

**THE NEED FOR CHANGE: AN EXAMINATION OF THE CENTERS FOR DISEASE
CONTROL AND PREVENTION'S CHLAMYDIA SCREENING
RECOMMENDATIONS**

by

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Submitted to the Graduate Faculty of
Behavioral and Community Health Sciences
Graduate School of Public Health in partial fulfillment
of the requirements for the degree of
Master of Public Health

University of Pittsburgh

2011

UNIVERSITY OF PITTSBURGH

Graduate School of Public Health

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Elian Aviraz Rosenfeld, MPH

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Chlamydia trachomatis is a bacterial infection spread through sexual contact, including oral, anal and vaginal sex. This largely asymptomatic infection is highly prevalent in the United States and has been for the past 40 years: indeed, chlamydia is the most common sexually transmitted disease (STD) in the United States. Left untreated, chlamydia can cause Pelvic Inflammatory Disease (PID), ectopic pregnancy, and infertility in women; complications are rare in men. Screening for this infection is necessary for its control and prevention and is a matter of great importance to public health. Currently, the Centers for Disease Control and Prevention (CDC) recommend annual chlamydia screening for all sexually active women aged 25 years and younger, older women with risk factors (new sex partners or multiple sex partners), and all sexually active men who have sex with men (MSM). This thesis examines the history of the CDC's chlamydia screening recommendations, the implications of the CDC's recommendation that all sexually active young women be screened for the infection, and the barriers to following current chlamydia screening recommendations. Through a close analysis of available evidence, this thesis asserts that the CDC's chlamydia screening recommendations are inconsistent, have not been updated to align with current diagnostic testing developments, place the burden of the disease upon women, further stigmatize people who are marginalized, and most importantly, fail to include sexually active heterosexual young men, a population that transmits the infection to women. New chlamydia screening recommendations are necessary based on the lack of control

over disease prevalence, the unequal burden of the disease on women, and the increased feasibility of diagnostic measures for men. Consequently, the CDC's guidelines should be updated. The guidelines should continue to recommend the annual screening of all sexually active women aged 25 and under and also recommend the annual screening of all sexually active young men aged 25 and under, as well as men and women over the age of 25 with risk factors.

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PREFACE

I would like to thank Dr. John Marx, Dr. Martha Terry and Dr. Jeanette Trauth for their guidance and support. I would also like to thank my sister Sharon—without her continuous help I could not have written this thesis.

1.0 INTRODUCTION

Chlamydia trachomatis is a bacterial infection spread through sexual contact, including oral, anal and vaginal sex (Centers for Disease Control and Prevention, 2010b). This largely asymptomatic infection is highly prevalent in the United States and has been for the past 40 years: indeed, chlamydia is the most common sexually transmitted disease (STD) in the United States. In 2009, over 1.2 million cases of chlamydia were reported to the Centers for Disease Control and Prevention (CDC), and research suggests that annually an estimated two million cases remain undiagnosed or unreported (Groseclose, Zaidi, Delisle, Levine, & St Louis, 1999). Left untreated, the infection can cause Pelvic Inflammatory Disease (PID), ectopic pregnancy, and infertility in women; complications are rare in men.

Chlamydia is often referred to as a “silent epidemic” due to the asymptomatic nature of the infection (Walsh, Anderson, & Irwin, 2000). Genital chlamydia has also been described as a persistent pathogen due to the infection’s ability to persist for months without symptoms and cause continuing damage without coming to the attention of the patient (Stamm, 2001). Furthermore, this infection is not only hidden in the body but is also socially veiled. Eng and Butler, editors of the Institute of Medicine’s report, *The Hidden Epidemic: Confronting Sexually Transmitted Disease*, state:

STDs are difficult public health problems because of the “hidden” nature of these diseases. The sociocultural taboos related to sexuality are a barrier to STD prevention efforts on a number of levels. Effective STD prevention efforts also are hampered by biological characteristics of STDs, societal problems,

unbalanced mass media messages, lack of awareness, fragmentation of STD-related services, inadequate training of health care professionals, inadequate health insurance coverage and access to services, and insufficient investment in STD prevention. (Eng & Butler, 1997, p. 2)

Since the 1980s, guidelines have been in place to promote chlamydia screening. Several organizations have recommendations for chlamydia screening, including the U.S. Preventive Services Task Force, the American Medical Association, the American College of Obstetricians and Gynecologists, and the American Academy of Pediatrics. The CDC's screening recommendations are supported and informed by these organizations (Walsh, et al., 2000). Currently, the CDC (2010b) recommends that all sexually active women aged 25 years and younger, older women with risk factors (new sex partners or multiple sex partners), and all sexually active men who have sex with men (MSM) be screened annually for chlamydia. Despite established screening recommendations and effective treatment guidelines, the prevalence of chlamydial infections has remained extremely high and has actually increased in recent years (Centers for Disease Control and Prevention, 2010a).

The purpose of this thesis is to describe the history of the CDC's chlamydia screening recommendations, examine the implications of the CDC's recommendation that all sexually active young women be screened for the infection, examine adherence to current chlamydia screening recommendations, and subsequently propose new national screening recommendations. The specific questions that are considered in this thesis are: 1) How have chlamydia screening recommendations and guidelines changed since they were first introduced by the CDC in 1985? 2) Why are there no recommendations to screen all sexually active young men aged 25 years and younger? 3) What are the social consequences and implications of

primarily screening women for chlamydia? 4) What are the barriers to following the CDC's screening recommendations?

Reviews of scientific and professional literature are central to this thesis. PubMed and the CDC's website were searched for relevant articles. The key phrases for the search included "chlamydia screening," "chlamydia screening recommendations," "chlamydia guidelines," "chlamydia sequelae," "chlamydia in men," "chlamydia in MSM," "chlamydia screening and social implications," "barriers to chlamydia screening," and "impact of chlamydia screening."

The organization of this thesis is to first present what is reliably studied and known about chlamydia screening measures. Next, the discussion and recommendations section integrates and analyzes all relevant information that has been found regarding the CDC's screening recommendations. The objective of this thesis is to present a position on the CDC's screening recommendations and ultimately propose a new set of recommendations.

2.0 GENITAL CHLAMYDIAL INFECTIONS

Genital chlamydia trachomatis is a bacterial infection that is spread through sexual contact in the form of vaginal, anal and oral sex. Some researchers assert that 85% to 90% of chlamydial infections are asymptomatic (Peipert, 2003), while others estimate that 70% of women and 40% of men have no symptoms (Walsh, et al., 2000). Additional studies have also estimated that 95% of infected men and 75% of infected women do not exhibit symptoms of chlamydial infection (Meyers, Halvorson, & Luckhaupt, 2007). While it is not clear from the research exactly what percentages of women and men have no symptoms, it is evident that chlamydia is largely asymptomatic.

The most common clinical manifestation of the infection in men is nongonococcal urethritis, which can cause symptoms such as urethral discharge and dysuria (painful urination) (Peipert, 2003). The infection may also cause epididymitis, which causes intrascrotal inflammation (Krieger, 1984). There are limited data about the effect of chlamydia on male fertility and complications are very rare in men (Paavonen & Eggert-Kruse, 1999).

Unlike in men, chlamydia can produce serious complications in women. The clinical manifestations in women depend on the site of the infection: infection of the urethra and lower genital tract can result in dysuria and abnormal vaginal discharge; symptoms of an infection in the upper genital tract include pelvic discomfort or pain and irregular uterine bleeding (Peipert, 2003). Left untreated, chlamydial infections can have severe sequelae. Between 15% and 40%

of women with untreated infections will develop Pelvic Inflammatory Disease (PID) (Walsh, et al., 2000). PID can cause inflammation of the uterus, ovaries, and fallopian tubes, and the consequences can include infertility, chronic pelvic pain, and ectopic pregnancy (Haggerty, et al., 2010). PID caused by chlamydia is one of the most preventable causes of infertility (Paavonen & Eggert-Kruse, 1999). One episode of PID can cause around 10% to 12% of females to become infertile (Paavonen & Eggert-Kruse, 1999; Walsh, et al., 2000). In addition, infection with chlamydia during pregnancy can lead to serious complications for the infant, as the infection can be transmitted during delivery. Anywhere from 30% to 50% of infants born to infected mothers will have conjunctivitis and as many as 20% of infants will develop chlamydial pneumonia (Peipert, 2003; Walsh, et al., 2000). Chlamydia can also induce preterm labor (Paavonen & Eggert-Kruse, 1999). Finally, in both infected men and women, chlamydia increases the risk of infection with HIV/AIDS if exposed (Fleming & Wasserheit, 1999).

2.1 TESTING FOR CHLAMYDIA

There are a variety of methods to test both men and women for chlamydia. Cell cultures, enzyme immunoassay tests, direct fluorescent antibody tests, and nucleic acid amplification tests (NAATs) are all tests approved by the Food and Drug Administration for the detection of chlamydia (Centers for Disease Control and Prevention, 2010b; Stamm, 2001). The cell culture method of testing uses test specimens collected by swabs from a woman's endocervix and a man's urethra; these specimens are inserted into a cell and stained with a specific antibody to determine if chlamydial bacteria is present (Centers for Disease Control and Prevention, 1985). Cell culture was the first available chlamydia screening method. It is expensive, time

consuming, and technically difficult to perform (Black, et al., 2002). Developed during the mid 1980s and early 1990s, enzyme immunoassay tests and direct fluorescent antibody tests are nonculture methods that similarly detect the infection by smearing specimens on glass slides and then staining them with antibodies that bind to chlamydia bacteria (Centers for Disease Control and Prevention, 2002a; Gaydos, Ferrero, & Papp, 2008; Stamm, 2001). These testing methods also utilize specimens from the endocervix for women and the urethra for men. However, both of these diagnostic measures are not as specific or sensitive as NAATs. NAATs, a molecular test that detects chlamydia-specific DNA and RNA sequences, became a widely used diagnostic method in the early 2000s (Centers for Disease Control and Prevention, 2002a). In addition to specimens from the endocervix and urethra, NAATs can also be performed on urine specimens (Stamm, 2001).

2.2 DEMOGRAPHICS

In the past 20 years there has been a large increase in the number of reported chlamydial infections, which reflects expanded screening, more effective diagnostic measures, and increased reporting of infections from states and health agencies to the CDC (Centers for Disease Control and Prevention, 2010a). Since 1994 chlamydial infections have been the most common sexually transmitted infection in the nation and make up the largest proportion of STDs reported to the CDC (Centers for Disease Control and Prevention, 2010a). In 2009, 1,244,180 cases of chlamydia were reported to the CDC from all 50 states as well as the District of Columbia, the largest number of any condition ever reported (Centers for Disease Control and Prevention, 2010a). The total number of cases of chlamydia reported to the CDC in 2009 increased close to

three percent over those reported in the previous year. This increase is believed to be due to increased screening efforts as well as more sensitive and specific tests; however, it is possible that this rate truly reflects a rise in infections (Centers for Disease Control and Prevention, 2010a).

The rates of reported chlamydial infections vary by gender, age, and race and ethnicity. The rate of infection among females was 592.2 cases per 100,000 and among males was 219.3 cases per 100,000; the higher rate in women is most likely the result of a greater number of women being screened (Centers for Disease Control and Prevention, 2010a). In fact, the CDC estimates that the rates of infection in men and women are actually quite similar. The highest age-specific rates of infection are in those aged 15 to 19 and those 20 to 24. All racial and ethnic minorities have high rates of infection: those among blacks is over eight times higher than whites, and rates among Hispanics and American Indians/Alaska Natives are also substantially higher than whites (Centers for Disease Control and Prevention, 2010a). The prevalence of chlamydia in MSM is monitored by the STD Surveillance Network (SSuN): 42 STD clinics in 12 cities are part of this program (Centers for Disease Control and Prevention, 2010a). In 2009, the median chlamydia prevalence in the MSM population was 11.2% (Centers for Disease Control and Prevention, 2010a).

2.3 COST OF INFECTION

As of the year 2000, the average cost per case of chlamydia was \$20.00 for men and \$244.00 for women (Chesson, Blandford, Gift, Tao, & Irwin, 2004). These costs are based upon screening tests with positive results, diagnosis and treatment of acute chlamydial infections, and sequelae

caused by acute infections (Chesson, et al., 2004). The significantly larger average cost per case for women is attributed to sequelae in women, which are far more severe (Chesson, et al., 2004). Overall, the annual costs associated with chlamydial infections in the United States are approximately two to three billion dollars (Chesson, et al., 2004; Groseclose, et al., 1999; Hu, Hook, & Goldie, 2004).

In sum, though chlamydial infections are largely asymptomatic, they cause severe sequelae and are extremely prevalent and costly. Consequently, screening for this infection is not only necessary for the prevention of the infection, but is also a matter of great importance to public health.

3.0 HISTORY OF CHLAMYDIA SCREENING GUIDELINES AND RECOMMENDATIONS

Research about the specific properties of chlamydia began in the 1960s and 1970s with the discovery and subsequent availability of chlamydia cell cultures (Centers for Disease Control and Prevention, 1985; Stamm, 2001). The availability of these cultures enabled researchers to discover that chlamydia trachomatis was the causative agent of both nongonococcal urethritis and PID as well as several neonatal conditions (Centers for Disease Control and Prevention, 1985; Stamm, 2001). In addition, research conducted during the early 1980s revealed that chlamydia was the most prevalent sexually transmitted disease in the United States (Thompson & Washington, 1983).

The following sections provide an overview of the CDC's chlamydia screening guidelines and recommendations in the United States from 1985 to 2010, and current screening recommendations in other nations.

3.1 CHLAMYDIA TRACHOMATIS INFECTIONS POLICY GUIDELINES FOR PREVENTION AND CONTROL, 1985

In 1985, as a result of the discoveries of both the high prevalence of chlamydia and the serious complications it causes, the CDC summoned a group of experts to meet with the staff of the CDC's Division of Sexually Transmitted Diseases to discuss measures and strategies to reduce and control chlamydial infections (Centers for Disease Control and Prevention, 1985). In August 1985, the CDC established their first policy guidelines for the prevention and control of chlamydia. The purpose of these guidelines was simply to provide a source of guidance for health care providers in the United States by highlighting the prevalence of the disease, the morbidity associated with it, and the treatments available for both chlamydia and the syndromes it caused (Centers for Disease Control and Prevention, 1985). The document also outlined the populations most at risk for infection: sexually active women under 20 years of age, teenage males, and individuals with multiple sex partners. Screening was suggested for pregnant women under the age of 20, married pregnant women with multiple sex partners, and unmarried pregnant women. Sex partners of those infected with chlamydia were to be notified, tested and treated. The recommended treatment for the infection was 100 milligrams of Doxycycline orally two times a day for seven days or 500 milligrams of Tetracycline orally four times a day for seven days. The guidelines did not specify which diagnostic tests, either culture or non-culture, should be used.

In addition, the CDC also established priorities for screening based on gender and sex practices. The guidelines (1985) asserted that "the screening of asymptomatic, high-risk women should be accorded the highest priority...the screening of heterosexual men should have a higher priority than screening homosexual men" (p. 61s). Though the guidelines (1985) did not

explicitly explain the reasoning behind this assertion, a previous section did state that “the prevalence of urethral chlamydia among homosexual men is approximately one-third the prevalence among heterosexual men” (p. 55s), indicating that heterosexual men required more screening. However, the CDC also asserted that “no single individual characteristic or practice...is in itself a sufficient criterion to define which persons should be screened” (p. 61s), thus providing no definitive guidance on who should be tested for chlamydia. Ultimately, the 1985 CDC guidelines did not establish specific screening recommendations, citing that the lack of inexpensive and reliable diagnostic measures restricted efforts to combat the infection.

3.2 1989 STD TREATMENT GUIDELINES

The 1989 guidelines differed slightly from those offered in 1985. The *1989 Sexually Transmitted Disease Treatment Guidelines* advised prioritizing the testing of “high-risk pregnant women, adolescents, and women with multiple sexual partners” (p. 22). This document expanded upon previous guidelines regarding pregnant women, adding that all pregnant women should be tested for chlamydia during their first prenatal visit and that high-risk women (those under 25, with a past history or presence of STDs, and/or with new or multiple sex partners) should also be tested during their third trimester. Another addition was that people who were infected with gonorrhea should also be treated for chlamydia due to the probability of coinfection, even if diagnostic testing of chlamydia was not available (Centers for Disease Control and Prevention, 1989). The 1989 guidelines made similar suggestions regarding sex partner notification but added that if testing was unavailable, those suspected of having an infection should be treated (Centers for Disease Control and Prevention, 1989). Notably, unlike

the previous guidelines, there was no mention of screening priorities regarding heterosexual and homosexual men.

Overall, the recommended treatment for the infection remained the same in the updated guidelines. And, once again, the CDC did not specify which diagnostic method—culture or non-culture—should be used. Like the 1985 guidelines, the 1989 guidelines provided only advice and did not establish specific recommendations.

3.3 RECOMMENDATIONS FOR THE PREVENTIONS AND MANAGEMENT OF CHLAMYDIA TRACHOMATIS INFECTIONS, 1993

The CDC report *Recommendations for the Prevention and Management of Chlamydia trachomatis infections, 1993*, updated previous guidelines. Like the 1985 guidelines, this document focused solely upon chlamydia. This document established the first set of CDC chlamydia screening recommendations for the nation. Newly available diagnostic tests, such as direct fluorescent antibody tests and enzyme immunoassay tests were more cost-effective and easier to use than those previously available. These diagnostic measures enabled the CDC to recommend a more aggressive prevention strategy through widespread screening (Centers for Disease Control and Prevention, 1993). Screening was now considered a central component of chlamydia prevention due to the asymptomatic nature of the infection, and thus the CDC recommended the annual screening of all sexually active women under the age of 20, women aged 20 to 24 with risk factors (multiple or new sex partners during the last three months or inconsistent use of barrier contraception), and women over 24 years of age with multiple risk

factors (multiple or new sex partners during the last three months and inconsistent use of barrier contraception) (Centers for Disease Control and Prevention, 1993).

Unlike the 1989 guidelines, these recommendations did not advise screening pregnant women during the first trimester as this provided a long period of time for women to become infected; instead, the guidelines asserted that pregnant women should be screened only during the third trimester. Also, treating people infected with gonorrhea for chlamydia regardless of diagnosis was discouraged, reflecting the expansion and ability of providers to diagnose patients with the infection. In addition, the guidelines called for providers to notify their patients infected with chlamydia that their sex partners needed to be examined and treated and, when possible, for health care providers to offer treatment to the sex partners of those infected or refer them to other appropriate resources.

The report also suggested the preferred sites for collecting screening specimens in women and men: the endocervix in women and the urethra in men. According to the report (1993), screening tests for men “would be more acceptable if urine rather than intraurethral swab specimens could be used” (p. 24); however, insufficient evidence existed to recommend the use of urine for diagnosis. With regard to treatment, one single dose of one gram of Azithromycin was found to effectively treat chlamydia and recommended treatment regimens include 100 milligrams of Doxycycline orally two times a day for seven days or one gram of Azithromycin orally (Centers for Disease Control and Prevention, 1993). It is evident from the report that new technological and medical advances since the late 1980s enhanced screening and expedited the treatment of chlamydial infections, which enabled the CDC to provide concrete recommendations.

3.4 1998 GUIDELINES FOR TREATMENT OF STDS

The CDC's *1998 Guidelines for the Treatment of Sexually Transmitted Diseases* expanded upon previous recommendations and recommended that all sexually active adolescent females as well as sexually active women aged 20 to 24 be screened. All other guidelines were the same as those in 1993.

3.5 STD TREATMENT GUIDELINES, 2002

The 2002 CDC guidelines included several key updates. These guidelines raised the ceiling age for screening sexually active young women from 24 to 25 years of age and added the recommendation that older women with any risk factors (new sex partners or multiple sex partners) be screened. In addition, unlike the 1989 and 1998 guidelines, the 2002 guidelines recommended that all pregnant women be tested for chlamydia at their first prenatal visit, instead of during the third trimester, to potentially reduce the harmful risks of chlamydia on pregnancy. The report recommended that women under the age of 25 and women with risk factors be tested during the third trimester as well (Centers for Disease Control and Prevention, 2002b).

This edition also included new recommendations to screen MSM,^{*} which was considered a special population at greater risk for HIV and STDs due to unsafe sex practices. The CDC noted that while the rates of HIV had decreased in the MSM population in the previous decade,

^{*} This document used the identity-free term MSM to refer to men who have sex with men instead of the word homosexual, which implies a specific sexual identity. In 1994 the term MSM was coined and has become widely used in public health (Young & Meyer, 2005).

preliminary data showed an increased rate of STDs in HIV-infected MSM as well as a possible increase in HIV and STD infection rates. The CDC (2002) speculated that these data reflected an increase in unsafe sexual behavior due to a number of factors including “improved HIV/AIDS therapy on quality of life and survival, ‘safer sex burnout,’ and in some cities, adverse trends in substance abuse” (p. 7). Consequently, the CDC recommended annual screening for urethral infection for sexually active MSM with oral-genital exposure, and screening for rectal infection for men who had receptive anal intercourse in the past year. In addition, screening was suggested approximately every three to six months for MSM who had anonymous or multiple sex partners, or who used illicit drugs in conjunction with sexual activities or had partners who did so. The CDC also recommended that this population be screened for HIV, syphilis, and gonorrhea.

A new guideline was also created for women who had suffered from a previous chlamydial infection. Women with chlamydia were to be rescreened three to four months after treatment due to the high prevalence of chlamydia found in those previously infected. The high rates of reinfection were believed to be a result of continued sexual activity with a partner not treated for chlamydia or participation in sexual activity in an area with a high prevalence of chlamydial infections (Centers for Disease Control and Prevention, 2002b). All other recommendations were the same as those in 1998.

3.6 STD TREATMENT GUIDELINES, 2006

In 2006, the CDC once again recommended screening all sexually active women aged 25 and under. The guidelines (2006) stated: “evidence is insufficient to recommend routine screening

for *C. trachomatis* in sexually active young men, based on feasibility, efficacy, and cost-effectiveness. However, screening of sexually active young men should be considered in clinical settings with a high prevalence of chlamydia” (p. 38). The 2006 screening recommendations for pregnant women and MSM were exactly the same as those made in 2002.

This edition provided updated information on diagnostic measures. According to the guidelines, in addition to swab specimens from the vagina or endocervix in women and the urethra in men, urine specimens could be used to diagnose the infection in both men and women. It also stated that NAATs were the most sensitive diagnostic measure available (Centers for Disease Control and Prevention, 2006).

3.7 STD TREATMENT GUIDELINES, 2010

The most recent publication of guidelines for the treatment of STDs feature a new recommendation to re-test pregnant women who tested positive for chlamydia three to six months later (Centers for Disease Control and Prevention, 2010b). The screening recommendation for the MSM population is the same except for the addition of declaring NAATs to be the preferred testing approach for men. All other recommendations are essentially the same as in 2006. However, more detail with regard to screening men was added: the CDC (2010b) asserts that there is a dearth of evidence to recommend the screening of men and that “targeted chlamydia screening in men should only be considered when resources permit and do not hinder chlamydia screening efforts in women” (p. 45). This statement clearly demonstrates that the CDC’s priority remains focused on screening women.

3.8 SUMMARY OF SCREENING GUIDELINES AND RECOMMENDATIONS

This section summarizes the most significant changes in the CDC's chlamydia screening guidelines and recommendations. Screening guidelines were similar in 1985 and 1989: sexually active young women and pregnant women were the highest screening priority, but no official recommendations were created. In 1993, the advent of more cost-effective and sensitive tests enabled the CDC to establish specific recommendations. The CDC recommended annual screening of all sexually active women under the age of 20, women aged 20 to 24 with risk factors (multiple or new sex partners during the last three months or inconsistent use of barrier contraception), and women over the age of 24 with multiple risk factors (multiple or new sex partners during the last three months and inconsistent use of barrier contraception). In 1998, the CDC expanded screening recommendations to also include the annual screening of sexually active women aged 24 and younger. These annual screening recommendations were further expanded in 2002 to include all sexually active women aged 25 and younger as well as older women with risk factors (new sex partners or multiple sex partners). The shifts in age range for screening reflect epidemiological data regarding disease prevalence in age groups. In addition, in 2002 the CDC recommended screening all sexually active MSM, the first screening recommendation for any population of men. To date, MSM is the only population of men that the CDC recommends screening. The 2006 guidelines cited a lack of evidence to recommend screening sexually active young men, while the 2010 guidelines further add that screening males should only occur if it does not impede screening women. Finally, the 2010 guidelines advise that NAATs are the preferred diagnostic approach for men.

3.9 SCREENING PROGRAMS AND GUIDELINES IN OTHER NATIONS

The United States is not the only nation with chlamydia screening recommendations. Several other countries utilize chlamydia screening programs and guidelines, as chlamydia is one of the most prevalent curable sexually transmitted diseases in the entire world (World Health Organization, 2001).

Sweden was the first nation to introduce a national chlamydia screening program. In 1982 Sweden implemented programs to conduct opportunistic screening of women aged 30 and younger getting abortions, contraception, or prenatal care as well as screening male sex partners of women infected with chlamydia (Low, 2007). In 1988, the Swedish government enacted a law requiring physicians to provide testing and treatment of chlamydia free of charge, report all cases of the infection, and notify partners of infected individuals (Low, 2007).

In the years following the implementation of these policies and the extensive screening of young women, the prevalence of chlamydial infections decreased by more than 60% (Sylvan & Christenson, 2008). The success of Sweden's screening program has been attributed to a strong medical infrastructure, a culture of open-mindedness toward sexual health, and the small size of the nation (Low, 2007). Sweden's screening program is largely considered to be highly effective, resulting in other nations following its example (Low, 2007). Denmark, Norway, Finland, and Italy all utilize similar opportunistic screening programs in which women are screened when they receive health care unrelated to chlamydial infections (European Centre for Disease Prevention and Control, 2008; LaMontagne, Fenton, Randall, Anderson, & Carter, 2004; Low, 2007).

However, since 1995, the prevalence of chlamydia has begun to increase in Sweden as well as in other Scandinavian countries (Sylvan & Christenson, 2008). The improved sensitivity

of diagnostic measures may partially explain the increase in infection rates (Low, 2007). In addition, Low (2007) and Sylvan and Christenson (2008) argue that the decrease in chlamydia rates during the late 1980s and early 1990s in Sweden should also be attributed to safer sex behaviors that were a result of HIV/AIDS education campaigns that took place during those years. According to Sylvan and Christenson (2008), the trend of safer sex behaviors reversed “when the fear of HIV diminished once it became obvious that there was no spread of HIV in the general population, as had been confirmed by the vigorous testing in Sweden” (p. 362). Yet another critical rationale for the increase in the prevalence of chlamydia is the minimal inclusion of men in screening programs (Low & Egger, 2002; Sylvan & Christenson, 2008). In recent years, researchers throughout the world have begun to question the exclusion of men in screening recommendations (Fenton, 2000; Low, 2007; Tebb, et al., 2005; Voelker, 2010). In fact, England implemented a National Chlamydia Screening Programme (NCSP) in 2002, but unlike other nations decided to offer opportunistic screening to both men and women under the age of 25 (LaMontagne, et al., 2004).

4.0 WHY NOT SCREEN MEN?

Noticeably absent from the CDC's chlamydia guidelines are screening recommendations for heterosexual men. There are several reasons why the CDC did not establish screening recommendations for men, including the priority to screen women over men due to the severe consequences the infection has in women, the lack of sensitive and noninvasive diagnostic screening tests for men, and the fact that male screening has not been found to be cost-effective in comparison to female screening. The following section provides the rationale behind the CDC's decision to exclude men from screening recommendations.

Since 1985, women have been the primary targets for screening activities and recommendations as a result of the serious complications chlamydia causes in women. From 1988 to 1993 the CDC (2010a) initiated a chlamydia screening demonstration project in Health and Human Services Region X (Alaska, Idaho, Oregon, and Washington), providing chlamydia screening for women attending family clinics and STD clinics. In one year, the prevalence of chlamydial infections in female patients served by these clinics declined by 65% (Walsh, et al., 2000). This demonstration project revealed that screening programs targeted at women lowered prevalence rates, and consequently led to the creation of other federally funded screening programs for women in several regions of the United States (Walsh, et al., 2000). The success of the demonstration project led to a large number of studies being conducted regarding the cost-effectiveness and benefits of screening young women for chlamydia. Many studies, utilizing

sophisticated methods such as decision-analysis models and computer-based mathematical models, found that screening sexually active women was cost-effective, based upon the cost of screening in relation to the cost of treating complications associated with the infection (Estany, Todd, Vasquez, & McLaren, 1989; Howell, Quinn, & Gaydos, 1998; Hu, et al., 2004). In addition, the wide availability of nonculture diagnostic tests, which were easier to use than cell culture tests, enabled the CDC (1993) to establish its first screening recommendations for women. According to the CDC (1993), the “use of nonculture tests is a cornerstone of chlamydia prevention strategies” (p. 9). Moreover, a study conducted by Scholes et al. in 1996 determined that screening young women for chlamydia and subsequently treating those infected, dramatically reduced the incidence of Pelvic Inflammatory Disease, a serious complication of chlamydia (Scholes, et al., 1996). Thus, it was evident that screening women for chlamydia was an effectual means of reducing infection prevalence as well as complications associated with the infection. Correspondingly, the CDC was able to recommend the screening of young women based upon available evidence.

However, while research found that screening women effectively reduced the prevalence of chlamydial infections, studies did not support the inclusion of men in screening efforts.* Literature from the late 1980s and early 1990s cited limited resources and the lack of effective diagnostic procedures for men as factors that inhibited the widespread screening of males for the infection (Genc, Ruusuvaara, & Mardh, 1993; Handsfield, 1987; Randolph & Washington, 1990; Rietmeijer, Judson, Van Hensbroek, Ehret, & Douglas Jr., 1991). A 1990 study of chlamydia in heterosexual men found that diagnostic techniques were neither specific nor sensitive enough,

* It should be noted that the CDC’s guidelines and recommendations do not cite any specific studies or reports to justify or explain the exclusion of men from screening recommendations until the 2010 guidelines.

and more specific and sensitive detection methods were needed in order to implement cost-effective screening programs for men (Rietmeijer, et al., 1991). The urethral swabbing required to test men for chlamydia was also considered to be a serious barrier to the widespread screening of men (Centers for Disease Control and Prevention, 1993). Gift, Blake, Gaydos and Marrazzo (2008) conducted a literature review on the cost-effectiveness of screening males for chlamydial infections; the articles reviewed in the paper were published between 1990 and 2007, and the majority found that screening women was more cost-effective than screening men (Gift, Blake, Gaydos, & Marrazzo, 2008). The CDC's exclusion of men in screening recommendations seemed logical given the lack of research to support such efforts, especially in relation to the strong evidence of the effectiveness of screening women.

However, new diagnostic technology has made screening males much simpler and more feasible. Evidence has shown that urine-based NAATs are specific and highly sensitive. Furthermore, the noninvasive nature of the test also makes possible the widespread testing of asymptomatic males (Gaydos, et al., 2008; Marrazzo, et al., 2007; Tebb, et al., 2005). In fact, this sensitive, noninvasive method of testing men for chlamydia has led to an increase in male screening; the detection of the presence of the disease among the male population has also increased (Satterwhite, Joesoef, Datta, & Weinstock, 2008). In 2005, the rate of chlamydial infection in men was 159.4 per 100,000 males, while in 2009 the rate was 219.3 per 100,000 males, a 37.6% increase (Centers for Disease Control and Prevention, 2010a). The CDC attributed this surge to the increased usage of NAATs. It is clear that this effective and noninvasive testing measure has removed a large barrier to screening males for the infection and also provided a means to determine the prevalence of the infection in men.

In recent years experts have begun to reconsider the chlamydia control and prevention strategy of primarily screening women. Tebb et al. (2005) argue that with the new data on the prevalence of chlamydia in young men, “and the ease of obtaining urine-based specimens, it is time to reassess the need for screening sexually active young men to complement ongoing screening efforts among young women; it is even conceivable that these efforts would be synergistic” (p. 1809). Kevin Fenton, former Director of the HIV and Sexually Transmitted Infections Department in the United Kingdom’s Health Protection Agency and current Director of the CDC’s National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention, asserts that,

although the benefits of screening asymptomatic women for *C. trachomatis* appear, on the surface, to outweigh those for asymptomatic men, this should not lead us to focus solely on women. At best, chlamydia screening for women is concerned with secondary prevention. Primary prevention can be achieved only by reducing the prevalence of chlamydial infection in men. (Fenton, 2000, p. 88)

In addition, Gift et al. argue that while many studies found male screening to be less cost-effective than female screening, numerous studies regarding screening women did not assess the implications of the transmission of chlamydial infections from males to females (Gift, et al., 2008).

In March 2006 the CDC convened a meeting with consultants to review evidence and address the issue of male chlamydia screening. The consultants included individuals from the CDC’s Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention, the National Center for Chronic Disease and Public Health Promotion, and the Division of Reproductive Health. This consultation also included experts from several universities, public health agencies, the U.S. Preventive Services Task Force, the American Medical Association, and several other organizations (Centers for Disease Control and

Prevention, 2007). The purpose of this meeting was to review available evidence and make recommendations to programs that were interested in or were already screening men, not to provide any formal recommendation about adopting or expanding male screening. The CDC stated that it planned to address the issue of broader recommendations for male screening in the future. The following list was created to assist programs on the male populations who should be screened for chlamydia. The CDC consultation (2007) advised screening: males attending STD clinics; males attending Job Corps; males less than 30 years of age entering prison; males entering juvenile detention centers; males less than 30 years of age in the military; partners of infected males; and, to rescreen males with chlamydial infection three months after the initial infection. The report (2007) also noted that “there was no consensus on the state of cost-effectiveness literature because of differences among studies regarding methodology and a lack of empiric evidence of the impact of screening men on the prevalence in women” (p. 5). Ultimately, the conclusion of the *Male Chlamydia Screening Consultation* (2007) was that:

screening men for Ct [chlamydia] infection presents challenges to programs including limited resources, lack of knowledge of high prevalence settings, and lack of information on the impact of screening men for Ct on rates and outcomes in women. A premise of the consultation was that STD programs should screen women less than 26 years of age for chlamydia infection as a primary focus and that screening men for Ct should be considered as a secondary focus to prevent Ct infection and sequelae among women. (p. 5)

It is evident that unlike female screening, there is a dearth of conclusive research about the effectiveness of male screening. However, no recommendations for further research on male screening were made and, as shown in Section 3.8, screening recommendations for the general male population remained the same from 2006 to 2010. In addition, the 2010 guidelines and recommendations cite the above consultation when stating that there is not sufficient evidence to include men in chlamydia screening recommendations (Centers for Disease Control and

Prevention, 2010b). While the CDC provided guidance for programs that wanted to screen men, the organization remained firmly committed to prioritizing the screening of women.

Unlike for heterosexual men, there are chlamydia screening recommendations for men who have sex with men. According to the CDC (2002), MSM have a high risk for infection with HIV in addition to other STDs. Research found that the MSM population practiced unsafe sex and had high rates of STDs, including chlamydia (Centers for Disease Control and Prevention, 1999; Chen, et al., 2002; Ciemins, et al., 2000; Geisler, Whittington, Suchland, & Stamm, 2002). While the frequency of sexually transmitted diseases in the MSM population declined from the mid 1980s to the mid 1990s, it began to steadily increase after this period. And as noted in Section 3.5, the CDC (2002) speculated that unsafe practices were increasing due to the changing views on HIV/AIDS as a result of new advances in treatment as well as a rise in substance abuse in the MSM population. As a result of the population's unsafe sexual practices and the high prevalence of chlamydia in the MSM population in the United States, the 2002 CDC guidelines recommended the annual screening of sexually active men who have sex with men (Centers for Disease Control and Prevention, 2002b, 2006, 2010b). There is no information on or reference to the purpose of screening MSM in relation to preventing chlamydia infection and sequelae in women.

5.0 SOCIAL CONSEQUENCES OF PRIMARILY SCREENING WOMEN

Discussing the screening of women for chlamydia, researcher J. Dennis Fortenberry stated: “there are some people who might argue that this is ongoing gender discrimination that still makes women bear a greater part of the burden of something that our entire society has to be interested in [for] our reproductive health” (as cited in Voelker, 2010, p. 824). While the current screening guidelines may place a burden primarily upon women, it has social consequences for both women and men.*

Screening women disadvantages them as their sexual behavior is scrutinized while men’s behavior is not (Duncan & Hart, 1999a). This sexual scrutiny transforms women into the transmitters and contractors of the infection (Duncan & Hart, 1999a). A qualitative study using semi-structured interviews conducted at a family clinic in Glasgow, Scotland, found that women felt stigmatized about having chlamydia and also felt a great deal of anxiety about notifying their partners (Duncan, Hart, Scoular, & Bigrigg, 2001). Duncan and Hart (1999a) state:

the stigmatised nature of “aberrant” sexual behavior which is implied by STIs imbues the act of screening with a meaning that displaces the cost-benefit health behaviour model of decision making about sexual health, where sexually active women are expected to attend for screening because they are “objectively” at risk. (p. 240)

* As stated in the previous section, the only men that the CDC recommends screening are those who have sex with men. No articles or research could be found regarding the social consequences screening causes within the MSM population.

Screening only women means that women are diagnosed as infected with chlamydia, must bear the responsibility of notifying their partner, and may be blamed for spreading the infection. Similarly, in a qualitative study conducted in Ireland, women worried about the stigma of being tested for chlamydia, fearing they would be considered “bad girls” if tested (Balfe, Brugha, O'Donovan, O'Connell, & Vaughan, 2010). Screening women may make them feel judged, labeled promiscuous, or irresponsible.

In a qualitative study conducted at a London sexual health clinic, Darroch, Meyers, and Cassell (2003) found that men and women had very different experiences about testing positive for chlamydia. Women possess more awareness about chlamydial infections than men, and unlike men, express self-blame regarding the contraction of the infection (Darroch, Myers, & Cassell, 2003). The authors suggest that this study illustrates the fact that women feel stigmatized, while men see themselves as blameless (Darroch, et al., 2003). Other studies have shown that screening for chlamydia can cause a great deal of anxiety in the women being tested (Balfe, et al., 2010; Darroch, et al., 2003; Duncan, et al., 2001). Sexuality and sexually transmitted diseases are complicated and sensitive issues, and focusing chlamydia screening on women can produce a negative impact on women both psychologically and socially.

In their article, “Sexuality and Health: the hidden costs of screening for Chlamydia trachomatis,” Duncan and Hart assert that focusing screening on women decreases the responsibility men feel regarding sexual health issues (Duncan & Hart, 1999b). The authors further assert that focusing screening mainly on women ignores the importance of addressing the sexual health needs of men (Duncan & Hart, 1999b).

Men also lack knowledge regarding chlamydia. A study conducted in Scotland found that male participants’ knowledge about chlamydial infections was less than that of their female

counterparts. Specifically, men were not aware that the infection was often asymptomatic (Lorimer & Hart, 2010). Another study found that male participants who had heard of chlamydia were not clear about the symptoms and consequences of the disease (Chaudhary, et al., 2008). In fact, most participants felt that chlamydia was not a serious health issue. One man stated, “it is treatable though, I mean, maybe that makes you more laissez faire about it. You think it’s not, like, the end of the world. You can go to your GP and get it sorted out, not like something that would last for life” (Chaudhary, et al., 2008, p. 467). Similarly, Darroch et al. (2003) found that the majority of males in their study perceived the severity of the infection to be low: one male patient interviewed did not believe that chlamydia was at all serious and only sought out treatment six weeks after being informed he was infected. The belief that chlamydia is not a health concern for men is quite problematic. While it is true that chlamydia does not typically cause serious complications for men, it does for women. It is also significant that most men are unaware of the impact the infection can have on their female partners’ reproductive health.

In addition, sexual health policies and guidelines are geared toward the needs of women and ignore or exclude men (Sonfield, 2002). And as a result, the sexual health and reproductive knowledge and needs of males have been overlooked (Armstrong, 2003; Sonfield, 2002). One qualitative study found that men consider chlamydia to be a woman’s issue (Chaudhary, et al., 2008). There is also very little research on the perceptions of men regarding chlamydia screening and their sexual health needs (Chaudhary, et al., 2008). According to Sonfield (2002), just like women, men need to be screened for STDs to protect themselves and their partners, but “service providers, policymakers and the general public have little awareness of the scope of men’s sexual and reproductive health needs...this lack of awareness and understanding has

helped to create other obstacles to meeting men's needs and has limited efforts to effect change”
(p. 10). Ignoring men's sexual health, especially regarding chlamydia, has adverse consequences
for both men and women.

6.0 BARRIERS TO SCREENING

Though the recommendation to primarily screen women leads to a variety of social consequences, barriers exist to actually following this established screening recommendation. In fact, the CDC's chlamydia screening recommendations are often not followed. According to Heijne, Tao, Kent, and Low (2010), who conducted a longitudinal study of regular annual chlamydia testing of women enrolled in health plans in the United States, "at present, the low rates of regular annual chlamydia testing do not comply with national recommendations and would not be expected to have a major impact on the control of chlamydia transmission at the population level" (p. 249). The sections below describe the factors that impede the screening of chlamydia in the United States.

6.1 PROVIDER ADHERENCE TO SCREENING RECOMMENDATIONS

Several studies have shown that provider adherence to the CDC screening guidelines is quite low. Pelvic examinations and preventative services such as Pap tests and urinalysis provide ample opportunities for practitioners to test women for chlamydia (Hoover & Tao, 2008). However, according to a study that surveyed 1600 physicians in Pennsylvania, including internists, general practitioners, obstetricians/gynecologists, and pediatricians, only 32% of physicians who perform gynecologic examinations would test a sexually active, asymptomatic

adolescent for the infection (Cook, et al., 2001). A statewide survey of primary care providers in Colorado determined that roughly 54% of providers routinely screened female teenagers who were sexually active (Torkko, Gershman, Crane, Hamman, & Baron, 2000). Another study of primary care providers in Washington and Idaho found that 42% of providers followed screening guidelines (McClure, et al., 2006). In addition, an analysis of data from the 2005 National Ambulatory Medical Care Survey, a component of the National Health Care Survey administered by the CDC's National Center for Health Statistics, found that of the 3.8 million visits made by women aged 15 to 25 to obstetrician/gynecologists in which pelvic examinations occurred, only 600 thousand patients were tested for chlamydia (Hoover & Tao, 2008). Adherence to the screening recommendations for MSM has also been found to be low (Kent, et al., 2005). It is possible that some MSM do not inform their providers about their sexual practices and, consequently, their providers are not aware that these patients should be screened for chlamydia. Although the CDC chlamydia screening guidelines have been in place for many years, it is evident that the majority of providers are not following these recommendations.

Providers' knowledge, beliefs and attitudes regarding chlamydia largely determine their screening practices (Cook, et al., 2001; McClure, et al., 2006). McClure et al. (2006) found that 20% of primary care providers surveyed were not aware of screening guidelines and recommendations. Some providers asserted that they were not comfortable recommending screening to their patients (McClure, et al., 2006), while others reported that they simply did not believe that their patients were at risk for infection with chlamydia (Cook, et al., 2001; Torkko, et al., 2000). Thus, a strong association was found between provider confidence and comfort with discussing sexual issues and screening patients (Cook, et al., 2001; McClure, et al., 2006; Torkko, et al., 2000). If providers are not aware of chlamydia screening guidelines, or the high

prevalence of chlamydia, or are uncomfortable discussing sexual issues with patients, it seems fairly certain that screening recommendations will not be followed, and patients will not receive the services deemed necessary for the prevention and management of chlamydial infections.

Other research has shown that race and ethnicity play a role in providers' screening practices, as providers are more likely to test minorities for chlamydia (Christiansen-Lindquist, Tao, Hoover, Frank, & Kent, 2009; Wiehe, Rosenman, Wang, & Fortenberry, 2010; Wiehe, Rosenman, Wang, Katz, & Fortenberry, 2011). Wiehe et al. (2010) also found provider testing practices to be strongly influenced by racial and ethnic stereotypes. As noted in Section 2.2, according to the CDC (2010a), the rates of chlamydial infection are much higher in minorities. However, these recent studies suggest that these higher rates may partly be a result of the greater number of minorities screened.

Gender and age are other factors associated with providers' chlamydia screening practices. Female physicians are more likely than male physicians to test their patients for chlamydia; empirically-based findings are unclear as to the reasons for this difference (Cook, et al., 2001; McClure, et al., 2006; Torkko, et al., 2000; Wiesenfeld, et al., 2005). Thus, according to Cook et al. (2001), "the reason for this consistent pattern of gender-specific behavior is not clear, but being female may represent a marker of differences in attitudes, knowledge, or previous personal experiences with health care" (p. 207). In general, female providers were found to have more favorable attitudes towards sexually transmitted diseases and be more comfortable talking to their female patients about sexual health issues; these factors could account for female providers' adherence to screening recommendations (Wiesenfeld, et al., 2005). In addition to female physicians, younger providers are also more likely to screen their patients (Cook, et al., 2001; McClure, et al., 2006; Wiesenfeld, et al., 2005). McClure et al.

(2006) posit that older practitioners may have had less instruction on screening practices than their younger colleagues. It is also possible that older male physicians, unlike their younger counterparts, are not comfortable discussing sexual health with young female patients.

6.2 PATIENTS

Like providers, patients' decision-making around chlamydia screening is directly related to their knowledge, beliefs and attitudes toward the disease. Numerous studies have found that young adults, both male and female, do not perceive themselves to be at risk for chlamydia and thus do not seek out screening (Barth, Cook, Downs, Switzer, & Fischhoff, 2002; Ford, Jaccard, Millstein, Bardsley, & Miller, 2004; Kaiser Family Foundation, 2001). Male and female patients also have difficulty discussing sexual health and STDs with their providers (American Social Health Association, 2005; Blake, Kearney, Oakes, Druker, & Bibace, 2003). In addition, according to the American Social Health Association (2005), many male and female adolescents and young adults incorrectly assume that STD testing is a routine part of care and do not ask their provider if they are being screened. The lack of communication between patients and providers is a serious barrier to screening.

Studies have also found that young men and women experience fear and anxiety around STD testing. Focus groups with young men and women in the Job Corps and Department of Youth Services in Massachusetts found that participants thought being screened and potentially diagnosed with chlamydia could negatively impact them, stating: “you feel like a low-life person” and “a person might feel dirty” as well as “your partner might not want to have sex with you” (Blake, et al., 2003, p. 525). These fears are cited as a deterrent to seeking out

screening. Physical anxiety surrounding the test may also be a barrier; the test itself prevented males from being tested, as urethral swabs are viewed as painful and uncomfortable (Blake, et al., 2003; Marrazzo, et al., 2007). However, this barrier has been recently overcome with the introduction of noninvasive urine-based testing.

6.3 HEALTH INSURANCE

Insurance coverage is another factor that plays a role in chlamydia screening. One study found that having health insurance coverage significantly lowers a person's risk of chlamydial infection (Geisler, Chyu, Kusunoki, Upchurch, & Hook III, 2006). Geisler et al. (2006) assert that there is "a significantly lower risk of chlamydial infection among insured individuals with these associations persisting even after controlling for race/ethnicity and age" (p. 394). According to the National Center for Health Statistics, roughly 30% of young adults aged 20 to 29 lacked health insurance in 2008 (Cohen & Bloom, 2010). Many millions of Americans in the age group in which chlamydia is most prevalent do not have any insurance coverage and are thus at an increased risk for infection and potential sequelae.

According to data from the National Longitudinal Study of Adolescent Health, participants who did not have insurance or had Health Maintenance Organization (HMO) coverage were significantly less likely to report testing or treatment of sexually transmitted diseases in the previous year than their counterparts with Medicaid (Fiscus, Ford, & Miller, 2004). Several other studies obtained similar findings regarding the relationship between the type of insurance coverage and chlamydia screening among young women: women with Medicaid or public health insurance are more likely to be screened than women with other forms

of insurance (Heijne, Tao, Kent, & Low, 2010; Wiehe, et al., 2010; Wiehe, et al., 2011). These studies suggest that the type of insurance coverage a woman has influences screening practices. The higher rates of screening among women with public insurance may reflect providers' belief that low-income women are more likely to be infected with chlamydia.

In 2000, the CDC's Division of STD Prevention worked with the National Committee for Quality Assurance (NCQA), a non-profit organization dedicated to improving health care and health plans, to add the annual chlamydia screening of sexually active young women aged 16 to 25 years of age as a performance measure for Healthcare Effectiveness Data and Information Set (HEDIS) (Burstein, et al., 2005). HEDIS is a tool used by the NCQA to measure the performance of managed care health plans' quality of care and service; the majority of commercial health plans and Medicaid report health services data to the NCQA (Burstein, et al., 2005). Moreover, health plans alter their practices to enhance and increase their performance ratings (Burstein, et al., 2005). The CDC analyzed HEDIS data from the years 2000 to 2007 and found that the annual screening rate of sexually active women aged 15 to 25 jumped from 25.3% in 2000 to 41.6% in 2007 (Centers for Disease Control and Prevention, 2009). There has been a clear increase in screening rates for women who are insured. It seems that the establishment of chlamydia screening as a quality performance measure for health plans has improved adherence to screening recommendations. This HEDIS performance measure will most likely continue to contribute to an increase in chlamydia screening in sexually active young women as health plans strive to improve their performance ratings. Yet while screening rates have significantly increased among at-risk individuals, as identified by the CDC, these statistics indicate that there are many individuals who are still not being screened.

7.0 DISCUSSION AND RECOMMENDATIONS

Primary prevention of a disease is defined as taking action to prevent its initial development, while secondary prevention is defined as the early detection of a disease as a means to reduce complications and transmission of the disease to others (Gordis, 2009). The goals of chlamydia screening recommendations are not only to reduce the severe consequences of the infection but also to prevent the infection from spreading to others in the population. Chlamydia is not only the most common STD in the United States, but it is also the infectious disease most frequently reported in the country (Centers for Disease Control and Prevention, 2010b). It is clear that chlamydial infections are neither being controlled nor prevented in the United States. The CDC's chlamydia screening recommendations are inconsistent, have not been updated to align with current diagnostic testing developments, unfairly place the burden of the disease upon women, and most critically, fail to include sexually active heterosexual young men in screening recommendations.

In 1985 the CDC published its first policy guidelines regarding chlamydia and asserted that screening young women should be prioritized. The reasoning behind prioritizing the screening of females is quite clear and logical: the consequences of the infection are severe in women. Since they were first introduced in 1993, the CDC's formal chlamydia screening recommendations have not changed a great deal. Studies during the late 1980s and 1990s determined that screening women was a central means of reducing chlamydia prevalence and the

rates of PID (Scholes, et al., 1996). The damage caused by chlamydial infections warranted screening in young women even though diagnostic tests were expensive (Estany, et al., 1989). The only significant changes in screening recommendations for women was raising the age bracket for annual screening from 20 and under, to 24 in 1998, and then another change to include women 25 years of age in 2002. These modifications were based on the current epidemiological data available regarding chlamydial prevalence by age (Centers for Disease Control and Prevention, 1993, 2002b). In addition, screening all pregnant women has consistently remained an important recommendation due to the complications chlamydia can cause in infants; only slight changes to recommendations for screening pregnant women have occurred since 1993. Overall, the rationale for screening recommendations for women is clear and consistent in the CDC guidelines.

Unlike for women, the CDC's guidelines and recommendations for male chlamydia screening are inconsistent and their rationale is unclear. In 1985, the CDC asserted that screening heterosexual men was a higher priority than screening homosexual men. The document did not explicitly state the reasoning for this guideline; however, a previous section in the publication cited that heterosexual men had much higher rates of chlamydial infections than homosexuals and presumably also infected women, who were the primary targets of screening (Centers for Disease Control and Prevention, 1985). Prioritizing screening heterosexual men, a population with higher rates of infection and one that transmits this infection to women, seemed completely logical. The priority of screening heterosexual males over homosexuals was not referred to in 1989, 1993, or 1998. It is unclear why screening priorities regarding heterosexual and homosexual men were not referenced or updated in subsequent years. It is possible that screening priorities for these men were not referenced because the CDC decided to focus

screening priorities on women due to evidence that screening only women lowered disease prevalence.

One rationale against screening men was due to the available diagnostic measures. Testing methods available during the 1980s, 1990s and early 2000s were not sensitive and required uncomfortable intraurethral swabs. In fact, the 1993 recommendations and guidelines cited the diagnostic measure of intraurethral swabbing for men as a serious barrier to screening asymptomatic men for the infection and that urine specimens would make screening much more acceptable. In the 2006 guidelines, the CDC stated that urine-based NAATs were the most sensitive tests available and in the 2010 guidelines declared this test to be the preferred diagnostic method. Thus, one of the largest barriers to male screening, urethral swabs, is no longer an issue. While NAATs are the CDC's preferred method and are widely available for chlamydia testing, these changes have not led to any shift in recommendations for male screening. Still, the availability of an effective testing approach did lead to an increase in interest regarding male screening.

Greater interest in screening among men led the CDC to convene a consultation in 2006 with researchers from the CDC and other medical organizations and universities. The purpose of this *Male Chlamydia Screening Consultation* (2007) was to offer guidance to programs that are interested in or currently screen men. The CDC understood that STD clinics and providers were interested in male screening and in need of assistance regarding screening parameters. While the CDC was willing to provide guidance for programs, it was unwilling to change its overall recommendations. Although the organization stated that it would continue to consider the important issue of male screening, the CDC did not modify its recommendations for men in the four years between the 2006 consultation and the publication of the most recent chlamydia

screening recommendations in 2010. The 2010 guidelines cite a lack of evidence regarding the feasibility, efficacy, and cost-effectiveness of male screening. Yet several research studies have found that male screening is feasible as a result of urine-based testing, and potentially cost-effective due to the high rates of infection (Gaydos, et al., 2008; Gift, et al., 2008; Tebb, et al., 2005). Also, the *Male Chlamydia Screening Consultation* (2007) did not suggest or encourage further research regarding male screening, in spite of the fact that it was clear that current screening recommendations were not effectively controlling or preventing the infection, as chlamydia remains the most common STD in the United States since 1994 (Centers for Disease Control and Prevention, 2010a). It seems apparent that the CDC requires more definitive evidence regarding the effectiveness of male screening. The CDC may also be hesitant to dramatically alter its recommendations while adherence to current established recommendations is still quite low.

Although no recommendations are in place for the general male population, in 2002 the CDC recommended annual screening for sexually active men who have sex with men. The CDC cited preliminary data indicating that this population was at high risk for HIV/AIDS and other STDs. But according to the CDC *Male Chlamydia Screening Consultation* in 2006, male screening should be considered secondary to female screening and a means to prevent the infection and its complications. It should be observed that if the purpose of screening men is to prevent chlamydial infection and its sequelae in women, then there is essentially no reason to screen MSM. While the MSM population is clearly at risk for chlamydial infections and other STDs as a result of unsafe sex practices, it seems rather illogical to provide screening recommendations only for men who are the least likely to infect women. The recommendation to screen only the males of the MSM population may further stigmatize this minority group and

does nothing to protect women. Though this population does suffer from high rates of various STDs, specifically syphilis and HIV (Centers for Disease Control and Prevention, 2010a), screening MSM as opposed to all men seems contradictory and ineffectual.

Furthermore, the recommendation to screen only women for chlamydia is, in effect, tantamount to gender discrimination. This recommendation places the onus of responsibility for sexual health solely on women. The qualitative studies referenced in Section 5 illuminate the way in which women are burdened as a result of chlamydia screening. Women alone are screened and, as a result, they experience the shame and stigma associated both with the need for screening due to their sexual practices, and the risk of a possible diagnosis (Duncan & Hart, 1999b). This recommendation essentially deems women to be the sole transmitters and carriers of the infection (Duncan & Hart, 1999a). The view of women as responsible for STDs is not new. According to medical historian Alan Brandt, campaigns to combat STDs during the early 1900s essentially focused only upon eliminating prostitution (Brandt, 1987). Brandt (1987) stated that “the campaign against the prostitute betrayed an underlying hostility towards women...social hygiene reformers and physicians assumed, in effect, that venereal infections could only be transmitted in one direction—that women bore the sole responsibility for the diseases” (p. 92). It seems that current screening recommendations serve to further perpetuate a belief that has long been held in the United States.

It is highly problematic as well as dangerous to have women solely bear the burden of chlamydia screening, as this infection is spread through sexual contact between both women and men. Empirical findings on patient views of chlamydia screening reveal the way in which fear and shame surround screening and potential diagnosis with a sexually transmitted disease. In addition, chlamydia has become an infection that is viewed as a “women’s issue.” Women are

those who have more knowledge regarding this infection, as evidenced by several studies. This increased knowledge is exhibited not only in female patients but in female health providers as well (Cook, et al., 2001). Unlike their male counterparts, female providers appear to understand the need for screening, which is exhibited in their much higher rates of screening for chlamydial infections (McClure, et al., 2006; Torkko, et al., 2000). As a result, both female patients and providers seem to bear the burden of responsibility for chlamydia screening.

The CDC's chlamydial infection screening recommendation also produces an unintended consequence: inadvertently discriminating against men. Their burden is not stigma, fear, or shame, but ignorance. The CDC's endorsement of screening only women virtually ignores the sexual health conditions of heterosexual men. While chlamydial infections in women are studied a great deal, there is barely any literature on chlamydia in heterosexual men (Chaudhary, et al., 2008). In fact, most studies on men's perceptions regarding chlamydia screening come from England, a nation that recently implemented screening recommendations and programs for both men and women.

Both screening recommendations and, ultimately, screening practices have further stigmatized people who are already marginalized. Minority female patients are more likely to be screened than their majority counterparts as are women covered by Medicaid (Christiansen-Lindquist, et al., 2009; Wiehe, et al., 2010). Providers clearly assume that minorities and low-income women practice unsafe sexual behaviors. As mentioned earlier in Section 6.1, increased screening among these populations results both in greater detection of the infection and higher reported rates of infection. As a consequence, this may present an inaccurate representation of disease prevalence; such a depiction of chlamydia prevalence leads again to stereotyping, perpetuating already held beliefs among some practitioners.

Many experts have questioned excluding men from screening recommendations in light of the array of recent findings regarding the infection (Fenton, 2000; Satterwhite, et al., 2008; Tebb, et al., 2005; Voelker, 2010). Researcher J. Dennis Fortenberry states that it is necessary to challenge “our belief that just by screening young women we’re doing enough” (as cited in Voelker, 2010, p. 823). Fortenberry is right. Screening young women is clearly not enough, but this belief has become the established norm in the past 20 years, especially in the United States. This conviction is exemplified by the CDC’s decision to not update its screening recommendations even though chlamydia rates have remained extremely high and new technology has simplified male testing.

New chlamydia screening recommendations are necessary based on the lack of control over disease prevalence, the unequal burden of the disease on women, and the increased feasibility of diagnostic measures for men. The CDC guidelines should continue to recommend annual screening of all sexually active women aged 25 and under, but also recommend the routine screening of all sexually active young men aged 25 and under. Screening is recommended for women over the age of 25 with risk factors (multiple or new sex partners) and new recommendations should also include men over the age of 25 with risk factors. The recommendations to screen all pregnant women at the first prenatal visit and all sexually active MSM should remain the same.

New screening recommendations alone cannot overcome all of the barriers that exist to chlamydia screening. As noted earlier in Section 6, a variety of barriers to screening exist, from providers’ attitudes and knowledge to patients’ fears and insurance status. Educating providers and patients about the importance of chlamydia screening is not a simple task, as it is both time-consuming and expensive. In addition, according to Hoover and Tao (2008), simply educating

providers is an insufficient method to increase screening rates. But other methods do exist to increase the adherence to chlamydia screening recommendations. Indeed, the inclusion of annual chlamydia screening for young women as a HEDIS performance measure for health plans increased the rates of screening a great deal from 2000 to 2007 (Burstein, et al., 2005; Centers for Disease Control and Prevention, 2009). To ensure that providers and health plans would follow the new recommendations to screen sexually active young men aged 25 years and under, this recommendation must also become a performance measure for health plans.

The CDC provides a section on clinical prevention guidance in *Sexually Transmitted Diseases Treatment Guidelines, 2010*. The agency offers strategies to obtain patient sexual histories and techniques to encourage behaviors to reduce the risk of STDs in patients (Centers for Disease Control and Prevention, 2010b). However, no guidelines are provided regarding techniques or measures to increase screening in clinical settings. Guidance is needed to encourage and promote screening recommendations and should be included in the CDC's treatment guidelines. For instance, simple interventions can be used to promote and increase chlamydia screening, such as encouraging hospitals, clinics and private practices to place chlamydia collection swabs next to materials used to conduct Pap tests or bundling laboratory tests to include chlamydia screening when conducting urinalysis (Burstein, et al., 2005; Hoover & Tao, 2008). There are clearly a variety of strategies available that would undoubtedly increase adherence to chlamydia screening recommendations.

8.0 CONCLUSION

Chlamydia is the most prevalent STD in the United States and is a serious public health issue. This highly prevalent and largely asymptomatic STD can cause severe health consequences in women. As a result, screening recommendations are in place to combat chlamydial infections.

This paper described the history of the CDC's chlamydia screening guidelines and recommendations, examined the social consequences of primarily screening women for the infection, and presented barriers to current screening recommendations. Analysis of this information found that screening recommendations are not consistent, place the burden of responsibility of the disease upon women, and further stigmatize minorities. This analysis, in addition to findings regarding the feasibility of new diagnostic methods and the current lack of control over chlamydia prevalence, ultimately led to the assertion that the CDC's current chlamydia screening recommendations need to be changed. It is the position of this thesis that the CDC should recommend the annual screening of all sexually active women aged 25 and under, women over the age of 25 with risk factors (multiple or new sex partners), and also recommend the routine screening of all sexually active young men aged 25 and under, and men over the age of 25 with risk factors. However, the recommendations to screen all pregnant women at the first prenatal visit and all sexually active MSM should remain the same.

Several areas regarding chlamydia screening recommendations should be further researched. There are very few studies about the knowledge and perceptions of heterosexual

men and MSM regarding chlamydia screening. It would be beneficial to more fully understand the ways in which current recommendations impact both heterosexual men and MSM. Further research should also be conducted regarding the relationship between the CDC's chlamydia screening recommendations and practitioners' practices, as this would illuminate the role of the CDC's recommendations in actual practices and potentially address methods to increase adherence to chlamydia screening recommendations.

It is evident that screening recommendations alone are insufficient to achieve control over this infection. New screening recommendations coupled with simple interventions have the potential to control and prevent chlamydial infections in the United States. In addition, including all sexually active young men in screening recommendations is not only a means to decrease the prevalence of the infection, but is also a way to equally distribute the responsibility of sexual health between the sexes. Chlamydia is not a "women's issue" or an infection present only in MSM. Expanding screening recommendations to include sexually active heterosexual young men could be an important step to addressing men's sexual health needs—needs that have been largely ignored.

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