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# EPIDEMIOLOGY BULLETIN

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# Pelvic Inflammatory Disease:

## Guidelines for Prevention and Management*

Each year approximately 1 million women in the United States experience an episode of symptomatic pelvic inflammatory disease (PID). Women with PID are at increased risk of chronic pelvic pain, ectopic pregnancy, and tubal infertility. After one episode of PID, a woman's risk of ectopic pregnancy increases sevenfold compared with the risk for women who have no history of PID. Approximately 12% of women are infertile after a single episode of PID, almost 25% after two episodes, and over 50% after three or more episodes. Other sequelae associated with PID include dyspareunia, pyosalpinx, tubo-ovarian abscess, and pelvic adhesions. Overall, such complications are estimated to occur among 15%-20% of women with PID, and they often require subsequent surgical intervention. These medical consequences of PID are associated with great emotional stress and can have a major effect on a woman's reproductive health.

Many women with PID have minimal symptoms, and some are believed to experience no symptoms ("silent PID"). Concern about asymptomatic PID stems from high rates of PID sequelae such as tubal infertility

among women with serologic evidence of previous sexually transmitted infections but no history of overt illness. Whether such patients were truly asymptomatic or unrecognized only because of subtle or atypical clinical signs is uncertain. In either case, the best strategies for preventing PID are: a) prevention of lower-genital-tract infection with *Chlamydia trachomatis* and *Neisseria gonorrhoeae* among both men and women, b) when this fails, early detection of lower-tract infection followed by prompt and effective treatment.

Implementing these two strategies requires the establishment and maintenance of effective sexually transmitted disease (STD) control programs nationally and locally. Along with appropriate medical management of illness, essential elements of such programs include: a) educating individuals to adopt healthy behaviors, b) training clinicians to counsel patients about risky behavior, c) screening persons at risk of STD, and d) involving male partners in prevention and management plans.

### *Microbial Etiology and Pathogenesis*

Multiple organisms have been implicated as etiologic agents in PID, and most cases of PID are associated with more than one organism. *C. tra-*

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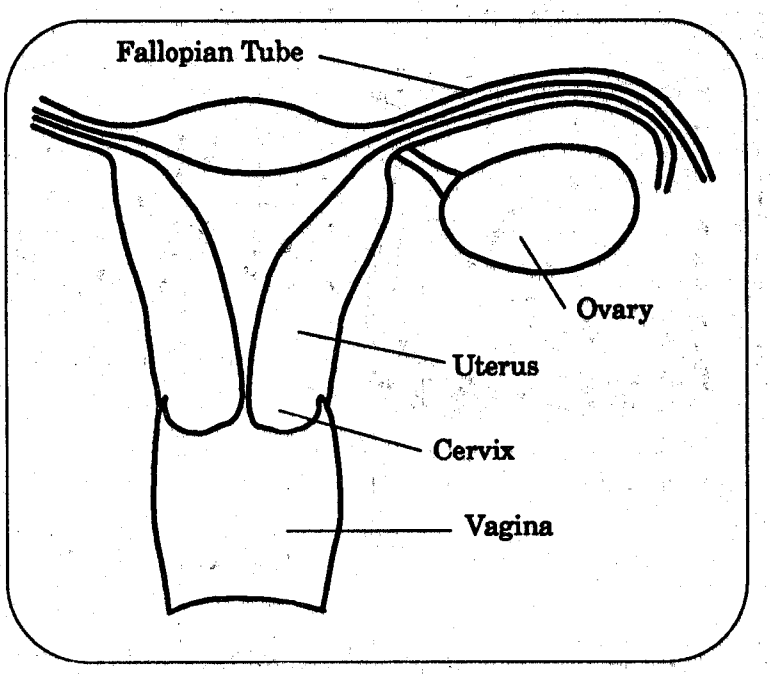
*chomatis, N. gonorrhoeae,* and a wide variety of anaerobic and aerobic bacteria are recognized as playing an etiologic role for PID in the United States. Mycoplasmas have also been recovered from the genital tract, but their role in PID is less clear.

The proportion of women with PID who are infected with *C. trachomatis* or *N. gonorrhoeae* varies widely, probably because of variations among the populations studied, differences in the time intervals of the investigations, variations in the severity of infection, and differing methods of microbial investigation. In the United States, *C. trachomatis* has been recovered from the cervix of 5%-39% of women diagnosed as having PID and from the fallopian tubes among zero to 10% of patients with PID. Serologic evidence of *C. trachomatis* infection has been found among 20%-40% of women with a history of PID. *N. gonorrhoeae* has a particularly wide range of recovery rates among women with PID, with isolation rates from the cervix ranging from 27% to 80% and from the fallopian tubes ranging from 13% to 18%. However, sampling of microorganisms from the fallopian tube has been difficult.

## What is PID?

Pelvic inflammatory disease refers to the clinical syndrome among women resulting from infection involving the uterus, fallopian tubes, ovaries, peritoneal surfaces and/or contiguous structures. Most PID results from ascending spread of microorganisms from the vagina and endocervix to these upper-genital sites. Because PID encompasses a wide variety of pathologic processes and many etiologic agents, it has a broad clinical spectrum that includes a) acute PID, b) silent PID, c) atypical PID, d) the PID residual syndrome or chronic PID, and e) postpartum/postabortal PID. Individual cases of PID can also be more specifically defined by a) the site(s) of disease (i.e., endomyometritis, salpingitis, salpingo-oophoritis); and b) the etiologic agent(s) involved (e.g., those that cause chlamydial endometritis, gonococcal salpingitis, nonchlamydial/nongonococcal salpingo-oophoritis).

In addition to *C. trachomatis* and *N. gonorrhoeae*, a wide variety of anaerobic and aerobic (facultative) bacteria have been isolated from the upper-genital tracts of 25%-50% of women with acute PID. The most common anaerobic bacteria found are *Bacteroides, Peptostreptococcus,* and *Peptococcus* species, whereas the most common facultative bacteria are *Gardnerella vaginalis, Streptococcus species, Escherichia coli,* and *Haemophilus influenzae.* The syndrome bacterial vaginosis (BV) has also been suggested as an antecedent to lower-genital-tract infection that leads to polymicrobial acute PID; the organisms involved in BV are similar to the nongonococcal, nonchlamydial bacteria frequently isolated from the upper-genital-tract of women with acute PID.




PID is believed to result from direct canalicular spread of organisms from the endocervix to the endometrial and fallopian tube mucosa. Both *N. gonorrhoeae* and *C. trachomatis* commonly cause endocervicitis. Between 10% and 40% of women not treated for gonococcal or chlamydial cervicitis apparently develop clinical symptoms of acute PID. Even higher percentages of ascending infection are detected if endometrial biopsies are used to diagnose subclinical endometritis. Noncanalicular spread of cervical infections has also been observed, possibly extending via parametrial lymphatics.

At least four factors could contribute to the ascent of these bacteria and/or be associated with the pathogenesis of upper-genital-tract infection. First, uterine instrumentation (e.g., the insertion of an intrauterine device [IUD]) facilitates upward spread of vaginal and cervical bacteria. Second, the hormonal changes during menses, as well as menstruation itself, leads to cervical alterations that may result in loss of a mechanical barrier preventing ascent. Also, the bacteriostatic effect of cervical mucus is lowest at the onset of menses. Third, retrograde menstruation may favor ascent to the tubes and peritoneum. Finally, individual organisms may have potential virulence factors associated with the pathogenesis of acute chlamydial and gonococcal PID.

## *Magnitude of the Problem of PID*

In the 1980s, millions of women in the United States were afflicted with symptomatic PID. From 1979 through 1988, an annual mean of 276,100 women were hospitalized for PID, with approximately 182,000 of these hospitalizations attributed to acute PID and the remainder to chronic PID. During the same period, women with acute PID made an annual mean of approximately 1.2 million visits to private physicians' offices; approximately 420,000 of these representing a woman's initial visit for PID. However, comparable data on the number of women seen in public clinics, emergency rooms, and hospital outpatient departments in this 10-year period are not available.

Sexually active women in younger age groups have higher rates of hospitalization for acute PID but lower rates of hospitalization for chronic PID. Data regarding office visits for PID show the age distribution to be similar to that of hospitalizations for acute PID. Women of other than white race have higher average annual hospitalization rates than white

women for both acute and chronic PID. Similarly, rates of office visits for PID are slightly higher for women of other than white race. For acute PID, hospitalization rates are higher for women who are single, separated, or divorced than for women who are married or widowed. For both acute and chronic PID, average annual hospitalization rates are highest in the South and lowest in the Northeast, with intermediate rates in the Midwest and West.

Overall, hospitalization rates for acute PID declined in the 1980s, although office-visit rates appear to have remained unchanged. Hospitalization rates decreased 36% from 1979 to 1988, from 3.5 to 2.2 hospitalizations per 1,000 women. Although hospitalization rates decreased for all age groups, a relatively smaller decrease among 15- to 19-year olds (10%) compared with a 40% decrease for the 20- to 24-year age group resulted in the younger age group's having the highest hospitalization rate in 1987-1988, even without adjusting for the proportion of sexually active women. Finally, hospitalization rates for women of both racial groups decreased similarly over the decade, and hospitalization rates declined in all four geographic regions.

## *Risk Assessment*

Identifying factors associated with increased risk of PID can help in both prevention and management of PID. Men and women without genital infections who are not engaged in high-risk sex practices can be encouraged to maintain healthy behaviors; those without infection who do acknowledge high-risk behaviors can be targeted for more intensive education and counseling. For women suspected of having PID, information about risk indicators should help clinicians in diagnosing PID when more definitive diagnostic capability, such as laparoscopy, is not readily available. However, diagnosis should not be based solely on knowledge about a suspected risk factor. Many women perceived to be at increased risk because of the presence of a risk indicator will not have PID, and many women who do not fit a typical risk profile will have PID.

Age, socioeconomic status, marital status, and rural/urban residence have been correlated with risk of PID (Table 1). Age is inversely related to PID rates and directly correlated with PID sequelae, (e.g., tubal damage and infertility). Sexually experienced teenagers are three times more likely to be diagnosed as having PID than are 25- to 29-year-old women. Both biological and behavioral characteristics of adolescents may account for these differences.

Low levels of education, unemployment, and low income as measures of socioeconomic status have been associated with increased risk of PID. However, the extent of the relationship between lower-genital-tract infection and socioeconomic status is not known. Data on marital status indicate that women who never married and women who are divorced or separated are at increased risk of PID. Finally, urban residence is often suggested to be associated with increased risk of PID, but no studies have compared PID rates among urban and rural populations.

Individual behavior and practices are strongly correlated with risk. Although STD-related PID results from having sex with someone with an STD, the precise role of sexual behavior in the development of PID remains unclear. Several dimensions of sexual behavior, however, have been associated with increased risk of PID. These include young age at first sexual intercourse, multiple sex partners, high frequency of sexual intercourse, and increased rate of acquiring new partners within the previous 30 days.

Contraceptive choice affects risk of PID as well as risk of STD and tubal infertility (Table 1). Because of complex interrelationships, precise etiologic associations are difficult to unravel.

When properly used, mechanical and chemical barriers decrease the risk of STD, PID, and tubal infertility. Current barrier methods and devices include condoms, diaphragms, and vaginal spermicides.

Condoms, when used consistently and correctly throughout sexual activity, compared with nonuse and incorrect use, appear highly effective for reducing risk of acquisition and transmission of the STD that causes PID, leading to decreased risk of hospitalization for PID, tubal pregnancy, and tubal infertility. Latex condoms offer greater protection against agents that cause STD, particularly viruses, than natural-membrane condoms.

Vaginal spermicides also appear to decrease a woman's risk of acquiring bacterial STD, particularly cervical infection with *C. trachomatis* and *N. gonorrhoeae*. Use of a diaphragm appears to decrease a woman's risk for PID and tubal infertility, although its precise mechanical protective effect against PID has not been determined because most women use a spermicide with a diaphragm. Finally, the combination of spermicide and diaphragm, as well as other combinations of barrier methods, may further decrease risk of STD and PID.

Table 1. Health Outcomes Affected.

| Risk Variable | Progression of Disease: Acquisition of STD | Development of PID | PID Sequelae |
|---|---|---|---|
| **Demographic & social indicators** | | | |
| Age | + | + | - |
| Socioeconomic status | + | + | • |
| Marital status | + | + | • |
| Residence, rural or urban | + | • | • |
| **Individual behavior & practices** | | | |
| **Sexual behavior** | | | |
| Number of partners | + | • | • |
| Age at first sexual intercourse | + | • | • |
| Frequency of sexual intercourse | + | • | • |
| Rate of acquiring new partners | + | • | • |
| **Contraceptive practice** | | | |
| Barrier | - | - | - |
| Hormonal | + | - | • |
| Intrauterine device | • | + | + |
| **Health-care behavior** | | | |
| Evaluation of symptoms | + | + | + |
| Compliance with treatment instructions | + | + | + |
| Partner notification | + | + | + |
| **Others** | | | |
| Douching | • | + | • |
| Smoking | + | + | • |
| Substance abuse | + | • | • |
| Menstrual cycle | + | + | • |

Key: (+) increased risk; (-) decreased risk; (•) no association reported.

Current data on use of oral contraception (OC) and risk of lower- and upper-genital-tract infection and sequelae are inconsistent. Women who use OC have an increased risk of *C. trachomatis* infection of the cervix, but lower risk of symptomatic, clinically overt PID. No substantial increase or decrease in risk of tubal infertility occurs among women using OC. Because of the questions raised by these findings, the risk of PID and its sequelae attributable to *C. trachomatis* among women using OC is undetermined. OC may reduce the risk of PID that is not attributable to *C. trachomatis*.

Women who use intrauterine devices (IUDs) are probably at increased risk of PID that may not be STD-related. Most of this increased risk occurs in the first months after insertion of an IUD. Lower risks of PID have been reported with the current generation of IUDs than with types used in earlier years.

Health-care-seeking behavior of both men and women influences the risk of lower- and upper-genital-tract infection. Prompt evaluation, compliance with management instructions, and referral of sex partners are likely to decrease the risk of PID.

Vaginal douching, menses, cigarette smoking, and substance abuse have also been suggested as variables influencing the risk of PID. Data from several reports suggest that women with acute PID are more likely to have a history of douching than women without PID. Current data, however, do not provide sufficient information to determine whether positive associations are attributable to characteristics of the women who douche, or to douching itself. Consequently, no conclusion can be reached regarding the precise relationship between douching and PID.

Women with chlamydial and/or gonococcal salpingitis have experienced onset of symptoms substantially more often within 7 days of onset of menses than at other times in the menstrual cycle. For nonchlamydial, nongonococcal salpingitis, the reverse relationship has been found. In two studies examining the effect of cigarette smoking on relative risk of having PID, women who were current smokers had a twofold increased relative risk of PID. A dose-response relationship was observed in one study but not in the other. Finally, alcohol and illicit drug use, particularly that involving cocaine, have been associated with gonorrhea and PID.

Provider behavior and practices may also influence the risk PID and its sequelae. Timely diagnosis and appropriate treatment of lower-genital-tract chlamydial and gonococcal infection among both men and women can reduce the risk of adverse consequences among infected individuals and can reduce the risk of further transmission to others. Also, practitioners can influence men's and women's risk of infection by providing effective counseling about their sexual behavior, health-care-seeking behavior, and contraceptive practice, and by convincing them to comply with management instructions. Finally, by ensuring timely and effective treatment of patients' sex partners, practitioners can reduce risk of reinfection. Moreover, because the partners' infections may be asymptomatic, interviewing and treating these persons will help reduce further transmission of infection in the community and may facilitate identifying other infected persons.

## *Prevention*

Preventing PID and its sequelae can take place on three levels—primary, secondary, and tertiary prevention. Primary prevention involves avoiding acquisition of sexually transmitted infections. Secondary prevention involves preventing a lower-genital-tract infection from ascending to the upper-genital-tract. Tertiary prevention involves preventing upper-genital-tract infection from leading to tubal dysfunction/obstruction and functional or structural damage to other abdominal/pelvic organs. At each of these levels of prevention, communities, individuals, and health-care providers can play a role (Table 2).

**Recommended Strategies for Communities.** Community support is essential if STD-prevention activities are to succeed. Community-based approaches to STD/PID prevention should be aimed at providing a) information, b) motivation, and c) skills to consumers and providers. In addition, communities have a respon-

sibility to provide supportive services for prevention programs.

A vital element of any community strategy for prevention of PID is a community STD-control program to prevent lower-genital-tract chlamydial and gonococcal infection. Such programs are important in reducing both symptomatic and asymptomatic PID. An STD-control program, in addition to counseling, disease detection, and treatment, should include community health promotion and education, partner notification, training of health-care providers, and screening for asymptomatic STD.

**Recommended Strategies for Health-Care Providers.** Providers should play a leading role in preventing PID and its sequelae (Table 2). Therefore, clinicians must assume a greater responsibility for such primary prevention activities as counseling, patient education, and community awareness, in addition to their traditional role of diagnosing illness and treating patients.

## *Diagnosis*

Clinical diagnosis of PID is difficult because of the wide variation in symptoms and signs among women with this condition. Many women with PID may exhibit subtle, vague, or mild symptoms that are not readily recognized as PID. This situation interferes with timely diagnosis, inhibits effective treatment, and contributes to inflammatory sequelae in the upper-reproductive tract. Laparoscopy can be used to obtain a more accurate diagnosis of salpingitis and a more complete bacteriologic diagnosis. However, this diagnostic tool is often neither readily available for acute cases nor easily justified when symptoms and signs are mild and/or vague. Moreover, laparoscopy will not detect endometritis and may not detect subtle inflammation of fallopian tubes. Consequently, the diagnosis of PID is often based on clinical findings supplemented with results of cultures or non-culture tests of samples obtained from the endocervix.

The clinical diagnosis of PID is imprecise. In published studies, when compared with laparoscopy as the standard, a clinical diagnosis of symptomatic PID has a predictive value positive of approximately two-thirds. No single historical, physical, or laboratory finding is both sensitive and specific for the diagnosis of PID (i.e., can be used both to detect all cases of PID and to exclude all women without PID). Combinations of diagnostic findings, which improve either sensitivity (detect more women who have PID) or specificity (exclude more women who do not have PID), have done so only at the expense of the other (i.e., requiring two or more findings will exclude more women without PID, but will also reduce the number of patients with PID who are detected).

Current evidence indicates that many episodes of PID are unrecognized. Although some women may have truly asymptomatic ("silent") PID, others go undiagnosed because they or their health-care providers fail to recognize the implications of mild or nonspecific symptoms and/or signs. Because of the potential for damage to the reproductive health of women by even these apparently mild cases of PID, a "low threshold for diagnosis" of PID is recommended. The following recommendations for diagnosing PID are intended to help clinicians both recognize when PID should be suspected and gain additional information to increase their diagnostic certainty.

Treatment for PID should be instituted on the basis of minimum clinical criteria for pelvic inflammation (see boxed text, p6) in the absence of competing diagnoses (e.g., positive pregnancy test, acute appendicitis).

Among women with severe clinical signs, more elaborate diagnostic evaluation is warranted because incorrect diagnosis and management may cause unnecessary morbidity. Thus, additional criteria should be used to increase the specificity of diagnosis. Routine criteria are those that are simple to assess; elaborate criteria are more definitive but are more expensive and often invasive.

Although not necessary to justify initial treatment decisions, bacteriologic diagnosis is helpful. It provides diagnostic confirmation (thereby improving management and reinforcing the need to treat sex partners) and serves as baseline for test-of-cure cultures.

The diagnostic approach outlined above reflects a growing concern that PID is often not diagnosed, especially among women with mild or atypical clinical signs. Although correcting this situation is a high public health priority, three qualifications regarding this more sensitive diagnostic approach must be noted.

First, the use of highly sensitive PID diagnostic criteria means that many women who do not have PID

Table 2. Recommendations for Health Providers to Prevent STD/PID

| General preventive measures | Specific recommendations |
|---|---|
| Maintain up-to-date knowledge about the prevention and management of STD/PID | Develop an accurate base of information on the diagnosis, treatment, and prevendon of STD/PID |
| | Complete continuing education courses periodically to update knowledge on STD/PID prevention and management |
| Provide effective patient education and counseling | Educate patients about STD/PID and their potential complications |
| | Encourage individuals to maintain healthy sexual behavior, use barrier methods, and adopt healthy medical-care-seeking behavior |
| Provide appropriate preventive medicine services | Screen patients for chlamydia and gonococcal infection routinely when indicated |
| | Provide epidemiologic treatment for STD/PID when appropriate |
| Provide appropriate medical management for illness | Diagnose STD/PID promptly |
| | Treat STD/PID promptly and with effective antibiotics |
| | Encourage patients to comply with management instructions |
| Ensure examination of sex partners | Encourage infected patients to refer all sex partners in need of medical assessment |
| Report all STD to appropriate health authorities | Evaluate and treat sex partners appropriately |

### Minimum Criteria for Clinical Diagnosis of PID

- Lower abdominal tenderness
- Bilateral adnexal tenderness
- Cervical motion tenderness

### Additional Criteria Useful in Diagnosing PID

**Routine**
- Oral temperature 38.3 C
- Abnormal cervical or vaginal discharge
- Elevated erythrocyte sedimentation rate and/or C-reactive protein
- Culture or non-culture evidence of cervical infection with *N. gonorrhoeae* or *C. trachomatis*

**Elaborate**
- Histopathologic evidence on endometrial biopsy
- Tubo-ovarian abscess on sonography
- Laparoscopy

### Tests Recommended for All Suspected Cases of PID

- Cervical cultures for *N. gonorrhoeae*
- Cervical culture or non-culture test for *C. trachomatis*

will be misdiagnosed and treated for PID (low specificity). Patients and their sex partners often have strong emotional reactions when faced with the implications of a diagnosis of STD. The health-care provider must, therefore, inform a patient of a diagnosis of PID carefully. Both the uncertainty of the diagnosis and the value of empiric treatment must be explained clearly.

Second, careful follow-up is necessary. If no clinical improvement has occurred at 48-72 hours, alternate diagnoses (e.g., appendicitis, endometriosis, ruptured ovarian cyst, or adnexal torsion) should be reconsidered. Use of alternate or additional antimicrobial therapy should also be considered.

Third, use of even these minimum clinical criteria may exclude some women with PID. Clinicians should not withhold therapy from a woman in whom they suspect PID because of failure to meet these criteria.

## *Treatment*

**Patient Education.** The clinician's role as a health educator is central to effective management. Practitioners should explain to women the nature of their disease and should encourage them to comply with therapy and prevention recommendations. Specifically, practitioners should:

- Emphasize the need for taking all the medication, regardless of symptoms.
- Review contraindications and potential side effects
- Identify and discuss potential compliance problems.
- Review the medical purpose of follow-up evaluation.
- Emphasize the need to avoid sex until treatment is completed.
- Emphasize the need to refer sex partners for evaluation and treatment.

When medical-care messages are clear, explicit, relevant, and rigorously delivered by providers, patients are likely to comply. Reinforcement of these messages can be achieved by providing written information. Information on written materials for patient distribution can be obtained from your local or state health department.

**Management of Sex Partners.** Treatment for sex partners of women with PID is imperative. The management of women with PID should be considered inadequate unless their sex partners have been appropriately evaluated and treated. Failure to manage her sex partner(s) effectively places a woman at risk for recurring infection and related complications. Moreover, untreated sex partners often unknowingly transmit STD in a community because of asymptomatic infection.

In clinical settings in which only women are seen, special arrangements should be made to provide care for male sex partners of women with PID. When this is not feasible, clinicians should ensure that sex partners are referred for appropriate evaluation and treatment. After evaluation, sex partners should be empirically treated with regimens effective against *C. trachomatis* and *N. gonorrhoeae* infections.

**Hospitalization.** The efficacy of outpatient management for preventing late sequelae remains uncertain. A single intramuscular (IM) injection of cefoxitin or ceftriaxone, even in conjunction with oral doxycycline for 10-14 days, will provide less complete antimicrobial coverage for a shorter duration than regimens recommended for inpatients. Theoretically, outpatient management could, therefore, reduce the likelihood of successful eradication of upper-genital-tract pathogens and potentially increase the likelihood of late sequelae. Currently, no data are available to adequately assess the risks, benefits, and costs of inpatient versus outpatient treatment for PID.

As for all serious intra-abdominal infections, hospitalization should be considered whenever possible, and is particularly recommended in the following situations:

- The diagnosis is uncertain.
- Surgical emergencies such as appendicitis and ectopic pregnancy cannot be excluded.
- A pelvic abscess is suspected.
- The patient is pregnant.
- The patient is an adolescent (adolescent patients' compliance with therapy is unpredictable, and the long-term sequelae of PID may be particularly severe for members of this group).

- Severe illness precludes outpatient management.
- The patient is unable to tolerate an outpatient regimen.
- The patient has failed to respond to outpatient therapy.
- Clinical follow-up within 72 hours of starting antibiotic treatment cannot be arranged.

Many experts recommend that all patients with PID be hospitalized so

that treatment with parenteral antibiotics can be initiated.

**Treatment Regimens.** Although several antimicrobial regimens have been proven highly effective in achieving clinical cure, no single therapeutic regimen of choice exists for persons with PID, unlike treatment for many specific sexually transmitted organisms. PID is a complex syndrome that encompasses a broad spectrum of inflammatory diseases (e.g., endometritis, salpingitis, and tubo-ovarian abscess) that may be caused by a variety of organisms.

Guidelines for the treatment of patients with PID, therefore, have been designed to provide flexibility in therapeutic choices. PID therapy regimens are designed to provide broad-spectrum coverage of likely etiologic pathogens. In addition to considering microbial etiology, selection criteria for a treatment regimen should also include institutional availability, cost-control efforts, patient acceptance, and regional differences in antimicrobial susceptibility.

The treatment regimens that follow (see accompanying boxed text) are recommendations, and the specific antibiotics named are examples. Treatments used for persons with PID will continue to be broad spectrum until more definitive studies are performed. Any regimen used, however, should cover *C. trachomatis, N. gonorrhoeae*, anaerobes, gram-negative rods, and streptococci.

Continuation of medication after inpatient treatment is important, particularly for the treatment of persons who may have *C. trachomatis* infection. Clindamycin has more complete anaerobic coverage than doxycycline. Although preliminary data suggest that clindamycin is effective against *C. trachomatis* infection, doxycycline remains the treatment of choice for patients with chlamydial disease. Thus, when *C. trachomatis* is strongly suspected as an etiologic agent, doxycycline is the preferred alternative. In such instances, doxycycline therapy may be started while the patient is hospitalized if initiating therapy before hospital discharge is likely to improve the patient's compliance.

Clinicians have extensive experience with both the cefoxitin/doxycycline and clindamycin/aminoglycoside combinations. Each of these regimens provides broad coverage against polymicrobial infection and has been shown in numerous studies to be highly effective in achieving clinical cures. However, data are lacking on the efficacy of these regimens, as well as other regimens, in preventing late sequelae. Cefotetan has properties similar to those of cefoxitin and requires less frequent dosing. Clinical data are limited on other third-generation cephalosporins (ceftizoxime, cefotaxime, ceftriaxone), to replace cefoxitin or cefotetan, although many authorities believe they are effective. Doxycycline administered orally has bioavailability similar to that of the IV formulation and may be given if normal gastrointestinal function is present.

Experimental studies suggest that aminoglycosides may not be optimal treatment for patients who have gram-negative organisms within abscesses, but clinical studies suggest that they are highly effective in treating persons for abscesses when administered in combination with clindamycin. Short courses of aminoglycosides are given to healthy young women when serum-level monitoring is usually not required.

Empiric regimens for oupatient treatment (see boxed text) provide broad-spectrum coverage against the common etiologic agents of PID. Notably, these regimens were particularly designed to treat persons with chlamydial and gonococcal infections; few data are available on the efficacy of these regimens for treating persons with PID, particularly nonchlamydial/nongonococcal PID. Parenteral β-lactam antibiotics are recommended in all cases. The cephalosporins are effective in treating persons with gram-negative organisms, including enteric rods, anaerobic organisms, and gonococci. Although decreased susceptibility of gonococci to cefoxitin has recently been noted, clinically evident treatment failure has not been a problem. Patients who do not respond to therapy within 72 hours should be hospitalized for parenteral therapy. Doxycycline provides definitive therapy for chlamydial infections. Patients treated on an outpatient basis need to be monitored closely and reevaluated in 72 hours.

## Inpatient Treatment

One of the following:

**Recommended Regimen A**

Cefoxitin 2 g intravenously (IV) every 6 hours or cefotetan** IV 2 g every 12 hours, **plus** doxycycline 100 mg orally or IV every 12 hours.

*The above regimen is given for at least 48 hours after the patient clinically improves. After discharge from hospital, doxycycline 100 mg orally 2 times a day should be continued for a total of 10-14 days.*

**Recommended Regimen B**

Clindamycin IV 900 mg every 8 hours **plus** gentamicin loading dose IV or IM (2 mg/kg of body weight) followed by a maintenance dose (1.5 mg/kg) every 8 hours.

*The above regimen is given for at least 48 hours after the patient improves. After discharge from hospital, doxycycline 100 mg orally 2 times a day should be continued for 10-14 days total. Continuation of clindamycin 450 mg orally 4 times a day for 10-14 days may be considered as an alternative.*

## Outpatient Treatment

**Recommended regimen:**

Cefoxitin 2 g IM and probenecid, 1 g orally, concurrently or ceftriaxone 250 mg IM (or equivalent cephalosporin), **plus** doxycycline 100 mg orally 2 times a day for 10-14 days or tetracycline 500 mg orally 4 times a day for 10-14 days.

**Alternative Regimen for Patients Who Do Not Tolerate Doxycycline/tetracycline:**

Substitute erythromycin 500 mg orally 4 times a day for 10-14 days *(no data available on this regimen).*

** Adapted from: Centers for Disease Control. Pelvic Inflammatory Disease: guidelines for prevention and management. MMWR 1991;40(No. RR-5):1-25.*

*** Other cephalosporins such as ceftizoxime, cefotaxime, and ceftriaxone, which provide adequate gonococcal, other gram-negative aerobic, and anaerobic coverage, may be utilized in appropriate doses.*

## Cases of Selected Notifiable Diseases, Virginia, October 1 through October 31, 1991.

| Disease | Total Cases Reported This Month | | | | | | Total Cases Reported to Date in Virginia | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Regions | | | | | | | |
| | State | NW | N | SW | C | E | This Yr | Last Yr | 5 Yr Avg |
| AIDS | 67 | 3 | 35 | 4 | 17 | 8 | 600 | 530 | 299 |
| Campylobacter | 34 | 7 | 7 | 3 | 8 | 9 | 526 | 489 | 533 |
| Gonorrhea* | 1674 | - | - | - | - | - | 15276 | 15477 | 14357 |
| Hepatitis A | 26 | 0 | 12 | 1 | 10 | 3 | 156 | 261 | 233 |
| Hepatitis B | 17 | 1 | 3 | 6 | 3 | 4 | 184 | 210 | 307 |
| Hepatitis NANB | 1 | 0 | 1 | 0 | 0 | 0 | 25 | 36 | 53 |
| Influenza | 0 | 0 | 0 | 0 | 0 | 0 | 689 | 789 | 2096 |
| Kawasaki Syndrome | 1 | 1 | 0 | 0 | 0 | 0 | 23 | 24 | 20 |
| Legionellosis | 2 | 0 | 1 | 1 | 0 | 0 | 13 | 13 | 12 |
| Lyme Disease | 14 | 3 | 6 | 0 | 3 | 2 | 127 | 112 | 41 |
| Measles | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 86 | 74 |
| Meningitis, Aseptic | 81 | 3 | 34 | 8 | 16 | 20 | 380 | 276 | 248 |
| Meningitis, Bacterial~ | 14 | 4 | 2 | 4 | 1 | 3 | 110 | 118 | 151 |
| Meningococcal Infections | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 46 | 54 |
| Mumps | 2 | 1 | 0 | 1 | 0 | 0 | 55 | 99 | 91 |
| Pertussis | 2 | 0 | 1 | 0 | 1 | 0 | 20 | 18 | 31 |
| Rabies in Animals | 26 | 3 | 9 | 1 | 7 | 6 | 221 | 171 | 236 |
| Reye Syndrome | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 |
| Rocky Mountain Spotted Fever | 4 | 0 | 0 | 1 | 2 | 1 | 18 | 22 | 25 |
| Rubella | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| Salmonellosis | 74 | 14 | 23 | 6 | 16 | 15 | 1103 | 1190 | 1355 |
| Shigellosis | 12 | 2 | 3 | 5 | 0 | 2 | 334 | 139 | 233 |
| Syphilis (1° & 2°)* | 67 | 1 | 10 | 11 | 14 | 31 | 776 | 787 | 458 |
| Tuberculosis | 16 | 3 | 3 | 2 | 0 | 8 | 274 | 320 | 331 |

*Localities Reporting Animal Rabies:* Albemarle 1 skunk; Augusta 1 cat; Fairfax 2 raccoons; Gloucester 1 raccoon; Greensville 4 raccoons; Hopewell 1 bat; Loudoun 5 raccoons; Lunenburg 1 skunk; Nelson 1 skunk; Newport News 2 raccoons; Powhatan 1 bat; Prince William 2 raccoons; Russell 1 skunk; York 3 raccoons.

*Occupational Illnesses:* Asbestosis 3; Carpal Tunnel Syndrome 65; Coal Workers' Pneumoconiosis 24; Lead Poisoning 1; Loss of Hearing 9; Mesothelioma 2; Repetitive Motion Disorder 6.

*Total now includes military cases to make the data consistent with reports of the other diseases.
~Other than meningococcal

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