SEXUALLY TRANSMITTED DISEASES IN THE MILITARY

The Challenge of Sexually Transmitted Diseases for the Military: What Has Changed?

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Sexually transmitted diseases (STDs) have been traditionally considered a challenge to military leaders [1]. Historically, women were considered the source of STDs for soldiers, sailors, and marines, and prostitution flourished around military settlements. In 1632, there were reported to be 15,000 "loose women" in camp at the siege of Nuremberg; in 1648, the Imperial and Bavarian Armies consisted of 40,000 soldiers and 140,000 prostitutes and camp-followers [2]. In 1793, Carot drove away 3000 women from his troops at Douai, France, and commented that the diseases transmitted by these women "killed ten times as many men as enemy fire" [2].

Today, women have assumed a great and important role in the military. In 1996–1997, ~17% of all new recruits to all military services of the United States were women [3]. Interventions to prevent or control STDs can no longer be aimed only at relationships between male military personnel and female sex workers. A complex environment exists in which sexually active young people enter the military and bring their community's STDs with them. They have the opportunity to interact sexually with others in the military and with civilians near their military installations, at overseas locations, and in their hometowns.

In 1972, Greenberg [2] divided the history of STDs in the military into 3 periods. The first, beginning during the American Revolution and lasting until 1909, was a time when STDs were deplored but ignored. The second, from 1909 to 1945, was an era of gain in scientific knowledge and the use of punitive measures as control methods. The third period began in 1945, when the use of penicillin provided cures for syphilis and gonorrhea [2]. Another characteristic of the third period was the development of the attitude that scare tactics should not be used as control measures [2].

One can now envision a fourth period that began in the 1980s, which includes the HIV era and recognition of high prevalences of nontraditional STDs caused by *Chlamydia trachomatis,* herpes simplex virus, and human papillomavirus in members of the military and other young adults [4–8]. Some STDs, such as syphilis, are declining in frequency and are not prevalent enough among new recruits to make screening on entry in the military cost-effective, although surveillance systems are needed to identify new infections acquired while on active duty [9].

The last 10 years of this "modern era" have seen the advent of molecular diagnostic techniques, which have made noninvasive, urine-based screening possible for STDs, such as chlamydia infection and gonorrhea [10–13]. Screening programs that use these molecular methods have been shown to be cost-effective in preventing disease sequelae of chlamydial infections in women, such as pelvic inflammatory disease, ectopic pregnancy, and infertility [14, 15].

Because of the asymptomatic nature of chlamydia infections, screening programs have been recommended [16, 17]. Such screening of new female Army recruits has demonstrated a prevalence of 9.2% in a cohort of >13,000 women [4]. A similar program of screening asymptomatic Army women with Papanicolaou smears yielded a prevalence >7% [18]. Because so many women are now in the military, protecting their reproductive health must be a high priority for the military [19–21]. The asymptomatic nature of STDs and the ease of transmission of STDs between sexual partners emphasize the importance of having programs to screen and treat soldiers of both sexes [22]. In addition, the economic impact of the STD "hidden epidemic" is formidable in both the civilian and military sectors [23].

This issue of *Clinical Infectious Diseases* has 4 articles that address STDs in the military [24–27]. The articles identify problems and potential solutions, and are both important and

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timely. They are important because the studies were done at Fort Bragg, North Carolina, a major Army installation that is the base of operations for military units that are expected to rapidly and effectively respond to defend our national interests or to carry out the policies of our government. The soldiers studied can be considered representative of rapid-response troops throughout the Army. The articles are timely because, for the first time in United States history, STDs are not considered to be an extremely important priority for military medicine. As pointed out above and in the papers in this issue, STDs were previously regarded as diseases with a demonstrated potential to significantly interfere with the work of the military. Recently, the leaders and practitioners of military medicine have had to deal with the challenges of reductions in people and resources, the threat of bioterrorism, transition to a managed medical care system, and requirements for programs to reduce training injuries and smoking. Although the military has devoted a great effort toward the study of HIV infection and AIDS, STDs in general have not been perceived as posing a great threat to the readiness status of military forces.

Efforts to identify and screen high-risk groups and to establish laboratory-based surveillance have been limited. The morbidity caused by STDs is not considered significant enough to interfere with the conduct of military operations. Therefore, this group of illnesses and their related infections were dropped from the Military Infectious Diseases Research Program, and the focus of this research program was restricted to more ominous threats, such as malaria and diarrheal diseases.

The articles in this issue identify several important points: (1) soldiers are at high risk for STDs; (2) rates for selected STDs in the population studied were higher than those for the surrounding state and the nation; and (3) behavioral interventions can be implemented and evaluated in the military setting with an expectation of success. However, for interventions to be effective and to provide a reasonable return on investment, more work needs to be done to identify high-risk persons and "core" groups frequently associated with transmission in today's complex military environment.

Behavior is the cornerstone for determining who will become infected with an STD. Equally important may be the prior behavior of the partners, as well as the partners of the partners [28]. The sexual network theory may explain some ethnic differences among STD prevalences [28]. The number and type of an individual's partners, as well as the contact of these partners with a core group of infected individuals, may explain why equal risk-taking practices could yield different rates of disease [28].

Jenkins et al. report that high-risk behavior for acquisition of HIV among 400 male soldiers at an STD clinic was frequent [24]. Although individuals were knowledgeable about their risk of acquiring HIV, they still had frequent partner turnover, multiple partners, sexual "bingeing," negative attitudes toward condom use, and sex during military leave time. Because the occurrence of an STD places an individual at increased risk of HIV infection and risk-taking behavior is similar for acquisition of both STDS and HIV, interventions are needed to assist these soldiers in decreasing their exposure to infected partners. Having both new and multiple partners suggests that the dynamics of transmission of STDs among these soldiers is consistent with the sexual network theory. Therefore, interventions must be broad in scope.

Prevalences of STDs among the military have been estimated to be higher than those among civilian counterparts. Seña et al. report in this journal that this estimation has been correct for incidence rates for gonorrhea and chlamydia infections during 1985–1996 at Fort Bragg [25]. By use of a clinic database and population demographics for the Fort Bragg installation, direct standardization of rates by age, race, and sex indicated that the adjusted rates for Fort Bragg remained higher than state and national rates. As 1 example, the 1996 adjusted incidence rates for chlamydia infection were 3- to 6-fold higher than the corresponding rates in North Carolina and the United States. This magnitude of difference cannot be attributed to chance and indicates an urgent need for interventions directed toward these diseases.

Repeatedly infected individuals pose a particular problem in efforts to control STDs in the military. The 400 male soldiers with urethritis who were enrolled in the study of high-risk sexual behavior [24] were also the subject of extensive follow-up and an expanded etiological-agent survey for causes of urethritis [26]. McKee et al. report that etiologic agents of STDs were identified for 70% of these men. Prevalences ranged from 35.5% for chlamydia and 34.5% for gonorrhea to 19% for ureaplasma; no cases of trichomonas infection or syphilis were found.

Twenty-five repeated infections occurred in 21 (5.3%) of the 400 men with urethritis [26]. Multivariate analysis demonstrated that only a history of STD was predictive of reinfection [26]. As pointed out by the authors, the "core group" theory, which holds that a relatively small number of individuals may contribute to the overall burden of STDs in the community, may account for the maintenance and transmission of an STD within a community [29, 30].

The high-risk behavior, the high prevalences and incidences of STDs, and the recidivism of certain individuals all point to the need for monitored intervention programs in order to control STDs in the military. Jenkins et al. also report on the evaluation of 3 single-session preventive interventions among the 400 male attendees at the STD clinic at Fort Bragg [27]. The control intervention was the standard clinic care, which was compared with standard care combined with 1 of 3 interventions. The first intervention was use of a health-risk appraisal, the second was an interactive video, and the third was a targeted situational behavior intervention. Behavior was very difficult to change, but there were modest short-term effects seen with the health-risk appraisal and the interactive video interventions. The authors concluded that although risk be-

havior was resistant to change with the use of a single session, it may have had a priming effect that had the potential to be reinforced and enhanced with a multisession approach.

Clearly, attempts to change behavior among young sexually active soldiers is a challenge we cannot afford to dismiss. The Centers for Disease Control and Prevention–funded project RESPECT, an HIV/STD prevention intervention, has achieved modest behavior change through use of a multisession approach [31].

In spite of the many other priorities, STDs must remain an important focus of military medicine. The military is composed of many people who practice risk-taking behavior and who are stationed in or deployed to areas where the opportunity for contracting STDs is great. These STDs can produce morbidity that results in significant amounts of time away from the job and high medical costs, which could occur long after a tour of military service has ended.

Also important is the link between military and civilian populations. The posting of military people around the world and their frequent and rapid travel between distant lands and their military installations and homes in the United States provide the opportunity for spread of STD agents, such as strains of antibiotic-resistant *Neisseria gonorrhoeae* [32]. Military medicine must look to reliable screening programs, surveillance systems, and effective preventive interventions. These interventions must be based on an understanding of those who are at high-risk of being in core groups. Equally important, the interventions must be evaluated to identify those interventions that have the greatest chance of being effective.

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