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## Review article

Update on strategies of controlling sexually transmitted infections: Taiwan experience<sup>☆</sup>Chia-Chun Tsai<sup>a, b, \*</sup>, Yi-Ya Wang<sup>a</sup>, Yii-Her Chou<sup>b, c</sup>, Ching-Chia Li<sup>a, b, c</sup>, Wen-Jeng Wu<sup>a, b, c</sup><sup>a</sup> Department of Urology, Kaohsiung Municipal Ta-Tung Hospital, Kaohsiung, Taiwan<sup>b</sup> Department of Urology, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan<sup>c</sup> Department of Urology, Faculty of Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

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## ABSTRACT

Sexually transmitted infections (STIs) are a variety of clinical infectious conditions caused by pathogens that are transmitted through sexual activity. In recent years, the incidence of STIs has been gradually rising, according to the statistics of the World Health Organization. Although the recommended management of people who have, or are at risk, for STIs were provided by the association of Europe and the United States, the pathogens of STIs still have a great diversity of epidemiology in different ethnic communities and countries. However, to our knowledge, there have been very few studies updating the status of STIs in the Taiwan population. In this article, we focus on evaluations and announcements for common pathogens of STIs in Taiwan. The strategies for prevention and control of STIs are also discussed in this article. We hope that our experience can be shared to the neighboring countries and lead to an Asian consensus of STI.

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## 1. Introduction

Sexually transmitted diseases (STDs) are a variety of infectious conditions that are caused by pathogens transmitted through sexual activity. Recently, STDs have been renamed as sexually transmitted infections (STIs) to avoid stigmatization. Based on the statistics of the World Health Organization (WHO), the global incidence of STIs has risen more than 10% from 2005 to 2008.<sup>1</sup> About 499 million new cases of curable STIs (including gonorrhea, chlamydia, syphilis, and trichomoniasis) were reported in 2008, and the highest estimation was recorded in Asian countries, including the WHO Western Pacific and Southeast Asia region, with a total of more than 200 million cases. The incidence of STIs has also been gradually rising in Taiwan in the past decades. The increasing trend may be attributed to numerous factors, including drug-resistant pathogens, various coinfections, asymptomatic manifestations, and sexually open societies. To make matters worse, most

patients tend to purchase over-the-counter drugs for self-treatment. Inadequate dosage and inaccurate treatment usually contribute to therapeutic failures and drug-resistant strains. Hence, there is a pressing need for accurate strategies to control and prevent STIs in Taiwan.

Sexual abstinence, appropriate precautions, and contraceptive barriers are still the most reliable methods that prevent acquisition and transmission of STIs. Consistent and appropriate condom use has been found to decrease human immunodeficiency virus (HIV) and STI transmission by 64% and 42%, respectively.<sup>2</sup> In the early 2000s, the recommended management for STIs was suggested in a synoptic overview by the European Association of Urology.<sup>3</sup> The guidelines for the treatment of people who have, or are at risk, for STIs were also updated by the Centers for Disease Control and Prevention in 2007, 2010, and 2015.<sup>4</sup> However, these guidelines seemed unsuitable for STIs in Taiwan. Because of Eastern racial preferences and geographical relations, the cross-border prostitution of Taiwanese mostly occurs within Asian countries and the pathogens of STIs in Taiwan are different from Western countries. Recent studies have also shown different antimicrobial susceptibility results of urethral *Neisseria gonorrhoeae* and *Chlamydia trachomatis* strains between Asian and Western countries.<sup>5,6</sup> Therefore, it is important to develop an Asian consensus of STIs.

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<sup>☆</sup> There are 3 CME questions based on this article.

In Taiwan, antimicrobial therapies of STIs were previously established in 2010.<sup>7</sup> Accumulated expertise supplemented with clinical pictures of Taiwanese were also collected and issued in the “Atlas and Treatment Guidelines of Sexually Transmitted Diseases” in 2015.<sup>8</sup> Moreover, there are two major strategies for the prevention and transmission of STIs in Taiwan. First, physicians must report diagnosed cases of syphilis, gonorrhea, and HIV to public health authorities. The patients with diagnosed syphilis and gonorrhea should be notified within 1 week and those with HIV should be notified within 24 hours. Taiwan Health Ministry and Centers for Disease Control (Taiwan CDC) can collect data and provide the current information regarding these threatening STIs. Second, to further improve the quality of STIs care services and encourage patients to seek reliable treatment, Taiwan CDC has asked relevant societies and associations to assist the training of the STD-friendly physicians since 2010. As of the end of 2013, a total of 1160 STD-friendly physicians were recommended and have made great contribution to STIs management in Taiwan.<sup>8</sup>

## 2. STIs and HIV screen

Worryingly, the data compiled by Taiwan CDC reveals that the number of HIV-positive patients increased from 20,801 in January 2011 to 32,045 in December 2015, reflecting a significant increase over the past 5 years. HIV infection is concentrated in specific populations, including drug abusers, sex workers and STI-infected individuals. In the past decades, HIV transmission in Taiwan has risen due to the sharing of needles between drug abusers. After conducting the programs of “Not Sharing Needles and Syringes” by Taiwan CDC, the number of HIV infections by injection has now decreased to less than 100 people per year. The major mode of HIV transmission in Taiwan has become through unprotected sexual behaviors. Among 2384 new HIV-positive patients in 2015, more than 88% of infections were contracted through sexual behaviors. Among these HIV-positive patients, more than 97% were men and 75% of them were men who have sex with men (MSM). MSM are at an independent risk for HIV acquisition, particularly those who have multiple sex partners and abuse recreational drugs.<sup>9</sup> Recreational drugs, which could enhance sensory stimulation, sexual performance, and orgasm, are very popular amongst MSM. However, using condoms becomes very uncomfortable owing to drug-related hyper sensitivity. Most recreational drugs, especially methamphetamines, usually cause inconsistent condom use among MSM and lead to STIs and HIV transmission. Because STIs are important cofactors in HIV transmission, health providers should remind STI-infected individuals to beware of the risks of contracting HIV.<sup>10</sup> Since 2008, Taiwan CDC suggested that all patients with STIs should undergo HIV screening. The outcome showed that ~0.5% of such patients are coinfecting with HIV, especially patients with syphilis and genital warts.<sup>8</sup> Because HIV infectors would decrease their exposure to unprotected sex by 68% after becoming aware of their own infection,<sup>11</sup> Taiwan CDC provides 405 free anonymous counseling and testing agencies for suspected HIV infectors. Furthermore, because the window period is 6–12 weeks, even after receiving a negative screening test, all suspected infectors are reminded to take another test 3 months later and refrain from unprotected sexual behavior or donating blood. Taiwan CDC also utilizes community engagement to conduct the programs of “I-Check & We-Check HIV Testing” and stipulate 27<sup>th</sup> June as the National HIV Testing Day. Taiwan CDC also provides post-exposure prophylaxis and pre-exposure prophylaxis for people, who are exposed or will have unprotected sex with suspected HIV infectors, at their own

expense. These strategies indeed have made great contribution to HIV prevention and control in Taiwan.

## 3. Syphilis

The diffusion of syphilis is usually limited because 95% of cases lose infectivity after 6 months and direct transmission is rare after 5 years of infection.<sup>12</sup> Compared with 2005, there was no obvious change in the incidence of syphilis, according to WHO statistics in 2008.<sup>1</sup> In Taiwan, the incidence of syphilis is the highest in patients aged over 70 years in recent years (Figure 1). Most of them have late latent syphilis with relatively low seroreactivity and are detected by elderly health examination. These patients with latent syphilis might have been infected by military sex workers during “World War II” or “Chinese Civil War” and received inaccurate diagnosis and treatment at the time. Moreover, the transmission might be more diffused by blood contamination due to incomplete sterilization of medical instruments in rural areas. Since symptoms of syphilis would be self-limited without accurate treatment, this would result in most patients entering the latent stage without awareness. Because only 33% patients with late latent syphilis might progress to tertiary syphilis, close follow-up or prophylactic treatment could be considered for these patients.<sup>12</sup> However, it should be remarked that the incidence of primary and secondary syphilis has increased gradually in young adults aged 20–30 years (Figure 1). This indicates that syphilis is transmitted amongst sexually active populations in Taiwan. To enhance the consistency of diagnosis rate and notifications, the “Upgrading Draft to Define Notifications of Syphilis and Congenital Syphilis” was issued by the Taiwan CDC in 2015, which removed the former common nouns, such as active and inactive syphilis, and switched them to primary, secondary, tertiary, and latent syphilis. Syphilis is diagnosed according to the clinical presentation and one of the following positive laboratory tests: (1) specimens can be tested for *Treponema pallidum* by darkfield microscopy, direct immunofluorescence, or nucleic acid detection; (2) for untreated or unknown patients, positive results of nontreponemal tests and treponemal tests are performed; (3) for patients who have been treated, the titer of nontreponemal test is re-elevated four times or more; and (4) positive results of cerebrospinal fluid nontreponemal test.

The updated management for different stages of syphilis is shown in Table 1. All sexual partners should accept inspection. Patients should avoid sexual activity for 14 days after complete therapeutic regimen and symptomatic remission. The quantitative nontreponemal test should be repeated at 6 months, 12 months, and 24 months after treatment.

## 4. Gonorrhea

Due to the increase in drug-resistant strains and sexually open societies, the incidence of *N. gonorrhoeae* drastically increased in recent years. From 2005 to 2008, the incidence of *N. gonorrhoeae* in patients aged 15–49 years increased by 21%.<sup>1</sup> In Taiwan, the incidence is also on the rise and the reported number of new cases increased from 2011 in 2011 to 3585 in 2015 (Figure 2). It is believed that the incidence of gonococcus urethritis (GU) is likely much higher than reported due to the over-the-counter drugs, low sensitivity of testing methods, unconfirmed treatments, and troublesome notification systems. Gonorrhea is diagnosed according to the clinical findings and laboratory tests, including microscopy, cultures, or nucleic acid amplification tests (NAATs). The sensitivity and specificity of NAAT is usually superior to that of other tests. To establish the antimicrobial susceptibility of the strain, the culture test is strongly suggested for all suspected

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