Pelvic Inflammatory Disease (PID)

Learning Objectives

Upon completion of this content, the learner will be able to

Describe the epidemiology of PID in the U.S.;

Describe the pathogenesis of PID;

Discuss the clinical manifestations of PID;

Identify the clinical criteria used in the diagnosis of PID;

List CDC-recommended treatment regimens for PID;

Summarize appropriate prevention counseling messages for a patient with PID; and

Describe public health measures to prevent PID.

Lessons

I. Epidemiology: Disease in the U.S.
II. Pathogenesis
III. Clinical manifestations
IV. PID diagnosis
V. Patient management
VI. Prevention

Lesson I: Epidemiology: Disease in the U.S.

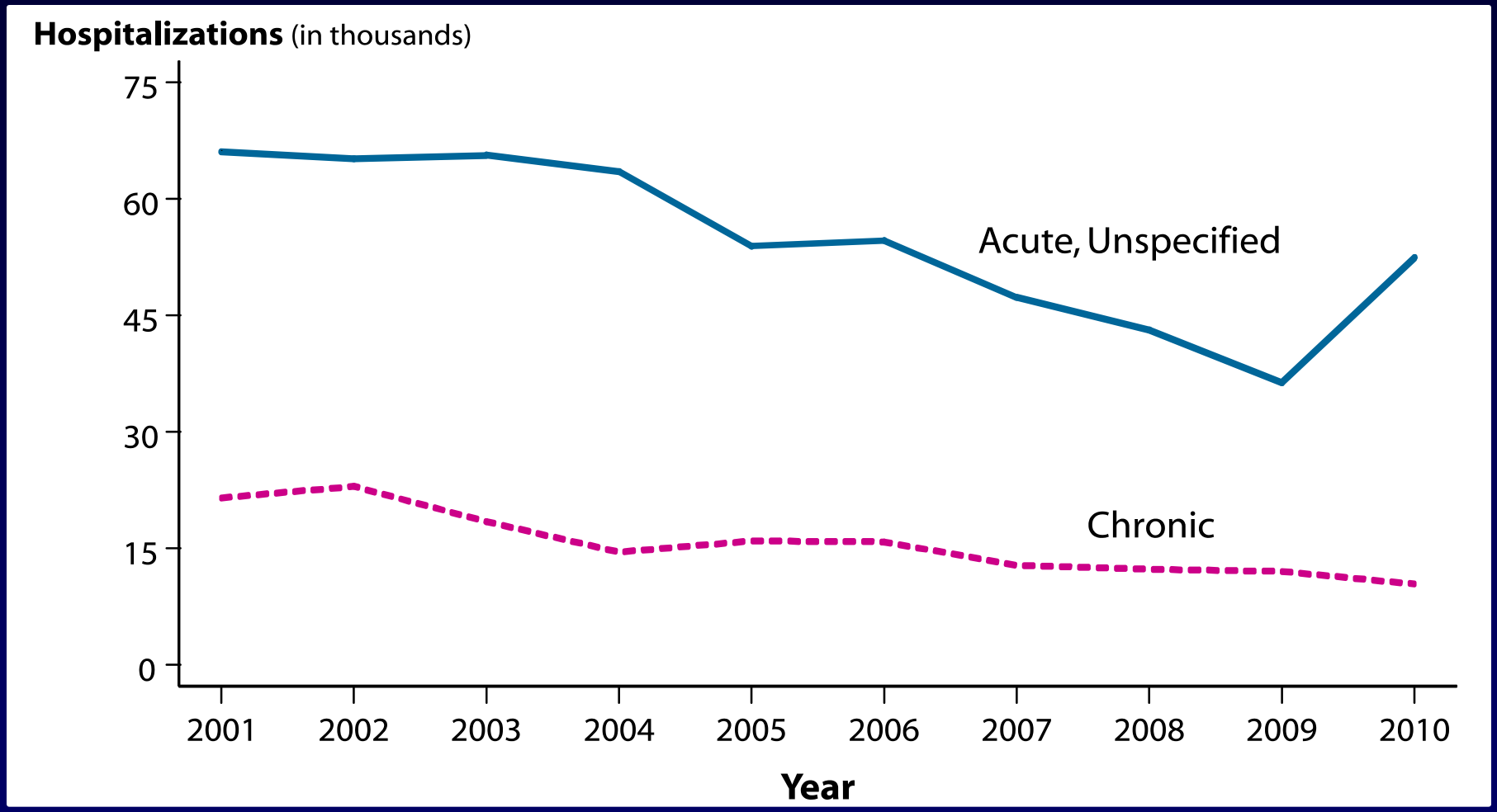
Pelvic Inflammatory Disease

- Clinical syndrome associated with ascending spread of microorganisms from the vagina or cervix to the endometrium, fallopian tubes, ovaries, and contiguous structures.
- Comprises a spectrum of inflammatory disorders, including any combination of endometritis, salpingitis, tubo-ovarian abscess, and pelvic peritonitis.

Incidence and Prevalence

- Estimated to occur in 750,000 U.S. women annually.
- Annual cost exceeds $4.2 billion.
- No national surveillance or reporting requirements exist, and national estimates are limited by insensitive clinical diagnosis criteria.
- During 2001-2010, hospitalizations for acute PID overall have shown modest declines, although hospitalizations for acute PID increased by 44.3% (from 36.3 to 52.4 per 100,000) between 2009 and 2010. Hospitalizations for chronic PID have also shown modest declines, remaining relatively stable between 2007 and 2010.
- The estimated number of initial visits to physicians' offices for PID from NDTI declined during 2003– 2012.

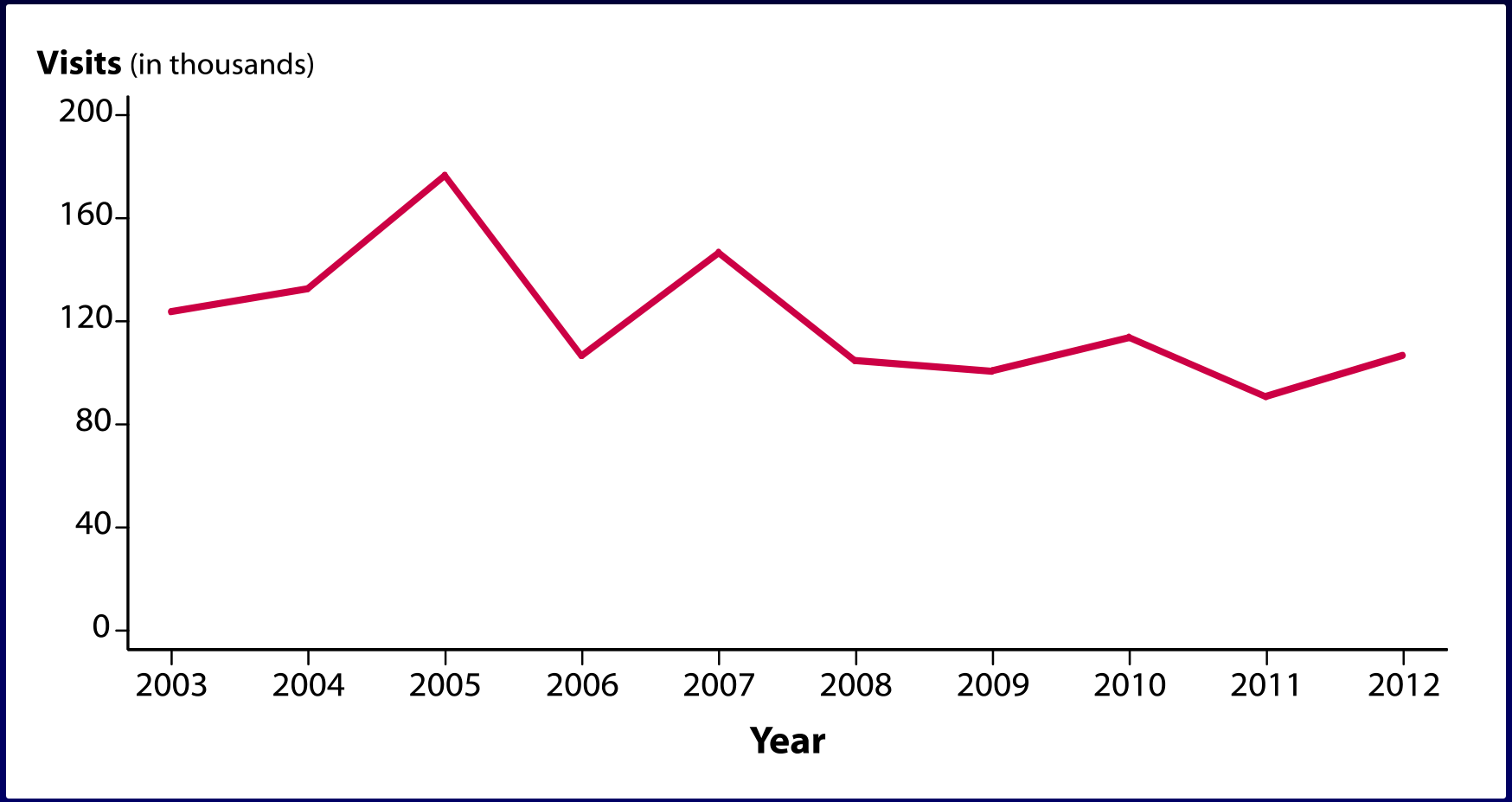
Pelvic Inflammatory Disease—Hospitalizations of Women Aged 15–44 Years, United States, 2001–2010



NOTE: The relative standard errors for acute and unspecified pelvic inflammatory disease (PID) cases ranges from 8%-18%. The relative standard error for chronic PID cases ranges from 12%–28%. Data only available through 2010.

SOURCE: 2010 National Hospital Discharge Survey [Internet]. Atlanta: Centers for Disease Control and Prevention. Available from: http://www.cdc.gov/nchs/nhds.htm.

Pelvic Inflammatory Disease—Initial Visits to Physicians' Offices by Women Aged 15–44 Years, United States, 2002–2012



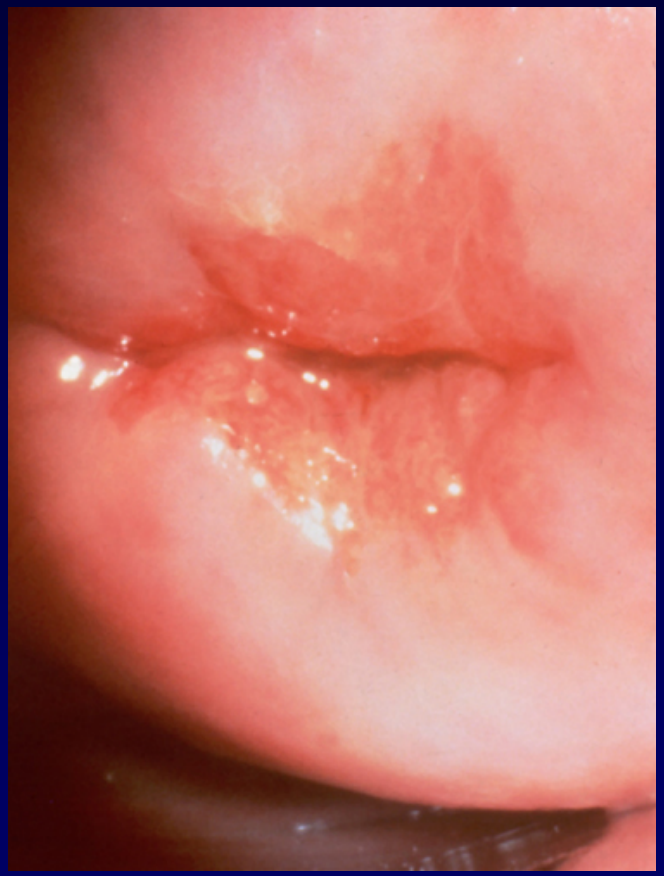
NOTE: The relative standard errors for these estimates are 21.6–30% .

SOURCE: IMS Health, Integrated Promotional Services ™. IMS Health Report, 1966–2012.

Risk Factors

- Adolescence
- History of PID
- Infected with or a history of gonorrhea or chlamydia
- Male partners with gonorrhea or chlamydia
- Multiple sex partners
- Current douching
- Insertion of IUD
- Bacterial vaginosis
- Oral contraceptive use (in some cases)
- Demographics (socioeconomic status)

Normal Cervix with Ectopy



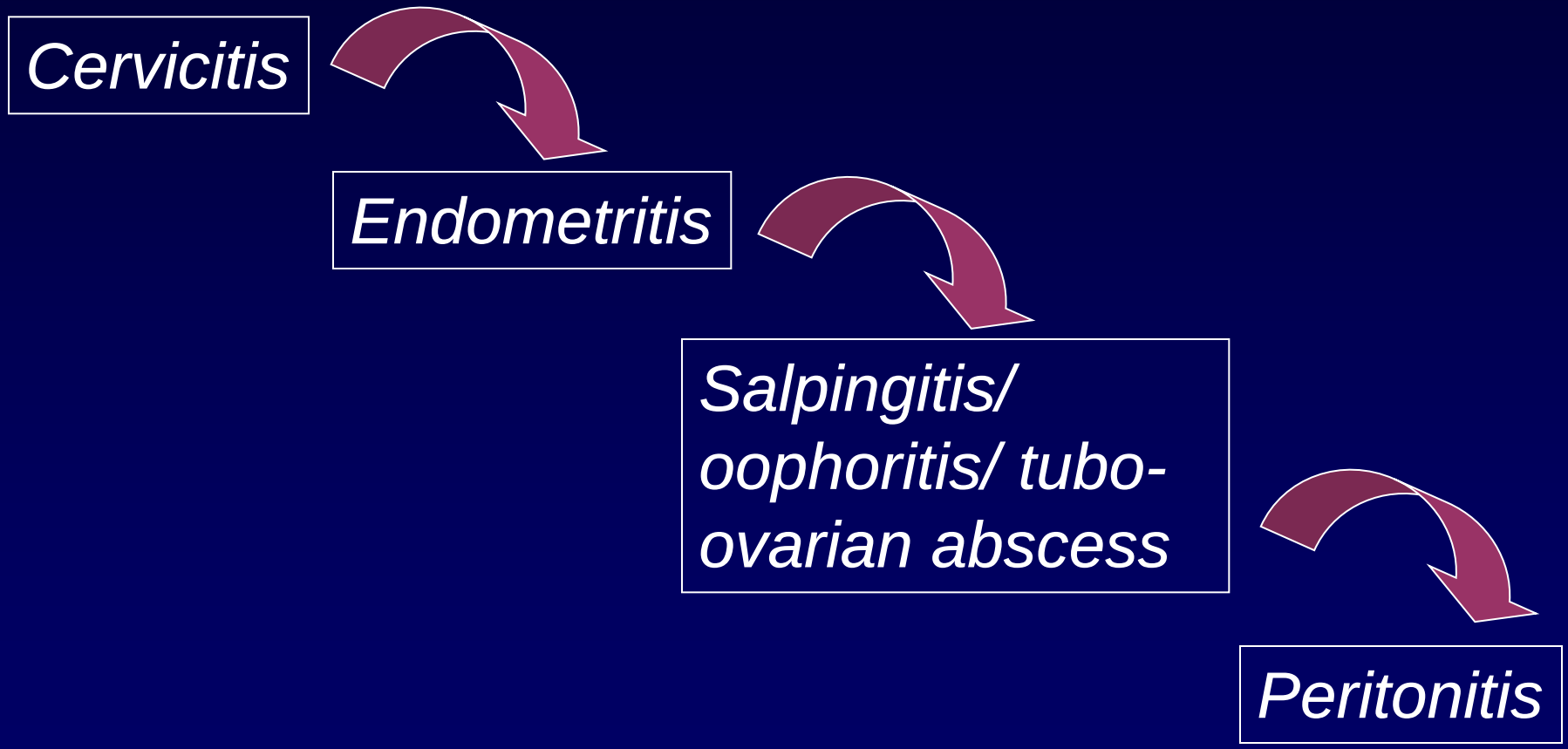
Source: Seattle STD/HIV Prevention Training Center at the University of Washington/ Claire E. Stevens

Lesson II: Pathogenesis

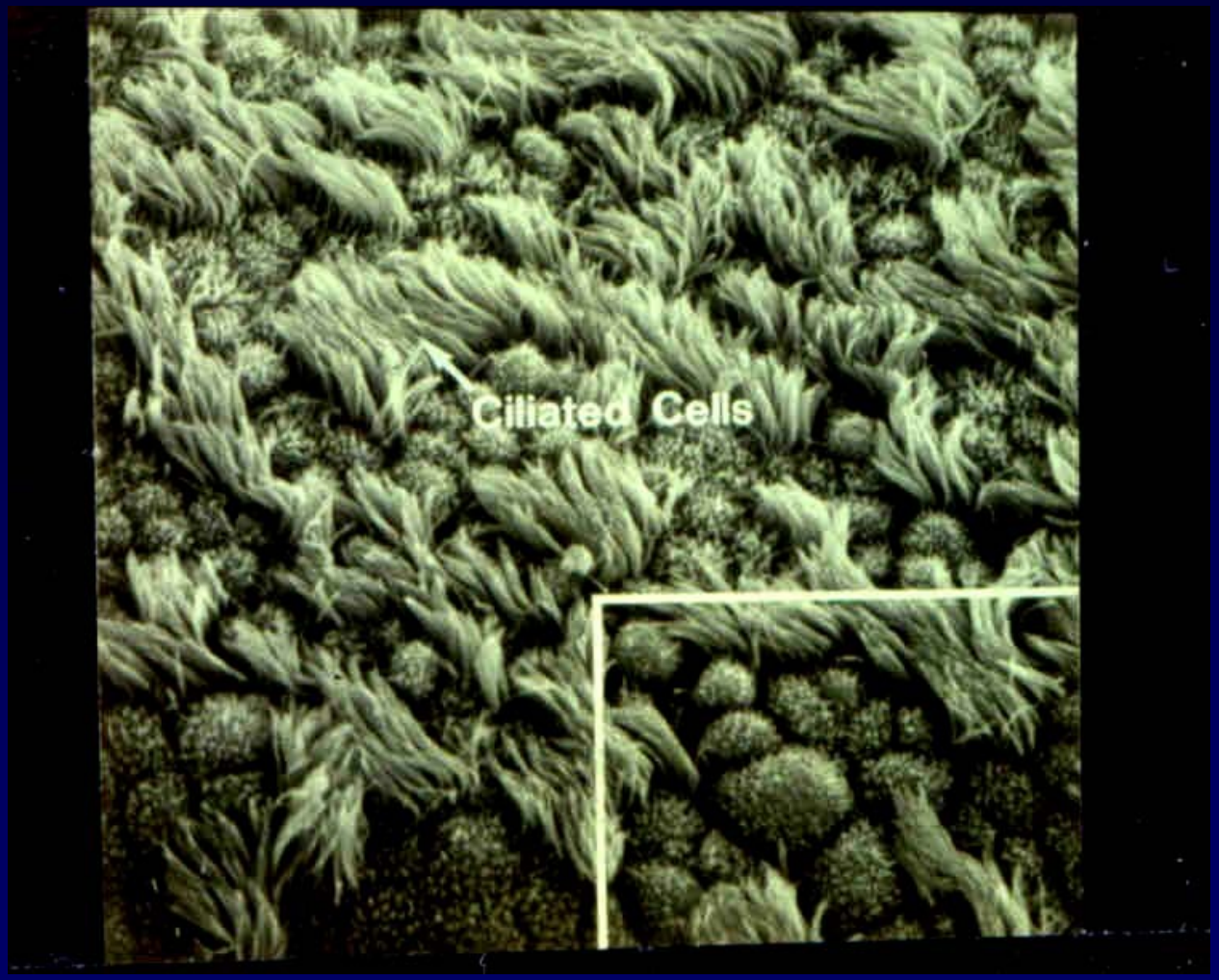
Microbial Etiology

- Most cases of PID are polymicrobial
- Most common pathogens
  - *N. gonorrhoeae*: recovered from cervix in 30%–80% of women with PID
  - *C. trachomatis*: recovered from cervix in 20%–40% of women with PID
  - *N. gonorrhoeae* and *C. trachomatis* are present in combination in approximately 25%–75% of patients

Pathway of Ascending Infection

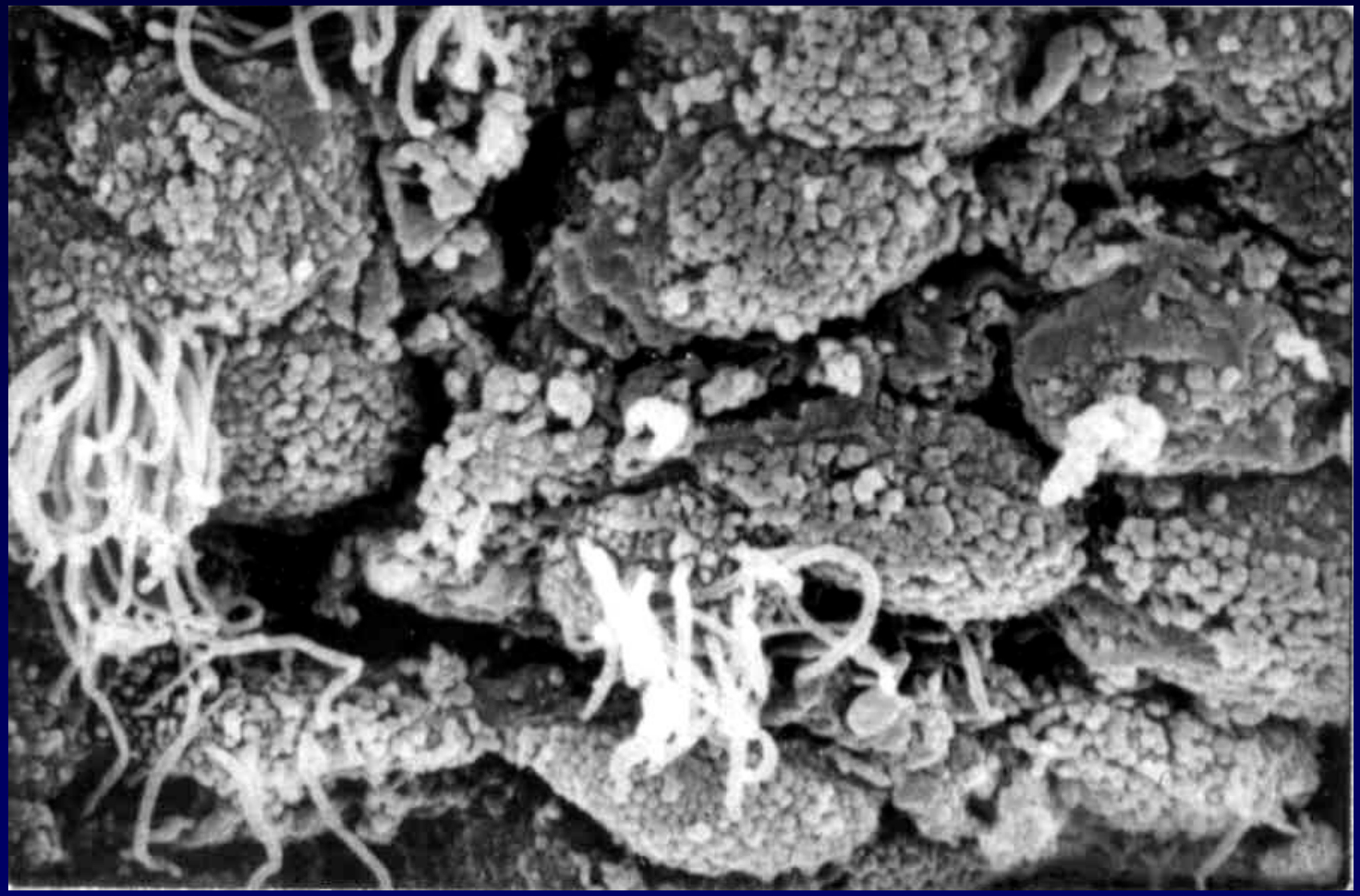


Normal Human Fallopian Tube Tissue



Source: Patton, D.L. University of Washington, Seattle, Washington

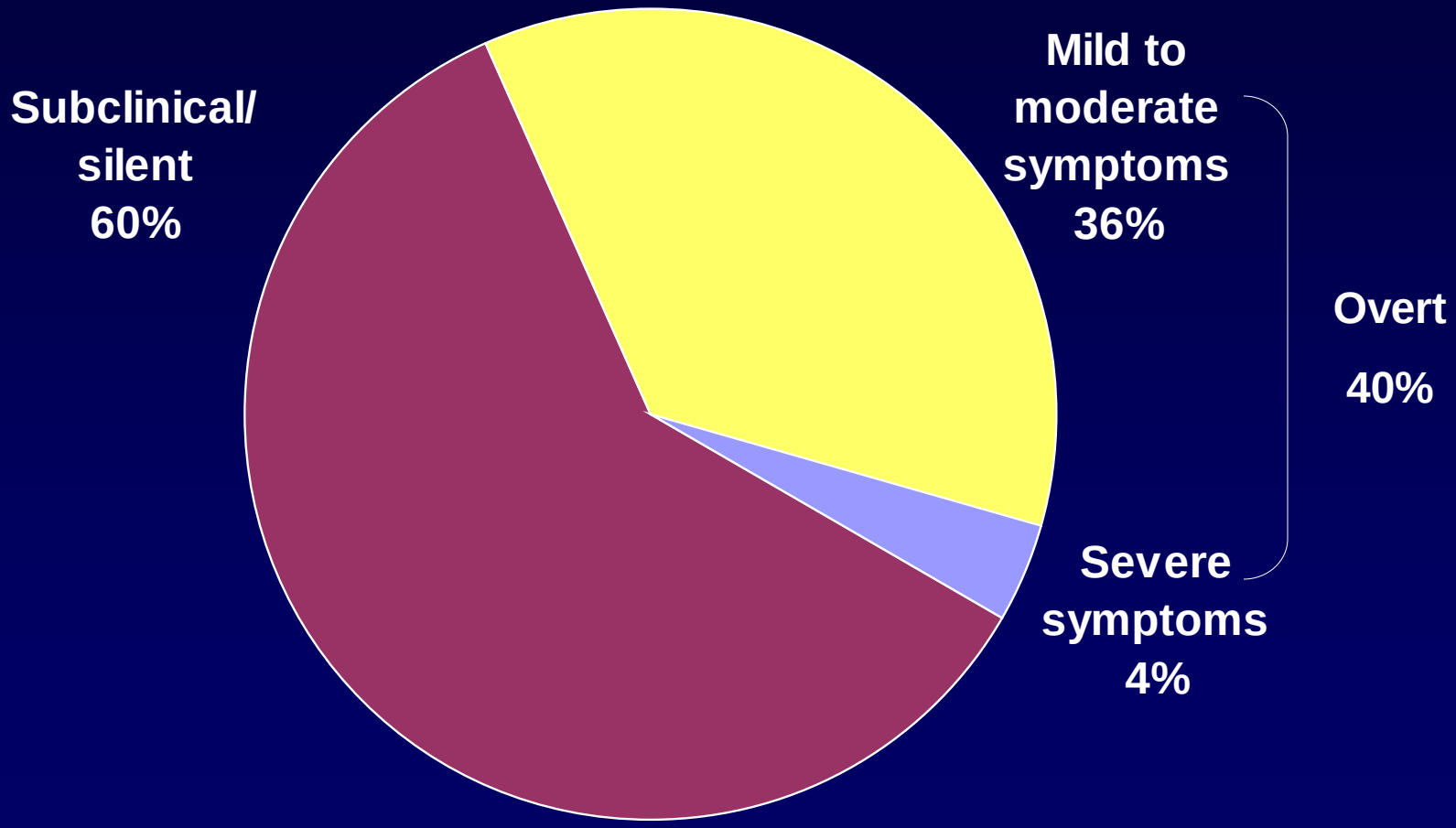
C. trachomatis Infection (PID)



Source: Patton, D.L. University of Washington, Seattle, Washington

Lesson III: Clinical Manifestations

PID Classification



Sequelae

- Approximately 25% of women with a single episode of PID will experience sequelae, including ectopic pregnancy, infertility, or chronic pelvic pain.

- Tubal infertility occurs in 8% of women after one episode of PID, in 20% of women after two episodes, and in 50% of women after three episodes.

Lesson IV: PID Diagnosis

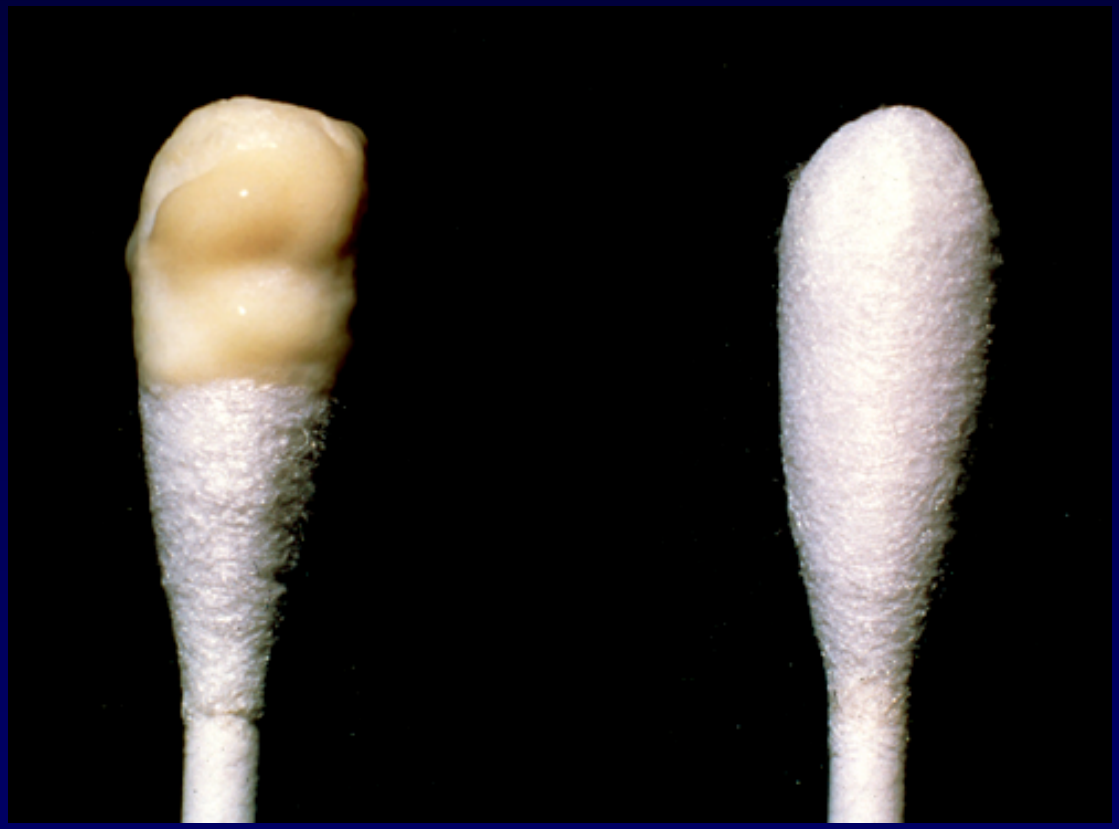
Minimum Criteria in the Diagnosis of PID

- Uterine tenderness, or
- Adnexal tenderness, or
- Cervical motion tenderness

Additional Criteria to Increase Specificity of PID Diagnosis

- Oral temperature >38.3˚C (101˚F)
- Abnormal cervical or vaginal mucopurulent discharge
- Presence of abundant numbers of WBCs on saline microscopy of vaginal fluid
- Elevated erythrocyte sedimentation rate
- Elevated C-reactive protein
- Cervical infection with gonorrhea or chlamydia

Mucopurulent Cervical Discharge (Positive swab test)



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

More Specific Criteria Used in Diagnosing PID

- Endometrial biopsy
- Transvaginal sonography or MRI
- Laparoscopy

Lesson V: Patient Management

General PID Management Considerations

- Regimens must provide empiric broad-spectrum coverage of likely pathogens including *N. gonorrhoeae*, *C. trachomatis*, anaerobes, Gram-negative bacteria, and streptococci
- Treatment should be instituted as early as possible to prevent long-term sequelae

Criteria for Hospitalization of Women with PID

- Inability to exclude surgical emergencies
- Pregnancy
- Non-response to oral therapy
- Inability to follow or tolerate an outpatient oral regimen
- Severe illness, nausea and vomiting, high fever
- Tubo-ovarian abscess

PID Treatment Regimens

- **CDC-recommended oral regimen A**
  - Ceftriaxone 250 mg intramuscularly in a single dose, plus
  - Doxycycline 100 mg orally two times a day for 14 days

    with or without
  - Metronidazole 500 mg orally two times a day for 14 days

- **CDC-recommended oral regimen B**
  - Cefoxitin 2 g intramuscularly in a single dose, and Probenecid 1 g orally in a single dose, plus
  - Doxycycline 100 mg orally two times a day for 14 days

    with or without
  - Metronidazole 500 mg orally two times a day for 14 days

- **CDC-recommended oral regimen C**
  - Other parenteral third-generation cephalosporin (e.g., Ceftizoxime, Cefotaxime), plus
  - Doxycycline 100 mg orally two times a day for 14 days

    with or without
  - Metronidazole 500 mg orally two times a day for 14 days

Follow-Up

- Patients should demonstrate substantial improvement within 72 hours.
- Patients who do not improve usually require hospitalization, additional diagnostic tests, and possible surgical intervention.
- Repeat testing of all women who have been diagnosed with chlamydia or gonorrhea is recommended 3–6 months after treatment.
- All women diagnosed with clinical acute PID should be offered HIV testing.

PID Parenteral Regimens

- CDC-recommended parenteral regimen A
  - Cefotetan 2 g intravenously every 12 hours, or
  - Cefoxitin 2 g intravenously every six hours, ***plus***
  - Doxycycline 100 mg orally or intravenously every 12 hours

- CDC-recommended parenteral regimen B
  - Clindamycin 900 mg intravenously every eight hours, ***plus***
  - Gentamicin loading dose intravenously or intramuscularly (2 mg/kg), followed by maintenance dose (1.5 mg/kg) every eight hours. Single daily gentamicin dosing (3–5 mg/kg) may be substituted.

Alternative Parenteral Regimen

- Ampicillin/Sulbactam 3 g intravenously every six hours, ***plus***
  Doxycycline 100 mg orally or intravenously every 12 hours

- It is important to continue either regimen A or B or alternative regimens for 24 hours after substantial clinical improvement occurs, and also to complete a total of 14 days **of** therapy with
  - Doxycycline 100 mg orally twice a day, or
  - Clindamycin 450 mg orally four times a day

Lesson VI: Prevention

Screening

- Screen and treat for chlamydia or gonorrhea to reduce the incidence of PID.

- Chlamydia screening is recommended for
  - Sexually-active women 25 and under annually;
  - Sexually-active women >25 at high risk;
  - Pregnant women in the first trimester; and
  - Retest pregnant women 25 and under and those at increased risk for chlamydia during the third trimester

- Gonorrhea screening is recommended for
  - Sexually-active women 25 and under;
  - Previous gonorrhea infection;
  - Diagnosed with another STD;
  - New or multiple sex partners;
  - Inconsistent condom use;
  - Engaged in commercial sex work or drug use.

Partner Management

- Male sex partners of women with PID should be examined and treated:
  - If they had sexual contact with the patient during the 60 days preceding the patient's onset of symptoms
  - If a patient's last sexual intercourse was >60 days before onset of symptoms or diagnosis, the patient's most recent partner should be treated

Partner Management (continued)

- Male partners of women who have PID caused by *C. trachomatis* or *N. gonorrhoeae* are often asymptomatic.
- Sex partners should be treated empirically with regimens effective against both *C. trachomatis* and *N. gonorrhoeae*, regardless of the apparent etiology of PID or pathogens isolated from the infected woman.

Reporting

- Report cases of PID to the local STD program in states where reporting is mandated.
- Gonorrhea and chlamydia are reportable in all states.

Patient Counseling and Education

- Nature of the infection
- Transmission
- Risk reduction
  - Assess patient's behavior-change potential
  - Discuss prevention strategies
  - Develop individualized risk-reduction plans
  - Discuss cessation of the practice of douching

Case Study

History: Jane Wheels

- 24-year-old female who reports lower abdominal pain, cramping, slight fever, and dysuria for four days.
- G1P1, LMP two weeks ago (regular without dysmenorrhea). Uses oral contraceptives (for two years).
- Reports gradual onset of symptoms of lower bilateral abdominal discomfort, dysuria (no gross hematuria), abdominal cramping and a slight low-grade fever in the evenings for four days. Discomfort has gradually worsened.
- Denies GI disturbances or constipation. Denies vaginal discharge.
- States that she is happily married in a monogamous relationship. Plans another pregnancy in about six months. No condom use.
- No history of STDs. Reports occasional yeast infections.
- Douches regularly after menses and intercourse; last douched this morning.

Physical Exam

- Vital signs: blood pressure 104/72, pulse 84, temperature 38˚ C, weight 132 lbs.
- Neck, chest, breast, heart, and musculoskeletal exam within normal limits. No flank pain on percussion. No CVA tenderness.
- On abdominal exam the patient reports tenderness in the lower quadrants with light palpation. Several small inguinal nodes palpated bilaterally.
- Normal external genitalia without lesions or discharge.
- Speculum exam reveals minimal vaginal discharge with a small amount of visible cervical mucopus.
- Bimanual exam reveals uterine and adnexal tenderness as well as pain with cervical motion. Uterus anterior, midline, smooth, and not enlarged.

Questions

1. What should be included in the differential diagnosis?

2. What laboratory tests should be performed or ordered?

Laboratory

Results of office diagnostics:

- Urine pregnancy test: negative
- Urine dip stick for nitrates: negative
- Vaginal saline wet mount: vaginal pH was 4.5. Microscopy showed WBCs >10 per HPF, no clue cells, no trichomonads, and the KOH wet mount was negative for budding yeast and hyphae.

3. What is the presumptive diagnosis?
4. How should this patient be managed?
5. What is an appropriate therapeutic regimen?

Partner Management

Sex partner: Joseph (spouse)

- First exposure: four years ago
- Last exposure: one week ago
- Frequency: two times per week (vaginal only)

6. How should Joseph be managed?

Follow-Up

- On follow-up three days later, Jane had improved clinically. The nucleic acid amplification test (NAAT) for gonorrhea was positive. The NAAT test for chlamydia was negative.

- Joseph (Jane's husband) came in with Jane at follow-up. He was asymptomatic but did admit to a "one-night stand" while traveling. He was treated. They were offered HIV testing which they accepted.

7. Who is responsible for reporting this case to the local health department?

8. What are appropriate prevention counseling recommendations for this patient?