# 1999 HOUSE INDUSTRY, BUSINESS AND LABOR

## HB 1378

1999 HOUSE STANDING COMMITTEE MINUTES

BILL/RESOLUTION NO. HB 1378

House Industry, Business and Labor Committee

❑ Conference Committee

Hearing Date 1-26-99

| Tape Number | Side A | Side B | Meter # |
|---|---|---|---|
| 1 | x | | 0.6 |
| | | | |
| | | | |
| Committee Clerk Signature | | | |

Minutes:

HB 1378 Relating to insurance coverage for chlamydia screening.

Chairman Berg opened the hearing on the bill.

Representative Sally Sandvig, District 21, Fargo, ND, testified in support of the bill.

(see attached written testimony)

Representative Kempenich asked how many people have the disease at the present time. The exact figures are not known but people usually find the disease when they go to a medical doctor for a medical check up. Screening is offered through health system providers.

Ms. Mary Jack Johnson, Director of Student Health Services, Minot State University, testified in support to the bill. It is important to be tested because about 87% of the people tested positive

did not know that they had the disease. If people have it without treating it, the disease will be more costly later on and also can cause other health problems. Because the disease is inflammatory, HIV can be more of a problem also.

Mr. Rod Larson, Blue Cross & Blue Shield, testified in opposition to the bill. His group is not in opposition to testing but testing may result in testing that is not necessary. The requirement for testing is not necessary. Legislative action for this is not necessary. Berg asked about the policy of coverage. Larson said coverage is available for testing because its important.

Mr. Tom Smith, Health Insurance of America, testified in opposition to the bill. They believe that mandatory testing takes out the competitive aspect of medical services. Representative Keiser asked if this would affect the self-insured market. Response from Smith was that this bill has no affect on self insurance which is about 35 - 40% of the market.

Ms. Pam Vukelic, Director of Disease Control, ND Health Dept. testified neutral on the bill. She spoke about how testing was done and said the bill broadens the testing.

Chairman Berg closed the hearing on the bill.

Moved by Representative Koppang for do not pass, Second by Representative Severson,

By roll vote, 13 pass, 0 no, 3 absent, motion passed.

Representative Johnson will carry the bill.

# FISCAL NOTE

(Return original and 10 copies)

Bill/Resolution No.: HB 1378 Amendment to: _____

Requested by Legislative Council Date of Request: 1-20-99

1. Please estimate the fiscal impact (in dollar amounts) of the above measure for state general or special funds, counties, cities, and school districts.

   **Narrative:**

   Assumes 800 procedures per year at an average cost of $31 per procedure. Also assumes this provision will not become effect for PERS until July 1, 2001.

2. **State** fiscal effect in dollar amounts:

| | 1997-99 Biennium | | 1999-2001 Biennium | | 2001-03 Biennium | |
|---|---|---|---|---|---|---|
| | General Fund | Special Funds | General Fund | Special Funds | General Fund | Special Funds |
| Revenues: | | | | | | |
| Expenditures: | | | | | 18,000 | 31,600 |

3. What, if any, is the effect of this measure on the appropriation for your agency or department:
   a. For rest of 1997-99 biennium: None
   b. For the 1999-2001 biennium: None
   c. For the 2001-03 biennium: None

4. **County, City, and School District** fiscal effect in dollar amounts:

| 1997-99 Biennium | | | 1999-2001 Biennium | | | 2001-03 Biennium | | |
|---|---|---|---|---|---|---|---|---|
| Counties | Cities | School Districts | Counties | Cities | School Districts | Counties | Cities | School Districts |

If additional space is needed, attach a supplemental sheet.

Signed Sparb Collins

Typed Name Sparb Collins

Date Prepared: 1-25-99

Department P.E.R.S.

Phone Number 328-3901

Date: 1-26-99
Roll Call Vote #: 1

# 1999 HOUSE STANDING COMMITTEE ROLL CALL VOTES
## BILL/RESOLUTION NO. 1378

House Industry, Business and Labor Committee

☐ Subcommittee on _____
or
☐ Conference Committee

Legislative Council Amendment Number _____

Action Taken do not pass

Motion Made By Koppang Seconded By Severson

| Representatives | Yes | No | Representatives | Yes | No |
|---|---|---|---|---|---|
| Chair - Berg | / | | Rep. Thorpe | | |
| Vice Chair - Kempenich | / | | | | |
| Rep. Brekke | / | | | | |
| Rep. Eckstrom | / | | | | |
| Rep. Froseth | / | | | | |
| Rep. Glassheim | / | | | | |
| Rep. Johnson | / | | | | |
| Rep. Keiser | / | | | | |
| Rep. Klein | / | | | | |
| Rep. Koppang | / | | | | |
| Rep. Lemieux | | | | | |
| Rep. Martinson | / | | | | |
| Rep. Severson | / | | | | |
| Rep. Stefonowicz | / | | | | |

Total (Yes) 13 No —

Absent 2

Floor Assignment Johnson

If the vote is on an amendment, briefly indicate intent:

## REPORT OF STANDING COMMITTEE

**HB 1378: Industry, Business and Labor Committee (Rep. Berg, Chairman)** recommends **DO NOT PASS** (13 YEAS, 0 NAYS, 2 ABSENT AND NOT VOTING). HB 1378 was placed on the Eleventh order on the calendar.

**1999 TESTIMONY**

**HB 1378**

**TESTIMONY**
**HB 1378**
**REPRESENTATIVE SALLY M. SANDVIG**
**IBL COMMITTEE**
**1-26-99 10:00 AM**

**CHAIRMAN BERG AND MEMBERS OF THE IBL COMMITTEE:**

**FOR THE RECORD I'M REPRESENTATIVE SALLY M. SANDVIG FROM DISTRICT 21 IN FARGO. I'M HERE TO TESTIFY FOR HB 1378 RELATING TO INSURANCE COVERAGE FOR CHLAMYDIA SCREENING.**

**THE REASON I'M SPONSORING THIS BILL IS BECAUSE AT A WOMEN'S LEGISLATIVE LOBBY OR WILL NATIONAL CONFERENCE HELD IN WASHINGTON, DC. IN 1997 WHICH I ATTENDED, I RECEIVED VALUABLE INFORMATION FROM ONE OF THE SPEAKERS THERE ON THE NECESSITY FOR CHLAMYDIA SCREENINGS IN THIS COUNTRY. THERE IS AN EPIDEMIC OF THIS DISEASE OUT THERE. OVER 4 MILLION CASES ARE FOUND IN THE U.S. EACH YEAR. THE SPEAKER HAD WORKED FOR THE CENTER FOR DISEASE CONTROL IN ATLANTA AND ALSO IN ALASKA WHERE THERE IS A HIGH INCIDENCE OF THIS DISEASE. I THEN TALKED TO OUR STATE HEALTH DEPARTMENT AND THEY WERE QUITE INTERESTED IN THE BILL THAT I AM SPONSORING, AND PROVIDED ME WITH SOME INFORMATION.**

**CHLAMYDIA IS A SEXUALLY TRANSMITTED DISEASE WHICH IS OFTEN ASYMPTOMATIC, YET HAS SERIOUS SEQUELAE. ADOLESCENTS ARE AT HIGHEST RISK FOR THE INFECTION WHICH IS AN IMPORTANT CAUSE OF PELVIC INFLAMMATORY DISEASE, CHRONIC PELVIC PAIN, & SUBSEQUENT TUBAL FACTOR INFERTILITY IN U.S. WOMEN. CHLAMYDIA CAN CHANGE A WOMAN'S LIFE LEAVING HER FALLOPIAN TUBES A TANGLE OF SCARS AND DESTROYING HER FERTILITY. IT CAN BE BLAMED FOR 45% OF THE CASES OF TUBAL INFERTILITY AND AN EQUALLY LARGE PORTION OF ECTOPIC PREGNANCIES. A PREGNANT WOMAN MAY PASS THE INFECTION ON TO HER NEWBORN DURING DELIVERY WITH SUBSEQUENT NEONATAL EYE INFECTIONS OR PNEUMONIA. IN MEN THE INFECTION CAUSES URETHRETIS AND EPIDIDYMITIS.**

**TESTS SHOW THAT 14 YEAR OLD FEMALES HAD THE HIGHEST RATES OF INCIDENCE, 63 OF 229 CASES IN BALTIMORE. I OUR STATE AN ESTIMATED 417 CASES OF MALE CHLAMYDIA, 380 CASES OF FEMALE CHLAMYDIA, AND 217 CASES OF CHLAMYDIA PELVIC INFLAMMATORY DISEASE WERE PREVENTED THROUGH DISEASE INTERVENTION EFFORTS CONDUCTED BY THE STD PROGRAM. THE ECONOMIC SAVINGS WERE $911,949.00 . CHLAMYDIA IS INCREASING IN BLACKS AND IN THE 25-29 YEAR OLD GROUP. IN NATIVE AMERICANS 82.4% OF POSITIVE TESTS WERE IN THE 15-24 YEAR OLD GROUP. IN THE REGION 8 NON-FAMILY PLANNING CLINICS, CHLAMYDIA PROJECT 87.8% OF THE PATIENTS WHO TESTED POSITIVE HAD NO SYMPTOMS. THE**

**HIGHEST PERCENTAGE OF POSITIVE FEMALES WERE IN THE 15-19 YEAR OLD AGE GROUP, AND MALES IN THE 20-24 YEAR OLD AGE GROUP.**

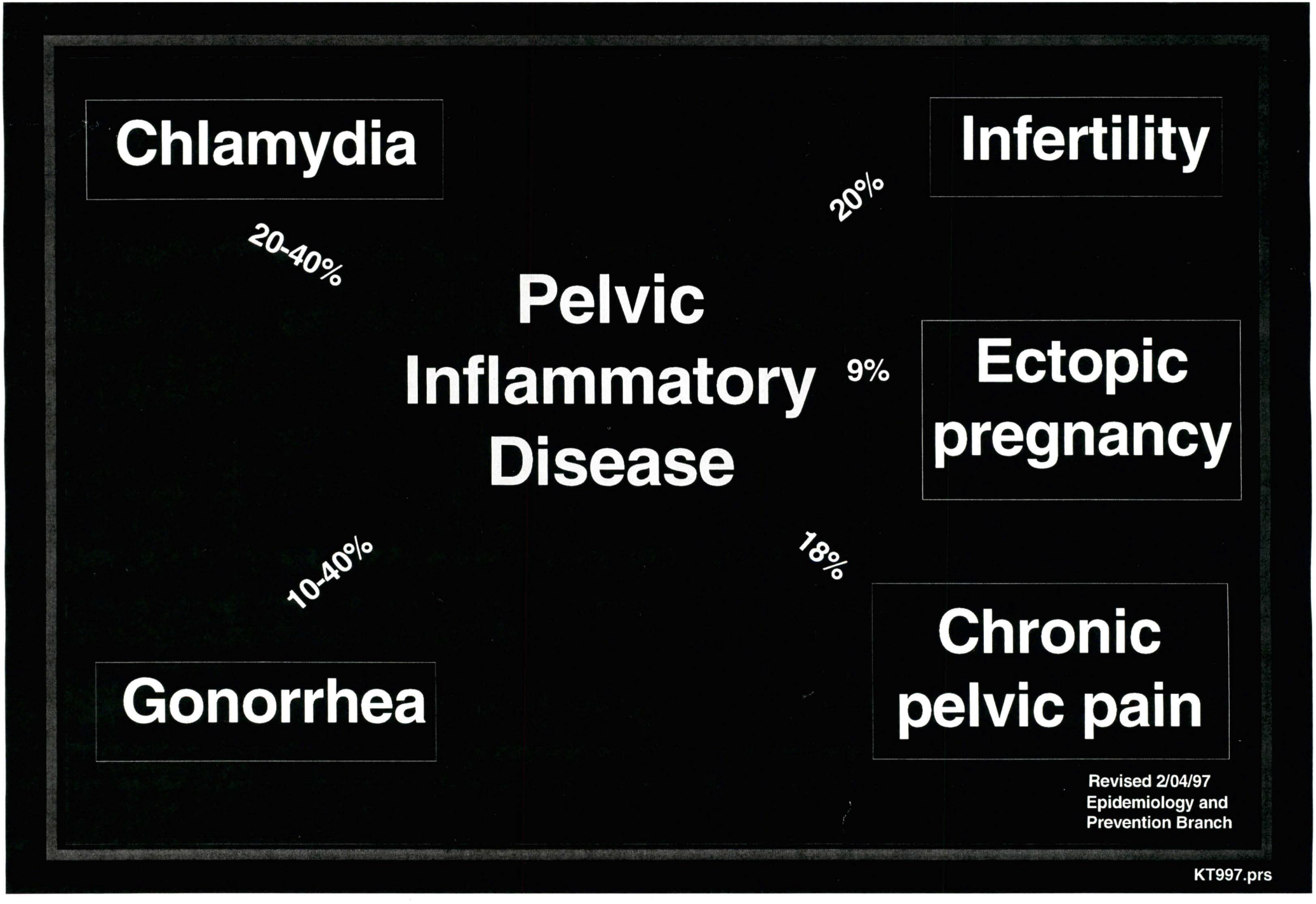
**SCREENING HIGH RISK WOMEN CAN CUT THE NUMBERS OF PELVIC INFLAMMATORY DISEASE BY ALMOST 60% . HIGH RISK WOMEN WHO ARE SCREENED AND FOUND CAN BE CURED WITH A SHORT COURSE OF ANTIBIOTICS. SCREENING AND TIMELY TREATMENT CAN DECREASE THE INCIDENCE OF SEQUELAE AND THE ASSOCIATED MEDICAL COSTS. THE SEQUELAE OF CHLAMYDIA COST MORE THAN 2.7 BILLION EACH YEAR. THE CENTER FOR DISEASE CONTROL HAS CALCULATED THE COST EFFECTIVENESS OF CHLAMYDIAL SCREENING BY COMPARING THE TOTAL COSTS, INCLUDING SCREENING PROGRAM COSTS, AND ESTIMATING FUTURE MEDICAL COSTS OF ALL SEQUELAE. DOLLARS SPENT ON EARLY DETECTION WILL SAVE MONEY IN THE LONG RUN BY PREVENTING SERIOUS REPRODUCTIVE COMPLICATIONS.**

**WOMEN WHO ARE AT HIGHEST RISK AND SHOULD BE SCREENED ARE THOSE WHO HAVE AN INFLAMED CERVIX, THOSE WHO DO NOT USE BARRIER CONTRACEPTION, THOSE WHO HAVE HAD MORE THAN ONE SEX PARTNER WITHIN 90 DAYS, OR THOSE WITH A NEW SEX PARTNER.**

**GEORGIA NOW HAS A LAW REQUIRING COVERAGE FOR SCREENINGS IN PLACE. I URGE YOU TO FOLLOW GEORGIA'S EXAMPLE AND GIVE THIS BILL**

**A DO PASS RECOMMENDATION. LET'S STOP THIS EPIDEMIC BEFORE THE CONSEQUENCES COST US ANY MORE $.**

**THANK YOU.**


Chlamydia
20-40%
Infertility
20%
Pelvic Inflammatory Disease
9%
Ectopic pregnancy
10-40%
18%
Gonorrhea
Chronic pelvic pain
Revised 2/04/97
Epidemiology and Prevention Branch
KT997.prs

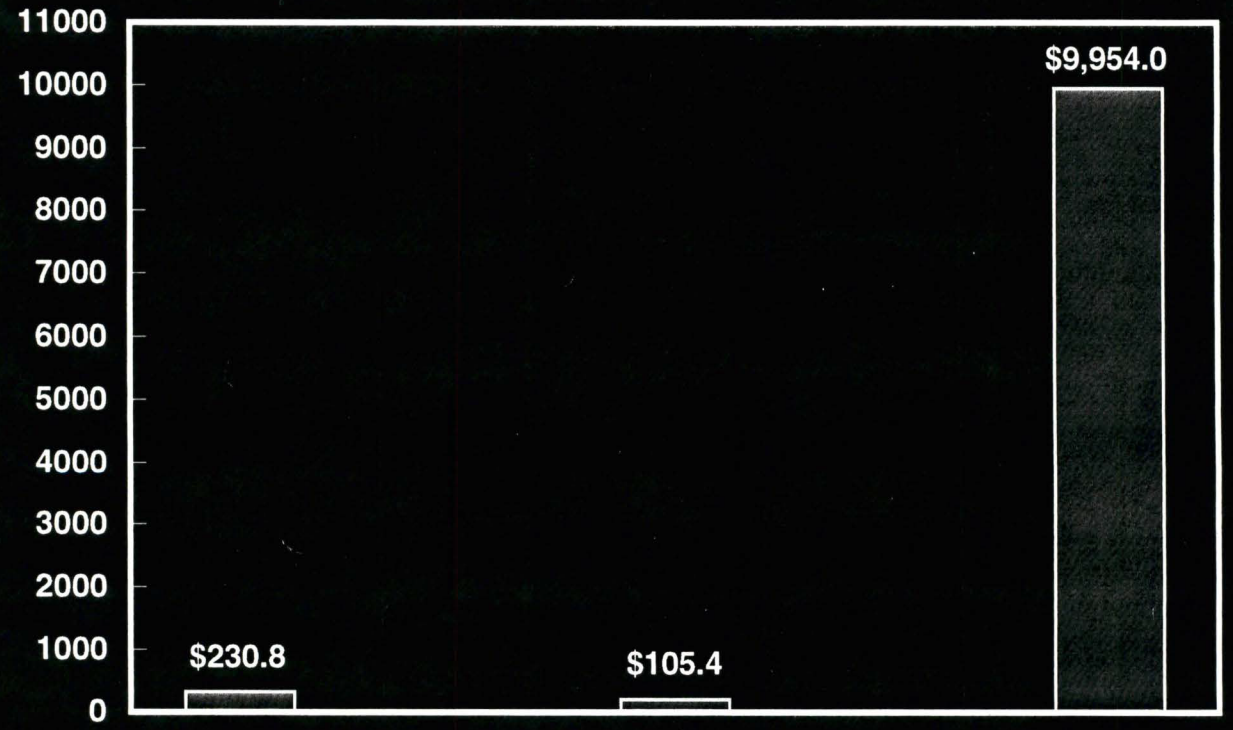
# Cervical Cancer

- Number two cause of cancer deaths in women worldwide
- Approximately 15,700 new cases & 5,000 deaths in American women annually
- Several types of HPV constitute single most important risk factor for dysplasia and invasive cancer

Epidemiology and
Prevention Branch

KT997.prs

# The estimated total costs associated with STDs was more than 43 and 94 times greater than the national public investment in STD prevention and research, respectively, in 1994




Epidemiology and
Prevention Branch

KT997.prs

# Role of STDs in HIV Transmission

- STDs increase the risk to acquire or transmit HIV infection (up to 5 times higher risk)
- STD diagnosis and treatment can reduce the number of new HIV infections by more than 40%

Revised 2/04/97

Epidemiology and Prevention Branch

KT997.prs

- Screening for Chlamydia can save money - by preventing complications

- Screening for Chlamydia can reduce PID by nearly 60%

Revised 2/4/97

Epidemiology and Prevention Branch

KT997.prs

- **Chlamydia screening for young women**
  - Recommended by U.S. Preventive Task Force
- **Institute of Medicine (1996)**
  - All health plans should provide for or cover comprehensive STD-related services, including provision of chlamydia screening

Revised 2/04/97

Epidemiology and Prevention Branch

KT997.prs

# Selected STDs in the United States
# Estimated Annual Costs

| Syndrome | Cost | Source |
|---|---|---|
| Genital & Neonatal Herpes | $68 million | IOM, 1985 |
| Gonococcal Infection & Sequelae | $936 million | IOM, 1985 |
| Chlamydial Infection & Sepuelae | $2.2 billion | CDC, 1987 |
| PID & Sequelae | $4.2 billion | Washington, et al, 1990 |

Epidemiology and Prevention Branch

KT997.prs

# Estimated Costs of Selected STDs and Sequelae United States, 1994 (1994 $, millions)

| | Direct Cost | Total Cost |
|---|---|---|
| Chlamydia | 1514 | 2014 |
| Gonorrhea | 791 | 1052 |
| PID | 3119 | 4148 |
| Syphilis | 79 | 106 |
| Chancroid | 0.7 | 0.9 |
| Herpes | 178 | 237 |
| HPV | 2878 | 3828 |
| HBV | 117 | 156 |
| Cervical cancer | 554 | 737 |
| Subtotal STDs (excl. HIV/AIDS) | 7484 | 9954 |
| Sexually transmitted HIV/AIDS | 5025 | 6683 |
| Total (including HIV/AIDS) | 12509 | 16638 |

Source: Institute of Medicine, 1996

Epidemiology and Prevention Branch

KT997.prs

- STDs are a serious health problem for women
- STDs are common in all communities
- The South has the highest rates of STDs among all states

Revised 2/04/97

Epidemiology and Prevention Branch

KT997.prs

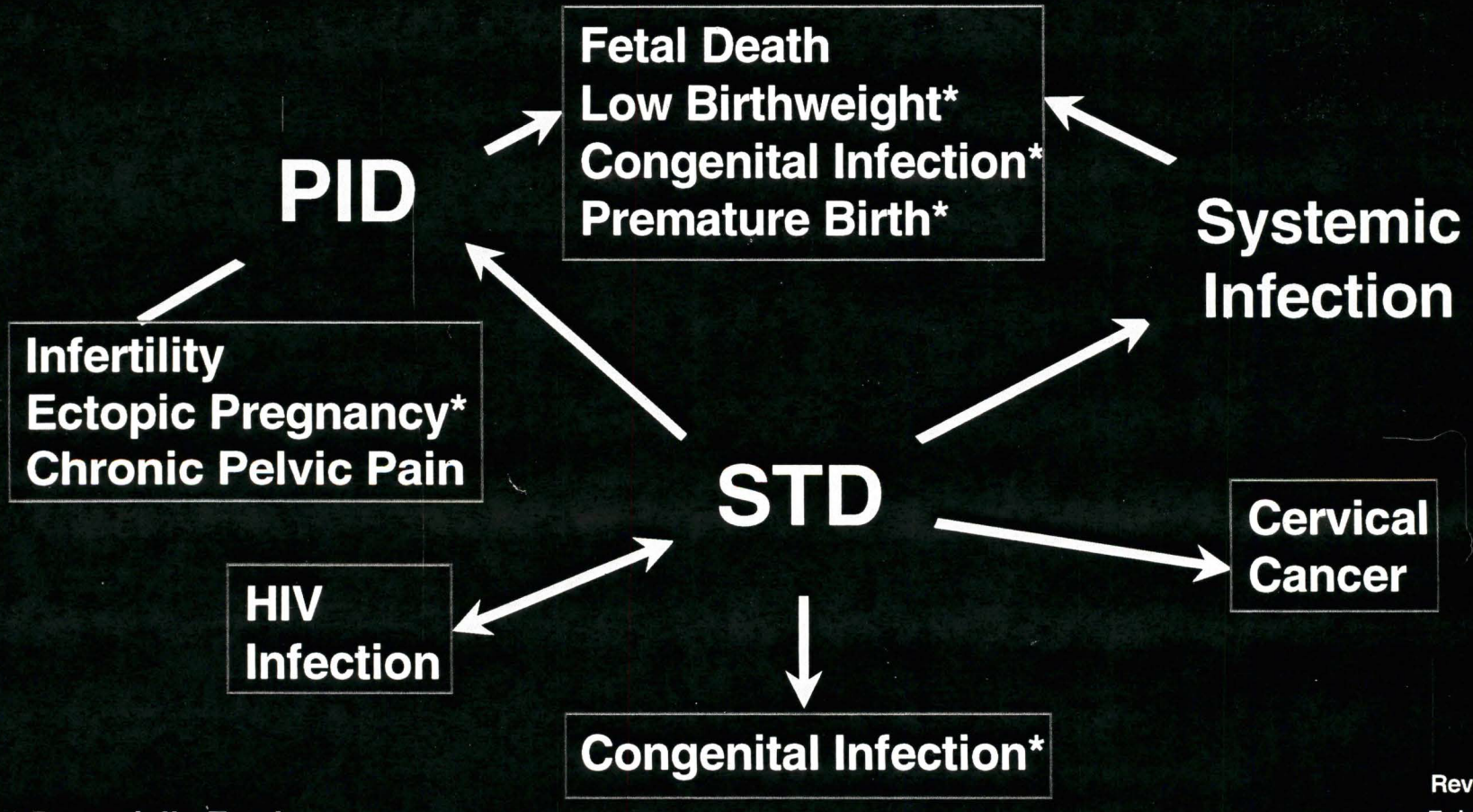
# STDs: Women are at Increased Risk

- Women are more likely than men to get STDs
  - Power dynamics
  - Prevention technologies (i.e. condoms)
  - Anatomy
- Women are less likely than men to seek care
  - Most women have no STD symptoms
  - Social stigma
- Women are more difficult to diagnose
- Women suffer more severe biological & social consequences

Revised 2/04/97
Epidemiology and
Prevention Branch

KT997.prs

# Complications of Sexually Transmitted Diseases in Women




* Potentially Fatal

Revised 2/04/97

Epidemiology and Prevention Branch

KT997.prs

# Chlamydial infection and gonorrhea in teenage women

By Alvin F. Goldfarb, MD

In the age of AIDS, attention has tended to focus on that lethal and feared sexually transmitted disease. But for those caring for adolescents, infection by these two bacterial pathogens is still a daily and serious concern. Once they establish a foothold, the way to serious sequelae, including HIV infection, is open.

With the highest rate of sexually transmitted diseases (STDs) in the developed world, the United States is in the throes of a "hidden epidemic," according to a recent report from the Institute of Medicine.[1] In addition to the high human cost to the victims of these diseases and their families, the authors of the report estimate that the financial burden of this epidemic to US taxpayers is at least $10 billion per year—*not including the costs of HIV infection.* In 1995, of the 10 most frequently reported notifiable diseases, five were STDs, and these accounted for 87% of cases among the top 10 reportables.[2]

The epidemic comprises a variety of diseases and is the result of many factors: (1) changing sexual mores and patterns; (2) emergence and spread of viral diseases such as herpes, human papillomavirus (HPV),

Dr. Goldfarb is professor of obstetrics and gynecology, Thomas Jefferson School of Medicine, and executive director, North American Society for Pediatric and Adolescent Gynecology, Philadelphia, PA.

TABLE 1
**Sexual behavior of US high-school girls (1995)**

| Grade | Ever had sexual intercourse (%) | First intercourse before 13 | Four or more sex partners during lifetime (%) |
|---|---|---|---|
| 9th | 32.1 | 7.7 | 6.8 |
| 10th | 46.0 | 5.6 | 11.3 |
| 11th | 60.2 | 3.6 | 17.2 |
| 12th | 66.0 | 3.2 | 20.8 |
| **Total** | **52.1** | **4.9** | **14.4** |

Source: Youth Risk Behavior Surveillance System, Centers for Disease Control and Prevention: MMWR 1996;45(SS-4):64

*d* HIV infection; (3) poor access to clinical health-care services among high-risk populations; (4) inadequate screening and public educational efforts; and (5) lack of a national program focusing on the STD problem. But one factor is common to all STDs and their complications: they are preventable. Yet, regrettably, public expenditures on prevention of STDs amount to only $1 for every $43 spent on treatment and other costs.[1]

The disparity between preventive efforts and costs incurred by preventable disease is nowhere more evident than in adolescent medicine. Of the 12 million STD cases occurring in the US every year, 3 million are estimated to occur in teenagers,[3] perhaps the most underserved of all population groups in the health-care system. Among those 3 million cases, significantly more than half are in girls and young women, who are more likely to acquire STDs from male partners than to transmit them. They are also more likely than boys and men to suffer long-term and severe consequences—pelvic inflammatory disease, cervical cancer, ectopic pregnancy, and infertility. In addition, unlike their male partners, they are able to transmit infection or its complications to offspring if, as is all too common, they compound STD infection with pregnancy.

To those of us engaged in adolescent gynecology—pediatricians, obstetrician-gynecologists, family physicians, adolescent medicine specialists, and others who provide care for adolescent girls and women—"hidden" is perhaps a misnomer for an epidemic we have been facing as front-line shock troops for some time. We welcome the Institute of Medicine's call for additional resources to confront this problem because it's obvious we can't win this battle alone. However, as primary providers of health services to adolescents, we are still in the best position to help prevent as well as manage these infections and their consequences.

TABLE 2
**High-school students (%) using condoms at last intercourse**

| Sex/race | 1991 | 1993 | 1995 |
|---|---|---|---|
| Female | 38.0 | 46.0 | 48.6 |
| Male | 54.6 | 59.2 | 60.5 |
| White | 46.6 | 52.3 | 52.5 |
| African-American | 48.0 | 56.5 | 66.1 |
| Hispanic | 37.6 | 46.1 | 44.4 |
| Total | 46.2 | 52.8 | 54.4 |

Sources: Youth Risk Behavior Surveillance System, Centers for Disease Control and Prevention; MMWR 1995;44:124; MMWR 1996;45(SS-4):57

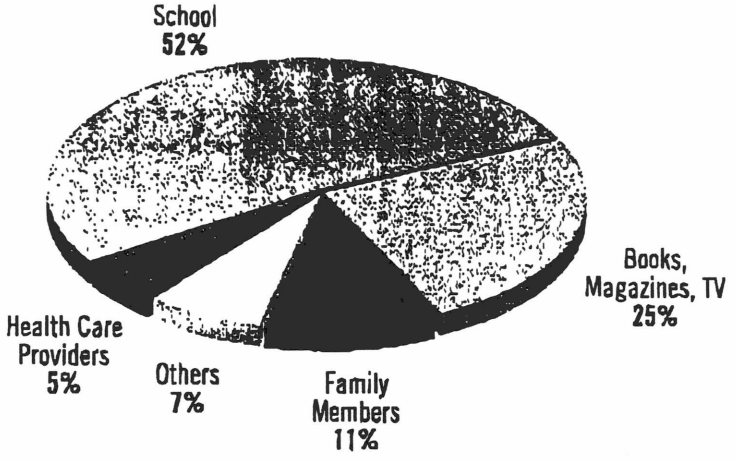
In this article, the first in a series on STDs in adolescents, I will address the two most common bacterial STDs in the US: chlamydial infection and gonorrhea. These two infections are similar not only in many of their signs and symptoms but also in their frequent lack of them. They share other characteristics as well: both are not only preventable but readily curable—when found early; both can lead to serious consequences for young women if not diagnosed and treated appropriately; and, increasingly, both are more prevalent among teenagers than among any other age group.

## Why are teens at high risk?

Compared with women of other age groups, adolescents exhibit the highest risk not only for chlamydial infection and gonorrhea but also for syphilis and HPV infection.[4] While the teen years were never risk free, the emergence of adolescent age itself as a risk factor for STDs may be traced to the changes in teen sexual behavior that began with the so-called sexual revolution of the 1960s and continue today. The latest report from the CDC's Youth Risk Behavior Surveillance System (YRBSS) reveals that in 1995, nationwide, more than half (52.1%) of *all* high school girls were sexually experienced (Table 1).[5] More specifically, the YRBSS data show that 66% of 12th-grade girls had had intercourse at least once and that 20.8% had had more than four sex partners. The same report indicates that 32.1% of 9th-grade girls had already had sexual intercourse and that 7.7% had their first experience before age 13.

Obviously, more and earlier sexual encounters create more opportunity for exposure to STDs. But, as several authors have pointed out, the fact of sexual experience in teens does not necessarily put them at higher risk for consequences such as STDs or unwanted pregnancy. In fact, European adolescents have similar levels of sexual activity and debut but much lower rates of both pregnancy and

FIGURE 1
**Distribution of US teens by primary source of information about STDs**




Source: American Social Health Association: STD News 1996;3:1

STDs.[6,7] That is true for the general populations of these countries as well. In Sweden, the reported rate of gonorrhea is about 2% of the US rate; in Canada it is about 12% of the US rate.[1]

What makes US teens—and young adults—different is their high frequency of unprotected intercourse. For sexually active adolescents, effective condom use is the best if not the sole hope for avoiding exposure to STDs. Even though there is evidence that teen condom use has increased somewhat over the past decade (Table 2)[5,8]—most likely as a result of fear of HIV infection—it is still sporadic and often poorly or incorrectly managed. According to the YRBSS report, only 48.6% of high-school girls could report condom use during their most recent sexual encounter.[5] Another author notes that most teens are sexually active for up to a year before starting to use any kind of protection.[9]

Why would a young girl or woman risk her health, future fertility, and even her life by failing to apply a method that is easy to use, readily available, and highly effective? Here are some of the reasons:

(1) *Ignorance of consequences.* Unlike parents in countries where STD rates are much lower, American parents tend not to discuss the specifics of sexual behavior with their children. A 1995 survey showed that only about 11% of US teens get most of their information about STDs from parents and other family members (Figure 1).[10] As a result, teens often get their sexual directions—and misdirections—from friends. Television is another prime source, and not a good one: a recent study found that of every 25 instances of sexual encounters portrayed on prime-time television, only one showed protective behavior.[11] Of course, much more reliable information is available from sex education programs in the public schools. However, despite existence of sex education in many schools and availability of condoms in some, such programs are lacking or poorly presented in many parts of the country, particularly the inner cities.

(2) *Poor access to health care.* Health care providers should be a main source of good sexual information, including condom use, for teens. But adolescents typically make their first visit for gynecologic care when they already have a sex-related problem: disease or pregnancy. About 20% of those 15- to 19-year olds who might have consulted a doctor earlier are uninsured. Even those who have insurance are likely to be covered only by Medicaid or plans that do not provide payment for preventive care.[1]

(3) *No choice.* Adolescent girls, particularly younger ones, may be victims of rape or sexual abuse.

(4) *Power imbalance.* A woman, particularly a young and inexperienced one, cannot force her male partner to use a condom. Negotiating skills are often needed, and these need to be learned.

(5) *Circumstances.* At the precise moment when she needs one, a girl or her partner may not have a condom, the money to buy one, or a place to buy one.

(6) *Low self-esteem.* Many studies have traced the origins of high-risk behavior such as unprotected intercourse in teens to a poor sense of self-worth or even a desire to punish themselves or their families. At the other end of the scale are teens who feel their youth and vigor or "street smarts" make them invulnerable to harm or that the warnings of adults aren't to be taken seriously.

(7) *Impaired judgment.* Use of alcohol, marijuana, and crack cocaine—highly associated with risky behaviors such as having sex with multiple partners or with high-

TABLE 3

## Estimated annual exposure to selected STDs in the US

| Disease | Incidence | Prevalence |
|---|---|---|
| Chlamydial infection | 4,000,000 | NA |
| Gonorrhea | 1,000,000 | NA |
| Syphilis | 101,000 | NA |
| Congenital syphilis | 3,400 | NA |
| Chancroid | 3,500 | NA |
| HPV infection | 500,000–1,000,000 | 24,000,000 |
| Genital herpes | 200,000–500,000 | 31,000,000 |
| Hepatitis B infection (sexually transmitted) | 53,000 | NA |
| AIDS | 80,000 | 185,000 |
| HIV infection | NA | 630,000–900,000 |
| Trichomoniasis | 3,000,000 | NA |
| PID | >1,000,000 | NA |

NA—not available.

Source: Estimates for 1994. From Committee on Prevention and Control of Sexually Transmitted Diseases, Institute of Medicine: The Hidden Epidemic: Confronting Sexually Transmitted Diseases. National Academy Press, Washington, DC, 1996.

risk partners—makes a rational decision about condom use much less likely. The YRBSS report shows that in 1995 49.9% of high-school girls were currently using alcohol and that 28.6% admitted to periodic heavy drinking. About 22% were currently using marijuana and 5% had used cocaine.[5]

### Chlamydia: silent and spreading

*Chlamydia trachomatis*, an obligate intracellular bacterium, is the most common sexually transmitted bacterial pathogen in the US, yet chlamydial infection was not added to the list of 52 notifiable diseases reported to the CDC until 1995. In that initial year, it led all other reportable diseases in number of cases with 477,638—versus 392,848 for gonorrhea, 120,624 for varicella, 71,547 for AIDS, and 68,953 for syphilis, the next four in frequency.[12] Of these *Chlamydia* cases, 383,956 were reported in women—versus 188,650 female cases of gonorrhea and 13,540 of AIDS. Even at these high levels, the CDC considers chlamydial infection vastly underreported, estimating actual infections at upwards of 4 million per year (Table 3).[13] The reasons so many of these infections go unrecognized are twofold: (1) as many as 70% are asymptomatic[14]; (2) public awareness of the disease continues to be extremely low.

While the CDC's 1995 summary does not provide data for chlamydial infection by age groups, it does designate adolescent age as the sociodemographic factor most highly associated with risk. In its 1993 recommendations on prevention and management of chlamydial infection, the CDC also recognized prevalence as highest—above 10%—among sexually active adolescent girls and women, while estimating prevalence in the general population as above 5%, "regardless of region of the country, urban/rural location of provider, or race/ethnicity."[15] In a recent study of 5,128 women of all ages in New Jersey, prevalence of chlamydial infection varied from 8% to 15%, with urban women under 20 at the top end of the scale.[15]

**Screening.** Teenage girls are at higher risk for chlamydial infection for physiological reasons as well as behavioral ones. Cervical columnar epithelial cells are a prime target for both *C trachomatis* and *Neisseria gonorrhoeae*, and in puberty and the developing years these cells extend outward beyond the protection of the cervical mucus. Only with full maturity do these cells recede into the inner cervix.

Because teens are more prone to chlamydial infection by both behavior and biology, the CDC recommends as its primary prevention strategy that *all sexually active adolescents and young adults be screened at least annually* whether or not they exhibit symptoms.[13] Establishing good and open communication is not always easy but is essential to eliciting an accurate sexual history (see "Tips on taking a sexual history," page 8). Testing is considered mandatory for those with mucopurulent cervicitis, those who have had a new or more than one sex partner in the preceding 3 months, and of course those who admit to inconsistent use of barrier contraception.

**Signs and symptoms.**[16] As noted earlier, chlamydial infection is more

## Tips on taking a sexual history

The prime impediment to obtaining clinical information about sexual behavior is embarrassment. That is true for older patients as well as younger ones—and even for some clinicians. The key to getting around it is usually simply "breaking the ice" and assuring the patient that what she says will remain confidential and is very important to your being able to give her the best health care.

Since patients are likely to be uncomfortable talking about sexual matters, it's especially important for you to appear comfortable when bringing them up. Not appearing relaxed and open is almost certain to send the wrong message.

In the case of a teenage patient, sexual history taking may have to be done in stages. Raising the issue of sexuality during one office visit may not elicit much information but may make it easier for the girl to be more forthcoming during the next visit—or even by phone when she gets home. Ideally, this kind of exchange should begin in the preteen years and before sexual activity has begun.

When starting the interview—always in a private setting and with the patient dressed—it's usually best to be straightforward about the kinds of questions you're going to ask. Beginning with "What do you like to do for fun?" and "Do you have a boyfriend (or girlfriend)?" is a way to break the ice. It may help to say, "I ask all my patients these questions." It may also help to frame some questions generally rather than personally. "Many girls are concerned about..." or "some people do... Is that something your friends have done or that you've thought about doing?"

While it's not necessary to resort to "street" language you don't feel comfortable with, neither is it a good idea to be too clinical in your choice of words. Using your listening skills well and being careful to observe nonverbal responses will help you refine your language to be sure you're being understood and not coming across as too distant, mechanical, or inquisitorial.

It's important to remember that teens will usually answer you honestly if they feel you're being open with them, that you're really listening to them, and that what they say is just between you and them. They'll listen to and even sometimes take advice if it's clear that you're interested only in their health and not their morals. You might even say, "I think you're too young to have sex, but if you decide to do it (or since you've decided to do it), let's talk about how we can keep you safe."

What they need to take away with them, whether they've told you all you need to know or not, is that you are someone they can call when they have a problem—or even better, to avoid having one. They must understand you are not judgmental in your attitude.

**SUGGESTED READING**

Alexander B: Taking the sexual history. Am Fam Physician 1981;23:147

Risen BD: A guide to taking a sexual history. Clin Sexuality 1995;18:39

Taking a sexual history to help patients prevent STDs. Contraception Rep 1996;7(2):12

**ADDITIONAL MATERIALS**

Personal Health History Forms and a guide on taking sexual history are available from the American Social Health Association (ASHA), P.O. Box 13827, Research Triangle Park, NC 27709; 919-361-8400. ASHA is a nonprofit organization that operates the CDC's STD Hotline (1-800-227-8922, Mon.-Fri., 8 a.m.-11 p.m. EST).

likely than not to be asymptomatic. When it does present clinically, it usually does so in the form of cervical inflammation and/or discharge of yellow "mucupus." A friable cervical os that bleeds when wiped with a cotton swab is another important sign. Visualization of 15 or more white blood cells per high-power field on a saline wet preparation or a Pap smear showing inflammatory changes with white cells may also suggest presence of *Chlamydia*.

The urethra is the second prime target for this organism. Urethritis or acute urethral syndrome with dysuria, frequency, and pyuria may signal either chlamydial infection or gonorrhea. Rectal inflammation may also be seen, and cystitis is a less common but possible effect.

**Diagnosis.** Culture of endocervical cells is still considered the gold standard for identification of *C trachomatis*, but culture is relatively expensive and requires careful handling and transport of specimens. In the near future, nucleic acid amplification methods, such as polymerase chain reaction (PCR) and ligase chain reaction (LCR) tests, or transcription-mediated amplification (TMA) tests may replace culture as the new gold standard. These tests will be easier for patients because they can be performed on first-catch urine samples rather than cervical specimens. They also promise results equal or superior to culture

...al sensitivity and specificity.[17-20]

In the meantime, a variety of other nonculture tests are now commercially available and are accepted by the CDC as alternatives to culture provided their limitations are understood. They are less specific than culture tests and, particularly in lower-prevalence areas, may produce false-positive results. Nevertheless, because they are cheaper, easier to use, and reasonably accurate, these tests have an important role in aggressive preventive strategies.

Commercial nonculture tests include the following:

(1) *Direct fluorescent antibody (DFA) tests*. These tests work by adding fluorescent monoclonal antibodies to a slide containing endocervical material. Antibody binds to chlamydial elementary bodies that can then be identified by fluorescence microscopy. Total processing time is 30 to 40 minutes, but processing must be done by an experienced professional laboratory.

(2) *Enzyme immunoassay (EIA) tests*. In this type of test, monoclonal or polyclonal antibody labeled with a color-signaling enzyme attaches to chlamydial antigen; the result is analyzed with a spectrophotometer. Lab processing is required for these tests as well.

(3) *Nucleic acid hybridization tests (DNA probe)*. This technique employs a chemiluminescent-labeled probe complementary to a particular sequence of chlamydial ribosomal RNA (rRNA). The probe hybridizes with rRNA present in the specimen, and the result is detected with a luminometer. Lab processing is required.

(4) *Rapid (stat) tests*. These test kits, packaged as single units, operate much like EIA tests in using antibodies to detect antigens of chlamydial species. They may be somewhat less sensitive and specific than tests performed by professional laboratories, but they require less equipment and can be done in the office.

**HIV shares with *C trachomatis* a predilection for cervical ectopy. One recent analysis suggests chlamydial infection may increase HIV susceptibility as much as fivefold.**

Sensitivities of nonculture tests, measured against culture, must exceed 70% to be adequate for screening, according to the CDC, and most appear to meet this standard.[13] Isolation of *C trachomatis* by culture is diagnostic. A positive result from a nonculture test in an adolescent, particularly if she is from a high-prevalence population, is not considered diagnostic but is usually reason enough for presumptive treatment, since side effects from the antibiotics used are uncommon and mild. The CDC recommends using culture or a second, different nonculture test for verification of chlamydial infection when a false-positive result may have adverse social or psychological consequences or when the patient is from a low-prevalence population.

Even in patients treated presumptively, the CDC recommends testing and verification to ensure appropriate medical care should symptoms persist. Verification also facilitates counseling, provides a basis for partner notification, and enhances compliance.

**Treatment.**[13,21] Prompt treatment of identified or presumed chlamydial infection in adolescent girls and women is imperative not only to relieve any cervical and urethral symptoms they may have but also to prevent transmission to partners and consequent reinfection. Even more important is eradicating the organism before it has a chance to ascend into the upper reproductive tract, where it has the potential to cause pelvic inflammatory disease and other serious problems.

The CDC's recommendations for uncomplicated endocervical, urethral, or rectal chlamydial infections in nonpregnant girls and women were updated in 1993 and no longer include tetracycline. The preferred regimens now are:

Doxycycline, 100 mg orally, twice a day for 7 days

*or*

Azithromycin, 1 g orally in a single dose.

Of these two options, the CDC leans toward azithromycin for use in adolescents, since the single-dose treatment can be provided during the patient's visit, eliminating problems of compliance. Results of a recent study from Sweden support this logic, though azithromycin does carry a higher price tag (approximately $30/dose vs. $2 for doxycycline).[22] As alternatives for adolescents, the CDC lists these additional options:

Erythromycin base, 500 mg orally four times a day for 7 days

*or*

Erythromycin ethylsuccinate, 800 mg orally four times a day for 7 days.

The CDC guidelines also mention sulfisoxazole, 500 mg orally, four times daily for 10 days, as a possible though less effective regimen. Ofloxacin, 300 mg orally twice daily for 7 days, is an option for adults

but *not* for pregnant women or adolescents under age 17 because evidence from animal studies suggests it may impair development of cartilage. For pregnant adolescents, doxycycline and azithromycin are also contraindicated, but either of the erythromycin regimens can be given. Amoxicillin, 500 mg orally three times daily for 7 to 10 days, is suggested for pregnant girls and women who can't tolerate erythromycin.

**Sequelae.** Pelvic inflammatory disease (PID) is the most common serious acute illness stemming from chlamydial infection. It can occur in girls and young women who have never exhibited cervical or urethral symptoms, as can lower abdominal pain and menstrual irregularities. PID can be caused by other organisms or be multifactorial, but *C trachomatis* has been found in 5% to 50% of those with a complaint of PID. Annually, PID accounts for some 2.5 million office visits, 275,000 hospitalizations, and 100,000 surgical procedures, according to the CDC.[13] Even when treated, PID can lead to infertility, chronic pelvic pain, or ectopic pregnancy, but the dangers of these consequences are compounded by nontreatment—a result of the often-silent nature of chlamydial infection. One review estimates one fourth of young women will have long-standing sequelae from PID.[23]

Endometritis, salpingitis, bartholinitis, and pelvic peritonitis are other manifestations. Chlamydial salpingitis can progress to perihepatitis (Fitz-Hugh-Curtis syndrome), with pain caused by adhesions strung between the liver and the peritoneum. Reiter's syndrome, with arthritis-like symptoms, is more likely to be seen in infected men but can occur in young women. Chronic conjunctivitis should also be part of the differential diagnosis of chlamydial infection in young women. Chlamydial conjunctivitis and pneumonia are concerns for offspring of infected mothers.

**Even though gonorrhea is a disease in overall decline in the US, we cannot assume that this trend will continue. The disease is still highly prevalent, especially in adolescent girls and women.**

Ulcerative STDs like syphilis, herpes, and chancroid have more often been linked as cofactors to HIV infection, but HIV shares with *C trachomatis* a predilection for cervical ectopy. One recent analysis suggests chlamydial infection may increase HIV susceptibility as much as fivefold.[24] Other studies have shown that HIV infectivity decreases with treatment of concurrent STDs.[25] This possibility makes the case for early diagnosis and treatment of chlamydial infection even more compelling.

**Follow-up.**[13] Treatment failures are uncommon with the CDC's recommended regimens and even with earlier regimens based on tetracycline. For that reason, the CDC does not recommend immediate, routine test-of-cure visits but suggests retesting previously infected women some weeks to months after therapy. That should be particularly true with adolescent patients. For this group, previous infection can be considered a risk factor for future reinfection. A British study of adolescents found a 39% rate of reinfection 2 years after treatment.[26]

Clearly, the surest way to avoid reinfection and spread of infection is to identify all sexual contacts and see that they are treated. Adolescents' reluctance to name partners, and the limited resources available for contact tracing even when they do, make this a daunting task. One study of contact tracing in an urban non-STD clinic showed that only about 20% ended up being treated.[27] Another identified age under 15 as the strongest independent predictor of reinfection by *C trachomatis*.[28] As compared with women over 30, the risk of this group was eightfold, and the risk for 15- to 19-year-olds was fivefold. Difficult as it may be, it's vital to make the effort to see that partners of such young women are identified and treated.

## Gonorrhea: down but not out

*Neisseria gonorrhoeae*, like *Chlamydia trachomatis*, is an intracellular bacterium that invades the female body by way of the vaginal canal but is much more damaging when it ascends to the upper reproductive tract and pelvic cavity. Until chlamydial infection began to be tracked nationally, gonorrhea was the most frequently reported STD in the US, reaching recorded levels of more than a million cases per year in the late 1970s, with actual cases estimated to be at least three to four times that number.[12] Gonorrhea numbers began to decline in the mid-1980s and continued to decline by about 8% per year until 1993, when they leveled off somewhat.

Even so, based on the nearly 400,000 cases reported in 1995, the CDC estimates actual cases still to be occurring at a rate of 1 million per year in the US (Table 3). Though one would expect about half of

CME

# Sexually Transmitted Diseases in the Adolescent

## *Part I: Chlamydia and Gonorrhea*

**Ellen S. Rome, MD, MPH***

*Nearly 3 million adolescents acquire an STD each year. Although gonorrhea rates have decreased in the United States, chlamydia rates have continued to climb. What are a teen's risk factors for these two infections? How do adults ensure that adolescents get diagnosed and properly treated? If chlamydia and/or gonorrhea are not treated, what are the consequences?*

Sexually transmitted diseases (STDs) continue to affect the health and future well-being of many adolescents—three million teenagers acquire an STD each year, which translates into one of every eight adolescents aged 13 to 19 years.[1] *Chlamydia trachomatis* and *Neisseria gonorrhoeae* are found at disproportionately high rates in adolescents and young adults.[2,3] Despite a 58% decrease in U.S. gonorrhea rates between 1985 and 1995, *C. trachomatis* infection rates continued to rise during these years, in part due to increased testing by clinicians.[3,4] Adolescents infected with these organisms remain at particular risk for long-term sequelae as the infection progresses. This article will delineate risk factors common to adolescents and address the diagnosis and management of two of the more common STDs, *Chlamydia trachomatis* and *Neisseria gonorrhoeae*.

### RISK FACTORS IN ADOLESCENTS

Adolescent risky behaviors tend to be interrelated and clustered.[5] Teens who begin having sexual intercourse at an earlier age are more likely to have multiple partners and are 50% less likely to use condoms.[6] There are a combination of biological and psychosocial risk factors for STDs in this age group.

Biological factors include a prominent exocervix with the transition zone serving as a magnet for certain STDs. Low levels of protective antibodies, due to less cumulative exposure, can also be a risk factor. Sperm can serve as vectors of infection, carrying an STD to the upper genital tract of the woman. Retrograde menstruation, occurring in 25% of healthy women, can also push infection out to the fallopian tubes and contiguous structures.

Psychosocial risks in adolescents stem from the adolescent mind-set

### CONTINUING MEDICAL EDUCATION

**GOAL:**

To discuss sexually transmitted diseases in adolescents, focusing on *Chlamydia trachomatis* and *Neisseria gonorrhoeae*.

**OBJECTIVES:**

1. To describe the etiology of both infections including manifestations and risk factors.
2. To review the range of diagnostic tests and their specificity and sensitivity.
3. To identify U.S. Centers for Disease Control and Prevention (CDC) recommended treatment regimens.

**ACCREDITATION:**

This activity has been planned and implemented in accordance with the Essentials and Standards of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of Albert Einstein College of Medicine and Quadrant HealthCom Inc. The Albert Einstein College of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

This activity is directed by Brian Cohen, MD, Associate Professor of OB/GYN at Albert Einstein College of Medicine, Montefiore Medical Center. It is designed for Primary Care physicians.

To earn credit, see instructions on page 29 and mail your answers according to the instructions on page 30.

of "It can't happen to me." This sense of personal invulnerability occurs in early to mid adolescence, when teens display concrete thought processes but with only a limited ability to foresee consequences. Furthermore, lack of information can impede effective use of protection from disease (i.e., condoms). A teen may discount the silent nature of many STDs, mistakenly believing that if both partners have been tested for STDs and "they are clean," then there is no risk. Limited access to contraceptive services can also serve as a barrier to effective adolescent contraception, as can the perception that care will not be confidential.

## CHLAMYDIA TRACHOMATIS

### Epidemiology

In the United States, 4 million new cases of *C. trachomatis* occur annually, at a cost of $2 billion per year for treatment of primary infection and sequelae.[1,8] In 1995, 477,638 cases of chlamydia were reported to the U.S. Centers for Disease Control and Prevention (CDC). The highest rates of infection were in the Western and Midwestern states.[2] Manifestations of serotypes D through K can be seen in Table 1. The prevalence ranges from 5% to 15% in asymptomatic sexually active adolescents and young adults, 20% to 30% in adolescents/young adults seen in STD clinics, 40% to 50% of symptomatic patients, and 15% to 50% of patients with concomitant *N. gonorrhoeae* infection.[2]

### Diagnosis

On examination, the presence of mucopurulent discharge and/or a friable cervix should raise the suspicion of the health care provider. Other risk factors include a history of more than one new sexual partner in the past 6 months (OR 1.6), age under 20 years (OR 1.6), use of oral contraceptives (OR 2.0), and inflammation on the Pap smear (OR 2.1).[9] In a study of 100 women in an STD clinic, Brunham et al found that 89% of women with *C. trachomatis* had 10 or more polymorphonuclear leukocytes per oil immersion field, compared with 17% of women who did not have the infection.[10]

Sexually active adolescents should be screened for chlamydia once or twice a year, after a change in sexual partners, and with any suggestive symptoms.[2,11] Given the high risk of asymptomatic infection leading to silent upper tract infection or subacute pelvic inflammatory disease (PID), clinicians need to perform frequent screenings in the adolescent population, obtaining a confidential history to identify those at risk.

Diagnosis can be made using a number of available techniques. Culture on McCoy cells with subsequent identification using fluorescent antibody stain 2 to 3 days later remains the gold standard. Cultures should be taken in all cases of suspected sexual abuse, due to the possibility of false-positive results on indirect tests. Culture is labor intensive, will not detect nonviable organisms of the lower genital tract, and may miss upper genital tract

*Continued on page 19*

...ed from page 16

infection if only an endocervical swab is taken. A dacron swab must be used for the culture, because endocervical cells are necessary to identify this intracellular organism. The sensitivity and specificity of culture and other methods are seen in Table 2.

Direct immunofluorescent antibody tests (DFA) involve looking for the presence of yellow-green elementary bodies after applying a fluorescein-conjugated monoclonal antibody (SWA MicroTrak system). This test has ranged in sensitivity from 61% in an adolescent clinic to 93% in an STD clinic, with a positive predictive value of 80% in populations with a 10% prevalence, and 95% in populations with a prevalence of 30%.[12,13]

Enzyme immunoassays include ...lamydiazyme (Abbott) and ...IA (Dako). The former is an ...zyme-linked immunoabsorbent assay (ELISA) that requires a spectrophotometer. Positive predictive values range from 32% to 87%, depending on the population studied.[2] IDEIA is an enzyme-amplified monoclonal immunoassay, found to have a 97% sensitivity in a population with a 16% prevalence of infec... (Boots CellTech IDEIA III).[14] ...he DNA probes (PACE 2, Gen-Probe) allow detection of both *C. trachomatis* and *N. gonorrhoeae* with a single swab. Using the Gen-Probe PACE 2, Biro et al found a sensitivity of 72%, specificity of 96%, positive predictive value of 67%, and negative predictive value of 96% in asymptomatic girls (prevalence 11% for chlamydia). In symptomatic girls (prevalence 20.7%), they found a sensitivity of 65%, specificity of 96%, positive predictive value of 81%, and negative predictive value of 91%.[15] Office-based tests, such as the Kodak Surecell, have been found to have a sensitivity of 67% to 84%.[16]

**Table 1. Manifestations of *Chlamydia trachomatis* (Serotypes D-K) in Men and Women**

**Men**
Nongonococcal urethritis
Epididymitis
Conjunctivitis
Reiter syndrome
Rectal infections/proctitis

**Women**
Mucopurulent cervicitis
Salpingitis (pelvic inflammatory disease)
Urethritis
Postabortal endometritis
Postpartum endometritis
Perihepatitis (Fitz-Hugh Curtis syndrome)
Premature rupture of membranes
Preterm labor
Low birth weight child
Tubal factor infertility
Conjunctivitis, pneumonia in newborns of infected mothers

Newer technologies include ligase chain reaction ([LCR], Abbott), polymerase chain reaction ([PCR], Amplicor, Roche), and Transcription Mediated Amplification ([TMA], Gen-Probe Amplified). LCR and PCR involve marked amplification of specific DNA sequences, while TMA is an amplified RNA assay. Several of these tests have also been approved for the screening of urine in adolescents. Routine screening for large numbers of symptomatic adolescents within the juvenile justice system using traditional genital examination with cervical sampling has been found to be time-consuming, costly, and difficult due to competing priorities. In contrast, noninvasive urine screening is easily performed, providing an opportunity for screening large numbers of at-risk adolescents whose disease might otherwise go undetected. Oh et al recommend that to identify complications, such as epididymitis and PID, further genital/ pelvic examination be done when there is a positive result on urine testing.[3]

**The presence of mucopurulent discharge and/or a friable cervix should raise the suspicion of the health care provider.**

### Treatment

If a patient has cervical motion tenderness without abdominal pain, most clinicians should treat presumptively for both chlamydia and gonorrhea. The 1998 STD Treatment Guidelines from the CDC state that asymptomatic chlamydial infections, chlamydial cervicitis, and urethritis should be treated with azithromycin (1 g orally) or with doxycycline (100 mg orally twice a day for 7 days).[7] Cerin et al have

**Table 2. Sensitivity and Specificity of Various Tests for *Chlamydia trachomatis***

| Method | Sensitivity (%) | Specificity (%) |
|---|---|---|
| Cell culture | 80–90 | 100 |
| Enzyme immunoassay (EIA) | 74–89 | 93–98 |
| Direct fluorescent antibody test (DFA) | 61–93 | 82–97 |
| Enzyme-amplified monoclonal immunoassay (IDEIA) | 61–93 | 82–97 |
| Nucleic acid hybridization (DNA probe) | 71–95 | 97–100 |
| Polymerase chain reaction (PCR) | 93–97 | 99–100 |
| Ligase chain reaction (LCR) | 87–94 | 99–100 |
| Transcription mediated amplification | 98–100 | 98–100 |

From: Sexually transmitted diseases: Gonorrhea, Chlamydia trachomatis, pelvic inflammatory disease, and syphilis. In: Emans SJ, Laufer MR, Goldstein DP, eds. *Pediatric and Adolescent Gynecology*, 4th ed. Philadelphia: Lippincott-Raven. 1998:469. Reprinted with permission.

noted that cell culture, a direct immunofluorescence test (Micro-Trak), and an enzyme immunoassay (IDEIA, CellTech) all gave negative results by day 6 of treatment with doxycycline.[17] It is possible for azithromycin to be used in pregnant patients, although more studies need to be done to further ascertain its safety and efficacy.

Alternative regimens include erythromycin 500 mg orally four times a day for 7 days, erythromycin ethylsuccinate 800 mg four times a day for 7 days, or ofloxacin 300 mg orally twice a day for 7 days. Ofloxacin has no advantage and increased expense when compared with doxycycline; and quinolones cannot be used in those patients who are pregnant, lactating, or are under 18 years of age.

Because of its one-time dosing, azithromycin has the added advantage of improved compliance; however, azithromycin has not been approved for the treatment of PID at this time. Tests of cure for chlamydia are not recommended; however, where there is a high risk of reinfection, a repeat test 4 to 8 weeks after treatment can help identify those teens whose partners have been inadequately treated or those who have been infected by a new partner.

## NEISSERIA GONORRHOEAE

Over the past 20 years, the number of cases of gonorrhea reported to the CDC has decreased from 1 million annually to an estimated 600,000. Cost of treatment is estimated at $288 million per year.[1,17,18] Adolescents and young adults continue to have the greatest rates of infection, with the risk of transmission estimated to be 20% to 50% per contact.[18] Coinfection with both gonorrhea and chlamydia may be as high as 15% to 20%.

### Diagnosis

Infections in men can produce urethritis, or mucopurulent discharge associated with dysuria and without urgency or frequency, occurring 2 to 5 days after contact with an infected partner. Symptoms in untreated individuals will usually resolve spontaneously over several weeks, leading to asymptomatic infection and ongoing transmission. Girls and women are more likely to have subclinical or asymptomatic infection, potentially delaying care and allowing the infection to spread to the upper genital tract. Symptomatic women may have dysuria with urethritis, urinary frequency, dyspareunia, lower abdominal pain, vaginal discharge and/or bleeding, usually occuring within 10 days of contact with an infected partner.[18] Inflamed Bartholin's glands in patients with gonococcal infection can present with pain and swelling of the labia minora, and inflamed Skene's glands can present with periurethral pain and swelling.[19]

Local perianal infection may be asymptomatic or may present with proctitis with tenesmus, pruritis, or rectal bleeding. Pharyngeal infection may resemble a viral pharyngitis with patchy erythema and cervical lymphadenopathy.[19] Some patients will develop a red, edematous uvula and vesiculopustular lesions on the soft palate and tonsils, similar to streptococcal pharyngitis. The infection usually clears spontaneously within 10 to 12 weeks, although there is an increased risk for disseminated

*Continued on page 23*

from page 20

isease during this time period.[19] Gonococcal conjunctivitis is rare beyond the neonatal period.

Systemic infection occurs in 0.5% o 3% of those with untreated nucosal gonorrhea and is especially common in women, during pregnancy, and within one week of menses.[18,19] Adolescents may present with fever, chills, migratory polyarthralgias, tenosynovitis with or without tenderness, and purpuric skin lesions. Skin lesions tend to be peripheral and infrequent (less than 20 per patient), with positive Gram stain results in only 10% of lesions. However, direct fluorescent antibody staining of biopsies will be positive for *N. gonorrhoeae* in over 80% of cases. Blood culture will be positive in as many as half of these patients within the first 2 days of pres[illegible]on.

Cu[illegible]remains the gold standard for id[illegible]fication of *N. gonorrhoeae*. Endocervical swabs should be plated directly onto chocolate agar and modified Thayer-Martin. Incubation should occur in a carbon dioxide-containing atmosphere at 35°C to 37°C. In all individuals with suspected sexual abuse, cultures must be obtained for both gonorrhea and chlamydia.

DNA probes for screening genital sites include the Gen-Probe PACE system (direct chemiluminescent DNA probe test), which has a sensitivity of 90% to 97%.[20,21] The Gen-Probe PACE-2 provides a reliable test of cure as early as 6 days after treatment.[2,22] The main drawback of DNA probes lies in their inability to test the organisms for antibiotic resistance. A distinct advantage is the ability to test simultaneously using the same swab for *C. trachomatis* and *N. gonorrhoeae*.[2] Pol[illegible]se chain reaction tests are part[illegible]ly useful, with a sensitivity of 79% and a specificity of 96% for *N. gonorrhoeae* in synovial fluid.[23] Ligase chain reaction tests have been used on endocervical samples (sensitivity 97.3%, specificity 99.6%) and on first-void urine specimens (sensitivity 94.68%, specificity 100%) in women at an STD clinic.[24,25]

**Table 3. Treatment Regimens for *N. gonorrhoeae****

| Oral treatments | Dosing Regimen |
|---|---|
| Cefixime | 400 mg in a single dose |
| Ciprofloxacin | 500 mg in a single dose |
| Ofloxacin | 400 mg in a single dose |
| Azithromycin | 2 g in a single dose |
| Doxycycline | 100 mg twice a day for 7 days |
| **Intramuscular treatment** | |
| Ceftriaxone | 125 mg in a single dose |

* Per the 1998 CDC STD Treatment Guidelines.

## Treatment

Standard treatment regimens for *N. gonorrhoeae*, as recommended in the CDC's 1998 STD Treatment Guidelines, are outlined in Table 3. Although single-dose cefixime has been shown to cure 97.1% of uncomplicated urogenital and anorectal gonococcal infections, ceftriaxone provides higher, sustained bactericidal levels in the blood, with 99.1% efficacy in uncomplicated gonococcal infection.[7] Ciprofloxacin has shown a cure rate of 99.8% in uncomplicated urogenital and anorectal infections, and is relatively inexpensive.

Some resistance to ofloxacin has been shown in certain communities, although clinical trials have found a cure rate of 98.4%. Azithromycin 1 g has only 93% efficacy in uncomplicated infection; although a dose of 2 g is more effective, it is expensive and associated with gastrointestinal distress too frequently to encourage regular use for gonorrhea.

Spectinomycin (2 g) administered intramuscularly remains an expensive but effective treatment, especially in patients who cannot tolerate cephalosporins or quinolones. Ceftizoxime 500 mg, cefotaxime 500 mg, and cefotetan 1 g can all be given intramuscularly in a single dose to cure uncomplicated gonococcal infection. Cefoxitin 2 g administered intramuscularly with probenecid 1 g administered orally is also effective. However, none of these injectable regimens has any advantage over ceftriaxone.

Uncomplicated gonococcal infection of the pharynx should be treated with either single-dose ceftriaxone 125 mg, ciprofloxacin 500 mg orally, or ofloxacin 400 mg orally. Simultaneous treatment for chlamydia should include either

azithromycin 1 g as a single dose or doxycycline 100 mg orally twice a day for 7 days.

Disseminated gonococcal infection should be treated with ceftriaxone 1 g intramuscularly or intravenously every 24 hours, with the patient hospitalized for initial therapy. Other regimens include cefotaxime or ceftizoxime 1 g every 8 hours. Once improvement begins, the initial regimen should be continued for an additional 24 to 48 hours, at which time therapy can be changed to either cefixime 400 mg orally twice a day, ciprofloxacin 500 mg orally twice a day, or ofloxacin 400 mg orally twice a day to complete a full week of antimicrobial therapy. Gonococcal meningitis should be treated with ceftriaxone 1 to 2 g every 12 hours for 10 to 14 days; endocarditis should be treated with ceftriaxone 1 to 2 g every 12 hours for at least 4 weeks.

**Cost of treatment for gonorrhea is estimated at $288 million per year.**

## FITZ-HUGH CURTIS SYNDROME

Fitz-Hugh Curtis syndrome involves a perihepatitis, with both *N. gonorrhoeae* and *C. trachomatis* implicated as etiologic agents. The patient presents with right upper quadrant pain that may be pleuritic. Lower abdominal pain may or may not be present. Liver function tests tend to be higher in those with gonococcal perihepatitis than in those with chlamydial perihepatitis. Elevated sedimentation rate and positive endocervical test for *C. trachomatis* or *N. gonorrhoeae* are usually seen. Ultrasonography can be useful to exclude the diagnosis of biliary tract disease. Fitz-Hugh Curtis syndrome should be treated in the same way as PID. Adolescents require in-patient therapy and/or very close monitoring.

## CONCLUSIONS

Gonorrhea and chlamydia represent relatively common sexually acquired infections in the adolescent age group. *(The second article in the series discusses syphilis, herpes simplex virus, and cancroid—their presentation, diagnosis, and treatment options.)* Public health efforts need to focus on primary and secondary prevention of disease in the adolescent population in order to decrease the risk of sequelae, including upper genital tract infection with subsequent infertility, chronic pelvic pain, or other problems. Patient access to confidential, adolescent-friendly services and contraceptive supplies remains imperative for ensuring prevention and treatment of disease in the adolescent population. TFP

## REFERENCES


1. Alan Guttmacher Institute. Sexually Transmitted Diseases in the United States. In: Facts in Brief, New York: 1993.

2. Sexually transmitted diseases: Gonorrhea, Chlamydia trachomatis, pelvic inflammatory disease, and syphilis. In: Emans SJ, Laufer MR, Goldstein DP, eds. *Pediatric and Adolescent Gynecology*, 4th ed. Philadelphia: Lippincott-Raven; 1998:457–504.

3. Oh MK, Smith KR, O'Cain M, et al. Urine-based screening of adolescents in detention to guide treatment for gonococcal and chlamydial infections. *Arch Pediatr Adolesc Med*. 1998;152:52–56.

4. Division of STD Prevention. Sexually Transmitted Disease Surveillance, 1995. Atlanta Centers for Disease Control and Prevention; September 1996.

5. Jessor R, Jessor SL. *Problem Behavior and Psychosocial Development. A Longitudinal Study of Youth*. New York: Academic Press, 1977.

6. Hingson R, Strunin L, Berlin B. Acquired immunodeficiency syndrome transmission: Changes in knowledge and behaviors among teenagers. Massachusetts statewide surveys, 1986–1988. *Pediatrics*. 1990;85:24–29.

7. Centers for Disease Control and Prevention. 1998 Sexually Transmitted Diseases Treatment Guidelines. *MMWR*. 1998;47 (RR-1):1–116.

8. CDC Recommendations for the prevention and management of *Chlamydia trachomatis* infections 1993. *MMWR*.1993, 42:1–39.

9. Han Y, Morse DL, Lawrence CE, et al. Risk profile for chlamydia infection in women from 12 public health clinics in New York State. *J Commun Health*. 1993, 18:1–9.

10. Brunham RC, Paavonen J, Stevens CE, et al. Mucopurulent cervicitis—the ignored counterpart in women of urethritis in men. *N Engl J Med*. 1984;311:1–6.

11. Mosure DJ, Berman S, Fine D, et al. Genital chlamydia infection in sexually active female adolescents: Do we really need to screen everyone? *J Adolesc Health*. 1997;20:6–13.

12. Shafer MA, Vaughan E, Lipkin ES, et al. Evaluation of fluorescein conjugated monoclonal antibody test to detect *Chlamydia trachomatis* endocervical infection in adolescent girls. *Pediatrics*. 1986;108: 779–783.

13. Tam MR, Stamm WE, Handsfield HH, et al. Culture-independent diagnosis of *C. trachomatis* using monoclonal antibodies. *N Engl J Med*. 1984;310:1146–1150.

14. Lebar W, Herschman B, Jemal C, Pienchala J. Comparison of DNA probe,


*Continued on page 26*

LLRM Medical College, Meerut.

Sera from 81 infertile women with tubal pathology and 40 controls were tested for the presence of antibodies against Chlamydia trachomatis & Neisserria gonorrhoeae. Indirect immunoperoxidase test (Ipazyme kit) & Enzyme linked immuno sorbent assay (ELISA kit) were used for detection of chlamydial & gonococcal antibodies respectively. Antibodies to Ch. trachomatis were found in 74.07% of the infertile women and 5% in control group. Only a very low prevalence (4.93%) of antibodies to N. gonorrhoeae was found is infertile women as compared to nil in control group. Antibodies detection is a sensitive, specific and noninvasive test for diagnosing infertility.

Department of Gynaecological Endocrinology and Reproductive Medicine, Women's University Hospital, Heidelberg, Germany.

The clinical significance of antichlamydial antibodies (Chlam Ab) was determined in a total of 1303 subfertile couples consulting for infertility investigation and treatment. Median age of the women was 30 (range 22-44) years and of the men 33 (range 21-53) years. The median duration of infertility was 4 (range 1-21) years. All patients were asymptomatic for genital tract infection. A comprehensive infertility investigation included examination of the endocrine, cervical, and tubal factor, and semen analysis, antisperm antibody (ASA) testing, sperm-mucus interaction testing in vitro using a standardized protocol, and post-coital testing (PCT). Screening for Chlam IgG Ab was performed in serum of both partners, obtained at the same time. Simultaneous microbial cultures in genital secretions of both partners included a broad spectrum of potentially pathogenic bacteria. Elevated titres of Chlam IgG Ab as seromarker for previous infection were found in 20.8% of all women, and in 12.6% of men. Chlam Ab were significantly more frequent in partners of seropositive patients (in 51.8% of women with a Chlam Ab positive partner, compared to 15.8% of the other women). Microbial screening outcome was not significantly related to results of chlamydial serology in both partners. In women, elevated titres of Chlam Ab were significantly associated with a tubal factor, but were not related to reduced quality of the endocervical mucus (CM), including the in-vitro penetrability of the CM (using partners' or donors' spermatozoa).

Salpingitis caused by Chlamydia trachomatis and its significance for infertility.
Acta Obstet Gynecol Scand 1994 Oct;73(9):711-5 (ISSN: 0001-6349)

Czerwenka K; Heuss F; Hosmann J; Manavi M; Jelincic D; Kubista E [Find other articles with these Authors]

1st Department of Gynecology and Obstetrics, University of Vienna, Austria.

Between July and November 1991, 32 women (mean age 24.8 years) were examined laparoscopically in our department for suspected tubal sterility. All women had smears taken from cervix, vagina, and urethra, and all were negative regarding an infection with Chlamydia trachomatis. All women had open fallopian tubes, however, with inflammatory changes that varied in degree. Fifteen women reported pains and were classified as PID (pelvis inflammatory disease)-positive, as compared to the PID-negative group of 17 women without pain. In the group of the 15 PID-positive women, we could detect Chlamydia trachomatis in the form of salpingitis in 11 cases in the direct demonstration of the infectious agent. IgA antibodies were detected in the serum of all of these women, in 12 of them IgA + IgG antibodies. In the group of the 17 PID-negative women, three were positive in the direct detection of the infectious agent, and IgA and/or IgG antibodies were detected in five cases. 38% of the women in the PID-positive group and 68% in the PID-negative group conceived within a period of one year after having completed a treatment with antibiotics.

Presence of the major outer-membrane protein of Chlamydia trachomatis in patients with chronic salpingitis and salpingitis isthmica nodosa with tubal occlusion.
Fertil Steril 1998 Oct;70(4):774-6 (ISSN: 0015-0282)

Dieterle S; Rummel C; Bader LW; Petersen H; Fenner T [Find other articles with these Authors]

Department of Obstetrics and Gynecology, University of Bochum, Herne, Germany. s.dieterle@t-online.de.

OBJECTIVE: To determine the presence of the major outer-membrane protein of Chlamydia trachomatis in fallopian tube tissue specimens of infertile women with chronic salpingitis and/or salpingitis isthmica nodosa with tubal occlusion. DESIGN: Prospective controlled study. SETTING: Department of Obstetrics and Gynecology, University of Bochum, Herne, Germany. PATIENT(S): Fifty-six consecutive infertile women with histologically documented chronic salpingitis and/or salpingitis isthmica nodosa and bilateral tubal occlusions were evaluated. They were compared with 28 fertile women. INTERVENTION(S): Fallopian tube tissue specimens were taken during reconstructive infertility surgery, including cesarean section and tubal ligation. MAIN OUTCOME MEASURE(S): Detection of the major outer-membrane protein of C. trachomatis in fallopian tube tissue specimens by a direct fluorescent antibody test. RESULT(S): The major outer-membrane protein of C. trachomatis was found in fallopian tube tissue specimens in 11 of 56 infertile patients (20%) with chronic salpingitis and/or salpingitis isthmica nodosa. The median titer of IgG serum antibodies to Chlamydia was significantly higher in women with the major outer-membrane protein of C. trachomatis than in patients without this antigen. In comparison, the major outer-membrane protein of C. trachomatis was not found in any of the fallopian tube tissue specimens of the control group. CONCLUSION(S): The presence of the major outer-membrane protein of C. trachomatis is associated with chronic salpingitis and/or salpingitis isthmica nodosa with tubal occlusion.

Chlamydia trachomatis is a primary cause of acute or silent salpingitis leading to infertility and ectopic pregnancy. The C. trachomatis epidemic, undiscovered in most cases, spreads, mostly in adolescents, during the years following the onset of sexual activity. As opposed to gonococcal infection which has greatly decreased, C. trachomatis cervical and urethral infection is common in young occidentals. More then 30 different studies covering 200-12000 subjects screened in family planning centers, college women and men, students and military recruits in different parts of the USA, in Scandinavian countries and France, indicate a prevalence of 5-20% (mean 10%) in apparently healthy young females < 25 years and 5-10% in males. Female prevalence is strongly related to age, being highest (5-20%) in women < 20 years old. Several cost-benefit analysis show that the total cost of the general screening in young populations, which can easily be carried out for women in family planning centers, could save twice the cost of treatment for pelvic inflammatory disease caused by C. trachomatis and six times the total cost of C. trachomatis epidemics if late sequelae are taken into account (tubal infertility treatment, ectopic pregnancy).

*The cost of screening is minuscule compared to the cost of treating people with pelvic pain and scarring related to advanced infection. Most women have no idea they are infected until tubal scarring causes pelvic pain.*

*Terry Burrell MSCNM*

Sally;

I hope this is helpful to you. If you need anything else let me know.

Terry

NIAID NEWS Office of Communications and Public Liaison

National Institute of Allergy and Infectious Diseases • National Institutes of Health

FOR RELEASE
Tuesday, Feb. 17, 1998

Cheryl Parrott
(301) 402-1663
cparrott@nih.gov

## Age-Based Screening is Cost-Effective Method to Control Chlamydial Infection

Screening all women younger than 30 years of age may be the most cost-effective method of stopping or limiting chlamydial infections and their consequences according to an article in the February 15 issue of *Annals of Internal Medicine*.

Investigators from the National Institute of Allergy and Infectious Diseases (NIAID) and Johns Hopkins University compared three strategies to screen 7,699 women without symptoms who attended two family planning clinics in Baltimore, Md. In addition to the age-based screening found to be most effective, investigators evaluated universal screening and screening with the criteria recommended by the Centers for Disease Control and Prevention (CDC). All women were tested with polymerase chain reaction (PCR). They calculated the cost-effectiveness of chlamydial screening by comparing total costs, including screening program costs, and estimating future medical costs of all sequelae.

"Certainly one of the great values of this study," says Anthony S. Fauci, M.D., director of NIAID, "is the confirmation that screening enables clinicians to identify and treat women with chlamydial infections and no symptoms, thus preventing many occurrences of serious sequelae, such as infertility."

Chlamydial infection is one of the leading sexually transmitted diseases in the United States today. The CDC estimates that more than 4 million new cases occur each year. Pelvic inflammatory disease, a serious complication of chlamydial infection, has emerged as a major cause of infertility among women of childbearing age. Genital chlamydial infection is caused by the bacterium, *Chlamydia trachomatis*, and is transmitted during vaginal or anal sexual contact with an infected partner. A pregnant woman may pass the infection to her newborn during delivery, with subsequent neonatal eye infection or pneumonia. The annual cost of chlamydial infections and their sequelae in the United States exceeds $2.7 billion.

"The majority of women infected with *Chlamydia* do not have symptoms, and damage to their fallopian tubes resulting in infertility can occur silently over time if the infection remains undiagnosed and not treated," said author Thomas C. Quinn, M.D., of NIAID and Johns Hopkins University, Baltimore, Md. "In our study, 6.6 percent of women attending the Baltimore family planning clinics were found to be infected. Because of the initial lack of symptoms and signs, most of these women would not have been diagnosed or treated if they had not undergone routine screening for *Chlamydia* using either urine or cervical specimens. New and simple tests make screening easier."

Currently, the CDC recommends testing all women with evidence of an inflamed cervix and all women younger than 20 years of age. They also suggest: (1) testing women 20 to 23 years of age who have not consistently used barrier contraception or have had a new sex partner or more than one sex partner during the past 90 days; and (2) testing women 24 years of age or older who have not consistently used barrier contraception and have had a new sex partner or more than one sex partner during the past 90 days.

The investigators compared each screening strategy's ability to identify women at risk and thus trigger testing and treatment, which in turn would result in fewer or no sequelae and reduced overall medical costs. They defined medical outcomes as prevented cases of pelvic inflammatory disease, chronic pelvic pain, ectopic pregnancy, infertility, male urethritis and epididymitis in adults, and conjunctivitis and pneumonia in infants.

The results were dramatic. Without screening, there would have been 152 cases of pelvic inflammatory disease and other sequelae in women, men and infants with an associated cost of $676,000. Screening according to CDC criteria would have prevented 64 cases of pelvic inflammatory disease and saved $231,000. Screening all women younger than 30 years of age would have prevented 85 cases of pelvic inflammatory disease and saved $305,000. Universal screening would have prevented an additional six cases, but would have cost considerably more than age-based screening -- approximately $3,000 more per case of pelvic inflammatory disease prevented.

The authors caution that although the study results suggest that age-based screening provides the greatest cost savings, universal screening is desirable is some situations. In general, screening with any criteria and a highly sensitive diagnostic test should be part of any chlamydial prevention and control program. NIAID has a major commitment to develop new sexually transmitted disease (STD) diagnostic tests that are rapid, inexpensive, easy-to-use and do not require an invasive sample. If such tests were available and acceptable to the patient, screening for "silent" STDs would be even more cost-effective.

Authors, in addition to Dr. Quinn, are M. Rene Howell, M.A., and Charlotte A. Gaydos, Dr.P.H., both of the Division of Infectious Diseases at Johns Hopkins University in Baltimore, Md.

---



---

Search | Home | News Releases

*Chlamydia..., Annals 15 Feb 98*

WebDoc Edward G. Miner Library
University of Rochester Medical Center

*Partner in the **Annals of Internal Medicine** Extracts Initiative*

Previous
Top Page
Next
OUTLINE
ABSTRACT
TABLES
FIGURES
REFERENCES
FULL ARTICLE
WebDoc
Survey
Search

# Screening for *Chlamydia trachomatis* in Asymptomatic Women Attending Family Planning Clinics

## A Cost-Effectiveness Analysis of Three Strategies

M. René Howell, MA; Thomas C. Quinn, MD; and Charlotte A. Gaydos, DrPH

**Ann Int Med** 15 February 1998. 128:177-284; 34 references.

## [INTRODUCTORY PARAGRAPH]

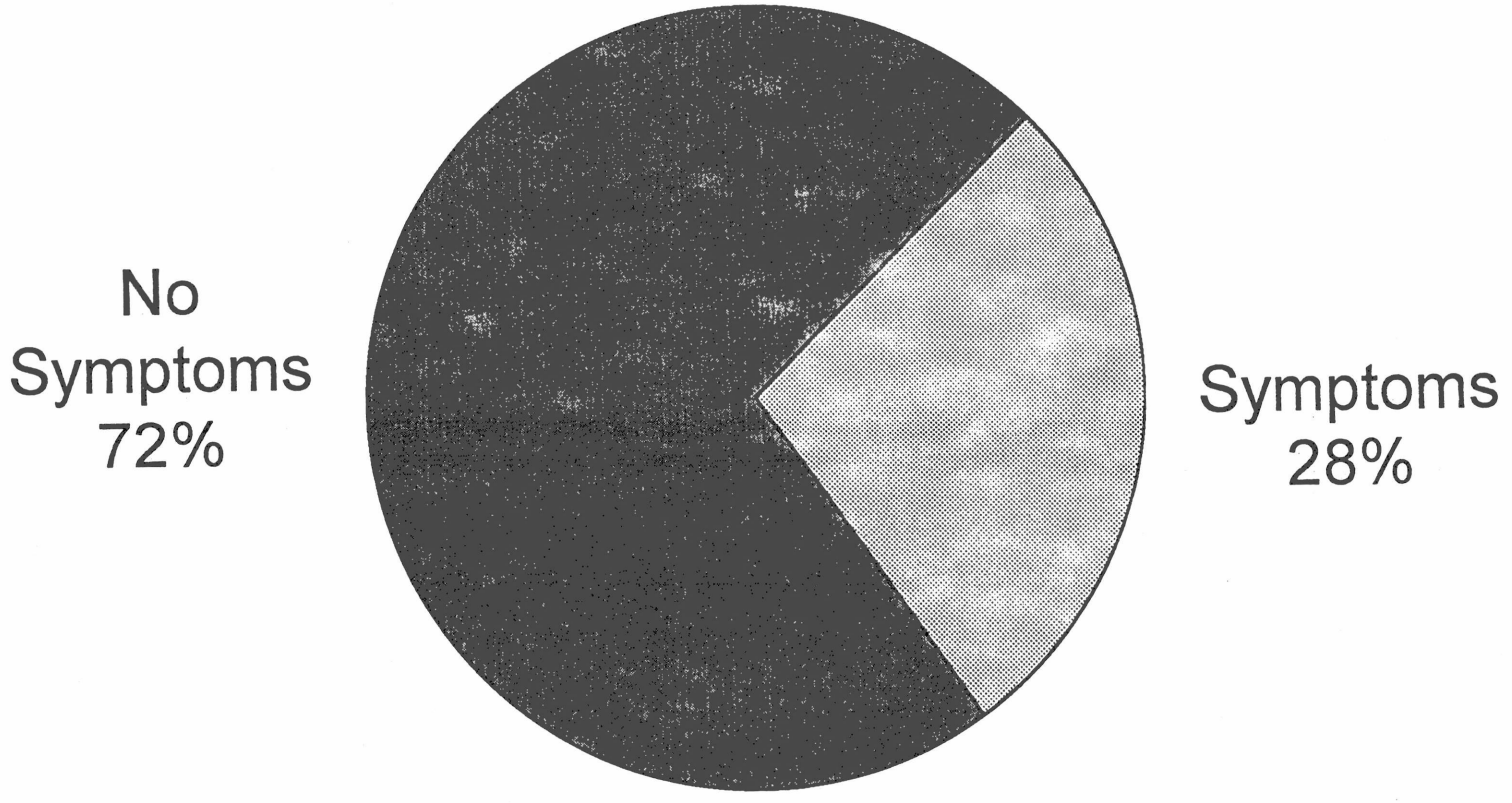
In 1996, the Centers for Disease Control and Prevention (CDC) provided $12.9 million for the Infertility Prevention Program (1). This ongoing project offers financial and legislative support for expanded service delivery within the U.S. Public Health Regions to prevent infertility and other sequelae of chlamydial infection, such as pelvic inflammatory disease and ectopic pregnancy. To ensure the continued success of the Infertility Prevention Program on a national basis, we must be able to cost-effectively identify women at high risk for chlamydial infection for the testing and targeting of prevention and control activities. The CDC recommends testing all women with evidence of mucopurulent cervicitis and all women younger than 20 years of age (2). They also suggest 1) testing women 20 to 23 years of age who have not consistently used barrier contraception or have had a new sex partner or more than one sex partner during the past 90 days and 2) testing women 24 years of age or older who have not consistently used barrier contraception and have had a new sex partner or more than one sex partner during the past 90 days (2). Alternatively, it has been suggested that all women younger than 30 years of age who are seen in family planning clinics should be screened (3).

The sequelae of chlamydial infection cost more than $2.7 billion each year (4). Screening and timely treatment can decrease the incidence of sequelae (1, 5) and the associated medical costs (6). Universal screening offers the potential to identify and treat as many chlamydial infections as possible, thus decreasing the incidence of future illness and the economic consequences of sequelae (7). Alternatively, a selective screening program based on the CDC criteria or age could target the portion of the population at highest risk and identify most chlamydial infections without testing all women (8).

To address the question of who should be screened, we applied three screening strategies in a medical cost and outcome decision model to the predominantly asymptomatic population seen at family planning clinics in Baltimore, Maryland. The three strategies were 1) screening women according to the CDC criteria, 2) screening women younger than 30 years of age, and 3) screening all women. We compared each strategy's ability to identify women at risk for chlamydial infection and thus allow the initiation of testing and treatment, decrease the incidence of sequelae, and decrease overall medical costs.

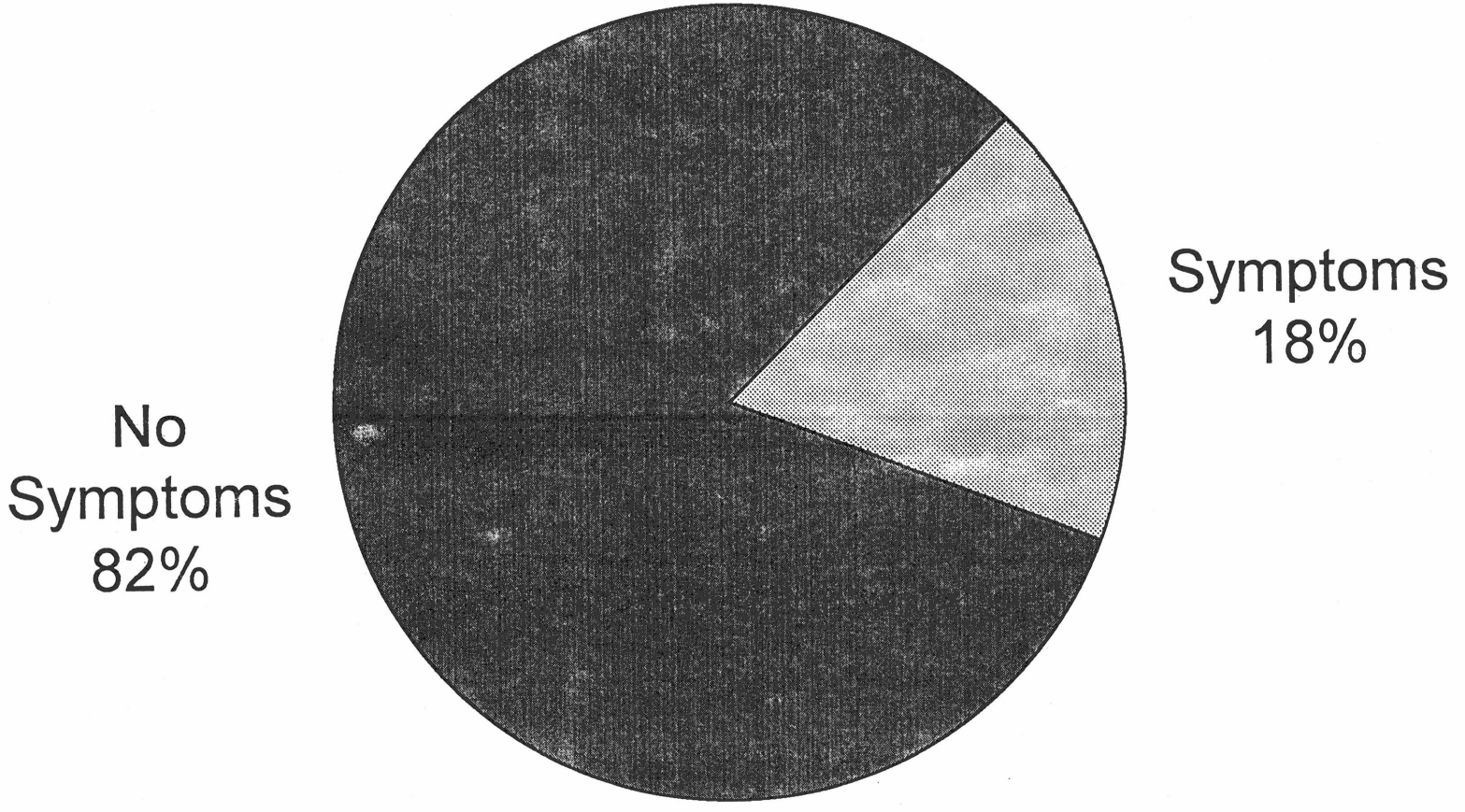
# Reported Symptoms Among

## Males Diagnosed with Chlamydia
## North Dakota, 1997



# Reported Symptoms Among

## Females Diagnosed with Chlamydia
## North Dakota, 1997



# Reported Cases of Chlamydia by Race, North Dakota, 1996

| Race | Cases reported | Percent of total | Rate per 100,000 |
|---|---|---|---|
| White | 697 | 68.2% | 115.4 |
| American Indian | 246 | 24.1% | 949.2 |
| African American | 35 | 3.4% | 993.2 |
| Hispanic | 32 | 3.1% | 686.0 |
| Other/ unknown | 12 | 1.2% | |
| Total | 1022 | 100% | 160.0 |

# Reported Cases of Chlamydia by Gender, North Dakota, 1996

| Gender | Cases reported | Percent of total | Rate per 100,000 |
|---|---|---|---|
| Female | 797 | 78% | 248.5 |
| Male | 225 | 22% | 70.7 |
| Total | 1022 | 100% | 160.0 |

# Reported Cases of Chlamydia by Age Group, North Dakota, 1996

| Age group | Cases reported | Percent of total | Rate per 100,000 |
|---|---|---|---|
| 0-9 | 2 | 0.2% | 2.0 |
| 10-14 | 8 | 0.8% | 16.4 |
| 15-19 | 304 | 29.8% | 651.4 |
| 20-24 | 490 | 48.0% | 1023.5 |
| 25-29 | 121 | 11.8% | 241.3 |
| >29 | 97 | 9.5% | 29.14 |
| Total | 1022 | 100% | 160.0 |

# Reported Cases of Chlamydia
## North Dakota, 1985 through 1995

| Race | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| White | 178 | 266 | 490 | 792 | 947 | 1270 | 1156 | 930 | 732 | 834 | 745 | 8340 |
| Native American | 24 | 58 | 66 | 137 | 137 | 178 | 152 | 142 | 120 | 178 | 238 | 1430 |
| Black | 3 | 15 | 42 | 45 | 65 | 62 | 47 | 46 | 47 | 39 | 58 | 469 |
| Hispanic | 0 | 1 | 5 | 6 | 7 | 10 | 19 | 11 | 17 | 22 | 22 | 120 |
| Other | 0 | 1 | 5 | 5 | 7 | 0 | 0 | 0 | 0 | 5 | 7 | 30 |
| Unknown | 8 | 2 | 4 | 7 | 23 | 21 | 54 | 55 | 46 | 23 | 9 | 252 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total | 213 | 343 | 612 | 992 | 1186 | 1541 | 1428 | 1184 | 962 | 1101 | 1079 | 10641 |
| Gender | | | | | | | | | | | | |
| Male | 51 | 81 | 186 | 222 | 322 | 389 | 340 | 297 | 238 | 269 | 251 | 2646 |
| Female | 162 | 262 | 426 | 769 | 863 | 1152 | 1088 | 887 | 724 | 832 | 828 | 7993 |
| unknown | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total | 213 | 343 | 612 | 992 | 1186 | 1541 | 1428 | 1184 | 962 | 1101 | 1079 | 10641 |

NDDOH, [redacted]ease Control

# Reported Cases of Chlamydia

## North Dakota, 1985 through 1995

| Age group | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-4 | 3 | 0 | 9 | 3 | 0 | 10 | 18 | 7 | 3 | 3 | 1 | 57 |
| 5-9 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 4 |
| 10-14 | 1 | 0 | 2 | 5 | 5 | 7 | 4 | 6 | 4 | 5 | 5 | 44 |
| 15-19 | 33 | 82 | 181 | 317 | 377 | 398 | 417 | 298 | 254 | 339 | 320 | 3016 |
| 20-24 | 88 | 163 | 285 | 461 | 518 | 759 | 726 | 615 | 490 | 528 | 525 | 5158 |
| 25-29 | 41 | 61 | 92 | 143 | 190 | 240 | 168 | 164 | 137 | 143 | 139 | 1518 |
| 30-34 | 30 | 15 | 28 | 34 | 58 | 81 | 67 | 63 | 47 | 45 | 42 | 510 |
| 35-39 | 5 | 13 | 8 | 11 | 19 | 32 | 16 | 19 | 19 | 18 | 29 | 189 |
| 40-44 | 4 | 4 | 4 | 8 | 15 | 7 | 6 | 4 | 7 | 10 | 9 | 78 |
| 45-54 | 3 | 3 | 2 | 6 | 0 | 3 | 3 | 8 | 1 | 10 | 6 | 45 |
| 55-64 | 2 | 0 | 0 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 10 |
| 65+ | 0 | 1 | 0 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 6 |
| unkown | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total | 213 | 343 | 612 | 992 | 1186 | 1541 | 1428 | 1184 | 962 | 1101 | 1079 | 10641 |

NDDOH, Disease Control

# Incident *Chlamydia trachomatis* Infections Among Inner-city Adolescent Females

Gale R. Burstein, MD, MPH; Charlotte A. Gaydos, DrPH; Marie Diener-West, PhD; M. Rene Howell, MA; Jonathan M. Zenilman, MD; Thomas C. Quinn, MD

**Context.**—Adolescents are at highest risk for infection with *Chlamydia trachomatis*, an important preventable cause of pelvic inflammatory disease and subsequent tubal factor infertility in US women. Current guidelines for delivery of adolescent primary care services recommend yearly chlamydia screening for those adolescent females considered to be at risk.

**Objectives.**—To describe the epidemiology of prevalent and incident chlamydia infection among adolescent females to assess the appropriate interval for chlamydia screening and to define risk factors that would identify adolescent females to target for screening.

**Design.**—Prospective longitudinal study.

**Patients.**—A consecutive sample of 3202 sexually active females 12 through 19 years old making 5360 patient visits over a 33-month period, January 1994 through September 1996.

**Setting.**—Baltimore, Md, family planning, sexually transmitted disease, and school-based clinics.

**Intervention.**—Testing for *C trachomatis* by polymerase chain reaction.

**Main Outcome Measures.**—Prevalence and incidence of *C trachomatis* infections; predictors of positive test result for *C trachomatis*.

**Results.**—Chlamydia infection was found in 771 first visits (24.1%) and 299 repeat visits (13.9%); 933 adolescent females (29.1%) had at least 1 positive test result. Females who were 14 years old had the highest age-specific chlamydia prevalence rate (63 [27.5%] of 229 cases; $P = .01$). The chlamydia incidence rate was 28.0 cases per 1000 person-months (95% confidence interval, 24.9-31.5 cases). The median time was 7.2 months to a first positive chlamydia test result and 6.3 months to a repeat positive test result among those with repeat visits. Independent predictors of chlamydia infection—reason for clinic visit, clinic type, prior sexually transmitted diseases, multiple or new partners, or inconsistent condom use—failed to identify a subset of adolescent females with the majority of infections.

**Conclusions.**—A high prevalence and incidence of *C trachomatis* infection were found among adolescent females. We, therefore, recommend screening all sexually active adolescent females for chlamydia infection every 6 months, regardless of symptoms, prior infections, condom use, or multiple partner risks.

*JAMA*. 1998;280:521-526

From the Department of Molecular Microbiology and Immunology (Dr Burstein), the Division of Infectious Diseases (Drs Gaydos, Zenilman, and Quinn and Ms Howell), and the Department of Biostatistics (Dr Diener-West), Johns Hopkins University, Baltimore, Md; and the National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md (Dr Quinn).

**This article appears on pages 521-526 of the August 12, 1998, issue.**

EDITOR'S NOTE.—*Chlamydia trachomatis* genital infections are often asymptomatic yet have serious sequelae. Most guidelines recommend annual screening of sexually active adolescent females for *C trachomatis*. This study used polymerase chain reaction testing to challenge those recommendations. Polymerase chain reaction testing is sensitive and specific for *C trachomatis*. It can be performed on cervical specimens as well as on urine or vaginal samples if a pelvic examination is not performed. The polymerase chain reaction tests were used at each of 5360 clinic visits made by 3202 sexually active adolescent females during 33 months. Twenty percent of test results were positive for *C trachomatis*. The median time after a negative test result to a positive test result was 7.2 months, and the median time from a positive test result to a repeat positive test result was 6.3 months. No clinical or behavioral predictors identified a high-risk subset with most infections. These results suggest that all sexually active adolescent females should be screened for *C trachomatis* every 6 months.

Carin M. Olson, MD, Contributing Editor

# Testimony - HB 1378

## Prepared by Senator Judy L. DeMers, District 18

## Tuesday, January 26, 1999

Chairman Berg and members of the House Industry, Business, and Labor Committee. For the record, I am Judy L. DeMers, a State Senator representing District 18, consisting of part of Grand Forks and part of the Grand Forks Air Force Base. I am sorry I cannot present this testimony in person, but I have another bill up for hearing at the same time as HB 1378. I ask you to include this testimony as part of the hearing record on HB 1378.

HB 1378 requires health insurance coverage for chlamydia screening. This bill applies to both private health insurance policies and to PERS. Although most policies now cover chlamydia screening when indicated, it is important that this coverage become universal.

Chlamydia is the most common sexually transmitted disease or STD in the state and in the country. Untreated, chlamydia can lead to pelvic inflammatory disease (PID), scarring, and infertility in women. It is known as the "silent epidemic" because most women with the disease have absolutely no symptoms. That is why screening for chlamydia, when indicated is so important. It is a treatable disease if and when it is diagnosed. The best way of identifying this disease is through the screening process.

Mr. Chairman and committee members, I ask for your favorable consideration for HB 1378.

Thank You!