tract infections

**CDC 2006: Bacterial Vaginosis**

**Recommended regimens**
- Metronidazole 500 mg PO BID x 7 days
- Metronidazole gel 0.75% 5g per vagina QD x 5 days
- Clindamycin cream 2% 5g per vagina QHS x 7 days

**Alternative regimens**
- Metronidazole 2 g PO x 1
- Clindamycin 300 mg PO BID x 7 days
- Clindamycin ovules 100 mg per vagina QHS x 3 days

**Recommended regimens in pregnancy**
- Metronidazole 500 mg PO BID x 7 days
- Clindamycin 300 mg PO BID x 7 days

**Counseling Women with Recurrent BV**

- Consider suppression with MTZ vag gel BIW
- Abstain from vaginal sex during treatment
- Don’t douche…with anything!
- Use of condoms (esp in 1st month after treatment) may reduce recurrences
- Clean sex toys (or use condoms) between use by one woman then another
- Avoid vaginal insertion following anal insertion of fingers or penises
**Bacterial Vaginosis Tips**

- **Diagnosis**
  - “Clue cell positive” if ≥ 20% of epithelial cells are clue cells
  - Amine test with residue on speculum, not slide
  - Vaginal pH between 4.5-6.0
  - “Homogenized milk” vaginal discharge
  - Culture and Pap smear have no role in diagnosis

- **Treatment** is a trade-off of convenience and cost
  - Oral MTZ: lots of side effects, but cheap
  - Topicals: fewer side effects, but more expensive

---

**CDC Classification of VVC**

- **Uncomplicated VVC (80-90%)**
  - Sporadic or infrequent VVC, or AND
  - Mild-to-moderate VVC, or AND
  - Likely to be Candida albicans, or AND
  - Non-immunocompromised women

- **Complicated VVC (10-20%)**
  - Recurrent VVC, or
  - Severe VVC, or
  - Non-albicans candidiasis, or
  - Uncontrolled DM, immunosuppression, pregnancy

---

**CDC 2006: Uncomplicated VVC**

- **Non-pregnant women**
  - 3, 7 day topicals equal efficacy and price
    - Recomend: 3 day topical or fluconazole 150 mg PO
  - If fungal vulvitis, add medium potency steroid (e.g., TAC 0.1-0.5% ointment) BID for 3-7 days
  - If first course fails
    - Reconfirm microscopic diagnosis
    - *Candida* culture to confirm infection and speciate
    - Treat with alternate antifungal drug
  - **No role** for nystatin, candididin

**CDC 2006: Complicated VVC**

- **Severe VVC**
  - Advanced findings: erythema, excoriation, fissures
  - Treat for 7-14 days of topical azole therapy or fluconazole 150 mg PO, repeat in 3 days

- **Compromised host**
  - Topical azoles for 7-14 days

- **Pregnancy**
  - Topical azoles for 7 days
  - Avoid fluconazole until more known about safety
**CDC 2006: Complicated VVC**

**Reason to consider Complicated VVC**

- Early treatment regimen with onset of symptoms
- Maintenance therapy for 6 months
  - Treat for 7-14 days of topical therapy or 14 days of topical therapy or
    - Fluconazole 150 mg PO q 72 hours x3 doses, then
      - Fluconazole 100-200 mg PO 1-2 per week
      - Itraconazole 100 mg/wk or 400 mg/month
      - Clotrimazole 500 mg suppos 1 per week
      - Boric acid 600 mg suppos QD x14, then BIW
      - Gentian violet: Q week x2, Q month X 3-6 mo

**Reason to consider Recurrent VVC**

- > 4 episodes of symptomatic VVC per year
- Confirm with candidal culture, since often due to non-albicans species
- Most women have no predisposing condition
  - Consider Type 2 diabetes or HIV infection only if other risk factors or symptoms
  - Partners are almost never the source of infection

**Vaginal Candidiasis Tips**

- 2/3 of women who believe that the have chronic or recurrent Candida don’t
  - Verify diagnosis with PCR, fungal culture
- Consider *Candida glabrata*
  - Different presentation, different treatments
- Oral or vaginal yoghurt doesn’t work because
  - Lactobacillus strains don’t adhere to vaginal cells
  - Predominant normal flora is *L. crispatus*, not *L. acidophilus* or *L. bulgaricus*

**Cervical Cancer Screening**

- Most *successful* cancer screening program in the US
- Most *expensive* cancer screening program in the US
- Long-standing public health messages drive consumers behaviors, beliefs, and preferences
- Recent changes in cervical cancer prevention
  - Pap smear intervals; start and stop points
  - Cytologic screening technologies: LBC
  - Adjunctive test modalities: HPV screening
- Primary prevention through HPV vaccination
Cervical Cancer Screening

<table>
<thead>
<tr>
<th></th>
<th>Previous Guideline</th>
<th>ACS 2002</th>
<th>USPSTF 2003</th>
<th>ACOG 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiate Paps*</td>
<td>18 or 3 yrs or 21 yrs old</td>
<td>SD + 3 yrs or 21 yrs old</td>
<td>SD + 3 yrs or 21 yrs old</td>
<td>SD + 3 yrs or 21 yrs old</td>
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<tr>
<td>Hysterectomy (benign disease)</td>
<td>Q3-5 yrs not recommended</td>
<td>not recommended</td>
<td>not recommended</td>
<td>not recommended</td>
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<tr>
<td>Upper age limit</td>
<td>None</td>
<td>70 yo*</td>
<td>65 yo, if previously nl</td>
<td>no comment</td>
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<tr>
<td>Pap interval</td>
<td></td>
<td>annual (glass)</td>
<td>at least every 3 yrs</td>
<td>annually</td>
</tr>
<tr>
<td>&lt; 30 yrs old</td>
<td>annually</td>
<td>Q2 yr (LBC)</td>
<td>at least every 3 yrs</td>
<td>Q2-3 years</td>
</tr>
<tr>
<td>≥ 30 yrs old</td>
<td>annually</td>
<td>Q2-3 years</td>
<td>at least every 3 yrs</td>
<td>Q2-3 years</td>
</tr>
</tbody>
</table>

Pap Smear Intervals: Made Easy

- **Start screening**
  - 3 years after first intercourse or 21 years old
  - Counsel virginal women re: benefits, risks
- **Stop screening after**
  - Total hysterectomy for a benign condition, or
  - 3 negative Paps if hysterectomy for CIN 3, or
  - 65-70 yo, if 3 consecutive benign Paps in prior 10 yrs
- **While screening**
  - If LBC, every 1-2 years till 30, then every 2-3 years
  - If glass, yearly until 30, then every 2-3 years
  - If immunocompromised, repeat annually

Pap Screening Interval in Immuneocompromised Women

ACS, USPSTF 2002; ACOG 2003

**Recommendation**

Perform Pap every 6 months x 2, then yearly if

- HIV seropositive
- Immuneocompromised by organ transplant, chemotherapy, chronic steroid use

**Rationale**

- Progression rates from HSIL to cancer more rapid in immuneocompromised women

---

“I feel a great disturbance in the force”

Obi-wan Kenobi
Star Wars, Episode IV, 1979
Common Questions About Pap Intervals

- Are the intervals any different for women
  - With multiple sexual partners?
  - Who have sex with women?
  - Who are pregnant?
  - Who use hormonal contraceptives or hormone therapy?
- If a Pap is not scheduled or necessary, what about a bimanual pelvic exam?

HPV+ Pap: Concerns

- For women who are HPV neg/ Pap neg, and who are re-screened earlier than 3 years, there is risk of
  - More false positive tests, leading to unnecessary colposcopies, biopsies, and treatments
  - Default to a less cost-effective screening strategy
- Neither providers nor consumers have a motive to limit utilization as recommended by guidelines
- Most healthcare systems, with the exception of Kaiser, have no mechanism to enforce the guidelines

Caveats

- Inform women in advance of HPV screening
- If Pap neg/ HPV positive, repeat both in 1 year
- Women who are Pap negative, HPV negative should be screened no earlier than 3 years

Implications of 2002 Pap Guidelines

- Far fewer Paps for women less than 21 yo
- Far fewer Paps for women older than 65-70 yo
- One-half as many Paps if LBC smears used
- One-third as many Paps if Pap neg/ HPV neg
- No Paps if total hysterectomy for benign disease
- No need for two Pap smears (antepartum and postpartum) in pregnant women
  - Illogical to do Paps in pregnant women ≤ 21 yo

HPV+Pap

Wright, Obstet Gynecol 2004;103:304

Indications
- Women 30 years old and older
- Immunocompetent
- Cervix in place

Information for Women: Click Here

Detecting, preventing and predicting disease

For women who are HPV neg/ Pap neg, and who are re-screened earlier than 3 years, there is risk of

- More false positive tests, leading to unnecessary colposcopies, biopsies, and treatments
- Default to a less cost-effective screening strategy

Neither providers nor consumers have a motive to limit utilization as recommended by guidelines

Most healthcare systems, with the exception of Kaiser, have no mechanism to enforce the guidelines
**2006 ASCCP Cervical Cytology Management Guidelines**

- Guidelines on Management of Women with *Cytological* Abnormalities
  - How to manage abnormal Pap results
- Guidelines on Management of Women with *Histological* Abnormalities
  - How to manage abnormal biopsy results

**ASCCP 2006: Major Changes in Cytology Management**

- Much less aggressive management of women <21 yo
  - No “reflex HPV” test in women with ASC-US
  - ASC-US, LSIL: repeat Pap (only) in 1 year
  - At colposcopy for HSIL Pap, do not perform “see and treat” LEEP
- Manage post-menopausal and immunosuppressed women as those in the general population
- If HSIL on Pap and less than CIN 2+ is identified on colposcopy, either a diagnostic excisional procedure or follow-up are acceptable

**ASCCP 2006: Five Algorithms for Biopsy Management**

- Biopsy CIN 1
  - Under 21 years old
  - 21 years old and older
  - Initial Pap: ASC-US, ASC-H, LSIL
  - Initial Pap: HSIL, AGC-NOS
- Biopsy CIN 2/3
  - Adolescents, young women (25-30 years old?)
  - Other women
- Biopsy: Adenocarcinoma-in-situ (AIS)

**What Are Indications for Colposcopy?**

Cytology result with...

- ASC-H, HSIL, or suspicion of cancer
- LSIL in women ≥ 21 (unless pregnant or post-menopausal)
- AGC (atypical glandular cells), unless AGC-atypical endometrial cells and positive endometrial sampling
- ASC-US in the following circumstances
  - Women unwilling to return for follow-up
  - Repeat cytology test with ASC-US or worse performed during observation period (except adolescents)
  - HPV DNA at initial or subsequent testing (except < 21)
What Are Indications for Colposcopy?

- Cervical leukoplakia (visible white lesion) or other unexplained cervical lesion regardless of cytology result
- Unexplained or persistent cervical bleeding regardless of cytology result

AVB: Differential Diagnosis

- Early pregnancy
- Ovulatory bleeding
  - Structural Conditions
  - Non-Structural Conditions
- Iatrogenic (medications)
- Anovulatory bleeding
  - Estrogenic or Hypoestrogenic
  - Aka: Dysfunctional Uterine Bleeding
**Dysfunctional Uterine Bleeding**

- What causes anovulatory bleeding?
  - Excess **androgen**: PCOS; acute stress
  - Excess **estrogen**: unopposed exogenous or endogenous estrogen
  - Excess **prolactin**: prolactinoma, drugs, lactation
  - **Age-related**: peri-menarche, perimenopause

**Management of Episodic DUB**

- Substitute a pharmacologic luteal phase for missed physiologic luteal phase
  - If **minimal bleeding** for a few days
    - Rx MPA 10 mg QD (or microP, 200 BID) x10d
    - Bleeding stops < 3 days; w/d after progestin
  - **Moderate or heavy bleeding > 3 days**
    - Monophasic OC given BID- TID x 5-7 days
    - OC “taper” (QID-TID- BID-QD) **and then stopping** is illogical and should not be used
  - **Torrential bleed**: surgical curettage (MUA)

**Normal Ovarian Hormone Cycle**

- Precipitous drop of E+P
  - Synchronous
  - Universal
  - Withdrawal Bleed

**Mechanism of “Chemical Curettage”**

- High dose OCs x 7 days
  - E stabilizes EM
  - P matures EM
Management of Recurrent DUB
- Pregnancy: clomiphene or metformin
- Contraception: cycle with OC
- Not interested in pregnancy or contraception
  - MPA or microP first 10-14 days each month
  - Withdraw every other month to document ovulation
- Peri-menopausal bleeding:
  - Once hyperplasia excluded, goal=cycle control
    » Low estrogen dose OC
    » Cyclic sequential HT

Postmenopausal Bleeding: Management
- If not using HT, endometrial evaluation is required
  - Endometrial biopsy (EMB)
  - Endovaginal ultrasound (normal stripe is < 5 mm)
- If using HT, EMB to evaluate unscheduled bleeding or bleeding > 3 months after initiation
- Therapy is tailored to the site of bleeding
  - Atrophic vaginitis: topical estrogen
  - Endometrial hyperplasia: continuous P x 3-6 months, then re-biopsy
  - Endometrial atrophy: cyclic or continuous HT

Postmenopausal Bleeding: Differential Diagnosis
- Exogenous estrogens
  - HT (therapy formerly known as HRT)
- Endogenous estrogens
  - Acute stress
  - Estrogen-secreting ovarian tumor
- Atrophic vaginitis
- Endometrial hyperplasia/adenocarcinoma
- Endometrial hypoplasia (atrophy)

Who Needs an EMB?
- Purpose: detect endometrial hyperplasia or cancer
- Menopausal woman
  - Any postmenopausal bleeding, if not using HT
  - Unscheduled bleeding on continuous-sequential hormone therapy
  - Bleeding > 3 mo after start of continuous-combined hormone therapy
  - Endometrial stripe ≥ 5 mm (applies to postmenopausal woman only)
  - Pap smear: any endometrial cells or AGC Pap
Who Needs an EMB?

Premenopausal Women
- Prolonged metrorrhagia
- Unexplained post-coital or intermenstrual bleeding
- Endometrial cells on Pap smear in anovulatory premenopausal woman
- AGC Pap
  - Abnormal endometrial cells
  - Older than 35 years old
  - < 35 yo with abnormal bleeding

Diagnosis of Menopause

- Surgical menopause can be assumed after bilateral oophorectomy
- Natural menopause
  - Average age: 51.4 years old; range: 40-55 y.o.
  - Diagnosis
    » Amenorrhea (12 mo)+ symptoms if > 45 yo (OR)
    » FSH >30 mIU/mL and E₂ < 30 pg/mL
    » However, single random levels of FSH or E₂ may not be reliable indicators of menopause...if in doubt, repeat

Stages of Reproductive Aging Workshop

<table>
<thead>
<tr>
<th>Stage</th>
<th>Reproductive</th>
<th>Menopausal Transition</th>
<th>Perimenopause</th>
<th>Postmenopause</th>
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<tbody>
<tr>
<td>-5</td>
<td>Early</td>
<td>Early</td>
<td>a</td>
<td>+1</td>
</tr>
<tr>
<td>-4</td>
<td>Peak</td>
<td>Late</td>
<td>b</td>
<td>+2</td>
</tr>
<tr>
<td>-3</td>
<td>Late</td>
<td>Early*</td>
<td>4 yrs</td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td>Late*</td>
<td>Early*</td>
<td>until demise</td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td>Late*</td>
<td>Late</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Endocrine:
- Normal FSH
- ↑ FSH

Post-WHI Thinking

- The CVD findings of WHI and HERS apply mainly to women 60 years of age and older
- Recent re-analyses show mild cardioprotective effect for HT users in their early 50s
  - But, there is no indication to prescribe HT for the purpose of cardioprotection at any age
- When used to treat menopausal symptoms, the benefits of HT exceed the known risks of HT
  - Shortest period of exposure
  - Lowest effective dose
**Hot Flashes: Lifestyle Changes**
- Exercise routinely, at least 3-4 days/week
- Cool room temperature, especially at night
- Dress in layers (remove outer layers if warm)
- Avoid hot and spicy foods
- Relaxing activities
- Avoid cigarettes
- Minimize alcohol

**Botanicals and PhytoSERMs**
- **Probably better than placebo**
  - Black cohosh
- **No evidence of efficacy**
  - Soy isoflavones
  - Red clover isoflavones
  - Evening primrose oil
  - Dong quai
  - Ginseng
  - Vitamin E
  - Chasteberry (Vitex)

**Non-hormonal Hot Flash Therapies**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Hot Flash Reduction</th>
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<tbody>
<tr>
<td><strong>Antidepressants</strong></td>
<td></td>
</tr>
<tr>
<td>Paroxetine</td>
<td>62-65%</td>
</tr>
<tr>
<td>Venlafaxine</td>
<td>38-60%</td>
</tr>
<tr>
<td>Fluoxetine</td>
<td>20%</td>
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<tr>
<td><strong>Anticonvulsants</strong></td>
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<tr>
<td>Gabapentin</td>
<td>45%</td>
</tr>
<tr>
<td><strong>Antihypertensives</strong></td>
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<tr>
<td>Metyldopa</td>
<td>65%</td>
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<tr>
<td>Clonidine</td>
<td>38%</td>
</tr>
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**Prescription HT Options: ET and EPT**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Oral</th>
<th>Transdermal</th>
<th>Intravaginal</th>
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</thead>
<tbody>
<tr>
<td><strong>ET</strong></td>
<td>- Micronized estradiol</td>
<td>- Patches</td>
<td>- Creams</td>
</tr>
<tr>
<td></td>
<td>- Conjugated equine estrogens (CEE)</td>
<td>- Gels</td>
<td>- Intravaginal tablet</td>
</tr>
<tr>
<td></td>
<td>- Synthetic conjugated estrogens</td>
<td>- Emulsion</td>
<td>- Rings</td>
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<tr>
<td></td>
<td>- Esterified estrogens</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Estropipate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Estradiol acetate</td>
<td></td>
<td></td>
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<tr>
<td><strong>EPT</strong></td>
<td>- CC-EPT</td>
<td>- E+P (combination) patches</td>
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<tr>
<td></td>
<td>- CS-EPT</td>
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*Menopause 2004; 11(1): 11-33
ACOG Task Force on HT Obstet Gynecol 2004; 104:106s-17s.
**HT Regimens**

<table>
<thead>
<tr>
<th>Month 1</th>
<th>Month 2</th>
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<tbody>
<tr>
<td><strong>Estrogen Therapy (ET)</strong></td>
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<tr>
<td><strong>Estrogen</strong></td>
<td></td>
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<tr>
<td>Continuous combined (CC) EPT</td>
<td></td>
</tr>
<tr>
<td><strong>Estrogen</strong></td>
<td></td>
</tr>
<tr>
<td>Progestin</td>
<td>Off for 14 d</td>
</tr>
<tr>
<td>Continuous-sequential (CS) EPT</td>
<td>Off for 14 d</td>
</tr>
<tr>
<td><strong>Estrogen</strong></td>
<td></td>
</tr>
<tr>
<td>Progestin 14d</td>
<td></td>
</tr>
<tr>
<td>Continuous-pulsed (CP) EPT</td>
<td></td>
</tr>
<tr>
<td>3d</td>
<td></td>
</tr>
</tbody>
</table>

**Treatment of Hot Flashes**

- If mild sx, try exercise, black cohosh + phytoSERM
- Initiate low dose HT if
  - Moderate or severe symptoms
  - Non-hormonal treatments have failed
  - No interest in non-hormonal therapy
- Titrate estrogen dosage upward if needed
- When estrogen can’t be used, offer
  - SSRI or SNRI
  - Gabapentin, clonidine, a-methyldopa,
  - MPA or Megesterol (Megace)
- Attempt discontinuation after 1-2 years

**Treatment of Sleep/ Irritability Sxs**

- If mild symptoms
  - Lifestyle change, black cohosh, phytoSERMs
- If severe symptoms or no response to above
  - Low dose HT, then titrate upward
  - If mood swings, transdermal E preferred
- Depression component, or no response to HT
  - SNRI or SSRI

**HT and Vaginal Atrophy**

- When HT is considered solely for this indication, local (not systemic) vaginal ET is generally recommended
- Progestogen generally **not indicated** with low-dose, local vaginal ET
- Vaginal lubricants often improve vaginal dryness and painful intercourse

### ET Vaginal

<table>
<thead>
<tr>
<th>Product</th>
<th>Brand</th>
<th>Dosage</th>
<th>Dose</th>
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<tbody>
<tr>
<td>Estradiol cream</td>
<td>Estrace</td>
<td>0.01% (0.1 mg/gm)</td>
<td>Daily, then 1-3 time/wk</td>
</tr>
<tr>
<td>Estradiol ring</td>
<td>Estring</td>
<td>7.5 mcg/24 hrs</td>
<td>Every 90 days</td>
</tr>
<tr>
<td>Estradiol ring</td>
<td>Femring</td>
<td>0.05 mg/d 0.1 mg/d</td>
<td>Every 3 months</td>
</tr>
<tr>
<td>Conjugated estrogen cream</td>
<td>Premarin cream</td>
<td>0.625 mg/gram</td>
<td>Daily</td>
</tr>
<tr>
<td>Estradiol vaginal tablet</td>
<td>Vagifem</td>
<td>25 micrograms</td>
<td>Daily for 2 wks, BIW</td>
</tr>
</tbody>
</table>

### HT and Cognition

- Initiating EPT after age 65 not recommended for primary prevention of dementia or cognitive decline
- Insufficient evidence to support ET/EPT for primary prevention of dementia when therapy is initiated during perimenopause or early postmenopause
- ET does not appear to convey direct benefit or harm for treatment of Alzheimer’s disease


### HT and “Quality of Life”

- Many women experience worsening of short term memory with onset of menopause
- 9 RCTs and 8 cohort studies
  - HT does not improve cognitive performance in women without symptoms
  - If symptoms, HT improved verbal memory, reasoning, and motor speed tests
- Reasonable to provide HT to lessen cognitive changes in symptomatic menopausal women

- RCTs and retrospective studies show that HT has no effect on “quality of life” measures
- Many woman who wean from HT state that they “feel worse”…even after 20 years after menopause!

Conventional wisdom
- In women who “feel better on/ worse off” of HT, continue low dose HT if few or no risk factors
- When (& how often) to re-attempt wean uncertain
- Don’t start HT for solely for improving QOL
**Summary: Fracture Risks**

- Aging
- Menopause
- Other RF

**SOF: Fracture Risk Factors**

**Non-modifiable**
- Low impact fracture as an adult
- History of fracture in first-degree relative
- Caucasian race
- Advanced age
- Female sex

**Potentially Modifiable**
- Current cigarette smoking
- Low body weight (<127 lbs)
- Menopause
- Alcoholism
- Low calcium intake (lifelong)
- Impaired eyesight
- Recurrent falls
- Little physical activity
- Poor health/frailty

**Fall risk factors**

**Candidates for “Routine” BMD Screening**

- Does treatment of low BMD prevent fractures?

**USPSTF 2002**
- No risk factors
- Risk Factors

**NOF 1998**
- No risk factors
- Treat no BMD

**Predictors of Osteoporotic Fracture**

- Low impact fracture (2-8x)
- Age > 60 years old (2-3x each decade >50)
- Risk Factors (1.2-2.0 x)
  - White, slender, sedentary, poor calcium intake, family history, smoker, drinker, height loss >2 cm
- Low bone mineral density
  - 1.5-1.8x for each SD decrease T-score
**Interpreting BMD Results**

- **Z-score**: patient vs. age-matched controls
- **T-score**: patient vs. young adults (peak BMD)
- World Health Organization (WHO) criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>BMD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>0 to minus 1 SD</td>
</tr>
<tr>
<td>Osteopenia</td>
<td>minus 1 to minus 2.5 SD</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>minus 2.5 SD or more</td>
</tr>
</tbody>
</table>

- **BMD predicts future fracture risk**
  - For every SD decrease in femoral neck BMD, risk of hip fracture increases 2.6 fold
  - Validated in post-menopausal women only

**NOF Treatment Guidelines 1998**

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Risk</td>
<td></td>
</tr>
</tbody>
</table>

**T-Score**

- 0
- -1.0
- -1.5
- -2.0
- -2.5
- -3.0

**NOF 2008: BMD Testing**

- Adults who have had a fracture after age 50
- Perimenopausal women with a specific fracture risk; low body weight, prior low impact fracture, high risk medication
- Adults with a condition, or taking a medication, associated with low bone mass or bone loss
- Anyone being treated for osteoporosis, to monitor treatment effect

**NOF 2008: BMD Screening**

- Women 65 and older
- Younger postmenopausal women about whom you have concern based on clinical risk factor profile
- Anyone being considered for pharmacologic treatment
- Postmenopausal women discontinuing estrogen “should be considered” for BMD testing
- Anyone not receiving therapy in whom evidence of bone loss would lead to treatment...huh???

**NOF 2008: Indications for Treatment**

- Postmenopausal women with the following
  - Hip or vertebral (clinical or morphometric) fracture
  - Other prior fractures and low bone mass (T-score -1.0 to -2.5 at the femoral neck, total hip or spine)
  - T-score ≤ -2.5 at the femoral neck, total hip, or spine after evaluation to exclude secondary causes
  - Low bone mass (T-score -1.0 to -2.5) and secondary condition
  - Low bone mass (T-score < -2.5) and secondary condition after evaluation to exclude secondary causes
  - Low bone mass (T-score -1.0 to -2.5) and 10-year probability of Hip fracture > 3% OR Any major OP fracture > 20%


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**WHO Fracture Risk Assessment**

- Current age
- Gender
- Femoral neck BMD
- Body mass index
- Current smoking
- Alcohol intake > 3 drinks per day
- Use of glucocorticoids
- Secondary osteoporosis
- Personal history of fracture
- Parental history of hip fracture

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**National Osteoporosis Foundation**

**February 2008**

- **Exercise**: aerobic + strength training
  - Improve bone density, improve balance
  - Reduction in hot flashes in some women
- **Calcium, Vitamin D**
  - Adults **under** age 50 need, per day
    - 1,000 mg of calcium*
    - 400-800 IU of vitamin D₃
  - Adults **50 and over** need, per day
    - 1,200 mg of calcium*
    - 800-1,000 IU of vitamin D₃

* In divided doses, preferably with meals
## Osteoporosis Treatments

<table>
<thead>
<tr>
<th>Name</th>
<th>Delivery</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcitonin</td>
<td>Intranasal, daily</td>
<td>Reduces bone pain</td>
<td>Less effective for fracture prevention</td>
</tr>
<tr>
<td>Raloxifene</td>
<td>Tablet, daily</td>
<td>Protects breast</td>
<td>Daily use, less effective</td>
</tr>
<tr>
<td>Alendronate</td>
<td>Tablet or solution, weekly</td>
<td>Reduces hip and spine fractures</td>
<td>GI side effects</td>
</tr>
<tr>
<td>Risedronate</td>
<td>Tablet, weekly</td>
<td>Reduces hip and spine fractures</td>
<td>• GI side effects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Less hip protection than alendronate?</td>
</tr>
<tr>
<td>Ibendronate</td>
<td>PO, monthly IV, Q3 months</td>
<td>Convenience</td>
<td>No protection for non-vertebral fractures</td>
</tr>
<tr>
<td>Zolendronate</td>
<td>IV, annually</td>
<td>Convenience No GI side effects</td>
<td>Cost</td>
</tr>
<tr>
<td>Teriparatide</td>
<td>Injection, daily</td>
<td>Used for severe cases</td>
<td>Cost, daily injection osteosarcoma risk</td>
</tr>
</tbody>
</table>

## Hormone Therapy and Fracture Prevention

### Pros
- Good data on fracture prevention (mainly 2nd prevention)
- Relatively lower cost than bisphosphonates
- Less concern of adverse effects with ET alone (vs EPT)

### Cons
- Requires long term use and surveillance
- Post-menopausal bleeding can be troublesome
- Increased risk of breast cancer after 5 years of use

### Utility
- Fracture prophylaxis if using HT for another indication
- Otherwise, consider bisphosphonates as first line

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*Time flies like an arrow... Fruit flies like a banana*