Update on Sexually Transmitted Infections in Adolescents and Young Adults

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OBJECTIVES

At the end of this presentation the participant will be able to:

- **Describe the epidemiology of the common STIs in the adolescent population**
- **Recognize the common STIs in the adolescent population**
- **Evaluate and treat the common STIs in the adolescent population**

CDC STD Treatment Guidelines (and updates) – 2010

http://www.cdc.gov/std/treatment/2010/

Available as an ibook at
http://www.cdc.gov/std/2010-ebook.htm
NOT available as smartphone app.

Separate section on expedited therapy for partners

PREVENTION

19 million cases yearly ($16.4 million cost).
9.1 million (~50%) cases in AYA 15-24 which could be reduced by:

DELAYED AGE OF SEXUAL ACTIVITY

PATIENT EDUCATION

IDENTIFICATION AND TREATMENT OF PARTNERS

PRE-EXPOSURE VACCINATION

- **HPV**
- **Hepatitis B**

PREVENTION

MALE CONDOMS

- **Reduce risk HIV by 80%, Reduce risk of HPV by 70%**
- **Reduce risk GC, CT, HSV, trich, PID, syphilis**
- **Natural membrane condoms not recommended**
- **For STI prevention**
- **www.cdc.gov/condomeffectiveness/latex.htm**

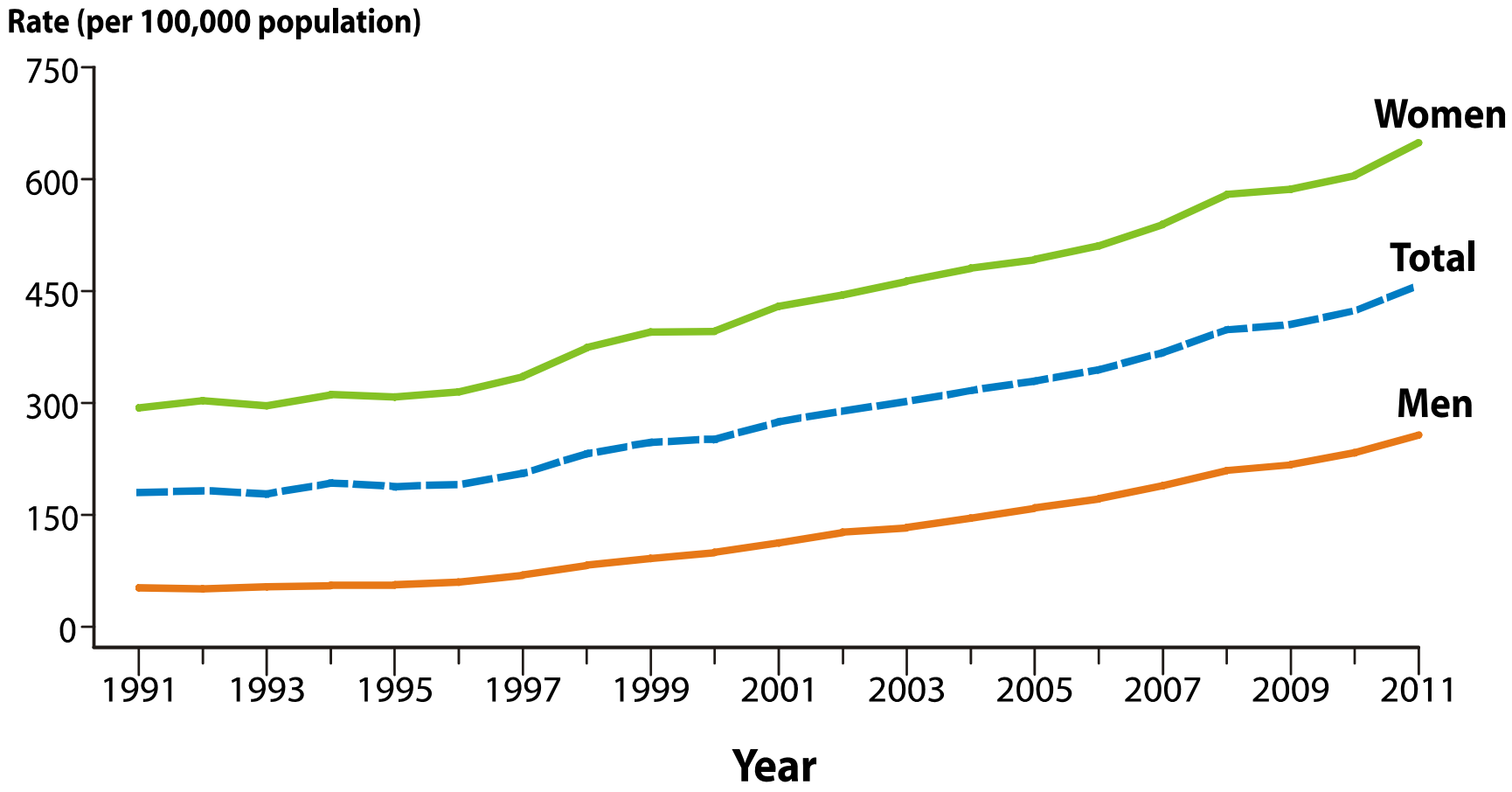
FEMALE CONDOMS: Effective but more limited studies

TOPICAL MICROBICIDS/SPERMICIDES: Ineffective

Populations at Greatest Risk

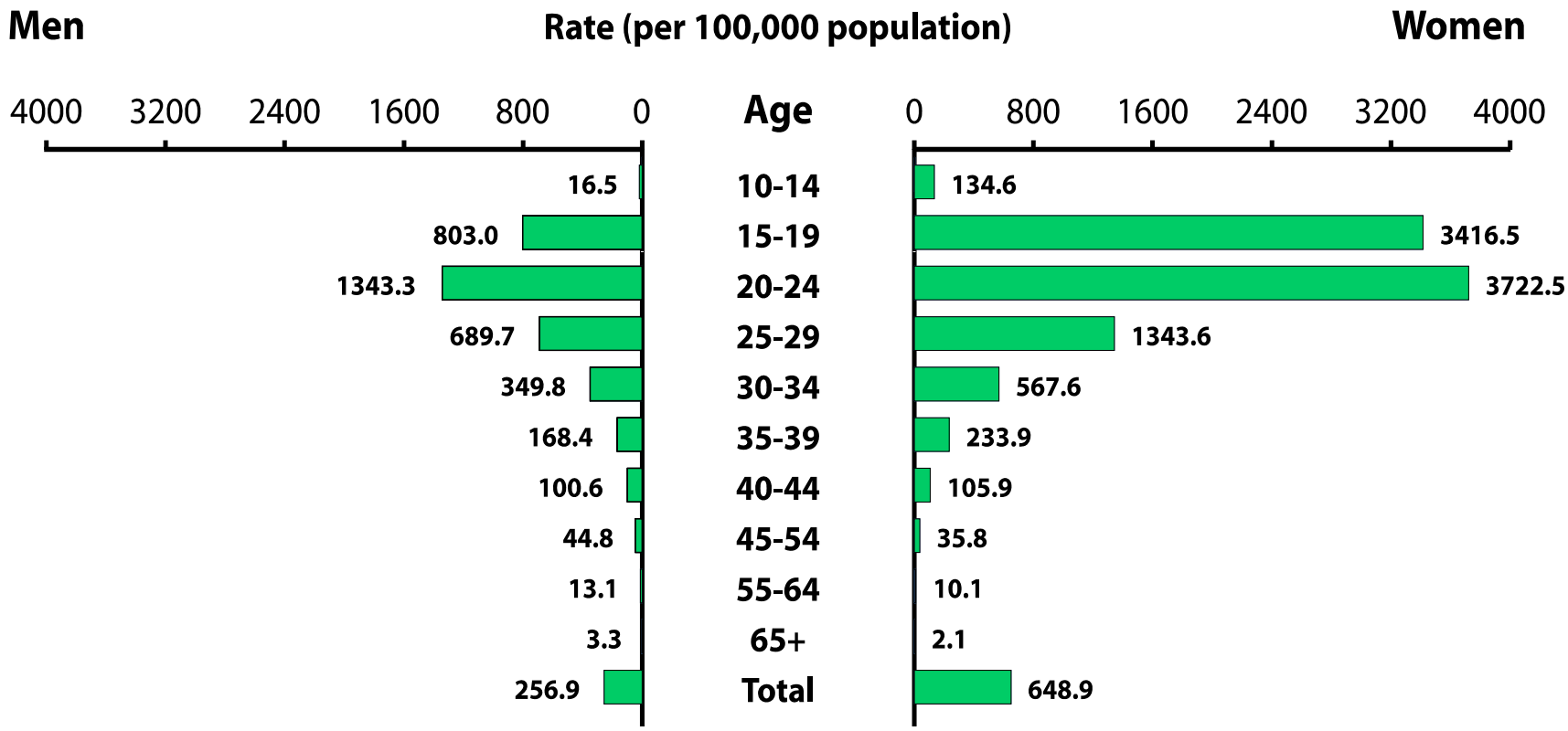
- Youth:
  - 19 million cases STD yearly and (~50%) 9.1 million cases in those 15-24
- Racial/ethnic minorities:
  - African Americans: 71% of GC, 48% CT, 52% syphilis
  - Past 5 years, syphilis up over 150% in African Am. males
- MSM
  - 71% of syphilis cases in 2011
  - High rates of HIV coinfection

Chlamydia—Rates by Sex, United States, 1991–2011

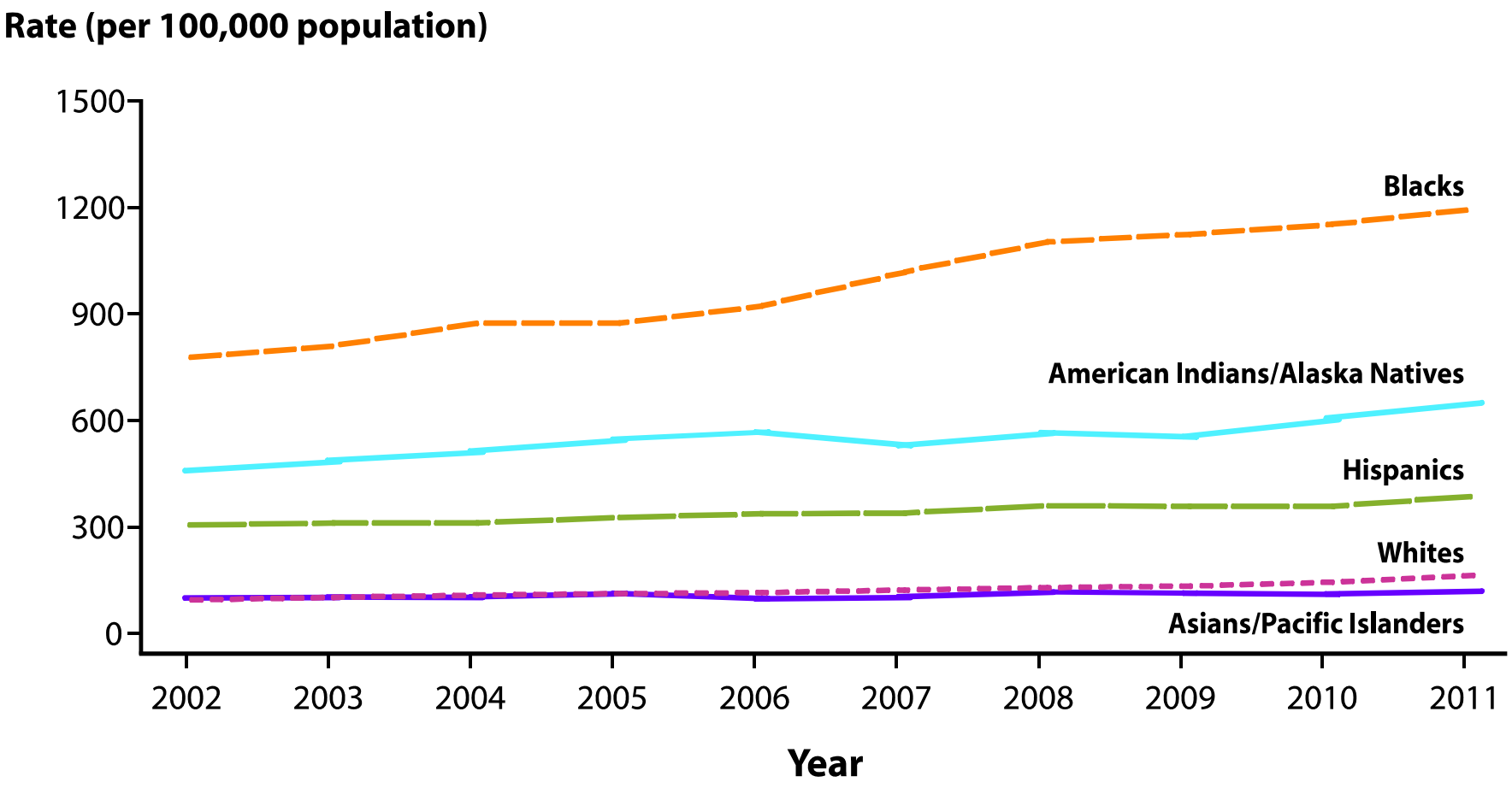


NOTE: As of January 2000, all 50 states and the District of Columbia have regulations that require the reporting of chlamydia cases.

Chlamydia—Rates by Age and Sex, United States, 2011

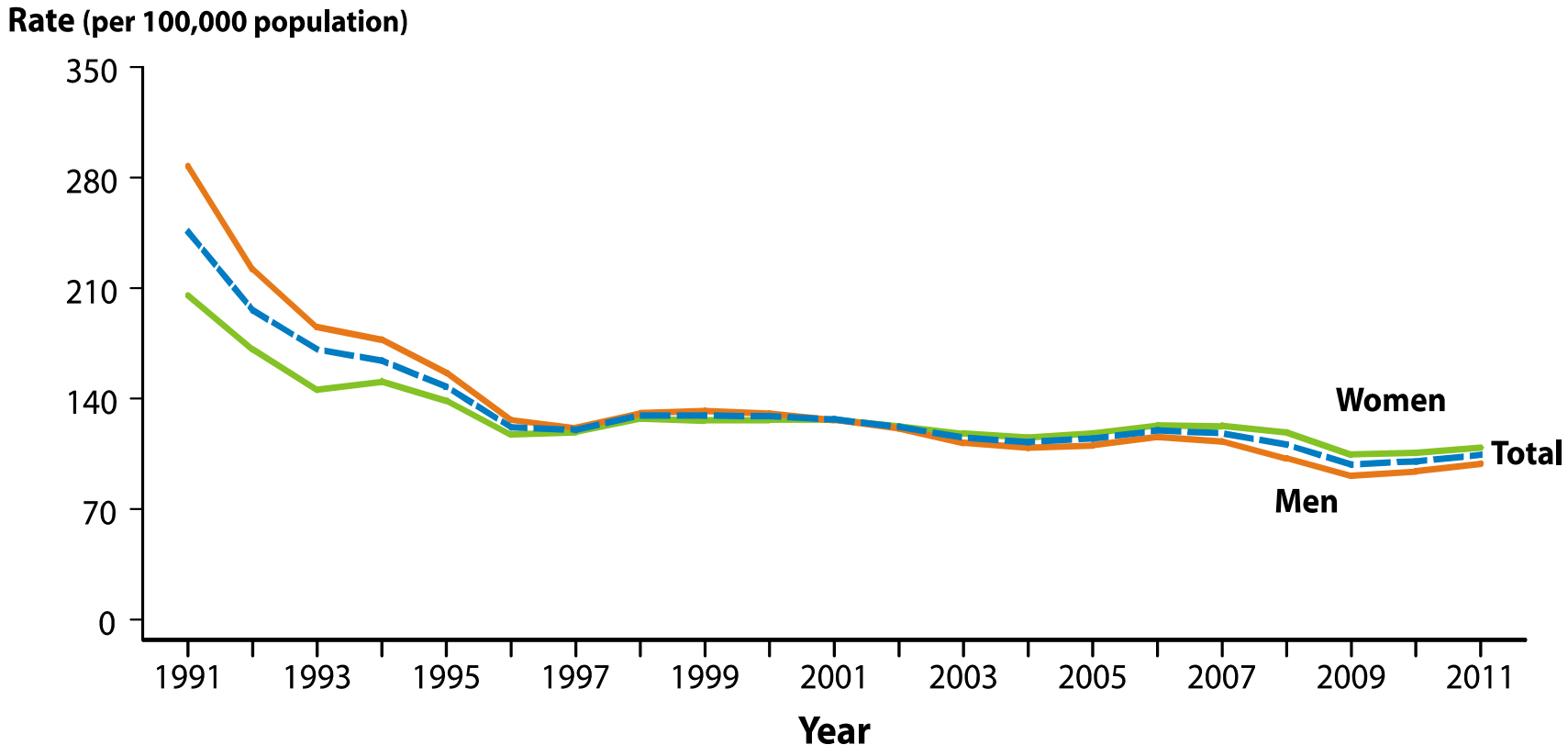


Chlamydia—Rates by Race/Ethnicity, United States, 2002–2011



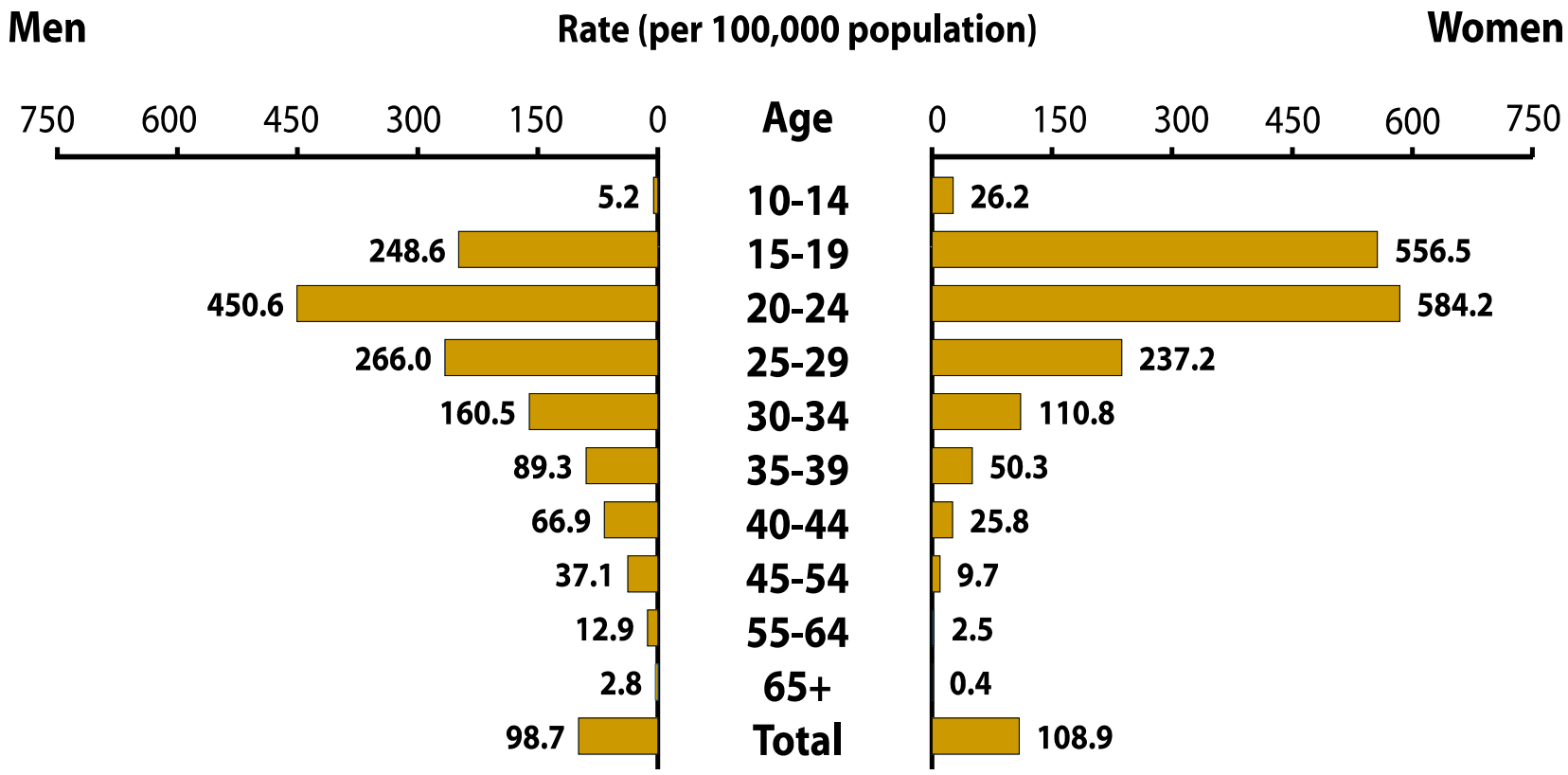
2011-Fig 6. SR

Gonorrhea—Rates by Sex, United States, 1991–2011

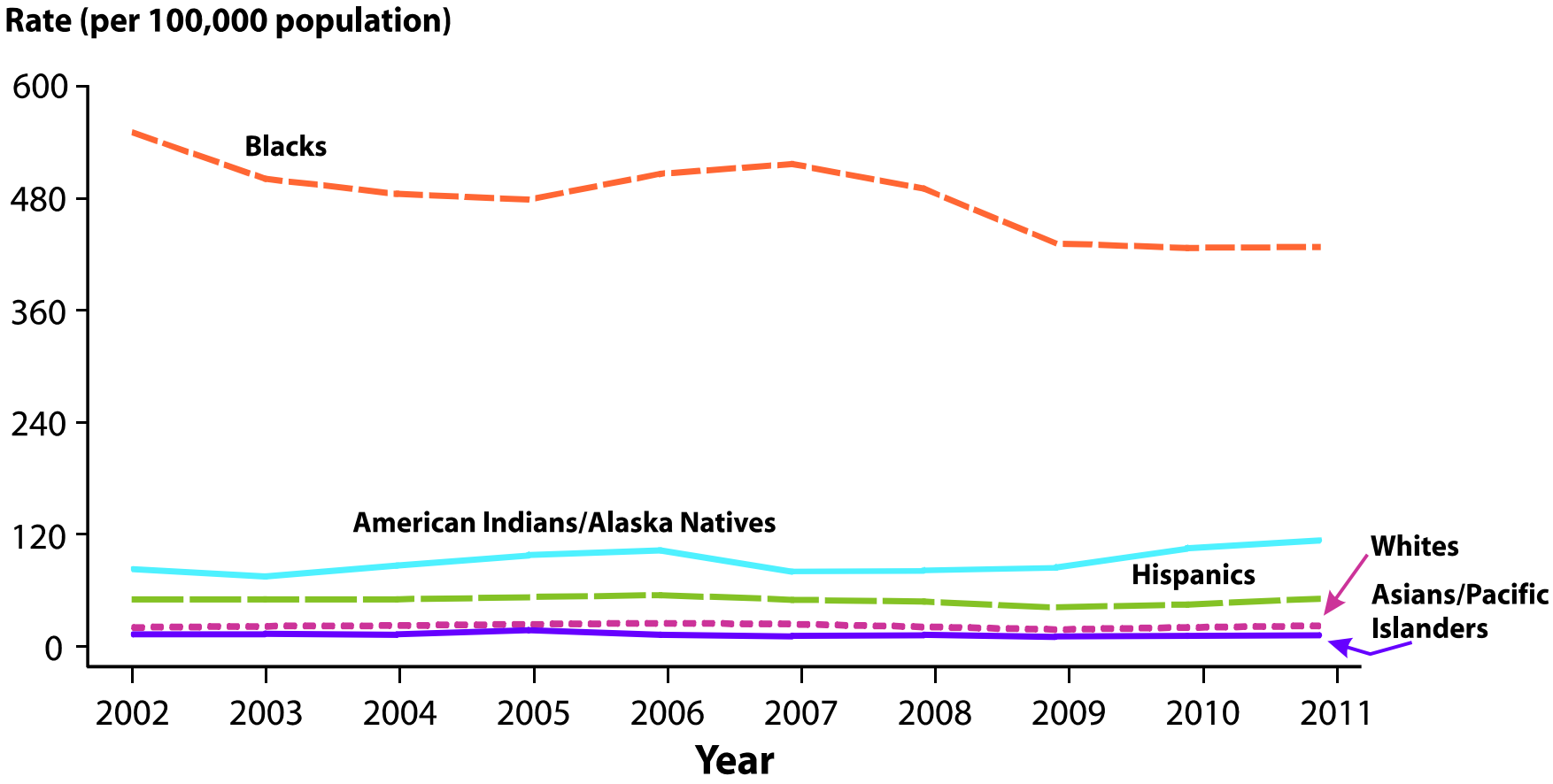


2011-Fig 17. SR

Gonorrhea—Rates by Age and Sex, United States, 2011



Gonorrhea—Rates by Race/Ethnicity, United States, 2002–2011



2011-Fig 24. SR

Prevalence of Chlamydia

- HMO (14-18 y/o males) JAH,2004 — 4%

- Household sample 18-26 y/o N=14,432
  (urine LCRs) JAMA 291:2229,2004 — 4.19%

Race	Males	Female
African Am.	11.1%	13.95%
Latino	7.24%	4.42%
White	1.38%	2.52%
Asian Am.	1.14%	3.31%

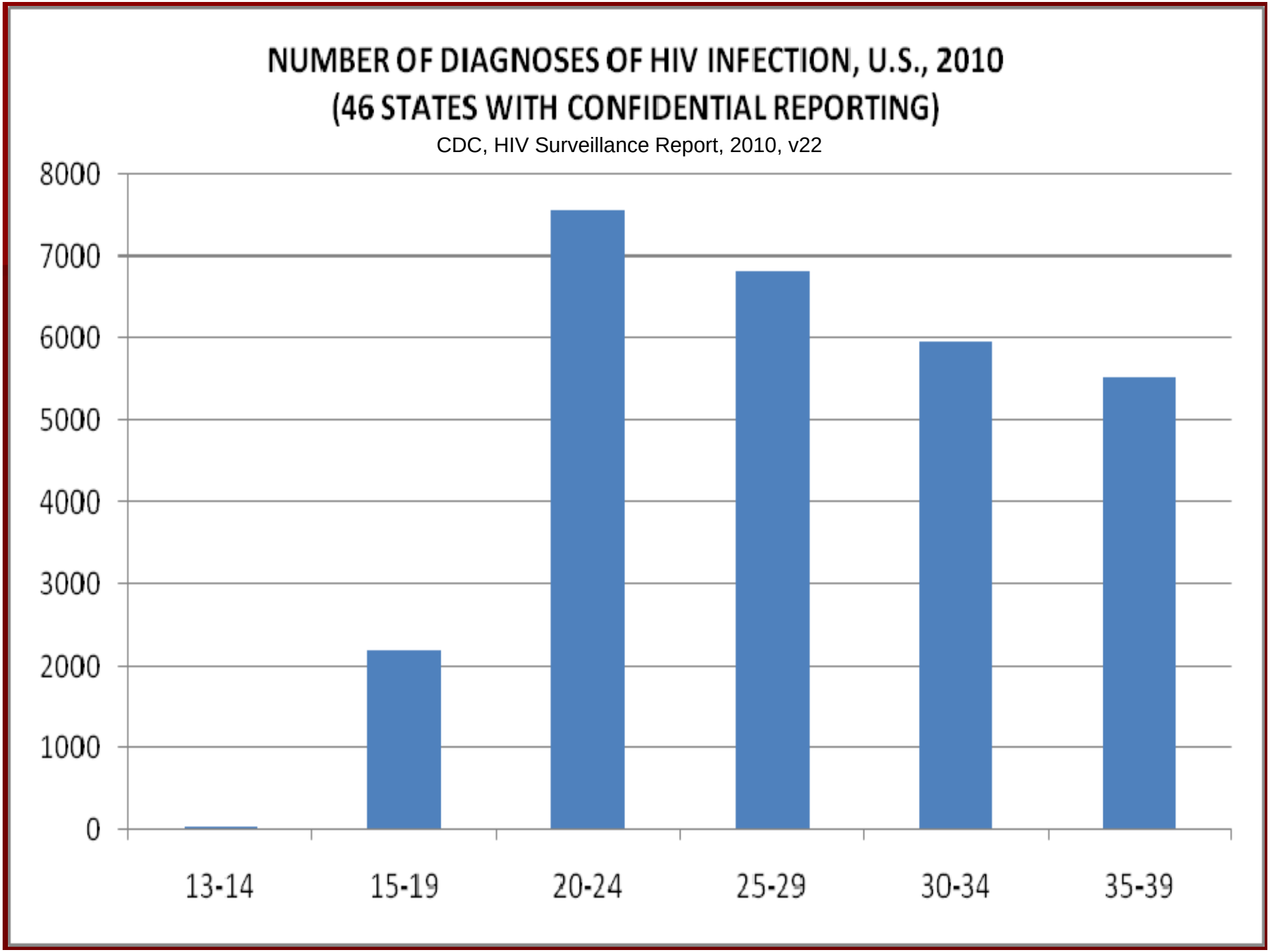
Prevalence of Gonorrhea

- Household sample 18-26 y/o 0.43%
  - JAMA 291:2229,2004

Race	Males	Female
African Am.	2.36%	1.91%
Latino	0.27%	0.13%
White	0.07%	0.13%

- Both GC/CT 0.3%
- If GC 70% with CT
- If CT 7.9% with GC

Rate increasing in MSM


NUMBER OF DIAGNOSES OF HIV INFECTION, U.S., 2010
(46 STATES WITH CONFIDENTIAL REPORTING)
CDC, HIV Surveillance Report, 2010, v22
8000
7000
6000
5000
4000
3000
2000
1000
0
13-14
15-19
20-24
25-29
30-34
35-39

Latin America HIV Rates

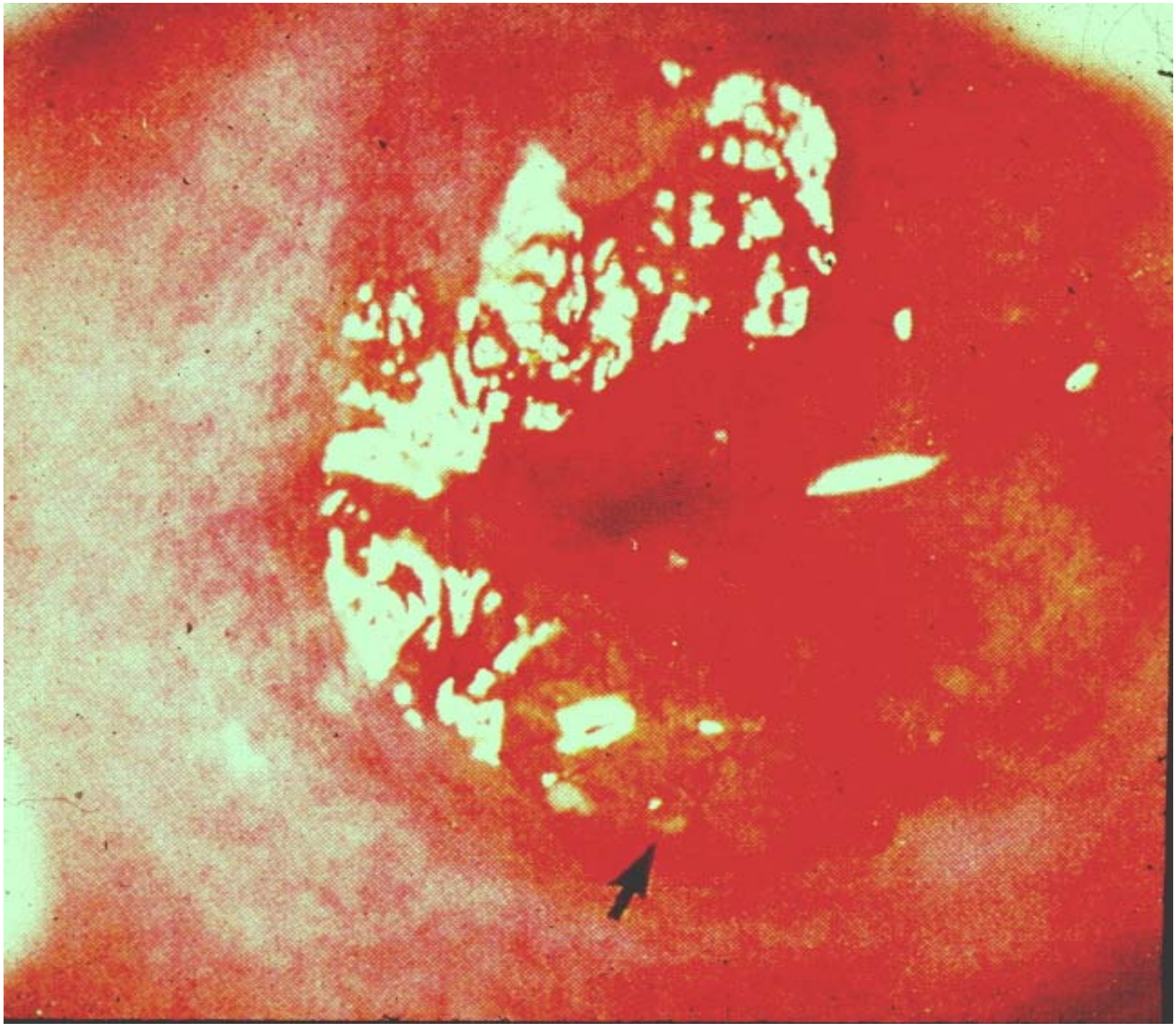
- 18 countries including Argentina, Brazil, Peru, Chile, Uraguay, Paraguay
- AYA/adult rates (%)
  - Belize 2.3%
  - Brazil (0.3-0.6%)
  - Argentina 0.5%
  - Uraguay 0.5%
  - Chile 0.4%
  - Peru 0.4%
- Unsafe sex among men who have sex with men (MSM) is common across the whole region. HIV prevalence ranges between 9% and 20% among men who have sex with men in at least 12 capital cities across central and south America.
- Condom use among MSM varies significantly across central and South America; from 36% in Nicaragua and 47% in Uruguay to 86% in Panama and 89% in Suriname.

UNAIDS 2010 Report on the Global AIDS epidemic

Risk From Coitus

Gonococcal transmission/coital act

- 50% infected male, uninfected female
- 25% infected female, uninfected male



"Could it just be too many Big Macs, doctor?"

HISTORY

HEADSS

- **Home**
- **Education**
- **Activities**
- **Drugs**
- **Sexuality**
- **Sexual/physical assault**

Five Ps

- **Partners**
- **Prevention of pregnancy**
- **Protection from STDs**
- **Practices**
- **Past history of STDs**

Can get curriculum by CDC at
http://www.stdhivpreventiontraining.org

SCREENING:
Adolescents and Young Adults

- CT: annually for those </= 25 in females
  and in selected males (STD/adol clinics, military, hi risk)
- GC: for those at risk: females <25 is a risk factor
- HIV testing encouraged in all individuals
- Routine testing in asymptomatic adolescents:
  NOT recommended for trich, syphilis, BV, HPV,
  HAV and HBV
- Cervical cancer screening age 21 (ACOG and
  USPSTF)

STD Screening Guidelines for men who have sex with men (MSM)

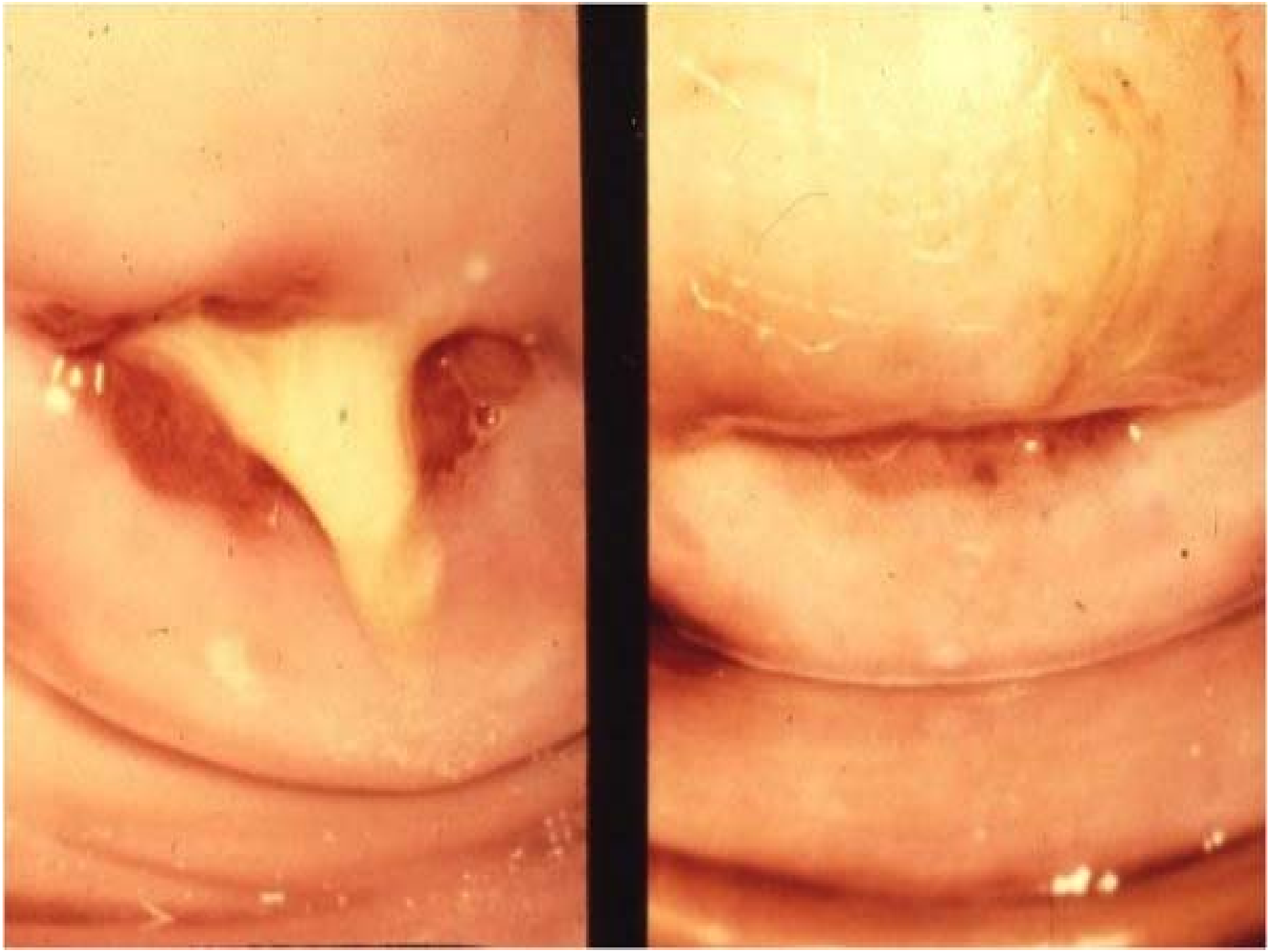
- Sexual history: Straightforward, nonjudgmental
- Screen q year: HIV, syphilis, CT/GC based on site
  - Urethral GC/CT (urine NAAT preferred)
  - Rectal GC/CT (NAAT of rectal swab preferred)
  - Pharyngeal GC/not Ct (NAAT is preferred method),
- Consider HSV-2 if status unknown
- ?Screening for anal cytologic abnormalities
- Hep serology (HBsAg) and immunizations (HAV, HBV)

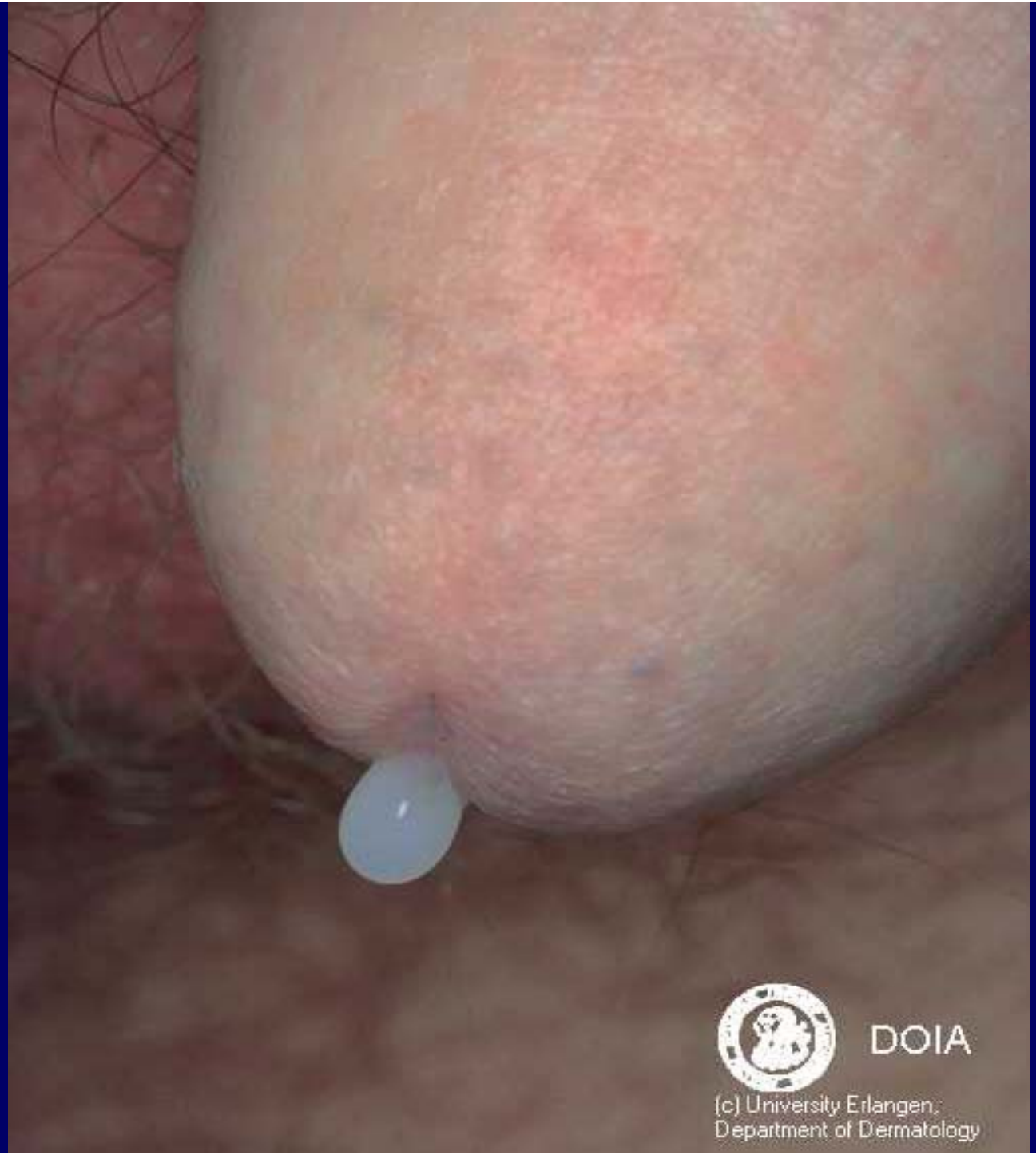
STD Screening Guidelines for women who have sex with women (WSW)

- Sexual history/practices including oral-genital, vaginal or anal sex with hands, fingers, oral-anal. Majority of WSW have history sex with men that might continue.
- BV: High prevalence, often similar flora of partner
- HPV: 13%-30% prevalence in WSW and also have LGSIL and HGSIL so need Pap/thin-prep screening

STD SYNDROMES

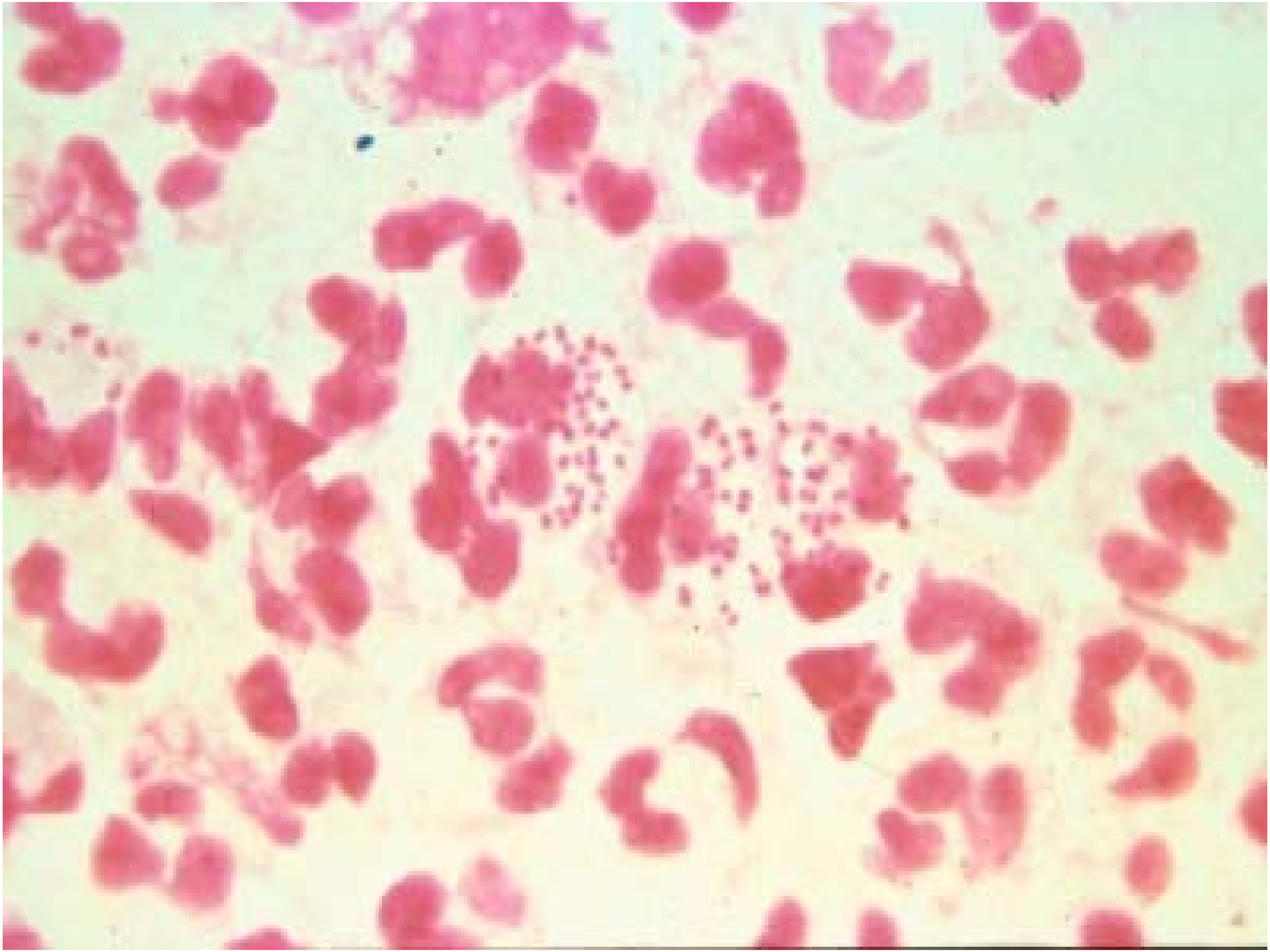
- **CERVICITIS/URETHRITIS**
- **VAGINITIS**
- **ABDOMINAL PAIN**
- **GENITAL ULCERS**
- **GENITAL GROWTHS**
- HEPATITIS
- ARTHRITIS
- EPIDIDYMITIS
- PERINATAL/FETAL INFECTION




DOIA
(c) University Erlangen,
Department of Dermatology

Urethritis

- **Bacterial STDS: GC (5-20%) CT (15-40%)**
- **NGU**
  - **Mycoplasma genitalium (5-25%)**
  - **Ureaplasma (0-20%), data inconsistent**
  - **Trichomonas vaginalis (5%-20%)**
  - **HSV (15%-30%) mainly in primary infections**
  - **Adenovirus, enterics, Candida, anaerobes**



Chlamydial Testing
NAATs - Nucleic Acid Amplified Tests

- Very high sensitivity (92-100%),
- Very high specificity (95-100%)
- Must be very careful for false positives in low prevalence population.

To pee or not to Pee: What is the right test for me? Males

- Use NAATs
  - Culture for chlamydia is NOT recommended
  - Culture for GC should be restricted to resistance surveillance sites
- Urine is the specimen type!

  Urethral swabs
  - May have lower sensitivity
  - Are subject to sample collection variability
  - May disincentivize future testing

To pee or not to Pee: What is the right test for me? Females

- Use NAATs
  - Culture for chlamydia is NOT recommended
  - Culture for GC should be restricted to resistance surveillance sites

- **Vaginal swabs may be the way to go**
  - **But CDC states urine or swabs from cervix or vagina**
  - Cervical swab at best equivalent to vaginal swab
  - ? about urine having lower sensitivity than vaginal swabs

Chlamydial Trachomatis Treatment 2010

Recommended Regimens

- Azithromycin 1 gm P.O. in a single dose or
- Doxycycline 100 mg P.O. bid X 7 days

(meta-analysis 12 randomized trials of azithromycin vs. doxycycline showed equal cure rates of 97%/98%.)

Alternative Regimens

- Erythromycin base 500 mg PO qid for 7 d, or
- Erythromycin ethylsuccinate 800 mg qid X 7 d or
- Ofloxacin 300 mg PO b.i.d. X 7 days or
- Levofloxacin 500 mg qd X 7 days

Pregnancy: Cannot use Doxycline, ofloxacin and levofloxacin but can use azithromycin 1 g in a single dose or amoxicillin 500 mg PO tid X 7 d.

Repeat Testing after Treatment

- Pregnant women
  - Repeat testing, preferably by culture, 3 weeks after completion of recommended therapy
- Non-pregnant women – no test of cure
  - Screen 3-4 months after treatment, especially adolescents
  - Screen at next health care visit
- Consider test of cure 3 weeks after completion of therapy for anyone treated with erythromycin

GC Treatment 2010
Uncomplicated GC

- Ceftriaxone 250 mg IM in a single dose

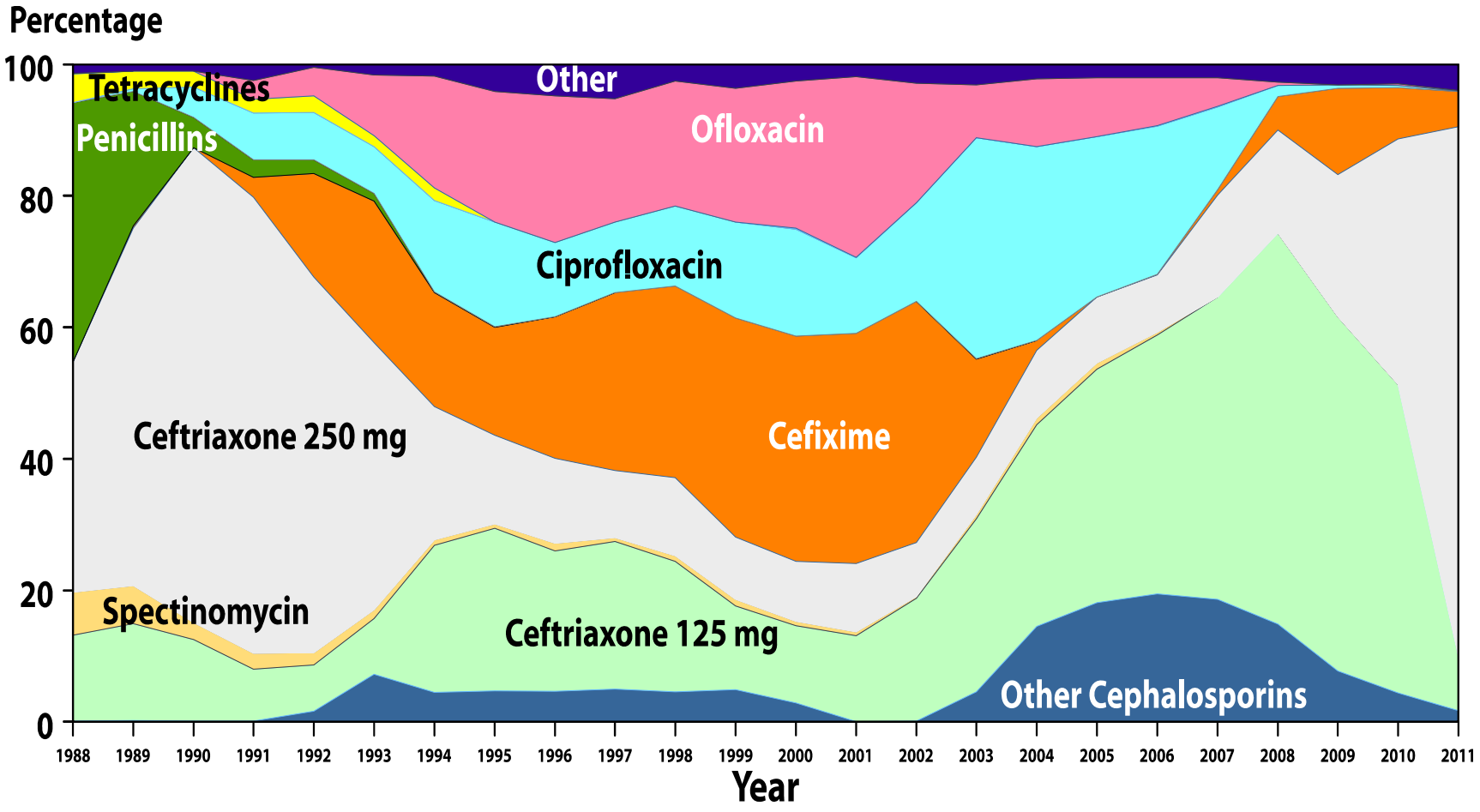
  Plus Add with either**:**
- **Azithromycin 1g orally in a single dose OR**

  D**oxycycline 100 mg twice a day for 7 days**

- **April 2007:** Fluoroquinolones are no longer recommended for treating GC infections and associated conditions such as PID

- **August 2012:** Cefixime eliminated from recommendations

Antimicrobial Drugs Used to Treat Gonorrhea Among Participants, Gonococcal Isolate Surveillance Project (GISP), 1988–2011

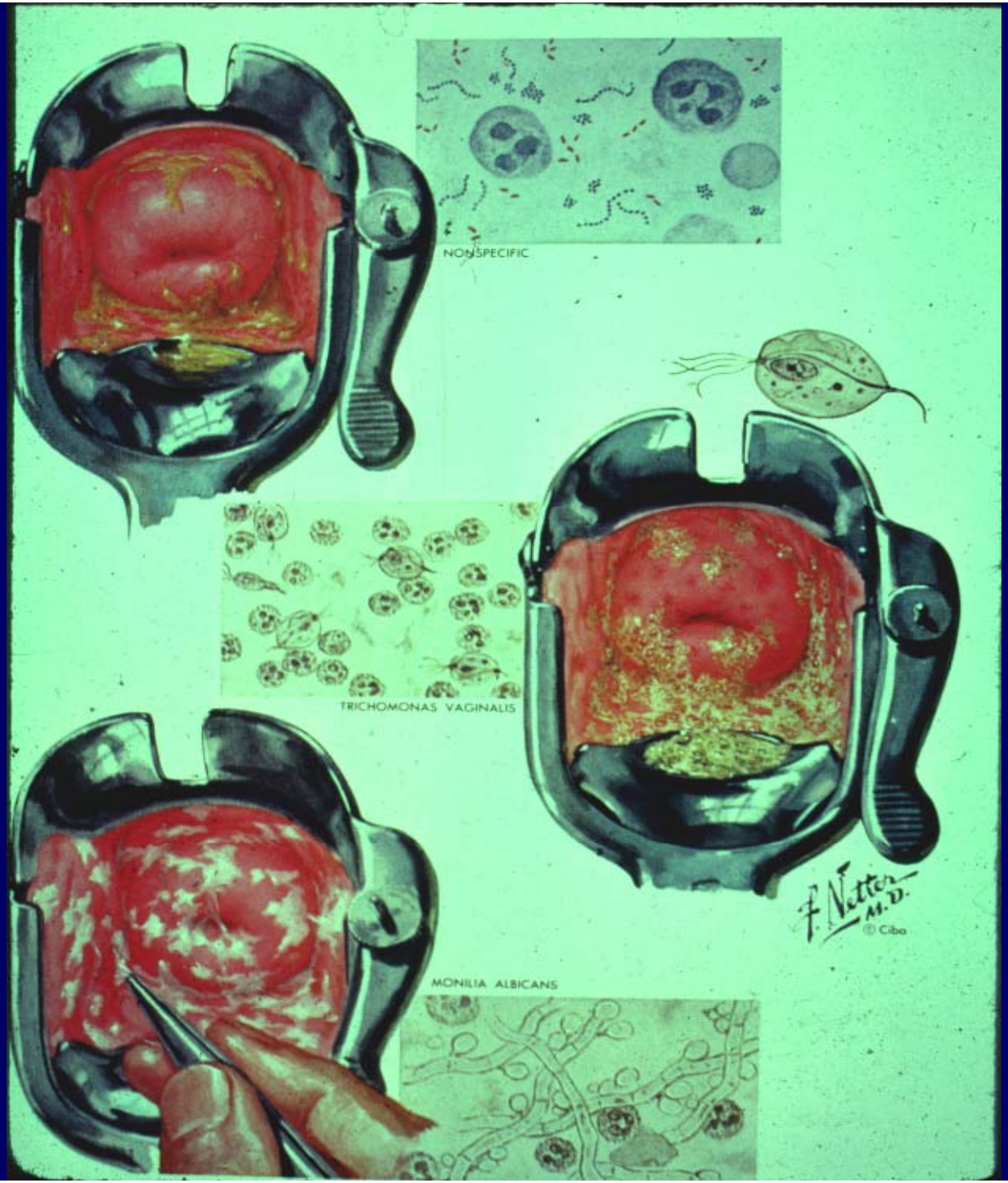


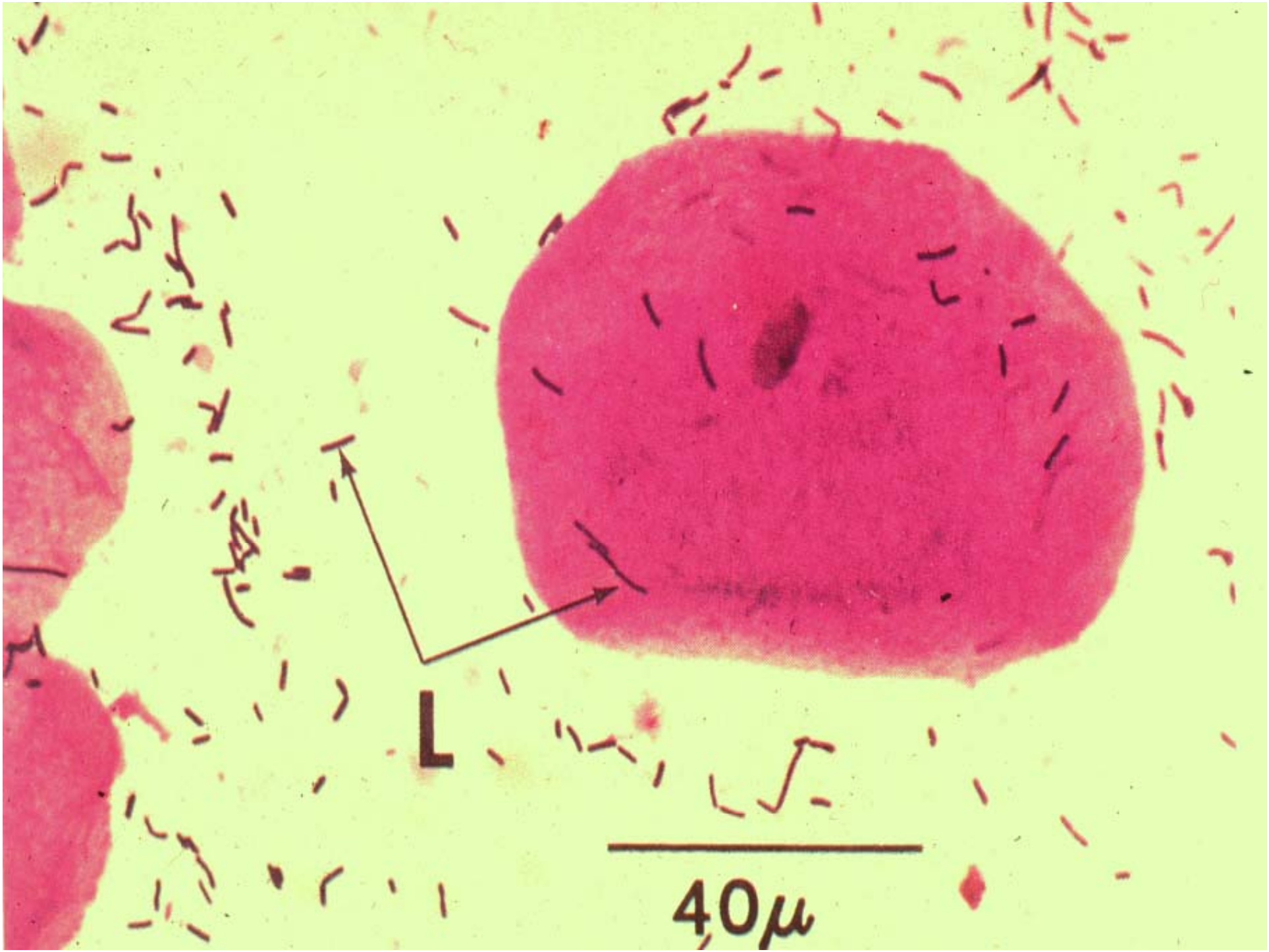
NOTE: For 2011, "Other" includes no therapy (1.2%), azithromycin 2g (2.3%), and other less frequently used drugs.

2011-Fig 35. SR

Partner Management

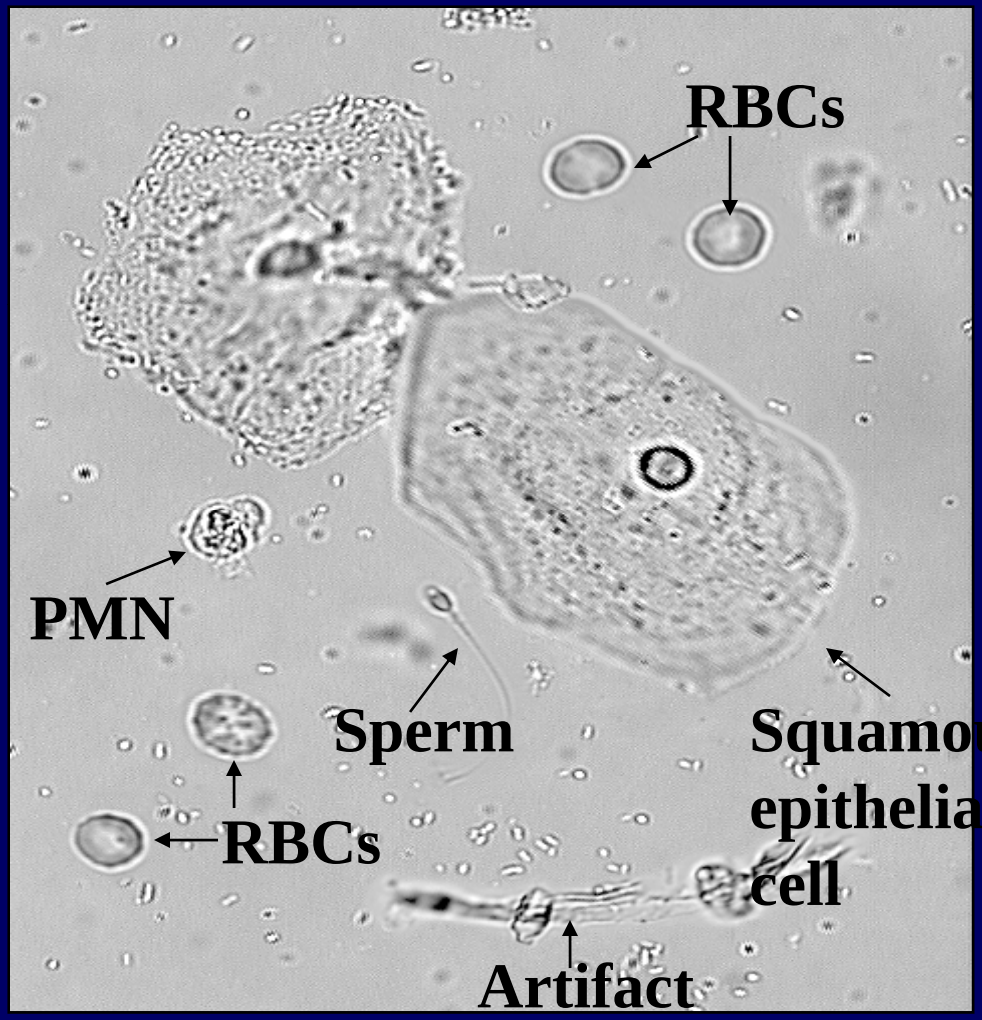
- Treat partners whose last sexual contact with patient was within 60 days of onset symptoms or most recent sexual partner
- Patient delivered therapy
  - Lowered recurrences for GC in particular
  - Check legal options in state
  - More emphasis in 2010 guidelines


NONSPECIFIC
TRICHOMONAS VAGINALIS
MONILIA ALBICANS
F. Netter M.D.
© Ciba

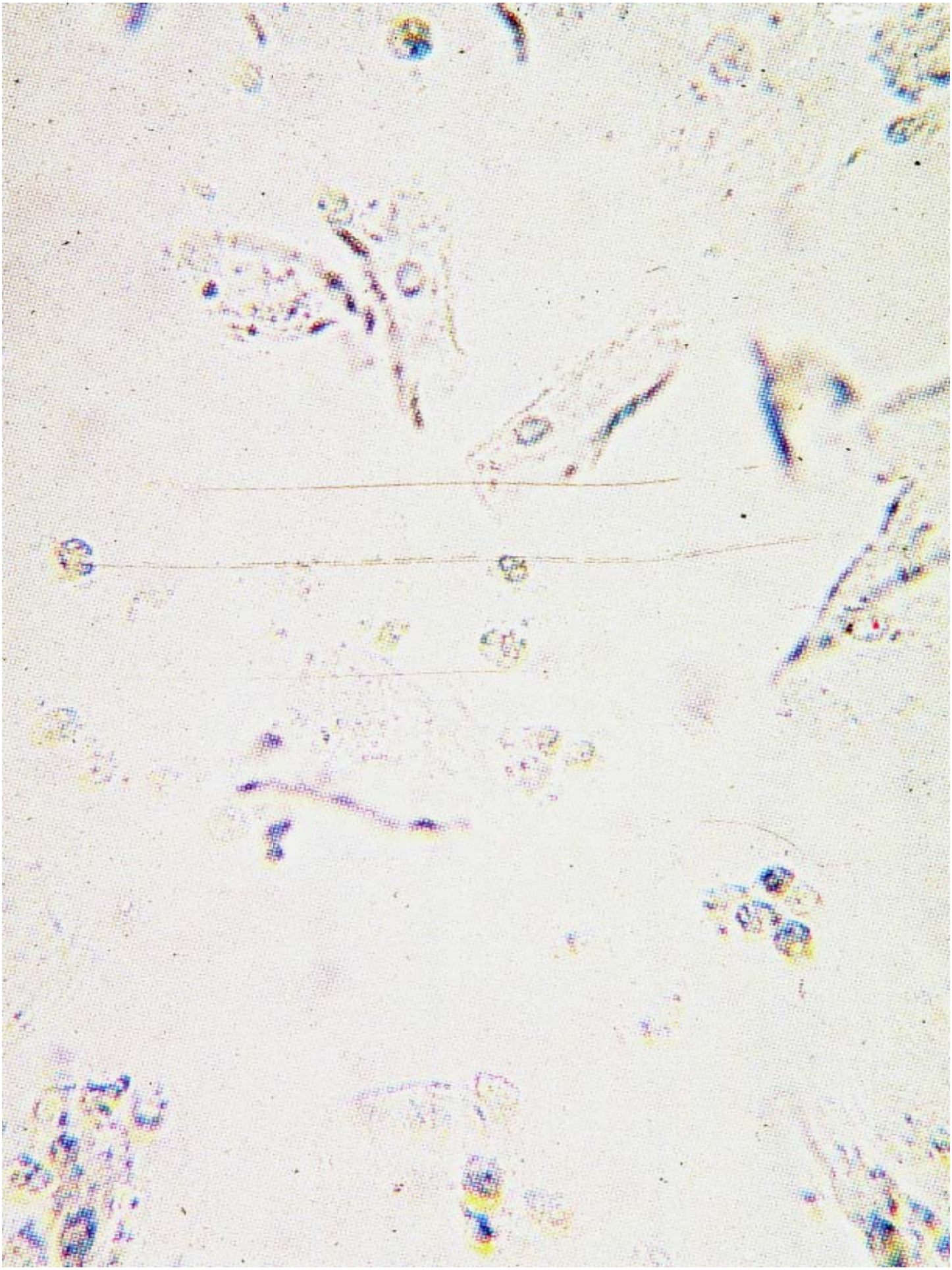

L
40μ

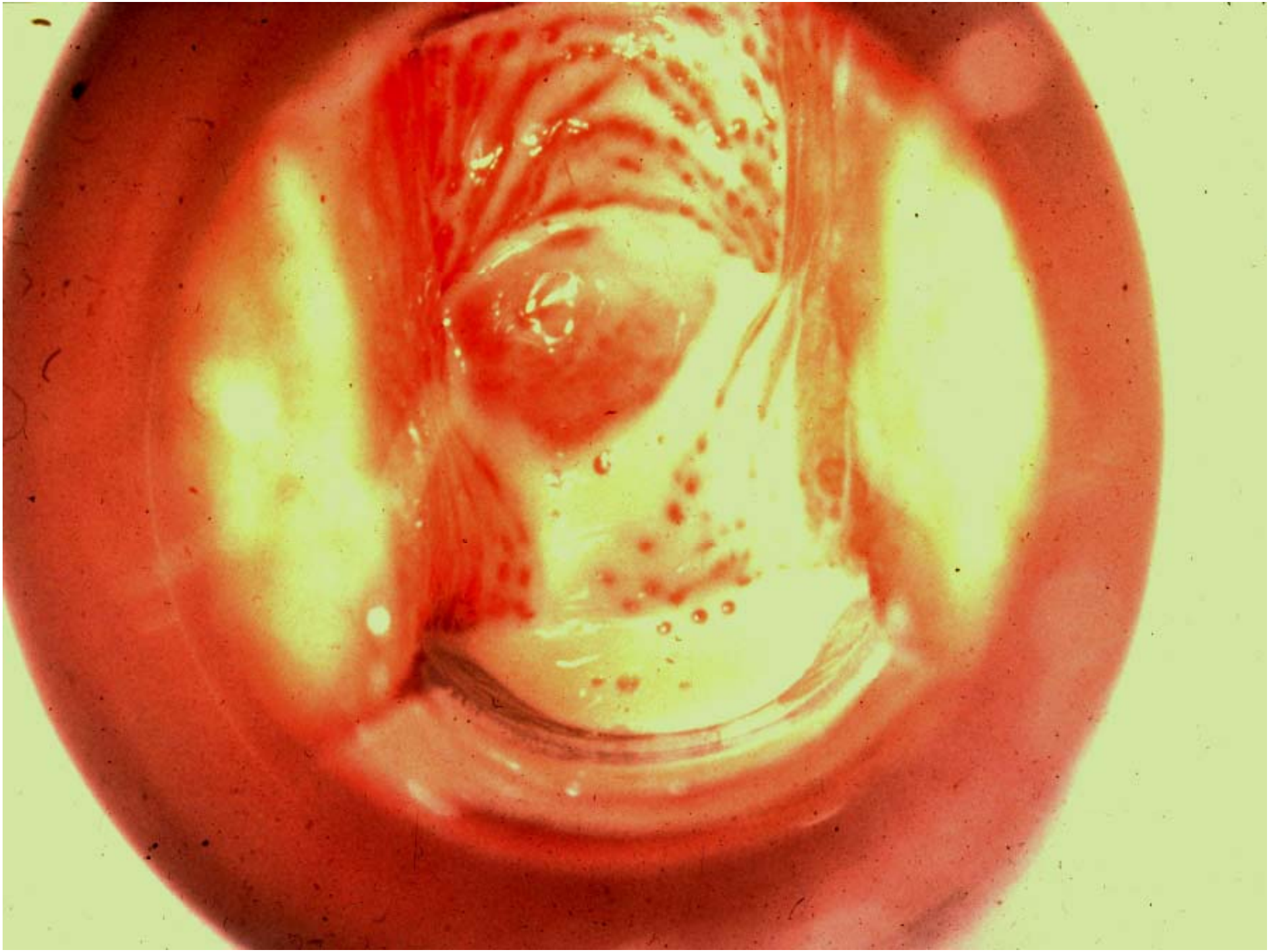
Wet Preps: Common Characteristics

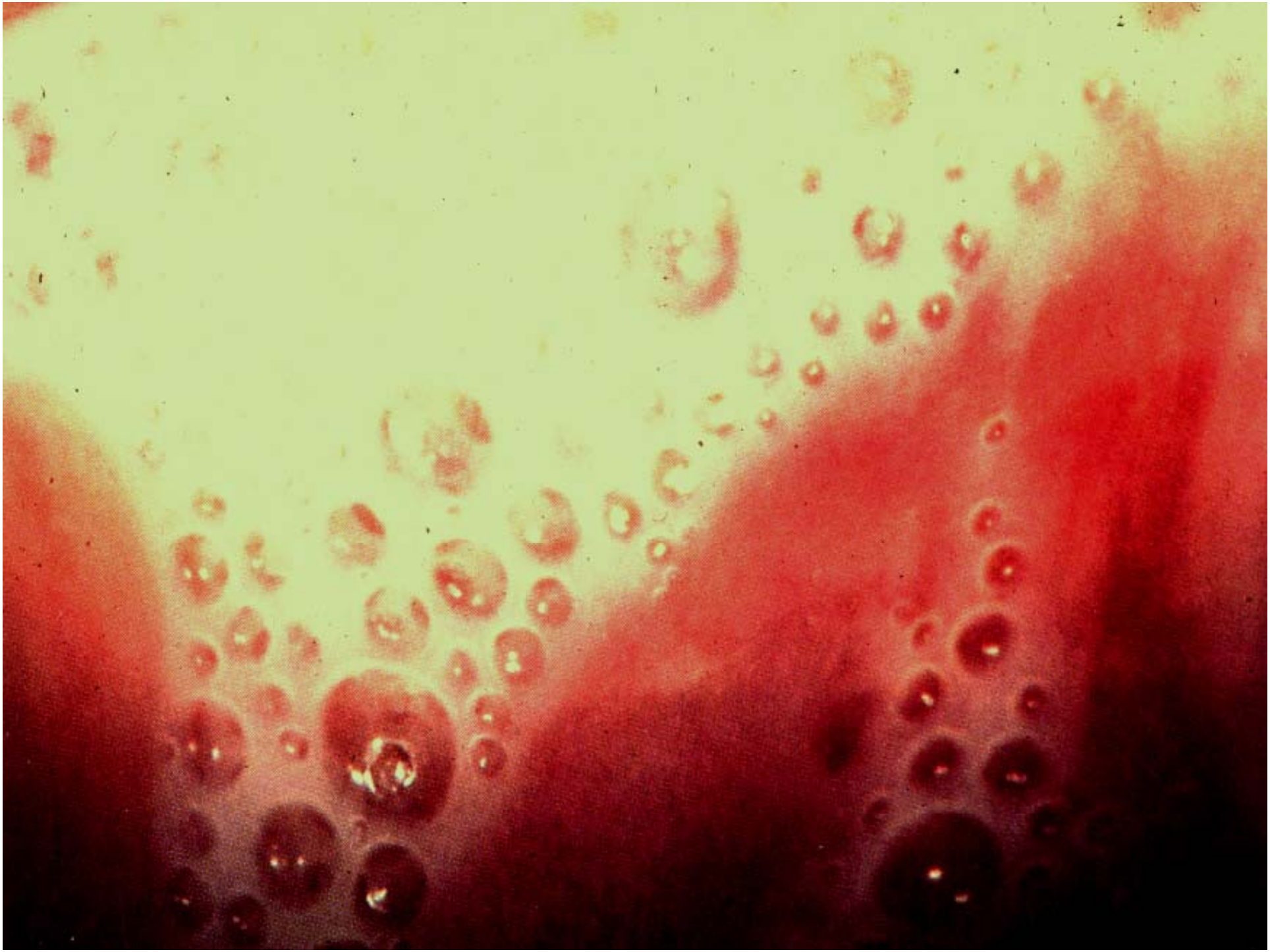
Saline: 40X objective



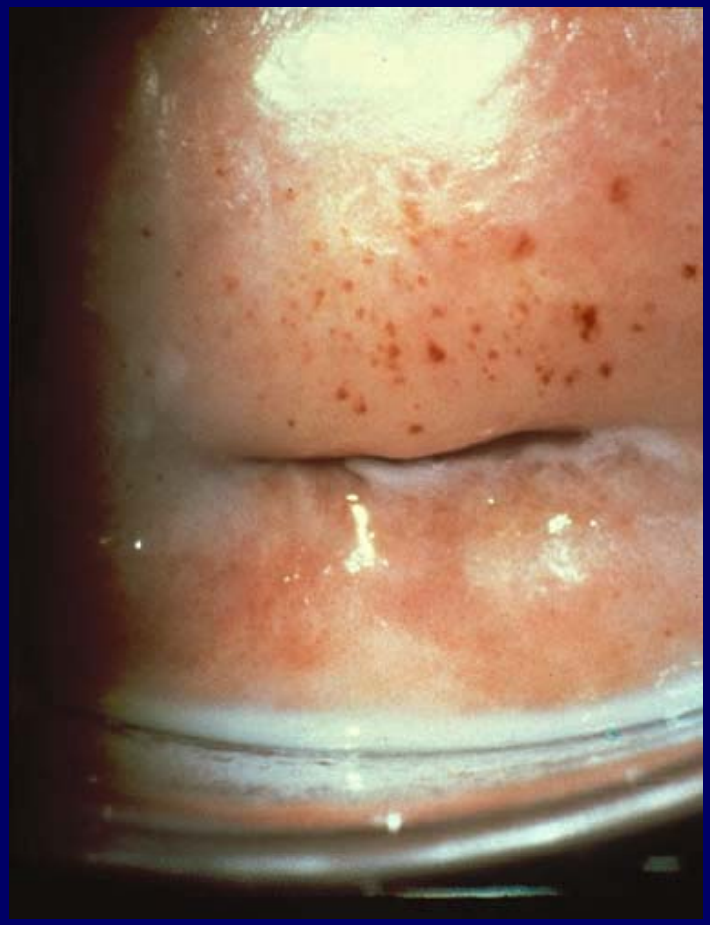
Source: Seattle STD/HIV Prevention Training Center at the University of Washington



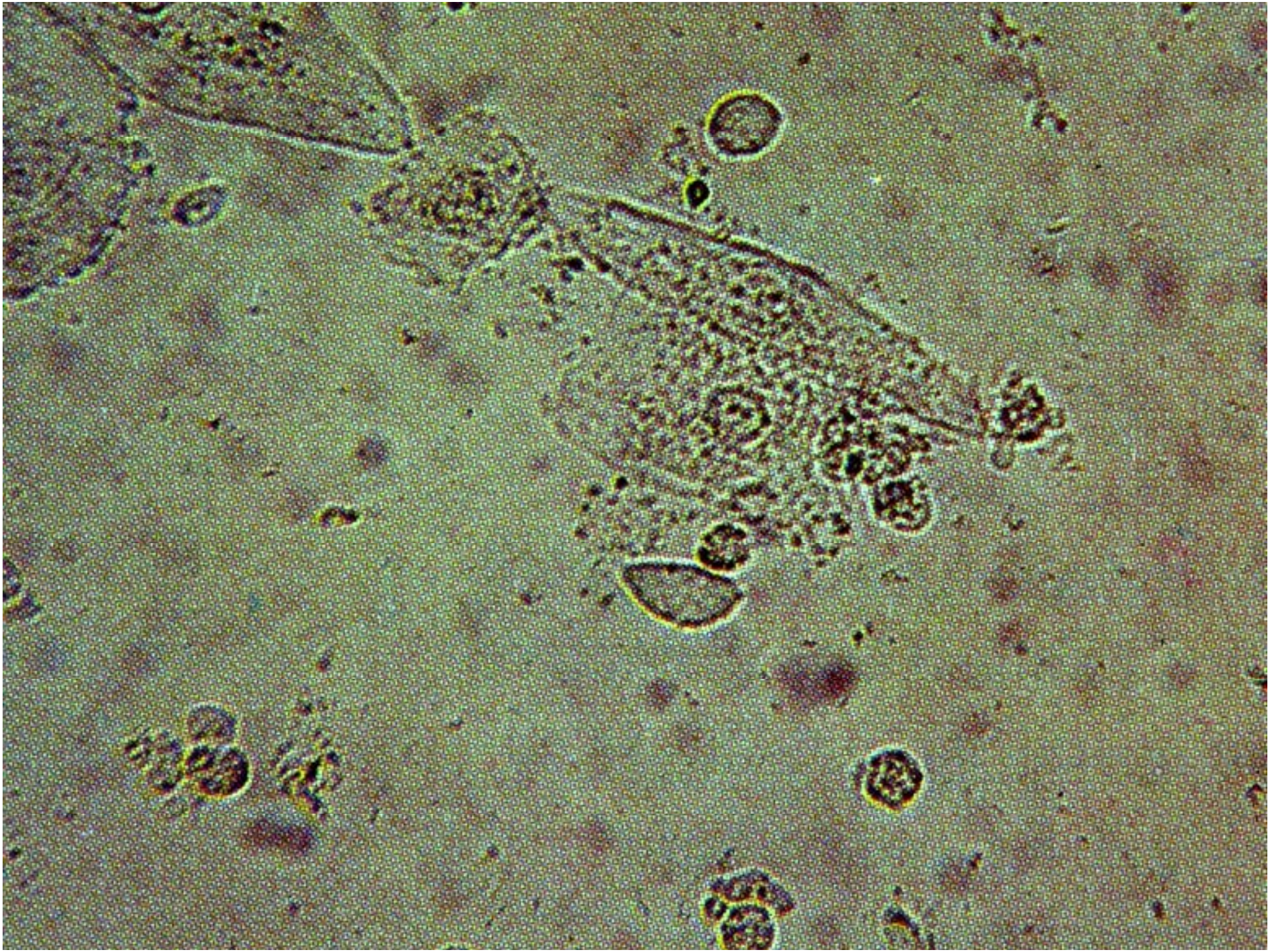




"Strawberry cervix" due to *T. vaginalis*



Source: Claire E. Stevens/Seattle STD/HIV Prevention Training Center at the University of Washington



Trichomonas Vaginalis

- One of the most frequent vaginal infections
- 28% of female teens in juvenile detention centers
- Incubation 4-28 days, can survive 1-2 hrs in wet sponge
- 25%-50% women and 90% men asymptomatic or NGU
- Lower abdominal pain in 5% of women

Trichomonas Vaginalis Diagnosis

- Wet mount about 60%-70% sensitive
- Affirm VP III
  - Nucleic acid probe for T. vaginalis, G. vaginalis and C. albicans
  - 45 minute result test
- OSOM Trichomonas Rapid Test
  - Immunochromatographic capillary flow dipstick
  - 10 minute test
- Both tests 83%/97% sensitivity and specificity, and false positives in low prevalence populations. Culture most sensitive test and best test in men.

Trichomoniasis Treatment 2010 (CDC)

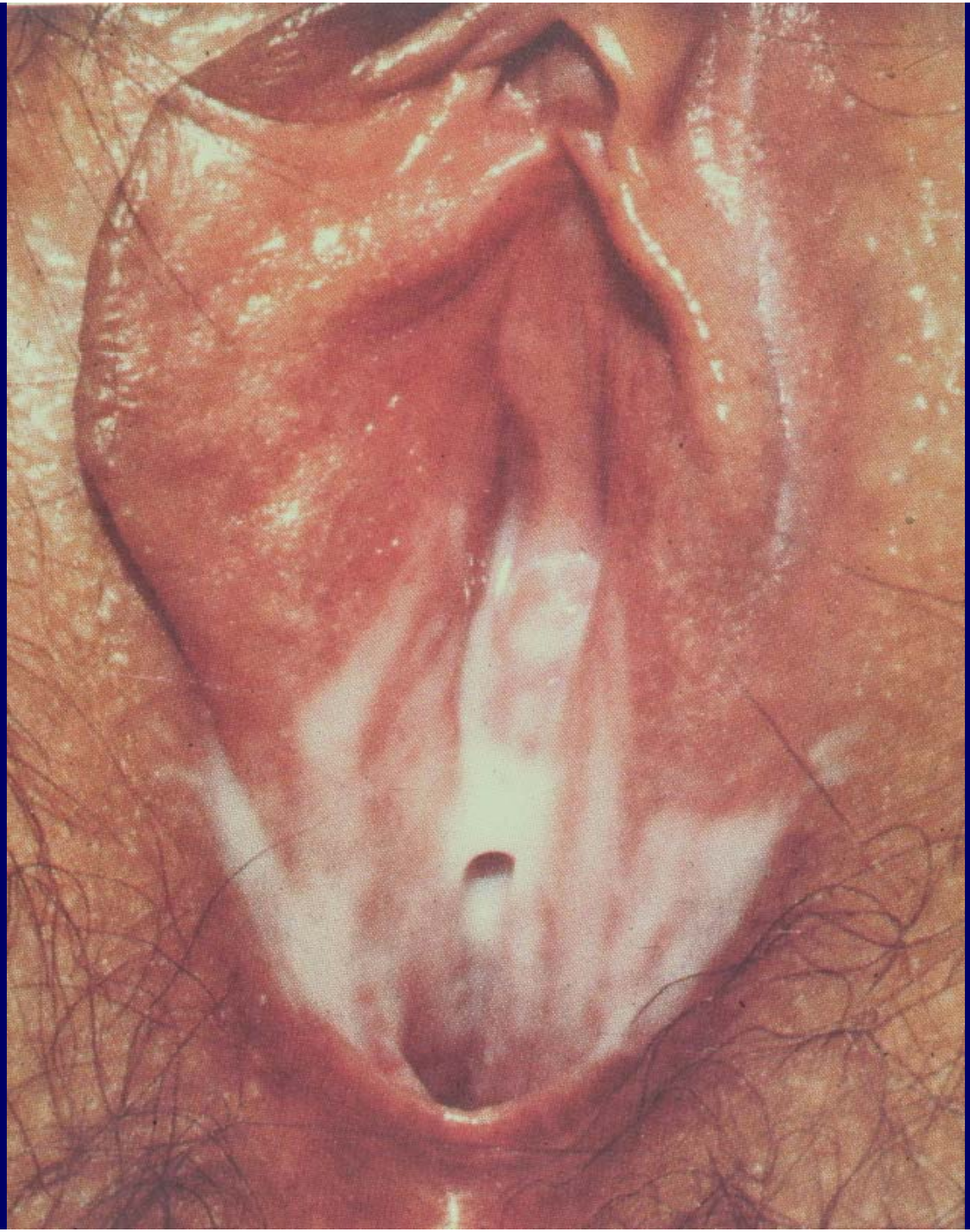
- Metronidazole 2 g PO in a single dose (90%-95% effective)

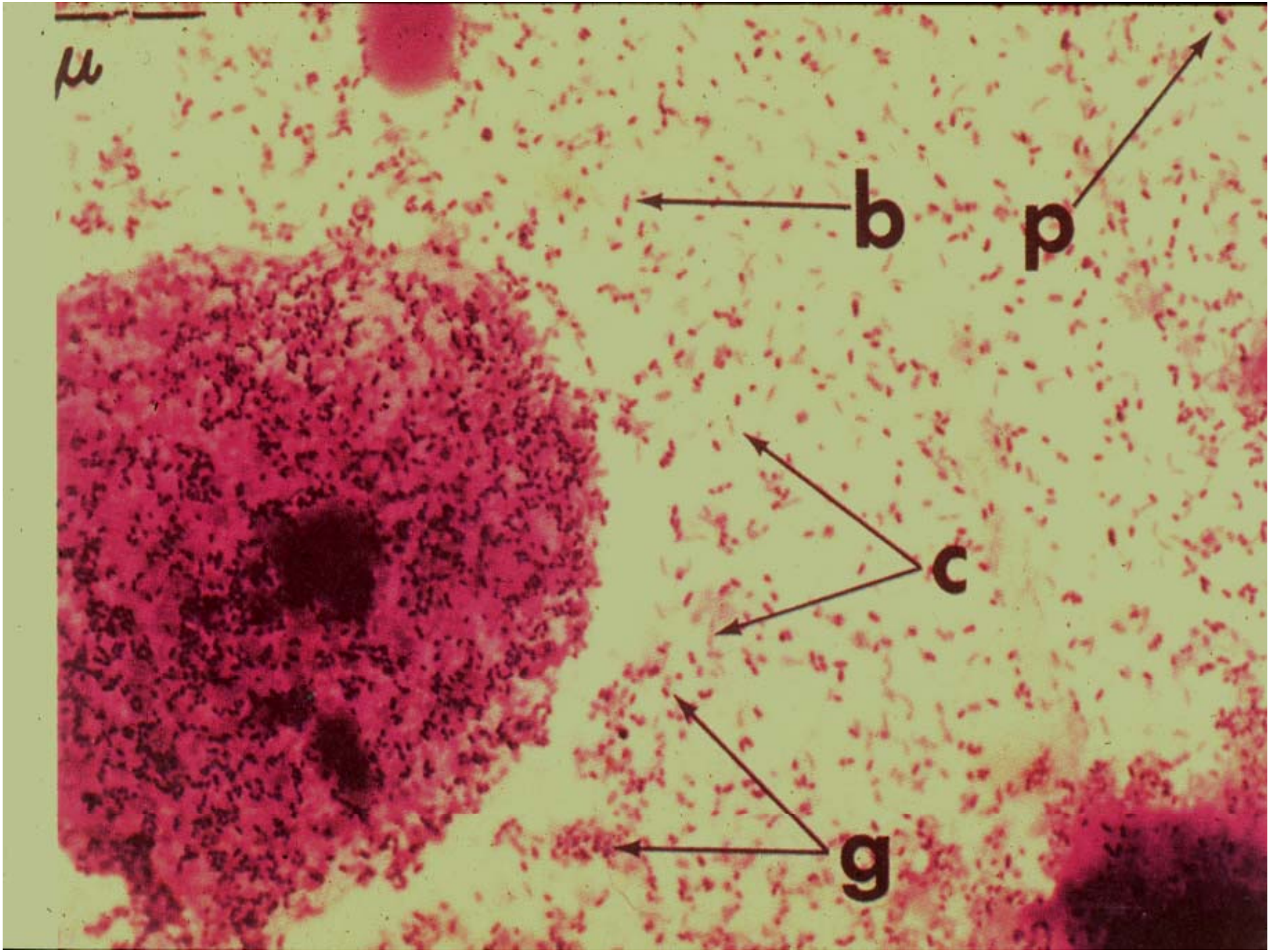
  OR

- Tinidazole 2 g orally in a single dose (86%-100% effective)
- Alternative Regimen: Metronidazole 500 mg X 7days (90%-95% effective)
- Local creams not effective
- Low level resistance: Metronidazole 500 mg orally BID for 7 days. If fail - tinidazole or metronidazole at 2 g orally for five days

Trichomoniasis Treatment

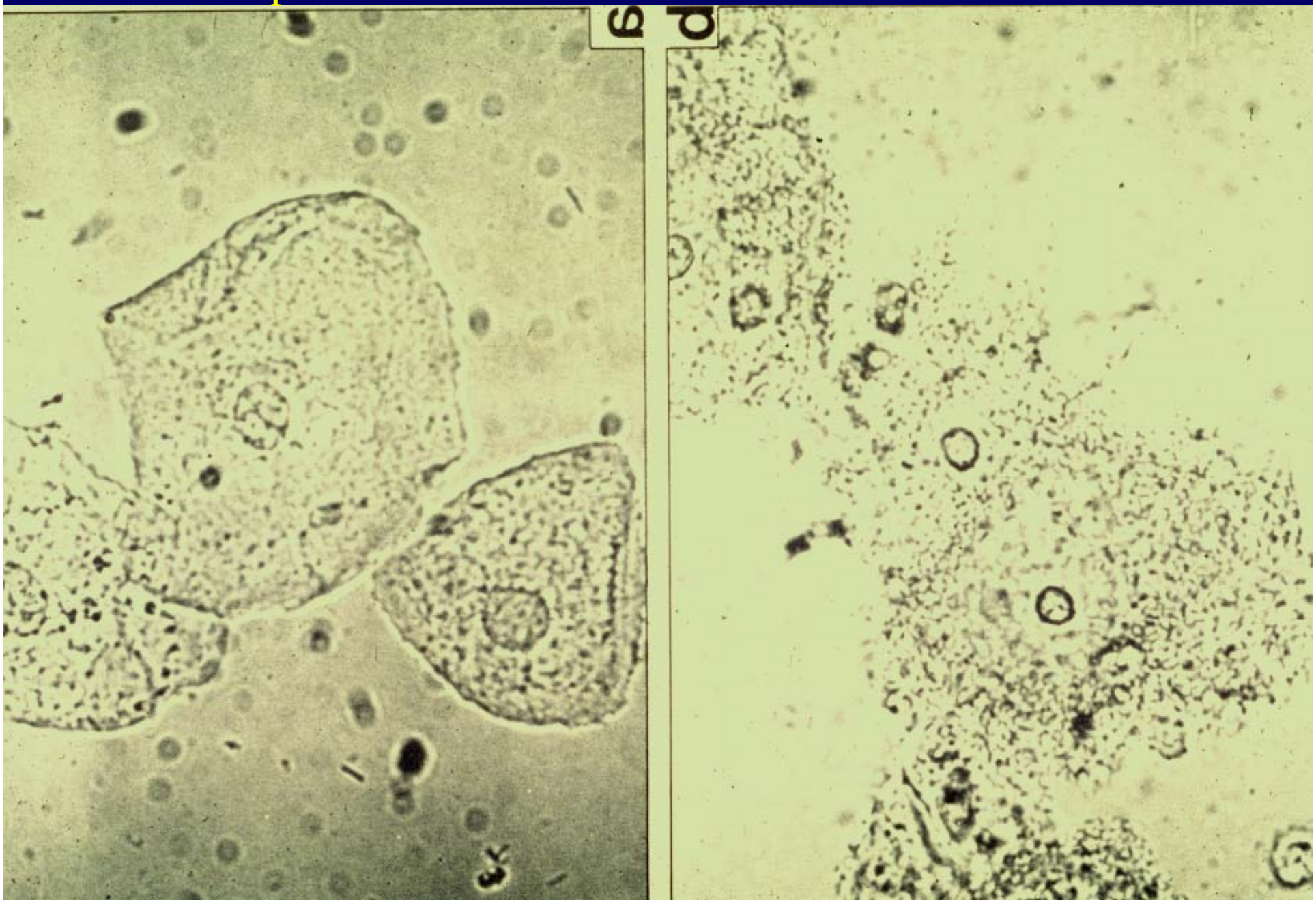
- Avoid alcohol for 24 hours after metronidazole or 72 hours after completion of tinidazole
- Follow-up: not needed if asymptomatic
  - Failures: Treat with 7 day course
- Partners: Treat and avoid sex until cured.
- Pregnancy: Metronidazole safe in pregnancy




μ
b
p
c
g

Normal Epithelial cell

Clue cells



BV Diagnosis: Amsel Criteria

Amsel Criteria:

Must have at least three of the following findings:

- Vaginal pH >4.5 (most sensitive)
- Presence of >20% per HPF of "clue cells" on wet mount examination (most specific)
- Positive amine or "whiff" test
- Homogeneous, non-viscous, milky-white discharge adherent to the vaginal walls

Bacterial Vaginosis
Treatment

- Benefits include relieving vaginal symptoms and reducing risk of infectious complications of abortion or hysterectomy

- BV during pregnancy associated with adverse pregnancy outcomes including:
  - premature rupture membranes,
  - premature labor,
  - preterm birth and intraamniotic infections

Bacterial Vaginosis: Treatment - 2010

- **Metronidazole** 500 mg PO b.i.d X 7 days* OR
- **Metronidazole gel 0.75%,** one applicator qd X 5 d OR
- **Clindamycin cream** 2%, one applicator qhs X 7 d

ALTERNATES:

- **Tinidazole** 2 g orally once daily for 2 days OR
- **Tinidazole** 1 g orally once daily for 5 days OR
- **Clindamycin** 300 mg orally BID for 7 days OR
- **Clindamycin** 100 g intravaginally qhs for 3 days

* Avoid alcohol during Rx and for 24 hours later

- Follow-up: not needed
- Partners: No change in response or relapse rates

LOWER ABDOMINAL PAIN

- **PID**
- **TRICHOMONIAISIS**
- **HERPES SIMPLEX**
- **ECTOPIC PREGNANCY**
- **RUPTURED OVARIAN CYST/TORSION**
- **CYSTITIS**
- **APPENDICITIS**

PID - Clinical Signs and Symptoms

- **Abdominal Pain - Bilateral, Lower, 8% unilateral**
- **Pelvic Tenderness - 100%**
- **Abnormal Uterine Bleeding - 35%**
- **Discharge - 20%**
- **Nausea and Vomiting - 25%**
- **Fever - 35%**
- **Elevated White Count - 50%**
- **Elevated ESR - 75%**
- **RUQ tenderness - 10%-20%**

PID - 2010 Guideline Changes
Minimum Criteria

Cervical motion tenderness or

Uterine tenderness or

Adnexal tenderness

PID - 2010 Additional Criteria

- **Oral temperature > 101 F**
- **Abnormal cervical or vaginal mucopurulent DC**
- **WBCs on wet prep of vaginal secretions**
- **Elevated ESR or CRP**
- **Positive cervical GC or CT test**

Most females with PID have mucopurulent discharge OR evidence of WBCs on a vaginal fluid wet prep. Dx unlikely without discharge or WBCs on wet prep.

Fertility after salpingitis

Number of episodes	Occlusion of Tubes
– **One**	– **12.5%**
– **Two**	– **33.5%**
– **Three or more**	– **75%**

Westrom L: Am J Obstet Gynecol 121:707,1975

PID: Indications for Hospitalization

- Surgical emergencies/DX uncertain, ?appy or ectopic
- Pelvic abscess
- Patient is pregnant
- Severe illness or nausea and vomiting
- Unable to follow/tolerate outpatient RX
- Failure to respond or unable to return for FU
- Patient has HIV
- Patient is adolescent (not evidence based and should be based on clinical signs and symptoms)

PID: Inpatient Therapy
2010 Recommendations

- All regimens should cover both GC and CT
- Treat as early as possible when presumptive Dx made
- Complete 14 days of antibiotics
- For mild to moderate PID, outpatient Rx can equal inpt.
- Treat partners in past 60 days or last partner
- Use NSAIDs for pain
- Single dose azithromycin not effective for PID
- TOA: Clindamycin or metronidazole should be part of treatment

PID: Inpatient Therapy
2010 Recommendations

- **Regimen A**
  - **Cefotetan** 2 g IV q 12 h, OR
  - **Cefoxitin** 2 g IV q6h

  PLUS

  - **Doxycycline** 100 mg IV or PO q12h

- **Regimen B**

  - **Clindamycin** 900 mg IV q8h (IV covers CT)

  PLUS

  - **Gentamicin** 2 mg/kg IV/IM loading dose then 1.5 mg/kg q8h. Single daily dose of 3-5 mg/kg can be substituted

  On discharge: **doxycycline** 100 mg bid or **clindamycin** 450 mg qid

- Continue doxy 100mg PO b.i.d. or clindamycin 450 mg PO q.i.d. to complete 14 days of Rx

PID: Outpatient Therapy - 2010

1a) Ceftriaxone 250 mg IM once,

OR

1b) Cefoxitin 2 g IM plus probenecid 1 gm PO once,
or another IM 3rd generation **cephalosporin**
(e.g., ceftizoxime, cefotaxime)

PLUS

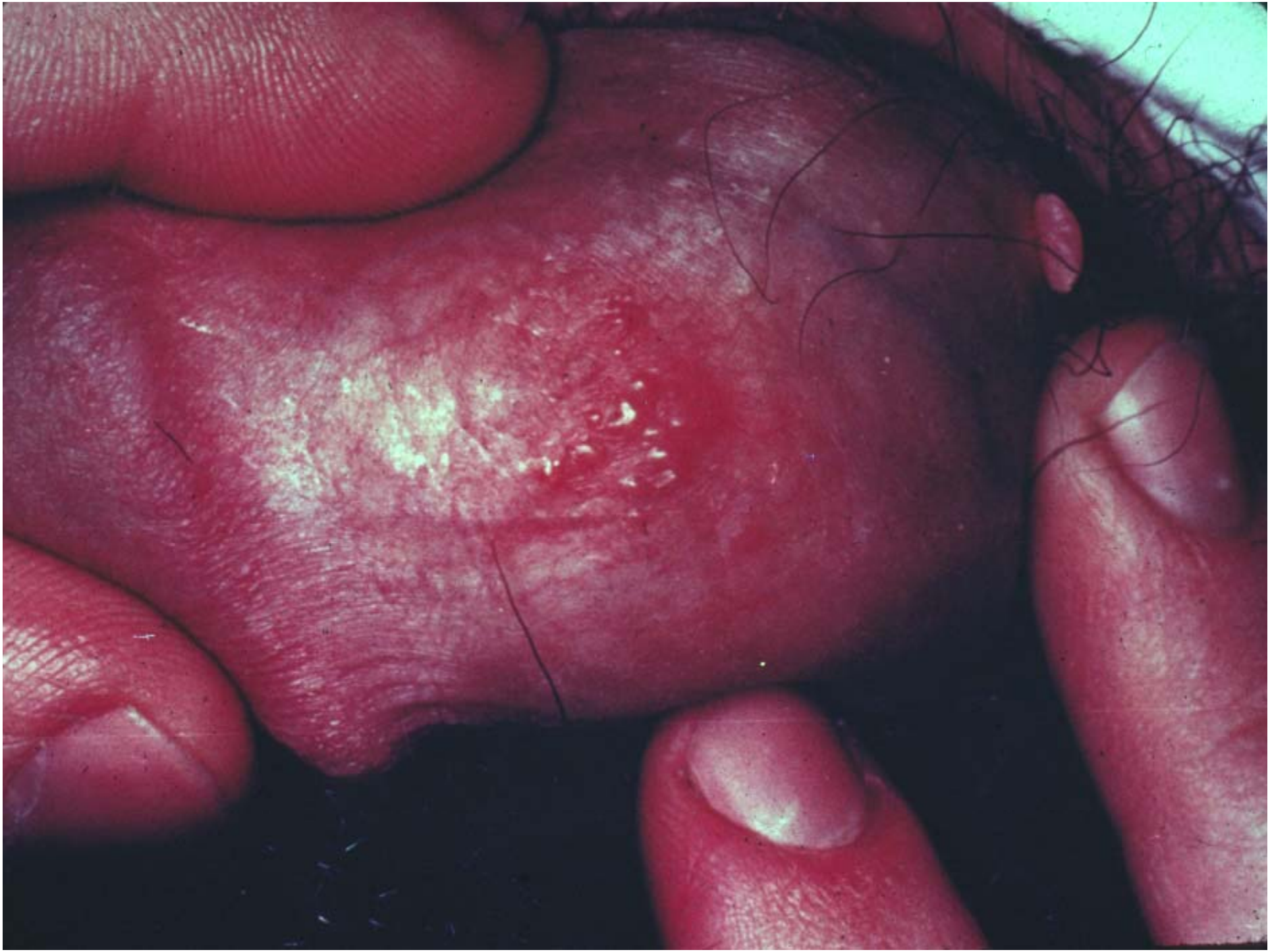
2) Doxycycline 100 mg PO b.i.d. X 14 days

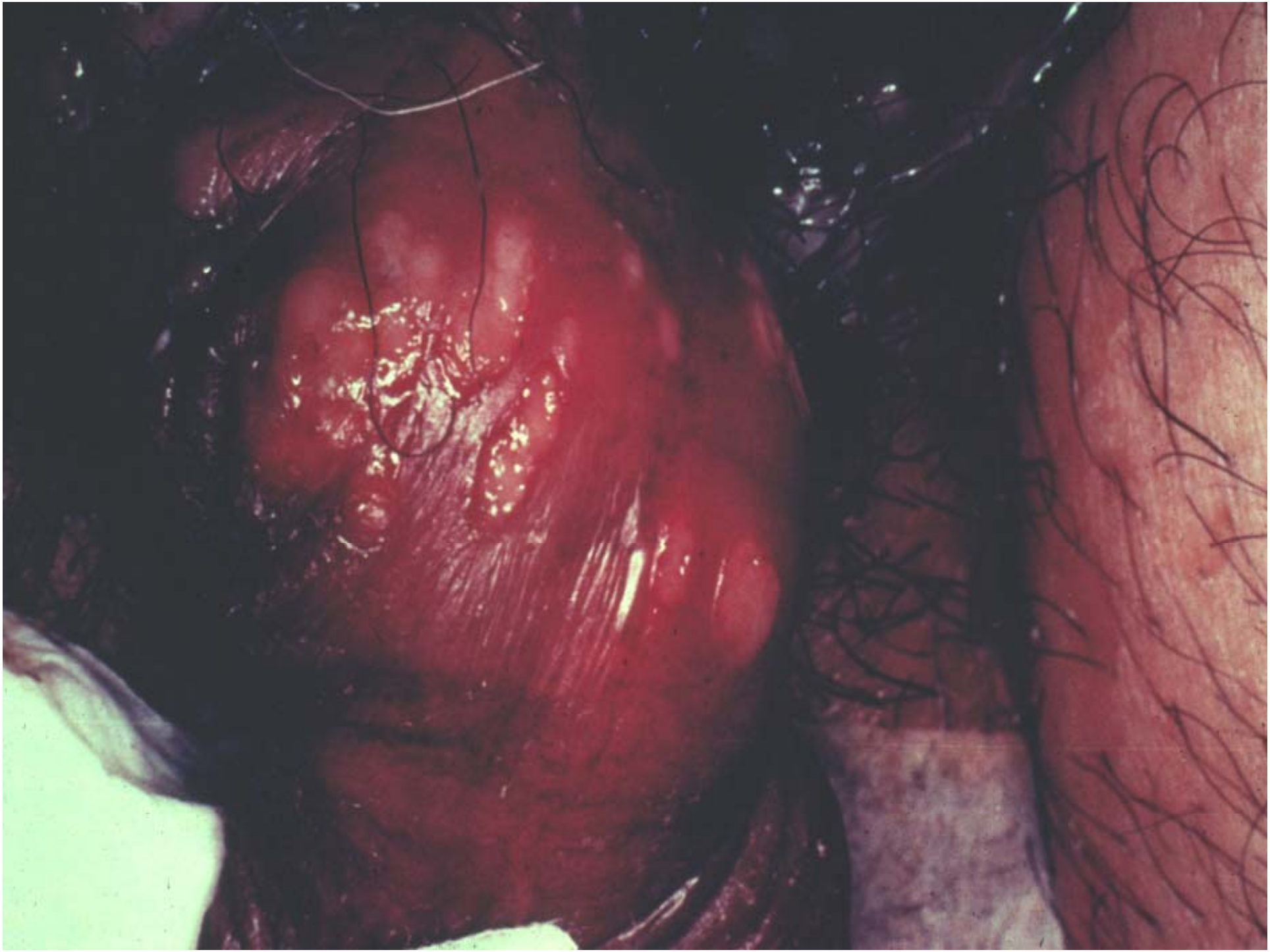
WITH OR WITHOUT

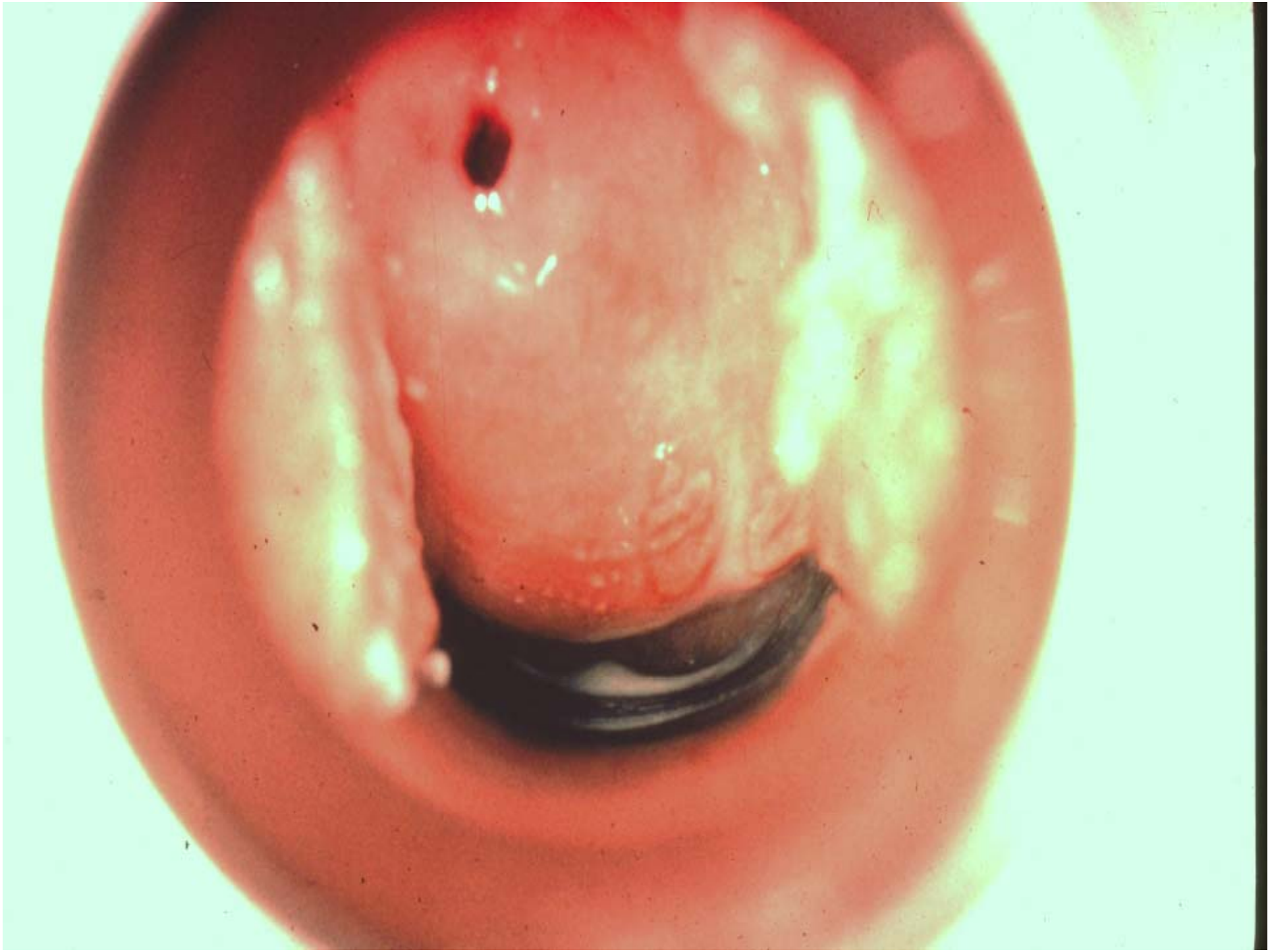
3) Metronidazole 500 mg PO b.i.d. X 14 days

GENITAL ULCERS

- HERPES SIMPLEX
- SYPHILIS
- CHANCROID
- LGV
- GRANULOMA INGUINALE
- TRAUMA







Epidemiology

- Genital herpes is a recurrent, lifelong infection.
- Two HSV serotypes – HSV-1 & HSV-2
- HSV-2 causes the majority of genital and perirectal herpetic outbreaks in the U.S. and > 50 million infected
- **50% to 90% of cases asymptomatic or unrecognized. Most people with HSV -2 have not been diagnosed.**
- The majority of infections transmitted by persons unaware that they have the infection or who are asymptomatic

Diagnosis

- Clinical diagnosis both insensitive and nonspecific
- Cell culture isolation of HSV is preferred virologic test for those seeking medical treatment of an ulcer but not sensitive.
- PCR more sensitive but not FDA cleared for genital lesions
- Type specific tests (glycoprotein G) should be used when doing serology. Sensitivities 80%-98% and spec. >96%.
- HSV-2 more helpful than HSV-1 in general population for genital infections.

Uses of Type-specific Serologic Tests

- NOT indicated in general population
- Recurrent genital symptoms or atypical symptoms with negative HSV cultures
- A clinical diagnosis of genital herpes without laboratory confirmation
- A partner with genital herpes
- ?evaluation for STDs among those with multiple partners, HIV infection and MSM.
- ?patient request

Genital Herpes Simplex

Treatment: 2010

First Episode:

- Acyclovir 400 mg PO tid X 7-10 d OR
- Acyclovir 200 mg PO 5x/day for 7-10 d OR
- Famciclovir 250 mg PO tid for 7-10 d OR
- Valacyclovir 1 g PO bid for 7-10 d

Recurrent Episodes:

- Acyclovir 400 mg PO tid X 5 d OR
- Acyclovir 800 mg PO tid for 2 d OR
- Acyclovir 800 mg PO bid X 5 d OR
- Famciclovir 125 mg PO bid X 5 d OR
- Famciclovir 1000 mg bid for one day
- Famciclovir 500 mg once, then 250 bid X 2d
- Valacyclovir 500 mg PO bid X 3-5 d OR
- Valacyclovir 1 gm PO qd X 5 d

Genital Herpes Simplex
Suppressive Therapy: 2010

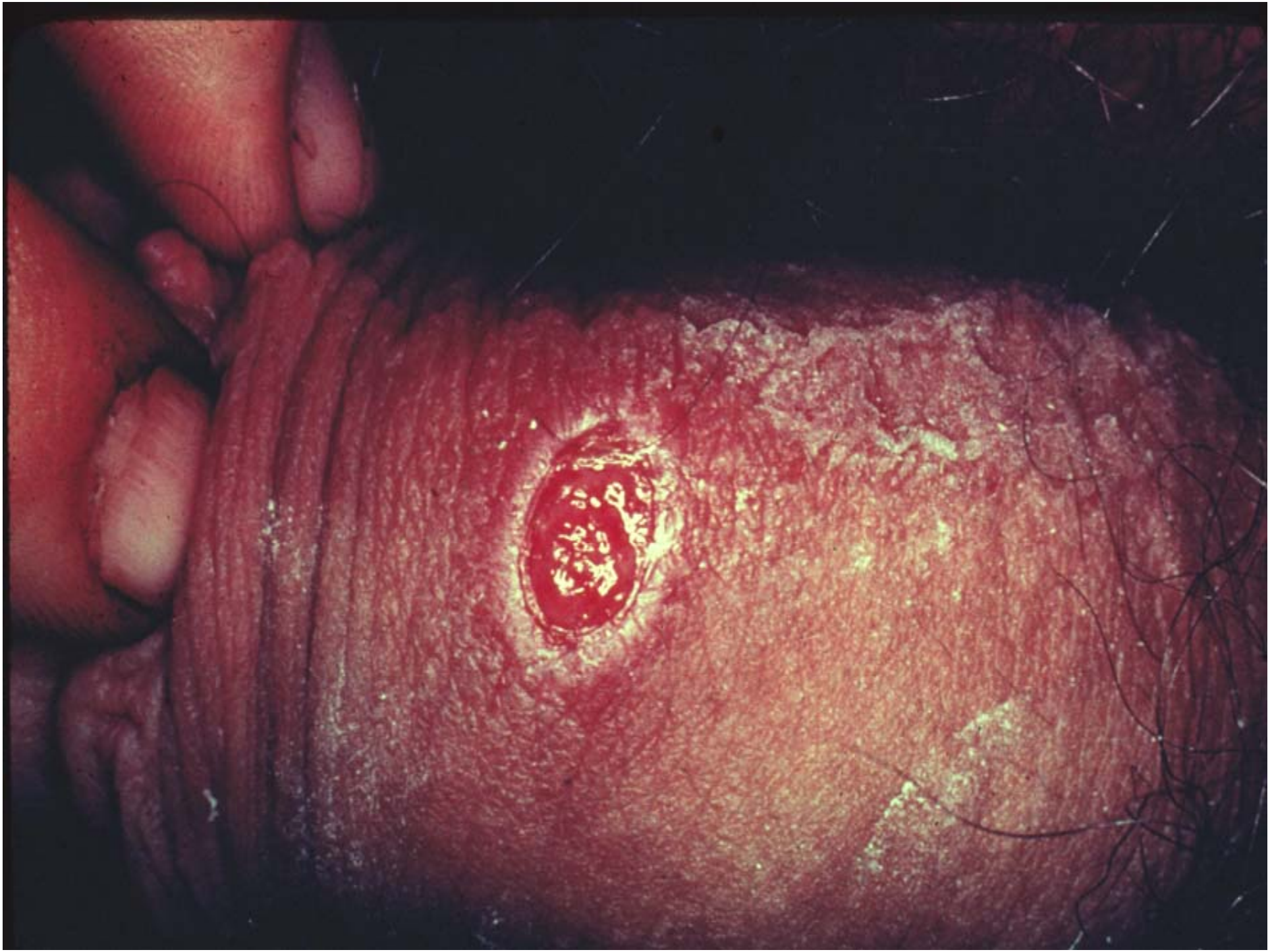
Suppressive Therapy:

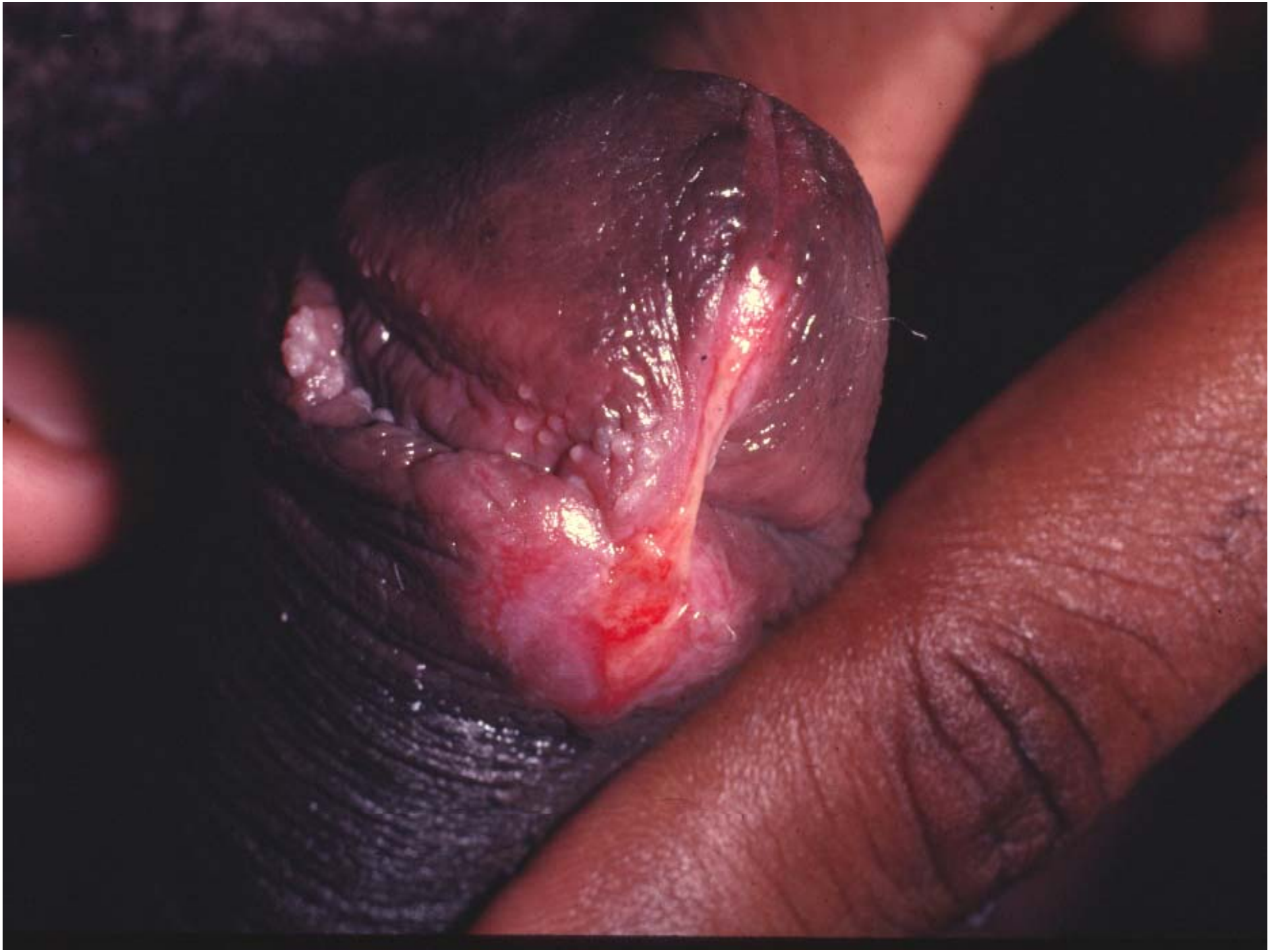
- Acyclovir 400 mg PO bid OR
- Famciclovir 250 mg PO bid OR
- Valacyclovir 500 mg PO qd OR
- Valacyclovir 1 g PO qd

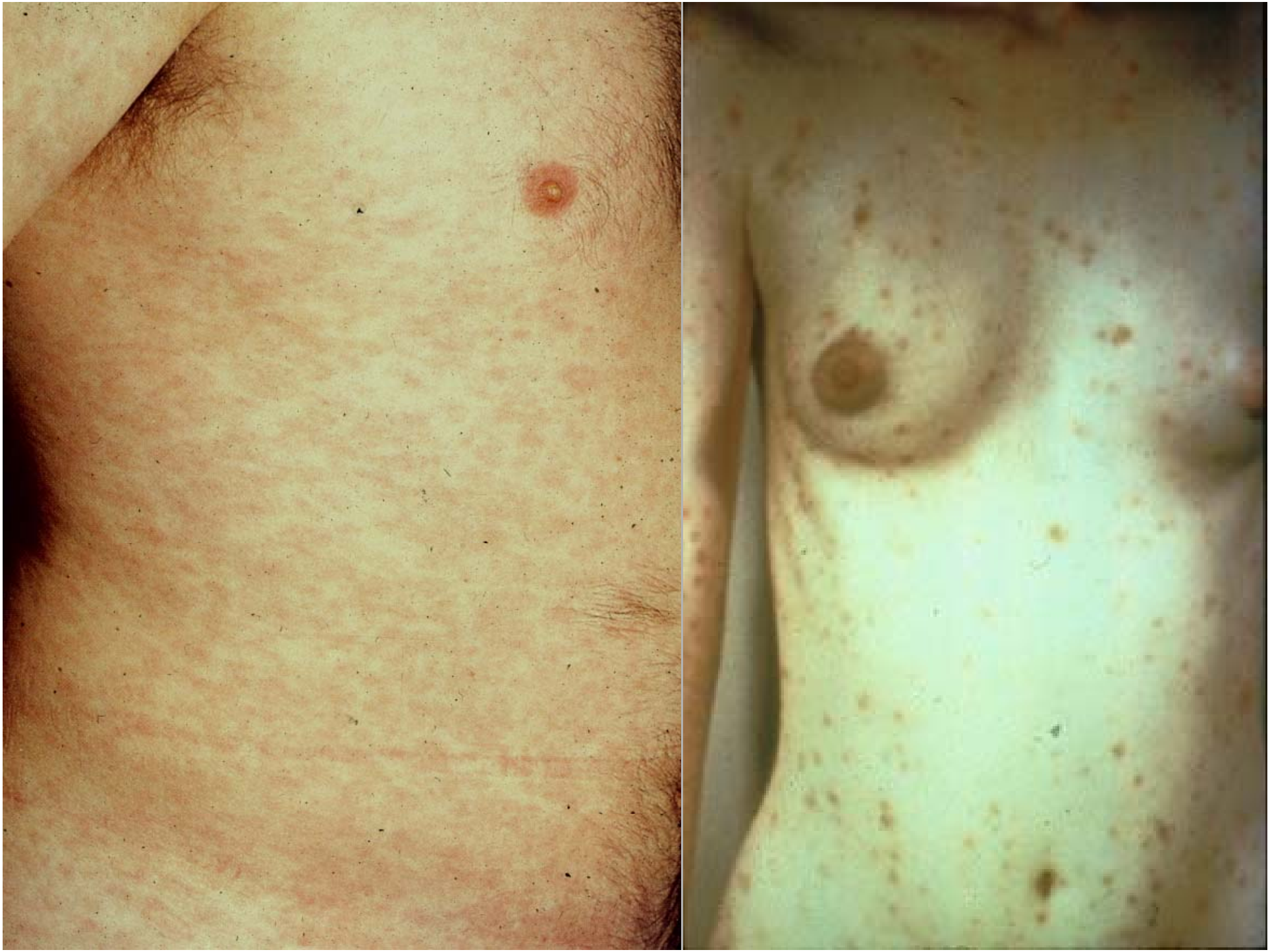
- Acyclovir and valacyclovir equal for suppressive therapy but famciclovir may have slightly less effectiveness for suppression

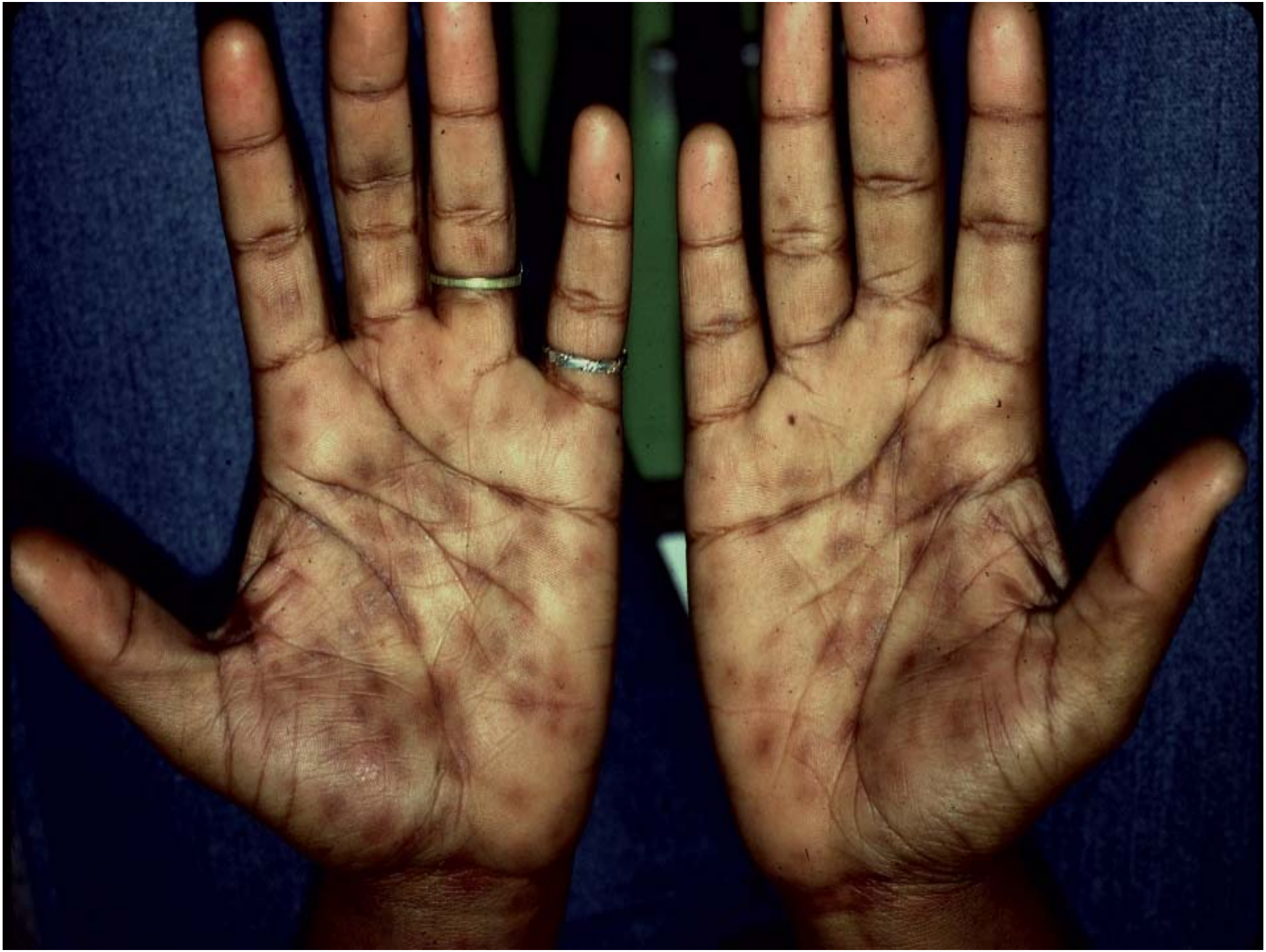
- Can significantly reduce symptomatic/asymptomatic shedding

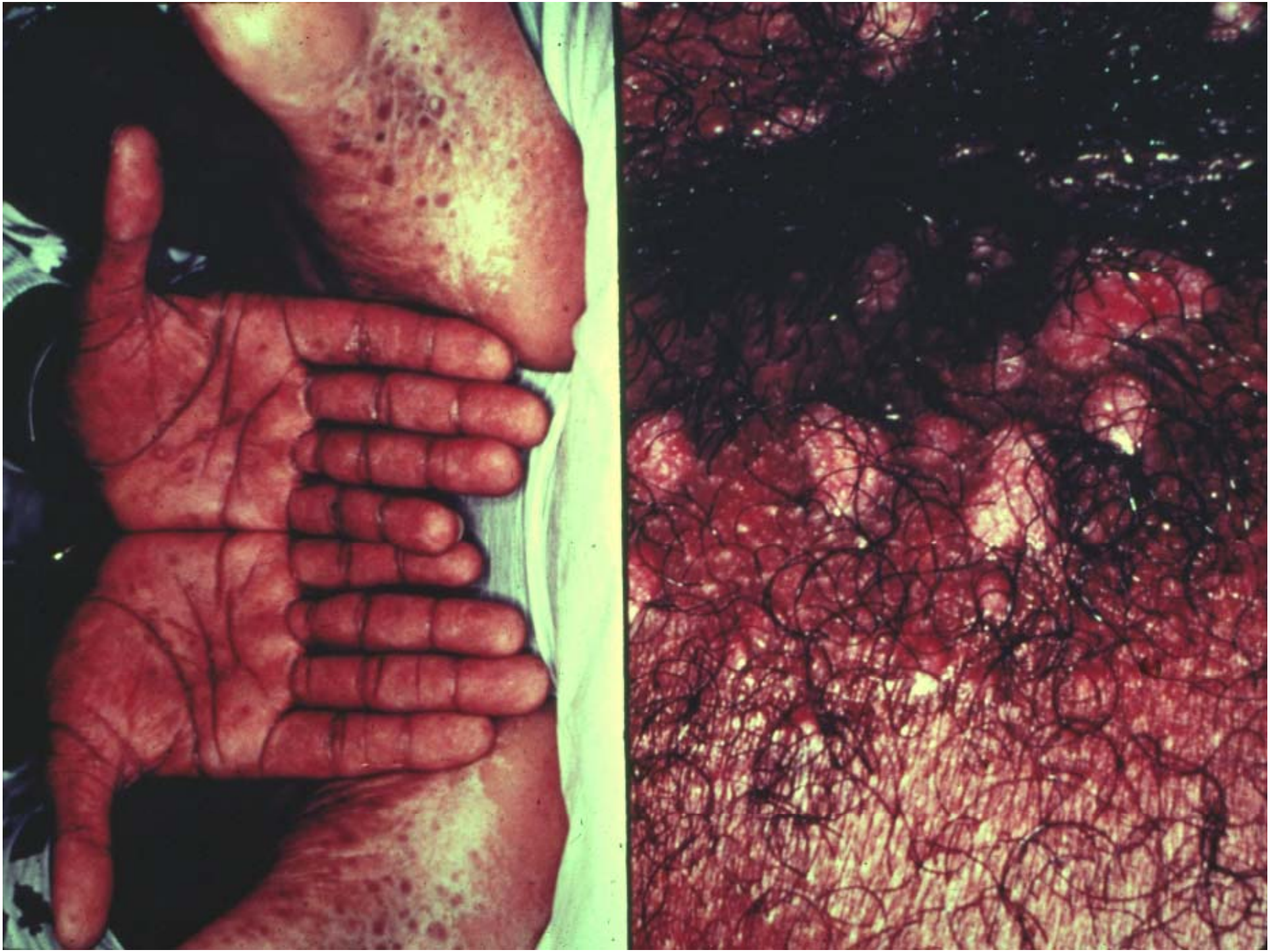
- Can reduce frequency of genital HSV by 70%-80% and many with no outbreaks. Safety and efficacy documented up to six years for acyclovir.



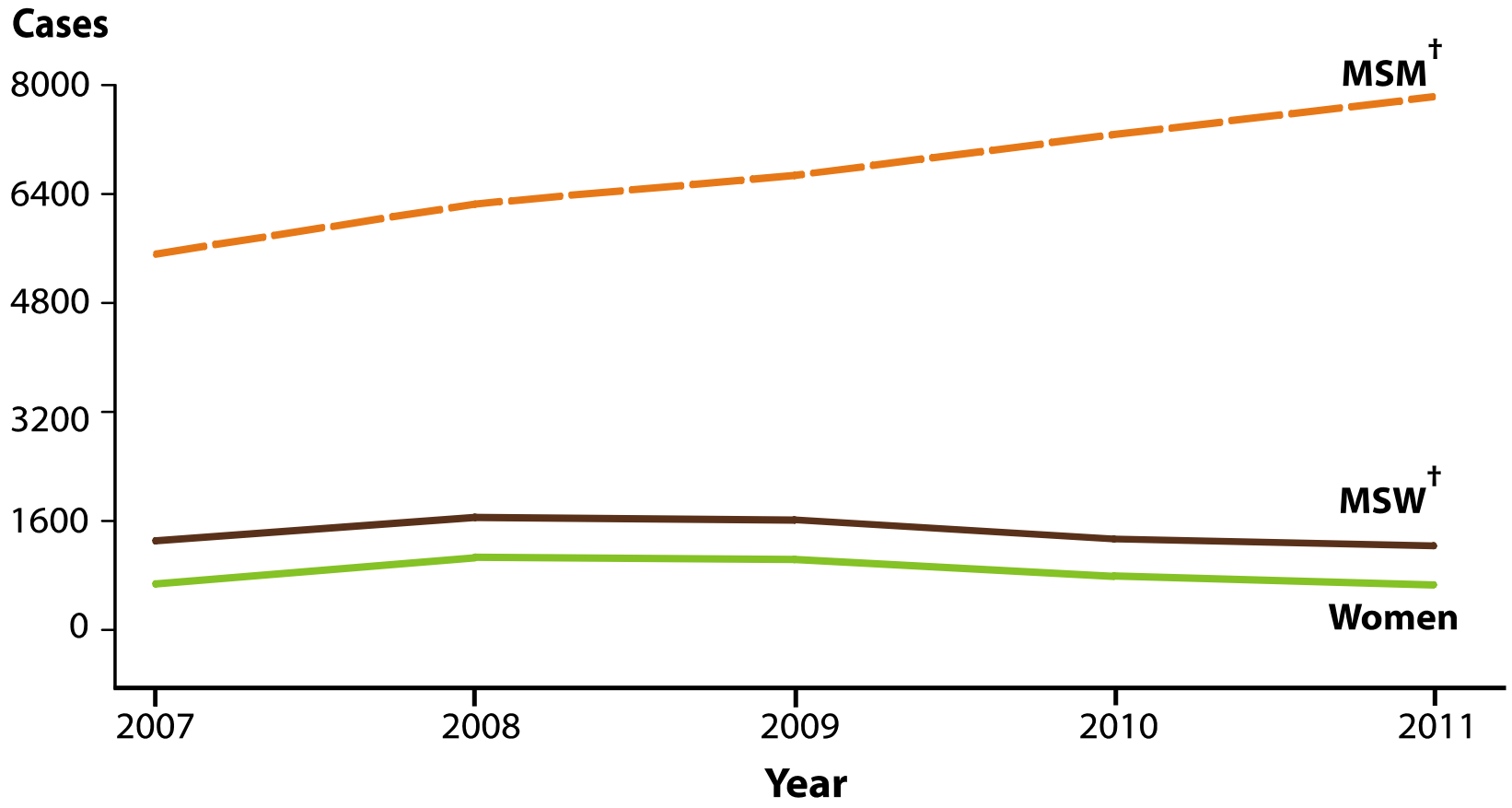








Primary and Secondary Syphilis—by Sex and Sexual Behavior, 33 Areas*, 2007–2011



*32 states and Washington, DC reported sex of partner data for ≥70% of cases of P&S syphilis for each year during 2007-2011.

†**MSM**=men who have sex with men; **MSW**=men who have sex with women only.

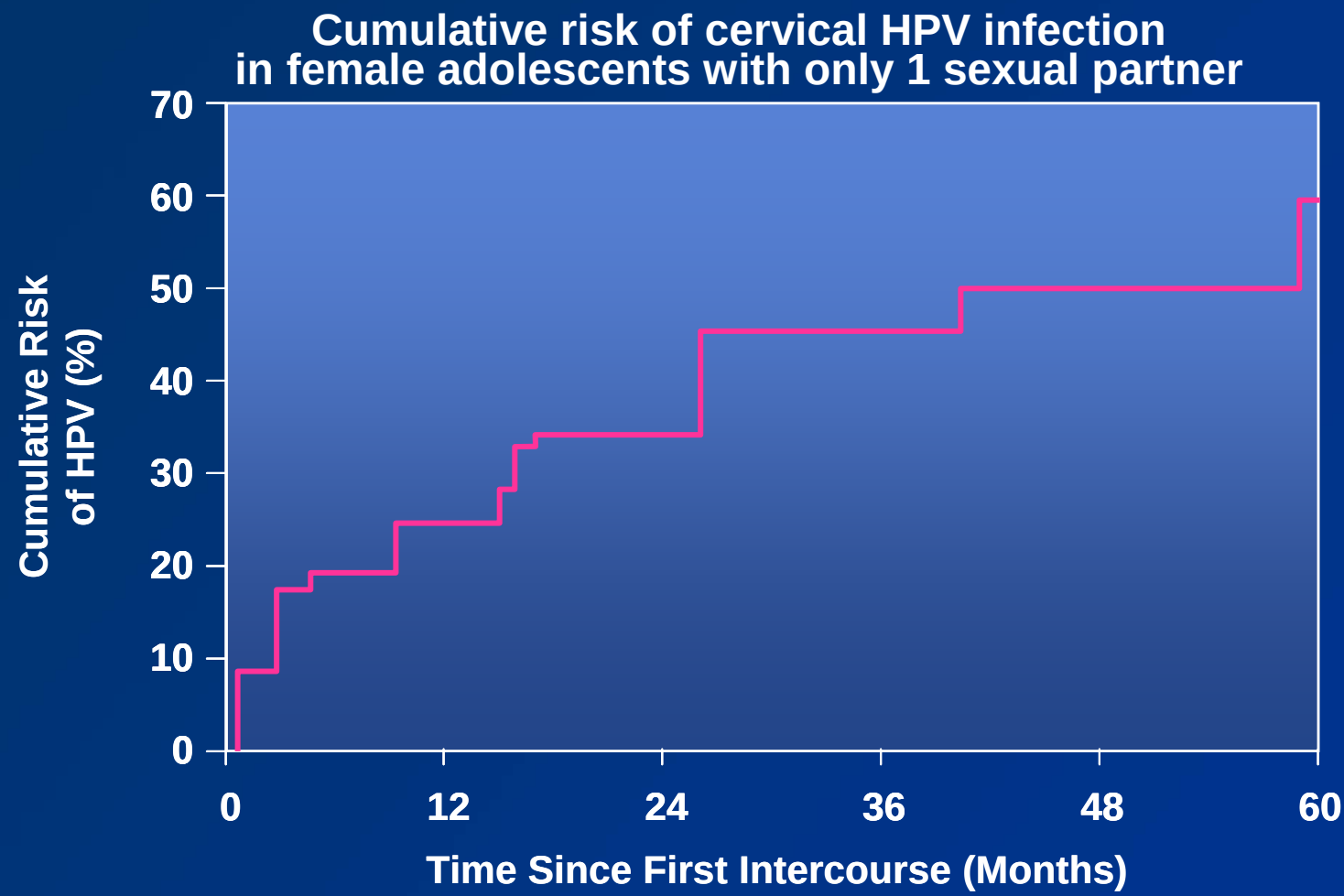
Genital Growths

- Condylomata Accuminata
- Condyloma Lata
- Molluscum Contagiosum

Human Papillomavirus (HPV)

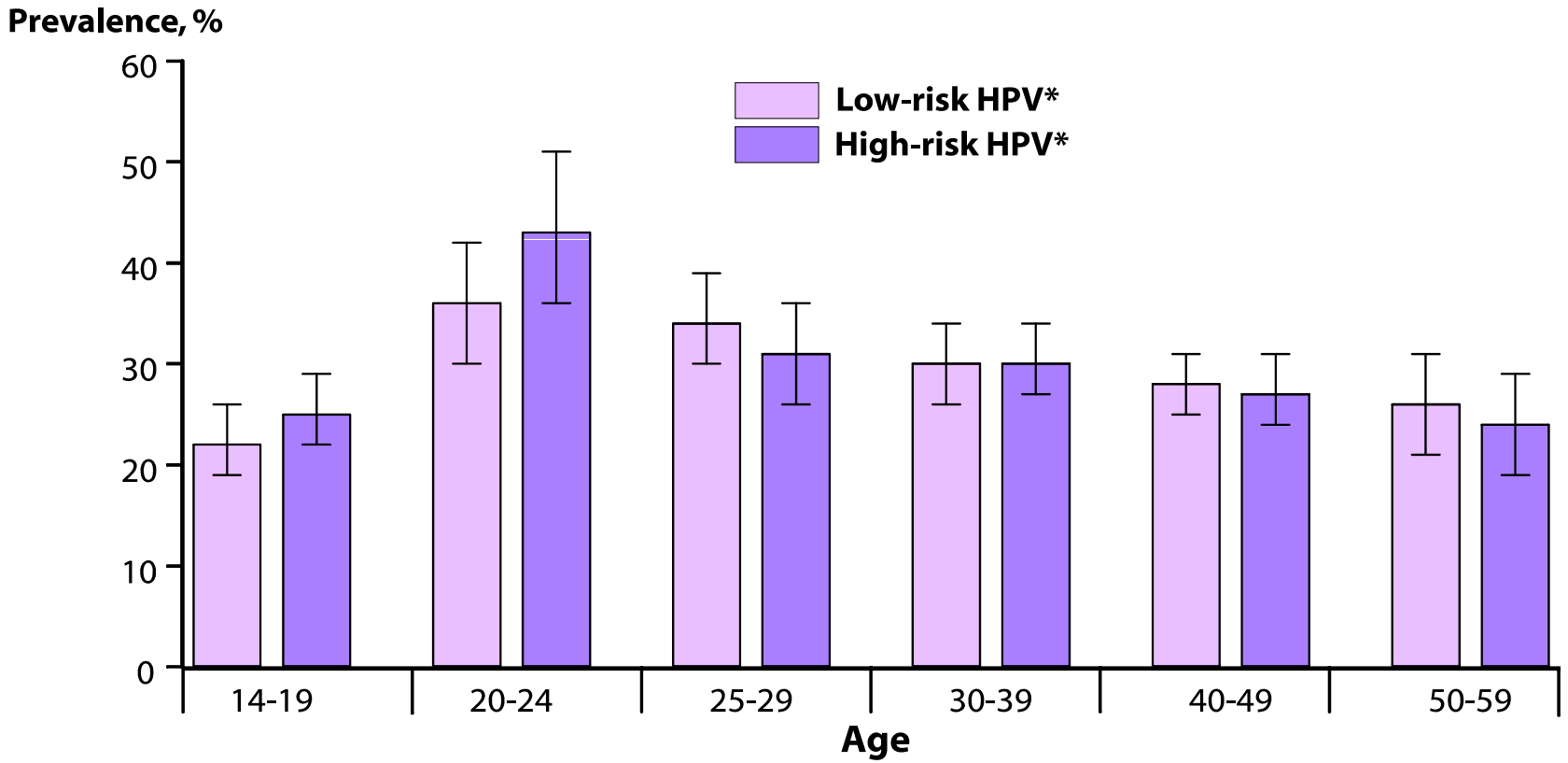
- Over 100 types identified
- 6,11 groups: **benign -** papillary, acuminate and flat condylomas **– 90% of genital warts**
- 31,33,35 group: **15% of cervical cancers -** condylomas and intraepithelial neoplasia
- 16,18 group: **70% of cervical cancers -** condylomas and intraepithelial neoplasia

Risk of Acquiring HPV After First Intercourse in Female Adolescents



From Collins S, Mazloomzadeh S, Winter H, et al. High incidence of cervical human papillomavirus infection in women during their first sexual relationship. *Br J Obstet Gynaecol*. 2002;109:96–98. Reprinted with the permission of the Royal College of Obstetricians and Gynaecologists.

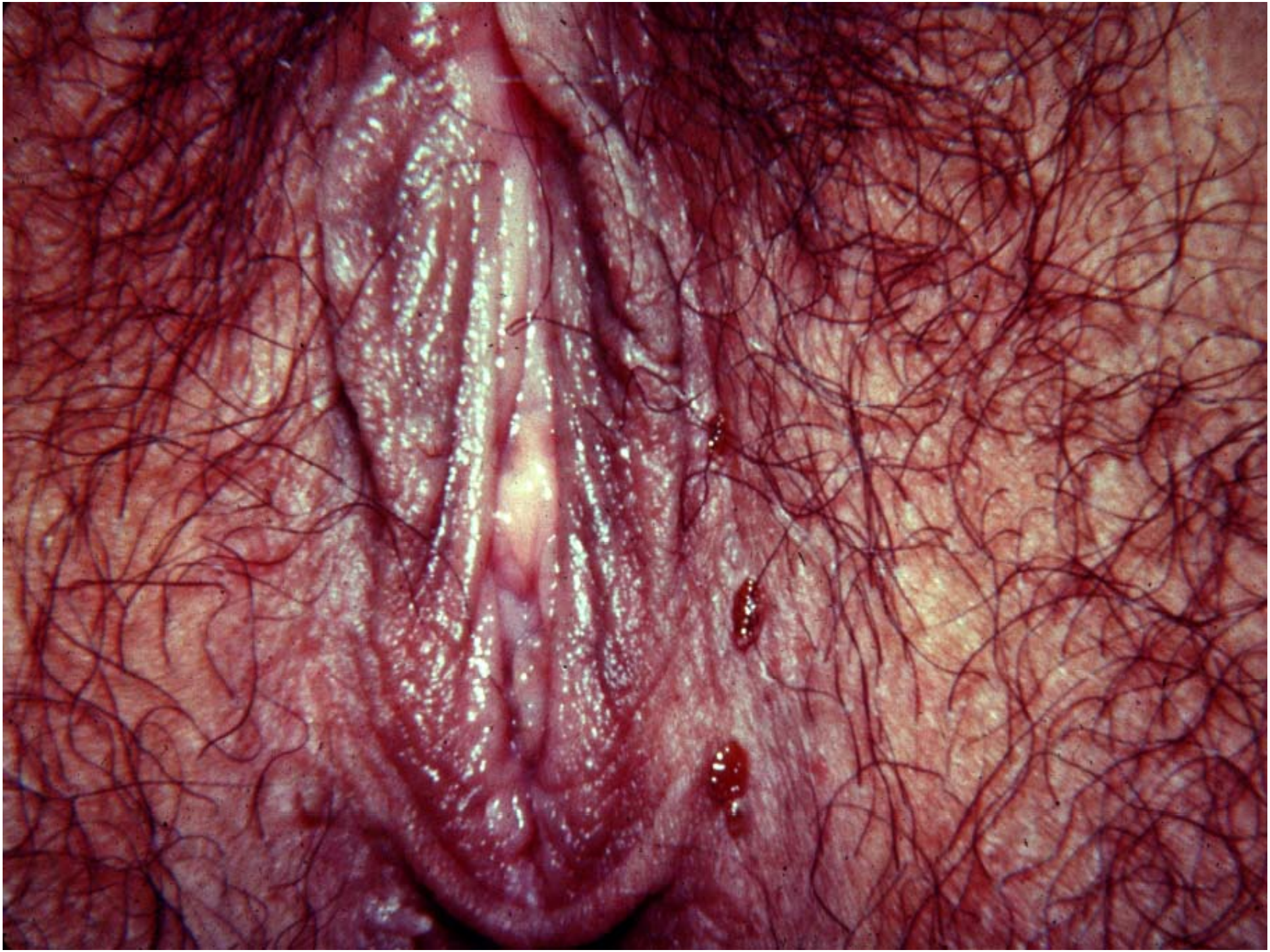
Human Papillomavirus—Prevalence of High-risk and Low-risk Types Among Females Aged 14–59 Years, National Health and Nutrition Examination Survey, 2003–2006

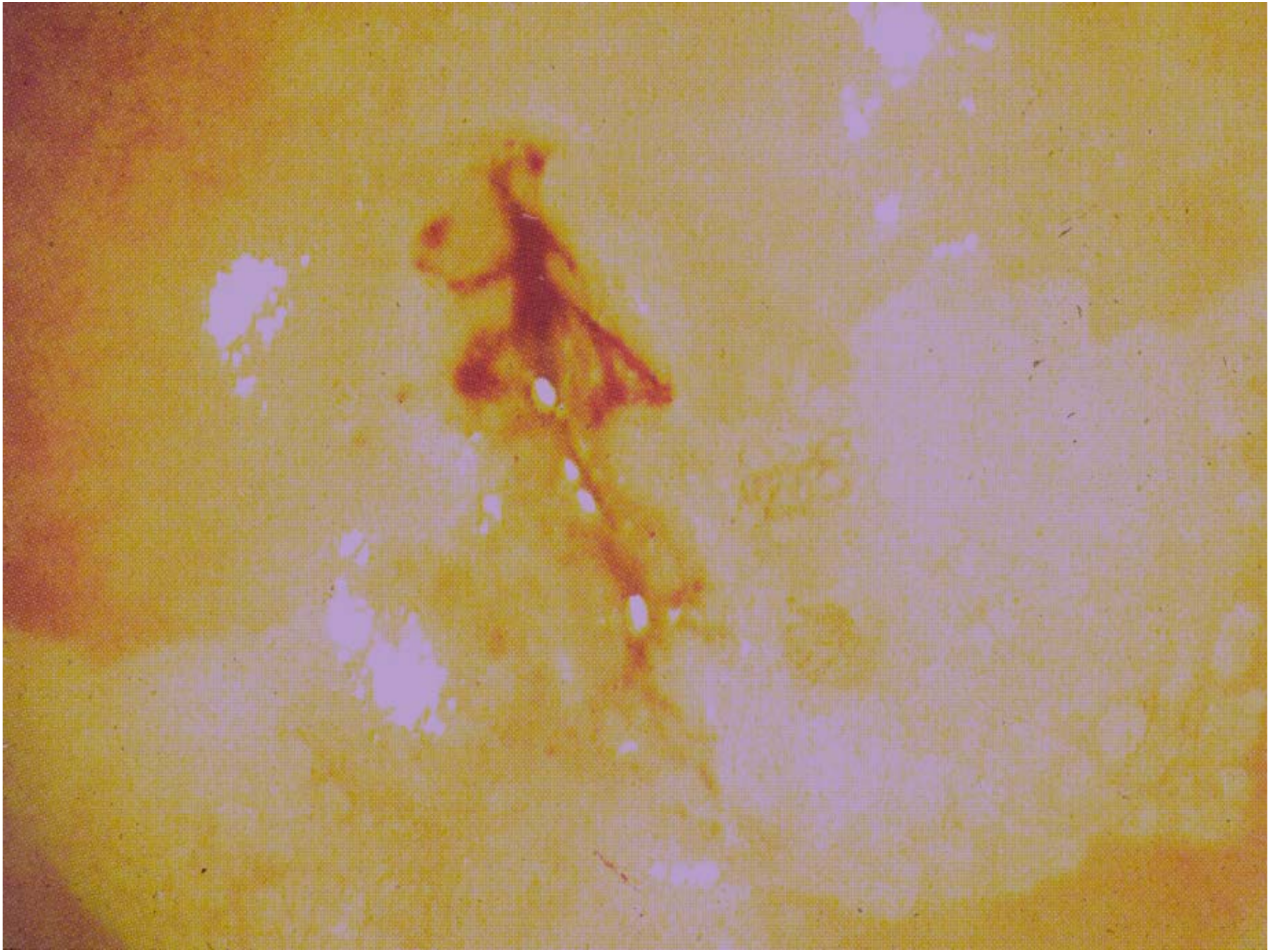


*__HPV__=human papillomavirus.

NOTE: Error bars indicate 95% confidence intervals. Both high-risk and low-risk HPV types were detected in some females.

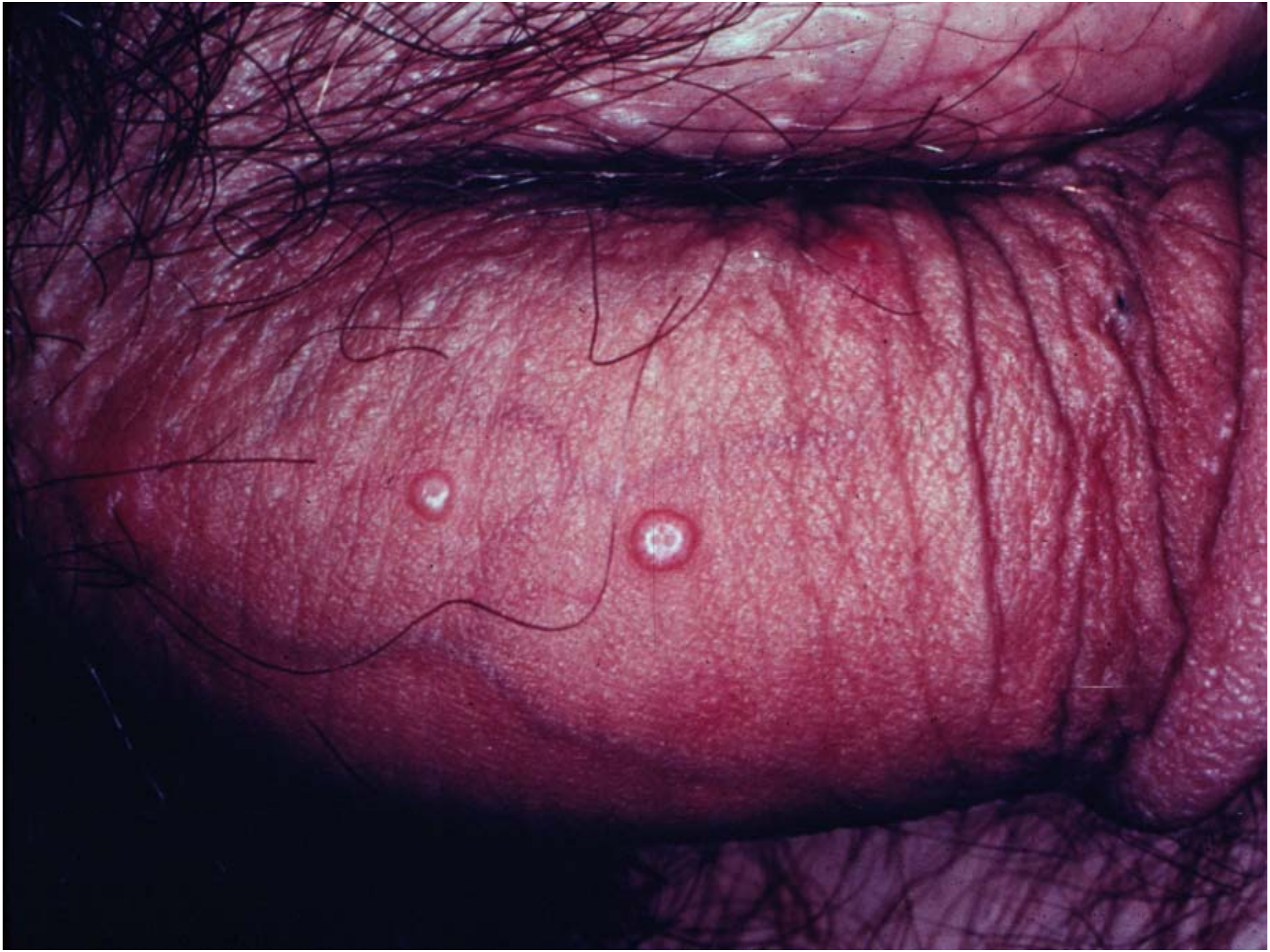
SOURCE: Hariri S, Unger ER, Sternberg M, Dunne EF, Swan D, Patel S, et al. Prevalence of genital HPV among females in the United States, the National Health and Nutrition Examination Survey, 2003-2006. J Infect Dis. 2011;204(4):566-73

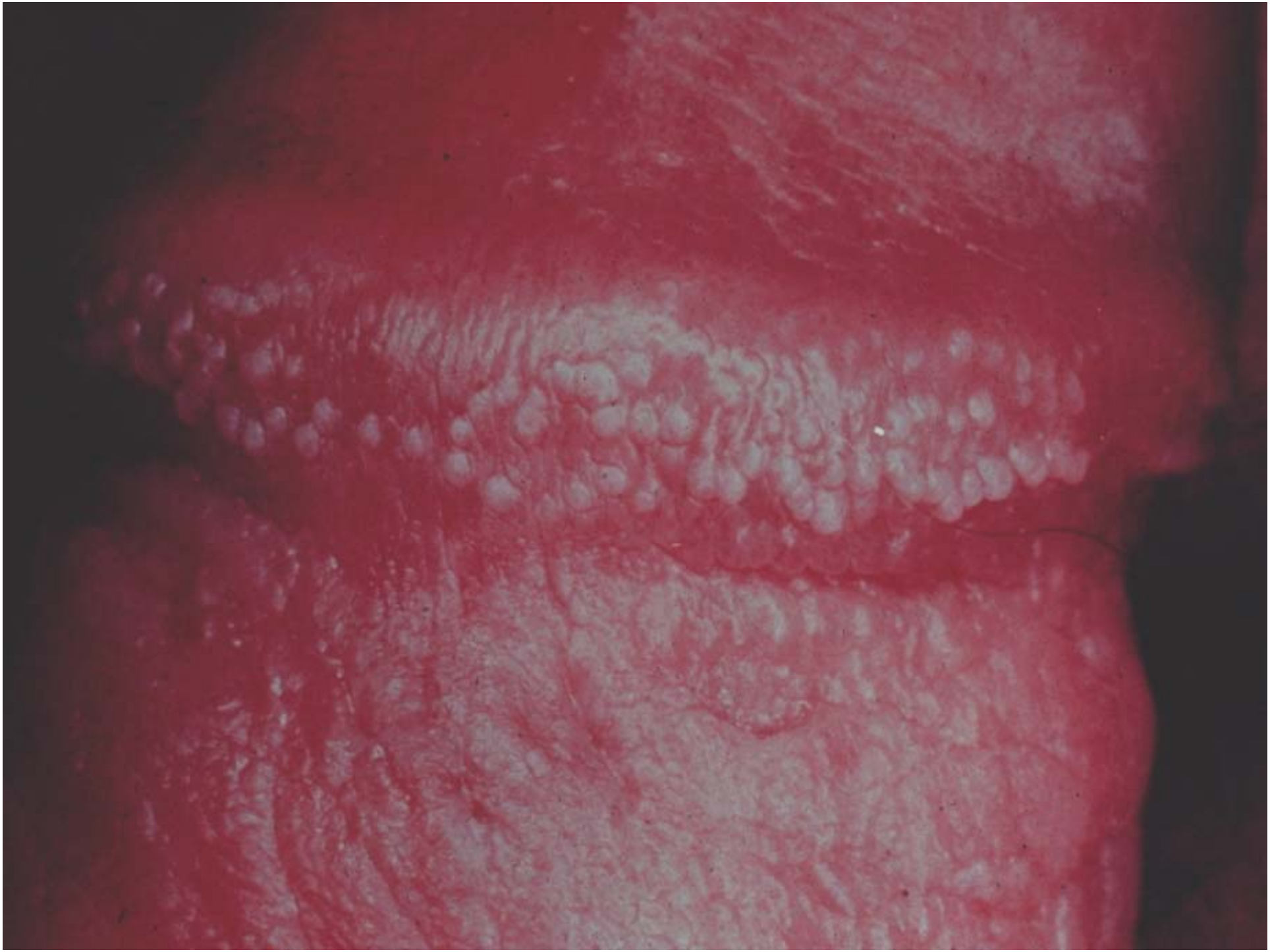


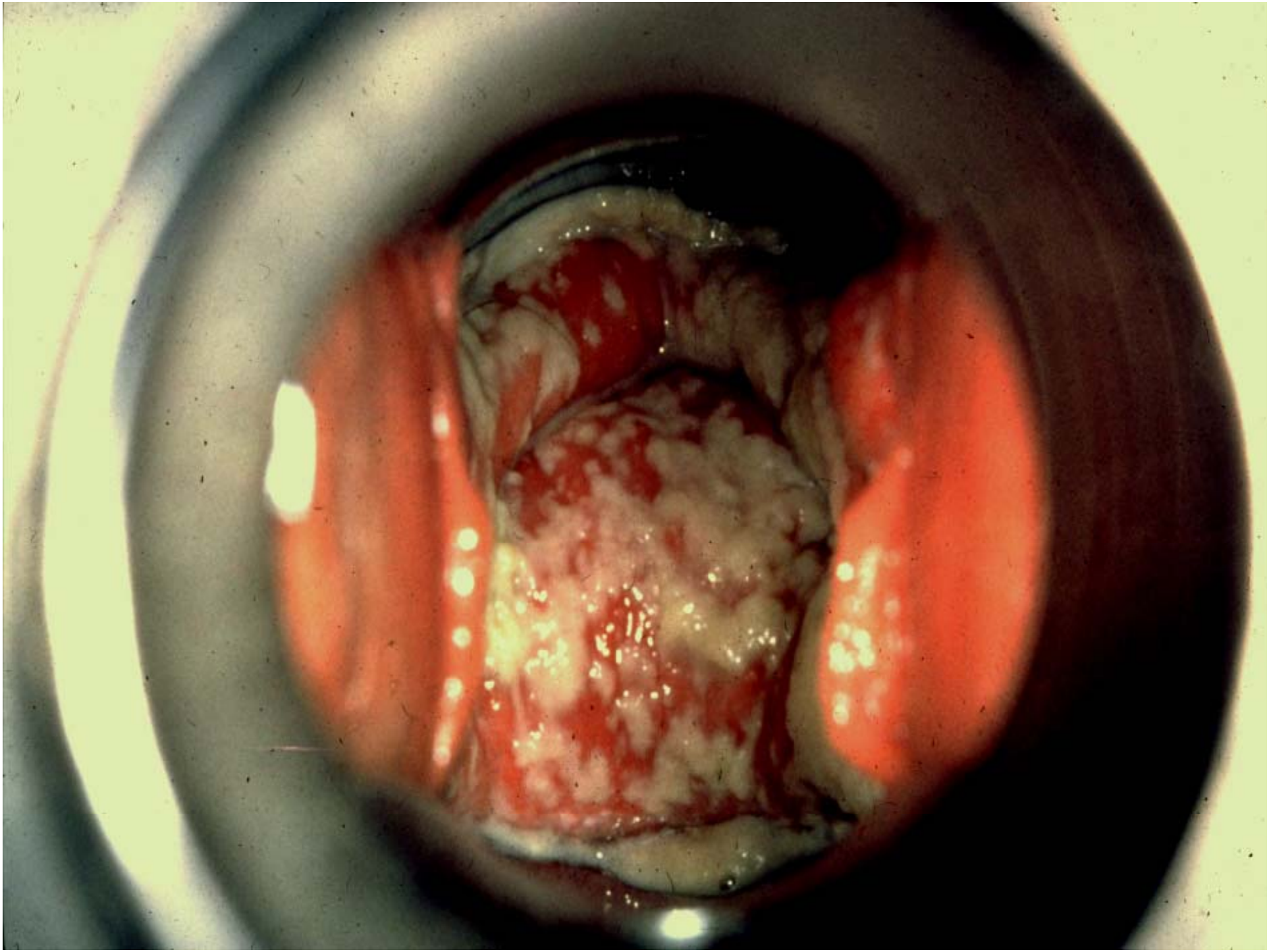


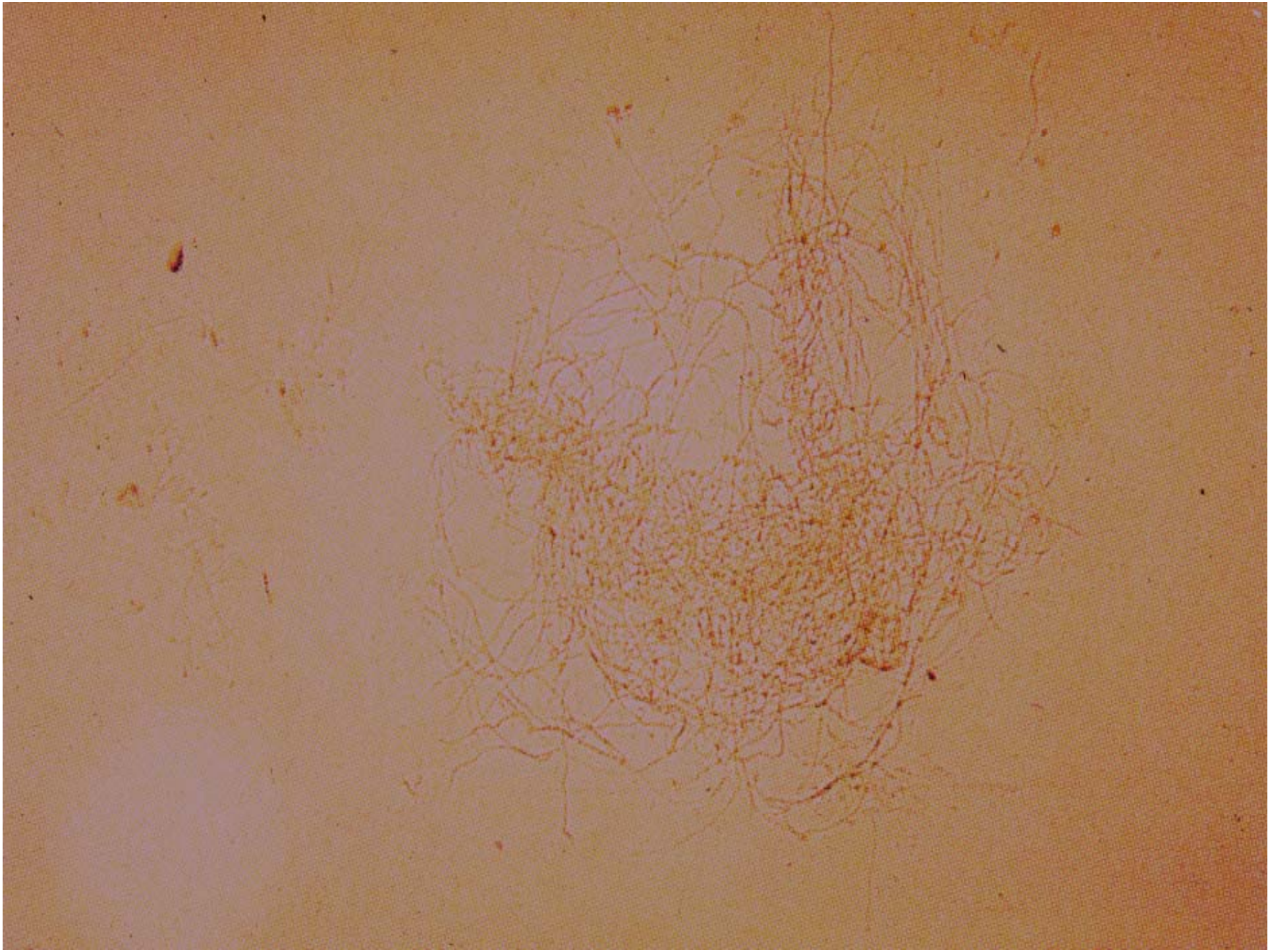
Cervical Cancer Screening (HPV)
Level A recommendation

- Cervical cancer screening should begin at age 21 years.
- Avoid <21 as may lead to unnecessary and harmful evaluation and treatment.
- Screening q2 years between 21-29.
- Liquid-based and conventional methods are acceptable.
- Cytology plus HPV – DNA testing is appropriate only for women >30.









Vulvovaginal candidiasis Treatment (OTC) - 2010

- Butoconazole 2% cream (Femstat)
  5 g intravaginally for 3 days

- Clotrimazole (Gyne-Lotrimin)
  1% cream 5 g intravaginally for 7-14 days
  2% cream 5 g intravaginally for 3 days

- Miconazole (Monistat)
  2% cream 5 g intravaginally for 7 days
  4% cream 5 g intravaginally for 3 days
  100 mg vaginal suppository, one for 7 days
  200 mg vaginal suppository, one for 3 days
  1,200 mg vaginal suppository, one for 1 day

- Tioconazole (vagistat)
  6.5% ointment 5 g intravaginally in a single application

Vulvovaginal candidiasis
Treatment (prescription) - 2010

- Butoconazole 2% cream (Femstat)
  5 g, single intravaginal application for 1 day

- Nystatin 100,000-unit vaginal tablet, one tablet for 14 days

- Terconazole
  0.4% cream 5 g intravaginally for 7 days
  0.8% cream 5 g intravaginally for 3 days
  80 mg vaginal suppository, one suppository for 3 days

- Oral Agent: Fluconazole 150 mg PO tablet, one in single dose

Vulvovaginal candidiasis – Rx

- Single dose only for mild/moderate cases
- Follow-up: Only if symptoms persist
- Partners: Not demonstrated to effect course
- Pregnancy: Topical azoles OK
- Complicated cases may need longer up front RX and maintenance with weekly fluconazole