










# Prevalence and epidemiologic transition of sexually transmitted infections in a Brazilian dermatologic clinic (2012-2019)

*Perfil de atendimentos em ambulatório de infecções sexualmente transmissíveis em um serviço secundário de dermatologia (2012-2019)*

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Dear Editor,

Sexually Transmitted Infections (STI) are infections that most commonly occur through sexual intercourse. They can be asymptomatic or associated with different symptoms. As STI can present cutaneous-mucosal manifestations, they are an important cause of seeking dermatological care and burden the healthcare system<sup>(1)</sup>. In 2018, STI accounted for up to 1.4% of the outpatient appointments in Brazilian Dermatology<sup>(2)</sup>.

The Brazilian government's STI health strategy includes training of primary health care professionals, health education policies, distribution of condoms, post-exposure prophylaxis for HIV, and HPV and Hepatitis B vaccination. Despite these measures, the incidence of syphilis has been on the rise since 2010 in Brazil.

According to government databases (2007 to 2017), the number of both congenital and acquired syphilis cases has increased in all regions of the country, especially in the Southern states<sup>(3)</sup>. An epidemiological report released in 2019 by the Brazilian Ministry of Health revealed that the incidence of syphilis in the country has grown from 2.1 cases/100,000 inhabitants to 75.8 cases/100,000 inhabitants from 2010 to 2018<sup>(4)</sup>.

Even though syphilis is a curable disease, with an easy and low-cost treatment, it is not possible to acquire permanent immunity. Thus, reinfection is a real possibility, especially in cases of poor treatment adherence and failure of disease prevention mechanisms. Furthermore, a study conducted from 2004 to 2012 in a Brazilian city showed that, among the 1,009 cases of syphilis, 13.6% (117) were reinfections. The risk factors associated with recurrence were: being male, age, homosexual or bisexual orientation, HIV coinfection, and silent clinical manifestations at diagnosis<sup>(5)</sup>. According to this study, strategies should target these risk groups more specifically, including public awareness campaigns, to reduce syphilis and other STI.

The human papillomavirus has also been shown to play an important role in the epidemiology of STI. According to a study, the prevalence of HPV with clinical manifestation is approximately 40%. In young men (between 13 and 24 years old) from a Brazilian community, it can reach up to 49%<sup>(6)</sup>. This high prevalence in the population is clinically significant, since some subtypes (mainly, subtypes

16 and 18) have a high oncogenic potential for cervical (100% of the cases), anal (85% of the cases), penis, and vulva cancer (50% of the cases)<sup>(7)</sup>. Some other subtypes (in Brazil, mainly subtypes 6 and 11) are important concerning genital warts.

Genital herpes is another STI with important prevalence in Brazil and around the world. It is caused by an infection with type 1 and type 2 Herpes simplex virus (HSV-1 and HSV-2), and it is highly associated with immunosuppressive states and infection with the Human Immunodeficiency Virus (HIV), especially the HSV-2, and also the persistence of HPV<sup>(8)</sup>. Although the main etiological agent of genital lesions is HSV-2, the importance of HSV-1 has become increasingly significant due to the practice of oral sex, especially in the young population<sup>(9)</sup>. Besides that, a study conducted in South Brazil showed an HSV-2 prevalence of 10.8% to 20.8% among a group of 302 women who attended the locally referenced healthcare service<sup>(8)</sup>.

Despite being less frequent than other STI, the viral disease known as "molluscum contagiosum" is also important in public health care. The infection occurs by a poxvirus, whose prevalence is more expressive in children than in adults. However, when it affects older groups, transmission is usually via sexual intercourse. Extensive and persistent cutaneous infection may suggest immunodeficiency of the carrier<sup>(10)</sup>.

Association between two or more STI is common as long as they share risk factors and ways of transmission. The epidemiological behavior of other STI is not known in Brazil. Moreover, the need for dermatologic care involving these diseases over the last decade is also unknown.

In this paper, we evaluated the clinical-demographic profile of patients treated at an STI outpatient unit of a public dermatology service, during eight years, from 2012 to 2019.

A retrospective cohort study was carried out, evaluating all new appointments of the Dermatology Outpatient Unit (Unesp, Brazil) registered between January 2012 and December 2019. The demographic variables, comorbidities, information about immunosuppression, syphilis, hepatitis (B and C), and HIV serological status were assessed and analyzed. Data normality was assessed by the Shapiro-Wilk test<sup>(11)</sup>. The variation of STI prevalence as a function of the biennia was evaluated using the chi-square test for trends. The variation in patients' age groups as a function of the biennia was analyzed using the Jonckheere-Terpstra test. It was considered

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significant if the p-value were  $<0.05$ . The study was approved by the institutional (FMB-Unesp) review board.

A total of 1,080 new episodes of care were registered in the period. The main demographic data and the frequency of STI are shown in **Table 1**. There is a predominance of male patients and a higher prevalence of genital HPV infection, accounting for up to 65.0% of the men seen in the period. HIV infection was identified in 9.5% of the cases.

The prevalence of the main STI diagnoses according to the period is shown in **Figure 1**. There was an increase in the proportion of syphilis (11 to 20%;  $p=0.014$ ) and a reduction in the proportion of cases of genital HPV infection (68 to 53%;  $p<0.001$ ).

**Figure 2** shows the distributions of the ages of the subjects with the main STI. There was a gradual increase in age as a function of

time in patients with genital HPV (average: 32 to 38 years;  $p=0.001$ ) and syphilis (average: 31 to 41 years;  $p=0.003$ ).

A worldwide recrudescence of STI, especially syphilis, was observed in the last 20 years. It is believed that behavioral aspects, based mainly on the effectiveness of antiretroviral therapies and vaccines (e.g., hepatitis and HPV), may have contributed to negligent care, and a higher number of sexual partners<sup>(12)</sup>.

The demographic transition in Brazil over the last 40 years resulted in an increase in life expectancy for the population, which is associated with therapeutic resources for sexual activity at older ages (such as testosterone for women, penile prosthesis, injections of prostaglandins, and phosphodiesterase inhibitors) that have prolonged the sexually active age range. This should serve as an alert to the occurrence of STI in the elderly. Our study identified a progressive increase in the average age of patients with syphilis and genital HPV, the two most prevalent STI<sup>(13)</sup>.

In Brazil, the HPV quadrivalent vaccine (subtypes 6, 11, 16, and 18), became available in the public health system in 2014. Currently, it is available for girls aged 9 to 14 years and boys aged 11 to 14 years old, in addition to HIV-infected men aged 9 to 26 years and HIV-infected and immunosuppressed women aged 9 to 45 years. However, the vaccination coverage rate was below the recommended level throughout Brazil (45% of girls and 20% of boys, in 2017).

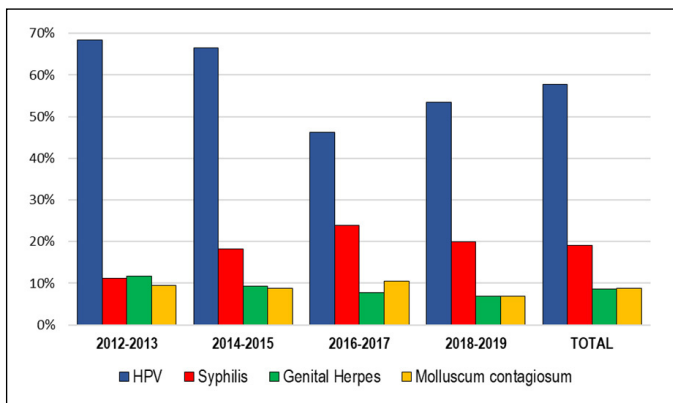
Despite the low vaccination coverage, the progressive reduction in the proportion of new cases as well as the current low proportion of young people with anogenital warts may reflect the impact of HPV vaccination<sup>(14)</sup>. However, it is also important to know that some cases do not show exuberant clinical findings, as shown by a recent study conducted in Southern Brazil, which illustrates that among a group of 210 college-age women, 33.8% of them had the HPV detected in cervix samples. Most of these women show the HPV-16 genotype, without any significant clinical findings, except for cytological abnormalities that can evolve to something more complex and possibly lethal<sup>(15)</sup>. These findings highlight the importance of diagnosing this STI early in young asymptomatic women and of a public policy designed for STI prevention.

Considering these findings, STI are strongly associated with the educational and cultural level of a population group. Therefore, it is

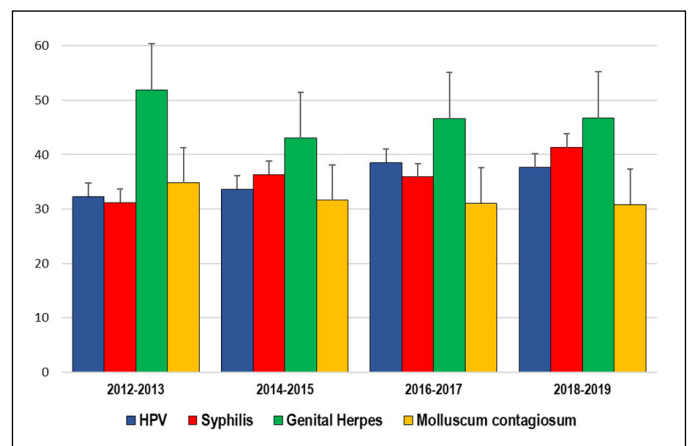
**Table 1.** Main clinical and demographic characteristics of the sample studied (n=1,080).

Variables	Outcomes
Age (years) – average (standard-deviation)	37.5 (16.4)
Gender – n (%)	
Female	254 (23.5)
Male	826 (76.5)
STI serology – n (%)	
HIV	68 (9.5)
Syphilis	257 (32.7)
Hepatitis B	23 (3.3)
Hepatitis C	15 (2.2)
Comorbidity – n (%)	
Immunosuppression	98 (9.3)
Diabetes mellitus	52 (5.0)
Arterial hypertension	105 (10.0)
STI diagnoses – n (%)	
Anogenital warts (HPV)	618 (57.8)
Syphilis	199 (19.0)
Molluscum contagiosum	93 (8.8)
Genital herpes	91 (8.6)
Other	79 (7.3)

STI: sexually transmitted infections; HPV: human papillomavirus.



**Figure 1.** Relative frequency of major sexually transmitted infections diagnoses as a function of each biennium from 2012 to 2019 (n=1,080).



**Figure 2.** Mean ages (95%CI) of patients diagnosed with the major sexually transmitted infections according to the biennia evaluated (n=1,080).

important to establish health care policies based on high-quality education, focused on the different aspects of information, through meetings and campaigns on the most prevalent sexual diseases. Awareness campaigns should target people of all ages and address the risks and conditions associated with these diseases.

This study has limitations for being a single-center study. Also, it depends on the quality of medical records and it includes patients from a public health care service in which female patients with STI are mainly referred to the gynecological outpatient unit, as usual in the Brazilian public health care system. Contrariwise, the representative sample and long follow-up strengthen the inferential properties of the results.

In conclusion, analyzing the profile of patients with STI receiving dermatological care, the main causes of demand for medical care were anogenital warts and syphilis. There was a progressive increase in the frequency of patients with syphilis, and an increase in the age range of patients with genital HPV and syphilis, over the last eight years.

### Approval by the Human Research Ethics Committee

Research protocol approved at the FMB-Unesp Review Board (no. 4.570.225).

### Participation of each author

VCO: Conceptualization, Investigation, Project administration, Writing – original draft, Writing – review & editing. HAM: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. ACSM: Investigation, Writing – original draft, Writing – review & editing. MMM: Investigation, Writing – original draft, Writing – review & editing. JFO: Investigation, Writing – original draft, Writing – review & editing. LYI: Investigation, Writing – original draft, Writing – review & editing. BLC: Investigation, Writing – original draft, Writing – review & editing. MVYMN: Investigation, Writing – original draft, Writing – review & editing. LGM: Investigation, Writing – original draft, Writing – review & editing.

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### Conflict of interest

The authors declare no conflicts of interest.

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