

# Pelvic Inflammatory Disease (PID)

# Learning Objectives

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

1. Describe the epidemiology of PID in the U.S.
2. Describe the pathogenesis of PID.
3. Discuss the clinical manifestations of PID.
4. Identify the clinical criteria used in the diagnosis of PID.
5. List CDC-recommended treatment regimens for PID.
6. Summarize appropriate prevention counseling messages for a patient with PID.
7. 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

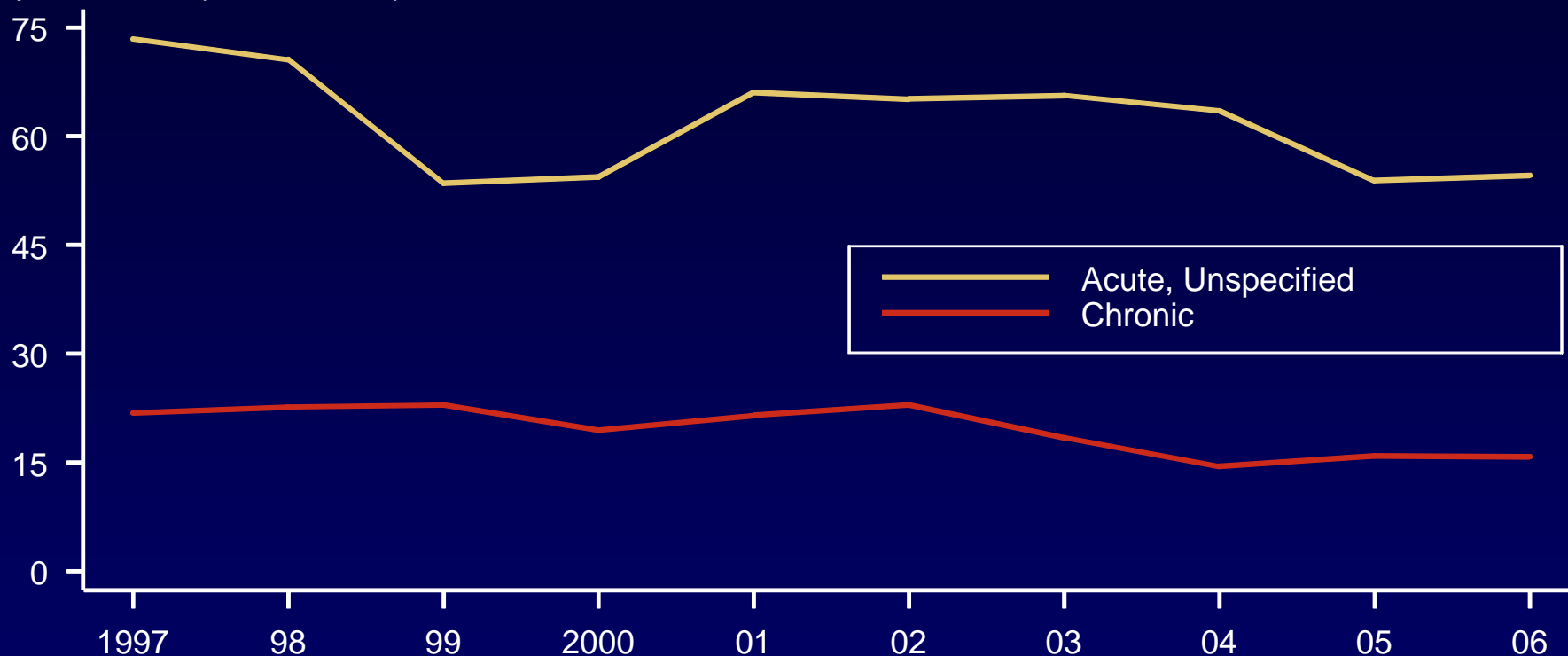
- Clinical syndrome associated with ascending spread of microorganisms from the vagina or cervix to the endometrium, fallopian tubes, ovaries, and contiguous structures.
- Comprises a spectrum of inflammatory disorders including any combination of endometritis, salpingitis, tubo-ovarian abscess, and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

# Incidence and Prevalence

- Occurs in approximately 1 million 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.
- Rates of hospitalization has decreased 16% from 1985-2001. Ambulatory data also support a decrease in PID rates. PID cases are more likely to be diagnosed in ambulatory settings.
- The reported number of initial visits to physicians' offices for PID generally declined from 1998 and 2007.

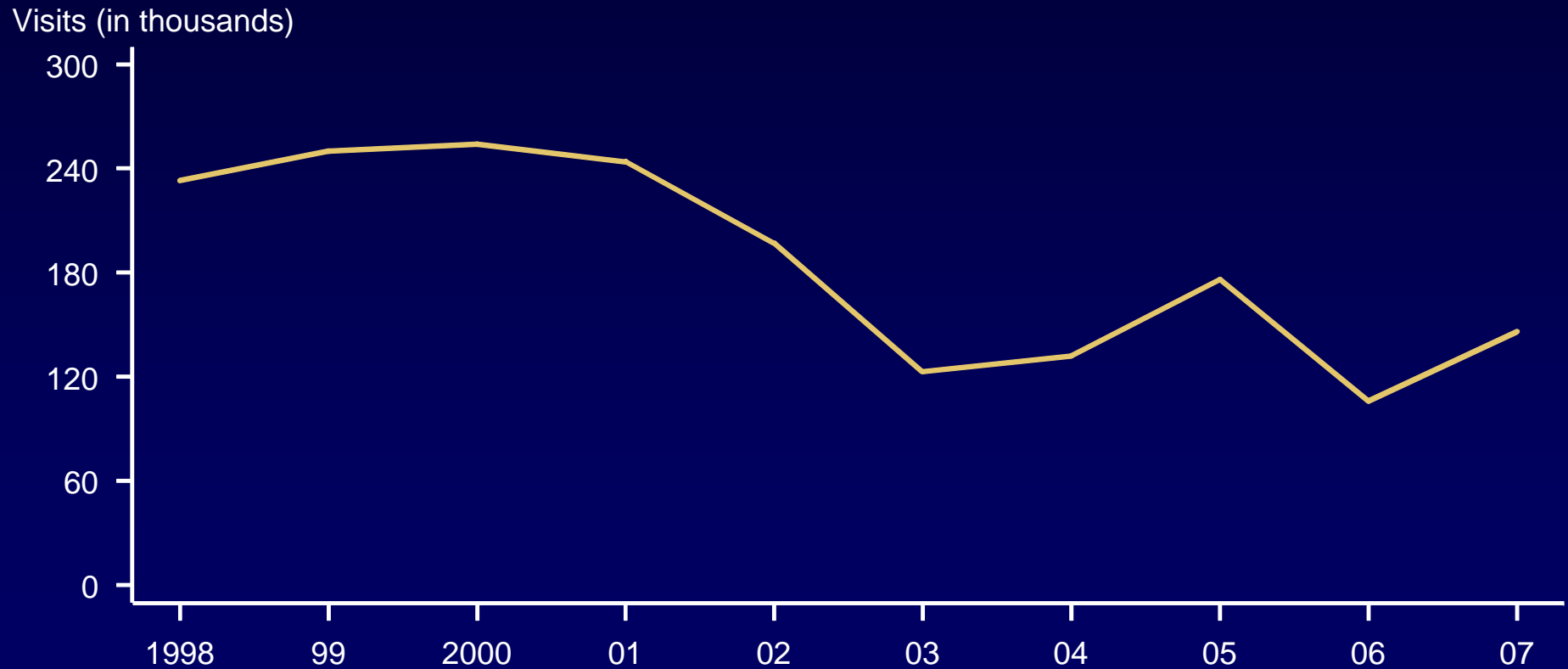
# Pelvic inflammatory disease — Hospitalizations of women 15 to 44 years of age: United States, 1997–2006

Hospitalizations (in thousands)



▪Note: The relative standard error for these estimates of the total number of acute unspecified PID cases ranges from 11.9% to 17.2%. The relative standard error for these estimates of the total number of chronic PID cases ranges from 11% to 18%. Data only available through 2006.

# Pelvic inflammatory disease — Initial visits to physicians' offices by women 15 to 44 years of age: United States, 1997–2007



Note: The relative standard error for these estimates ranges from 21.6% to 29.3%

# Risk Factors

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

# Normal Cervix with Ectopy



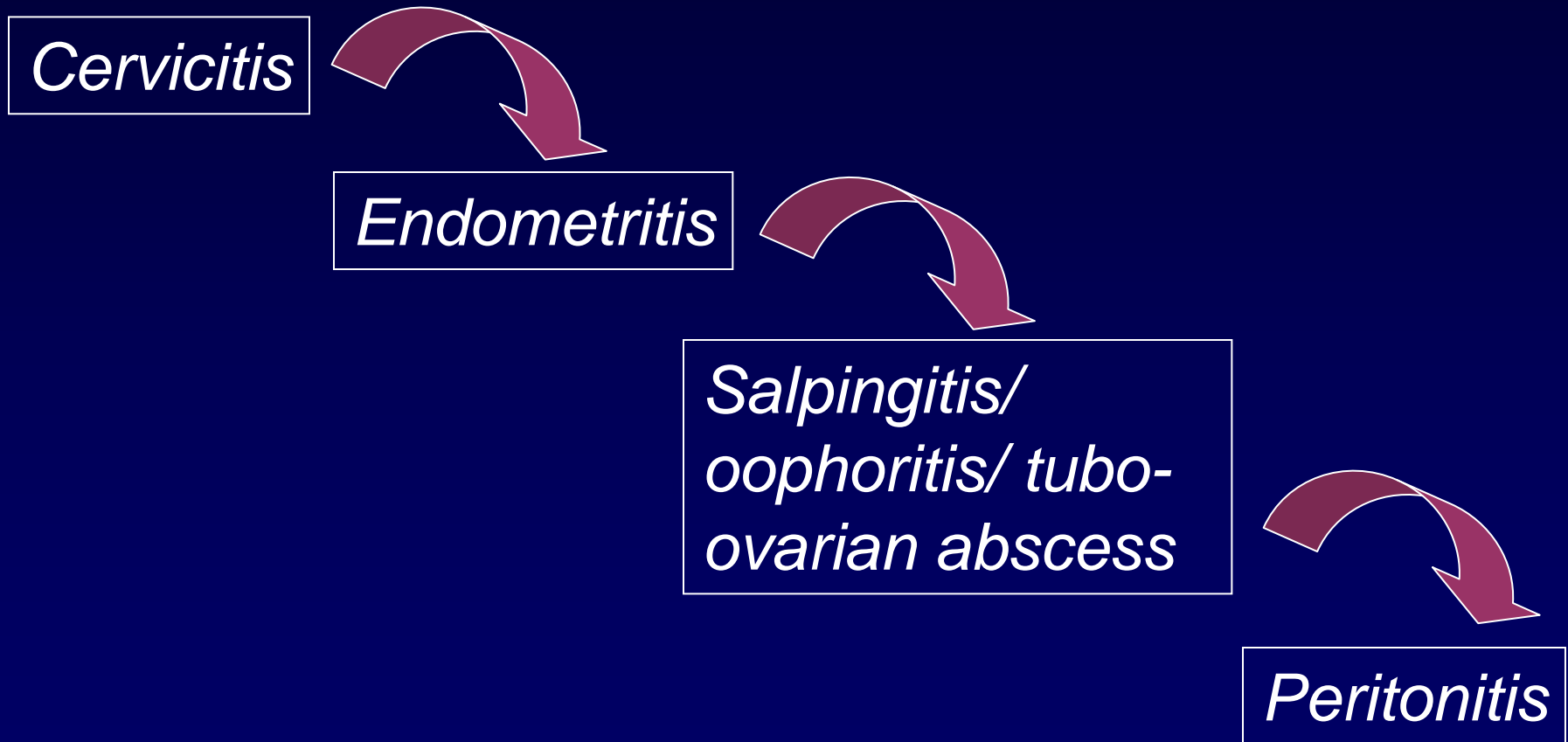
**Source:** Seattle STD/HIV Prevention Training Center at the University of Washington/  
Claire E. Stevens

# Lesson II: Pathogenesis

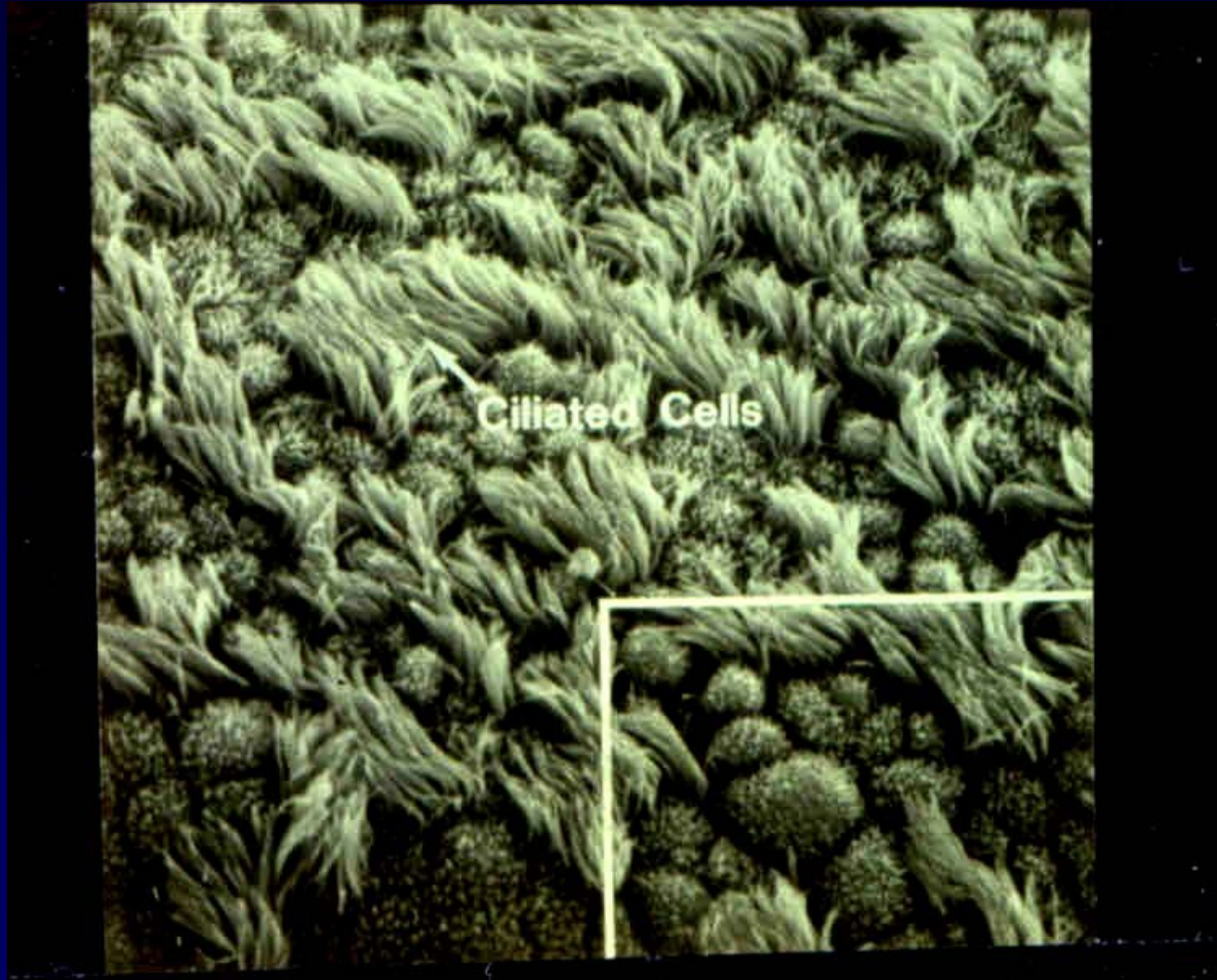
# Microbial Etiology

- 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 Ascendant Infection

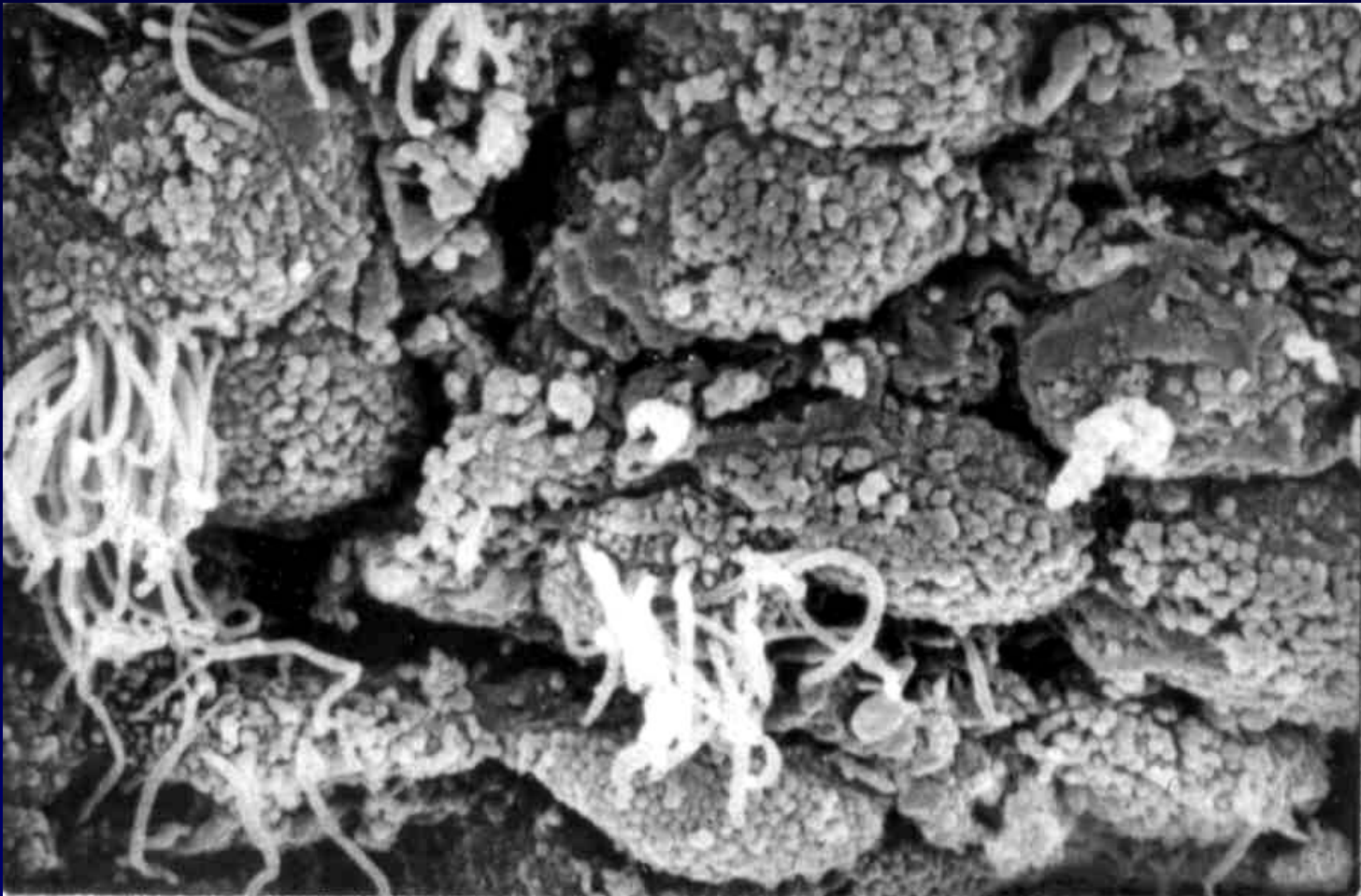


# Normal Human Fallopian Tube Tissue



Source: Patton, D.L. University of Washington, Seattle, Washington <sup>14</sup>

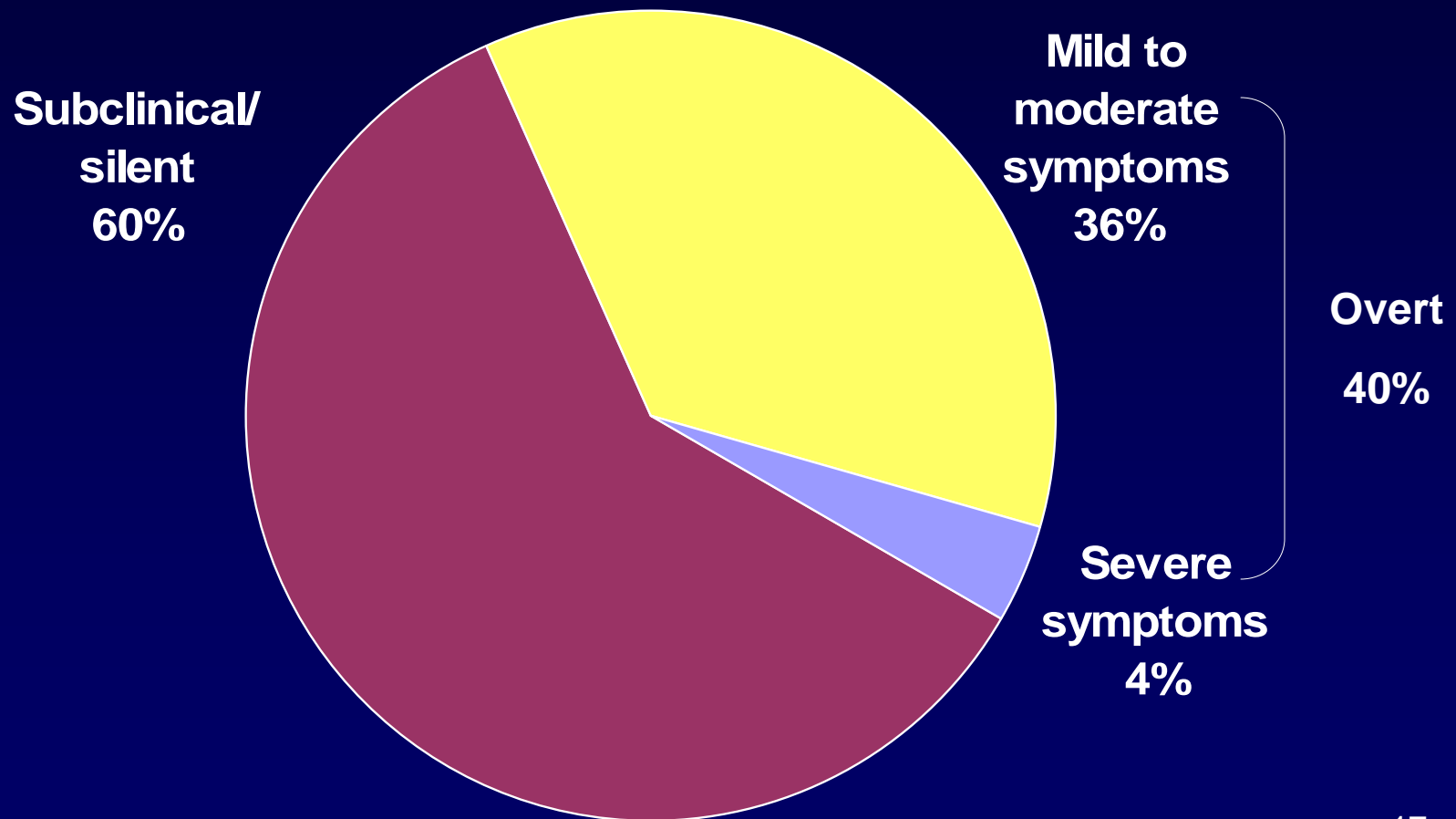
# *C. trachomatis* Infection (PID)



Source: Patton, D.L. University of Washington, Seattle, Washington <sup>15</sup>

# 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 1 episode of PID, in 20% of women after 2 episodes, and in 50% of women after 3 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 Diagnosis

- Temperature  $>38.3^{\circ}\text{C}$  ( $101^{\circ}\text{F}$ )
- Abnormal cervical or vaginal mucopurulent discharge
- Presence of abundant numbers of WBCs on saline microscopy of vaginal secretions
- Elevated erythrocyte sedimentation rate (ESR)
- Elevated C-reactive protein (CRP)
- Gonorrhea or chlamydia test positive

# 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

- Endometrial biopsy
- Transvaginal sonography or MRI
- Laparoscopy

# Lesson V: Patient Management

# General PID Considerations

- Regimens must provide coverage of *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

- Inability to exclude surgical emergencies
- Pregnancy
- Non-response to oral therapy
- Inability to tolerate an outpatient oral regimen
- Severe illness, nausea and vomiting, high fever or tubo-ovarian abscess
- HIV infection with low CD4 count

# Oral Regimens

- CDC-recommended oral regimen A
  - Ceftriaxone 250 mg IM in a single dose, PLUS
  - Doxycycline 100 mg orally 2 times a day for 14 days

***With or Without***

  - Metronidazole 500 mg orally 2 times a day for 14 days
- CDC-recommended oral regimen B
  - Cefoxitin 2 g IM in a single dose and Probenecid 1 g orally in a single dose, PLUS
  - Doxycycline 100 mg orally 2 times a day for 14 days

***With or Without***

  - Metronidazole 500 mg orally 2 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 2 times a day for 14 days

***With or Without***

  - Metronidazole 500 mg orally 2 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 surgical intervention.
- Some experts recommend re-screening for *C. trachomatis* and *N. gonorrhoeae* 4-6 weeks after completion of therapy in women with documented infection due to these pathogens.
- All women diagnosed clinical acute PID should be offered HIV testing.

# Parenteral Regimens

- CDC-recommended parenteral regimen A
  - Cefotetan 2 g IV every 12 hours, OR
  - Cefoxitin 2 g IV every 6 hours, PLUS
  - Doxycycline 100 mg orally or IV every 12 hours
- CDC-recommended parenteral regimen B
  - Clindamycin 900 mg IV every 8 hours, PLUS
  - Gentamicin loading dose IV or IM (2 mg/kg), followed by maintenance dose (1.5 mg/kg) every 8 hours. Single daily gentamicin dosing may be substituted.

# Alternative Parenteral Regimen

- Ampicillin/Sulbactam 3 g IV every 6 hours, PLUS
- Doxycycline 100 mg orally or IV every 12 hours.
  
- It is important to continue either regimen A or B or alternative regimens for at least 24 hours after substantial clinical improvement occurs and also to complete a total of 14 days therapy with:
  - » Doxycycline 100mg orally twice a day OR
  - » Clindamycin 450mg orally four times a day.

# Lesson VI: Prevention

# Screening

- To reduce the incidence of PID, screen and treat for chlamydia.
- Annual chlamydia screening is recommended for:
  - Sexually active women 25 and under
  - Sexually active women >25 at high risk
- Screen pregnant women in the 1<sup>st</sup> trimester.

# 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.

# 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

# Case Study



## History: Jane Wheels

- 24-year-old female who presents reporting lower abdominal pain, cramping, slight fever, and dysuria for 4 days
- P 1001, LMP 2 weeks ago (regular without dysmenorrhea). Uses oral contraceptives (for 2 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 4 days. Discomfort has gradually worsened.
- Denies GI disturbances or constipation. Denies vaginal d/c.
- States that she is happily married in a monogamous relationship. Plans another pregnancy in about 6 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
- 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: 4 years ago
- Last exposure: 1 week ago
- Frequency: 2 times per week  
(vaginal only)



6. How should Joseph be managed?

# Follow-Up

- On follow up 3 days later, Jane was improved clinically. The culture for gonorrhea was positive. The nucleic acid amplification test (NAAT) 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?