WHO global strategy for sexually transmitted infections: situation in Brazil

Leila Cristina Soares¹, Nathália Bezerra da Silva¹, Laura Campelo dos Santos¹, Lucas Alcides Barizon Lamim¹[®], Adriana do Valle Graça²[®], Jorge Luiz Alves Brollo³[®]

ABSTRACT

The World Health Organization (WHO) has established goals aligned with the United Nations (UN) objectives for sustainable development by 2030. This study aims to analyze Brazil's progress toward the goal of eliminating sexually transmitted infections. Consultations were conducted using the DATASUS database, the Ministry of Health's Vaccinometer, and the Integrated Health Surveillance Platform (IHSP) to gather data on live births, acquired, congenital, and pregnant syphilis, human papillomavirus (HPV) vaccination, and population projections. Discrepancies in syphilis data across these platforms have impacted the accuracy of the information systems, with DATASUS showing decreased numbers and IHSP showing increased numbers. In 2021, HPV vaccination coverage was 62.03%. Rescue vaccination efforts have proven effective in increasing coverage. However, there is a lack of data on gonococcal infections, and despite increased vaccination coverage, none of the parameters are close to meeting the WHO targets.

Keywords: World Health Organization. Sexually transmitted infections. Gonorrhea. Syphilis. HPV.

INTRODUCTION

In September 2015, the United Nations (UN) established 17 Sustainable Development Goals (SDGs) to be achieved by 2030. The World Health Organization (WHO) has defined a set of global health targets and objectives¹ aligned with these goals.

Among the goals aimed at eliminating sexually transmitted infections (STIs) by 2030 are: a 90% global reduction in the incidence of syphilis and gonorrhea; a reduction in cases of congenital syphilis to fewer than 50 per 100,000 live births in 80% of countries; and achieving 90% national coverage with the human papillomavirus (HPV) vaccine².

The most common pathogens responsible for sexually transmitted bacterial infections worldwide are Chlamydia trachomatis, Neisseria gonorrhoeae, and Treponema pallidum, which primarily affect women under 25 years old. According to the WHO, approximately 126 million new cases of curable STIs are diagnosed each year in the Americas region³.

The prevalence of N. gonorrhoeae or C. trachomatis infection in Brazil is still unknown. Except for HIV and syphilis, STIs are diagnosed through syndromic management despite their low sensitivity and specificity⁴. Many studies reported that 10%-40% of women with cervicitis caused by these agents develop pelvic inflammatory diseases⁵. The risk of serious complications, such as infertility, ectopic pregnancy, and chronic pelvic pain, increases with delayed diagnosis and treatment or when treatment is inadequate⁵. Furthermore, high resistance of *N. gonorrhoeae* to ciprofloxacin, emerging resistance to azithromycin, and decreased susceptibility to extended-spectrum cephalosporins require continuous monitoring⁶. Antimicrobial resis-



¹Universidade do Estado do Rio de Janeiro, Rio de Janeiro, (RJ), Brasil

² Universidade do Estado do Rio de Janeiro, Hospital Universitário Pedro Ernesto, Rio de Janeiro, (RJ), Brasil ³Universidade do Grande Rio, Rio de Janeiro, (RJ), Brasil

tance is acquired by gonococci via several mechanisms, including the acquisition of plasmids encoding β -lactamase resistance, point mutations in chromosomal genes that increase resistance to β -lactam antibiotics, macrolides, and fluoroquinolones, and uptake of DNA from other gonococcal strains or Neisseria sp⁷.

In Brazil, cases of acquired, gestational, and congenital syphilis must be reported. Epidemiological data show an increase in syphilis cases from 2010 to 2018, when the incidence rate increased by nearly four times, the pregnant syphilis detection rate increased by about six times, and the acquired syphilis detection rate increased from 34.1 cases per 100,000 inhabitants in 2015 to 75.8 cases per 100,000 inhabitants in 2018^{1,8}. According to the WHO, half of pregnant women with active syphilis will have stillbirths, or their neonates will catch the infection and die during the perinatal period⁹.

Human papillomavirus infection is one of the most common STIs in the world, and the persistence of some HPV types can lead to cervical cancer. Every year, 530,000 new cases of this disease are diagnosed. The vaccine against this virus was included free of charge in the National Immunization Program (PNI) of Brazil in 2014 and has been included in the schedules of more than 40 countries in the Americas since mid-2019¹⁰.

This study analyzed the situation in Brazil in 2021 in relation to WHO targets for eliminating STIs by 2030.

METHODOLOGY

WHO designated 2018 as the baseline year for reducing gonorrhea and syphilis. To compare the incidence of congenital and acquired syphilis, the database of the Informatics Department of the Brazilian Unified Health System on health information (DA-TASUS–TABNET)¹¹ from 2018 to 2021 was examined. The incidence reduction percentage was derived from the difference in incidence between 2018 and 2021, and the result was divided by the original incidence and then multiplied by 100. Information on live births was extracted from the Integrated Health Surveillance Platform (PIVS)¹².

Additionally, HPV vaccination information was extracted from DATASUS¹⁰ database and the Ministry of Health's vaccinometer¹³, and the coverage was calculated by the number of second doses administered in a given year/target population based on the population projection for 2021 × 100. As the campaign started in 2014 for girls aged 11-13 years, we considered those born in 2012 and later (9 years old in 2021), since this year the campaign included girls aged 9 to 11 years. WHO target for vaccine coverage is 90%, and, as it is not comparable with 2018, vaccination coverage was calculated using the population projection for 2021 in the age group of 9–20years.

RESULTS

There are no data available on DA-TASUS or any other platform. WHO aims for a 90% reduction in cases; however, the lack of data makes assessing the current situation difficult.

According to DATASUS, there were 159,329 notifications of acquired syphilis in 2018, which remained relatively stable in 2019, with 158,024, before dropping to 118,036 in 2020 and 64,279 in 2021. From 2018 to 2020, the number of cases of gestational syphilis remained stable, with 63,109 cases in 2018, 62,633 in 2019, and 61,566 in 2020, declining to 30,505 in 2021. Congenital syphilis affected 25,509 cases in 2018, 24,571 in 2019, and 21,968 in 2020, a decrease from 10,895 in 2021. It has dropped from 41.05 in 2018 to 35.71 in 2021. The results extracted from DATASUS are shown in Table 1.

The number of live births was obtained from the official platform at http://plataforma. saude.gov.br/natalidade/vindos-vivos/.

Table 1. Comparison between the reported cases of acquired, gestational, and congenital syphilis and the ratio of congenital syphilis per 100,000 live births from 2018 to 2021 obtained from DATASUS and Integrated Health Surveillance Platform (PIVS)

Year	Data source	Acquired	Gestational	Congenital	Congenital/100,000 live births
2018	DATASUS	159,329	63,109	25,909	879.79
	PIVS	159,734	63,407	26,839	911.36
2019	DATASUS	158,024	62,633	24,571	862.40
	PIVS	163,523	64,578	25,387	891.04
2020	DATASUS	118,036	61,566	21,968	804.65
	PIVS	125,143	65,835	23,578	863.62
2021	DATASUS	64,279	30,505	10,895	407.74
	PIVS	167,523	74,079	27,019	1009.26

According to DATASUS, the incidence of congenital syphilis / 100,000 live births, whose WHO target is less than 50, decreased from 879.68 in 2018 to 407.74 in 2021. since 2018, with a slight drop in 2020 and a rise in 2021. Gestational syphilis also shows some stability, with a significant increase in 2021.

According to data from the official epidemiological bulletin from the government, with data extracted from the website http://indicadoressifilis.aids.gov.br/, we observed discrepancies in DATASUS results. Acquired syphilis has shown some stability

HPV vaccine

To calculate vaccine coverage, data on second doses applied by year of birth during the different campaigns were extracted. (Table 2).

Year of birth	2014	2015	2016	2017	2018	2019	2020	2021	Total second doses applied
2001	1,004,187	87,013	6,265	2,158	4,054	3,421	1,446		1,108,544
2002	977,935	196,754	38,432	13,089	5,164	3,558	1,560	536	1,237,028
2003	594,008	343,225	86,915	75,934	28,284	5,351	2,930	709	1,137,356
2004	23,927	737,635	176,275	144,809	64,533	29,663	5,689	1,253	1,183,784
2005	14,306	622,206	223,562	168,072	80,673	49,347	28,442	2,034	1,188,642
2006		300,787	287,595	193,729	106,694	64,750	54,189	18,088	1,025,832
2007			255,345	402,593	164,447	99,914	75,958	36,082	1,034,339
2008				372,370	310,891	166846	136,274	52,650	1,039,031
2009					340,748	334,768	210,487	96,352	982,355
2010						353,016	324,347	174,050	851,413
2011							331,910	297,698	629,608
2012								306,426	306,426

Table 2. Second doses according to year of birth and year of vaccination (data extracted from DATASUS)

Data retrieved for the 2014 and 2015 campaigns are available on the DATASUS– TABNET and the Ministry of Health vaccinometer website, with different values (Table 3). Because the data for the following years are only available on DATASUS, the values used for coverage calculations were obtained from this database. It is important to note that there may be some inconsistencies in the data by the source systems that are being reviewed in these data.

Table 3. Inconsistencies in vaccination information between data extracted from the vaccinometer of the Ministry of Health and the DATASUS–TABNET of Brazil

DATASUS	Vaccinometer	Year of birth
1.004,187	1,110,742	2001
977,935	1,099,163	2002
594,008	680,696	2003

Vaccination coverage can be obtained by calculating the number of second doses in relation to the population projection for a given year. In 2021, coverage was 62.03% based on the number of women targeted by the campaign. This number may be higher because those born between 2009 and 2012 will still be included in future campaigns because the age group is 9–14 years old and can still be acquired (Table 4).

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Year of birth	Age in 2021	Female population projection ac- cording to age group in 2021	Coverage/age group in 2021
2001	20	1,108,544	65.43
2002	19	1,237,028	73.91
2003	18	1,137,356	68.81
2004	17	1,183,784	72.57
2005	16	1,188,642	73.86
2006	15	1,025,832	64.65
2007	14	1,034,339	66.13
2008	13	1,039,031	67.42
2009	12	982,355	64.68
2010	11	851,413	56.88
2011	10	629,608	42.66
2012	9	306,426	21.05
2021	9-20	18,900,844	62.03

Table 4. Population projection according to age group 2021 and calculated coverage (second doses)

DISCUSSION

WHO targets for 2030 to eliminate STIs is a 90% reduction in the incidence of gonococcal infection².

The main challenge in assessing the reduction in gonorrhea cases in Brazil is the lack of a database containing this information. According to De Lannoy et al.¹⁴, gonorrhea prevalence in the population aged 15–49 years is approximately 1.4%, with an annual incidence of around 500,000 new cases in the general population. However, because there is no information on its prevalence, it is impossible to analyze the re-

duction in patients, which is WHO's objective. Furthermore, diagnostic tests are not available in most primary care services.

The absence of symptoms in many women makes diagnosing gonorrhea challenging; therefore, they may be unaware of their infection for long periods¹⁴. In countries where screening for asymptomatic women is readily available, early detection and effective treatment prevent sequelae and interrupt transmission¹⁵.

Because more than 90% of male urethral discharge syndrome cases are symptomatic¹⁶, the Ministry of Health issued an ordinance in 2020 establishing sites for sentinel surveillance of male urethral discharge syndrome. These sites should provide information that may be used to create official epidemiological data. Thus, male urethral discharge syndrome must be reported in some Brazilian states¹⁴. The health unit qualified for surveillance must notify all urethral discharges attended, collect epidemiological data from patients using a form prepared by the Ministry of Health, collect and forward biological samples from at least 80% of people attending sentinel units with urethral discharge to carry out molecular biology tests, cultivate and isolate suggestive strains of N. Gonorrhoeae, and forward them to the national reference laboratory for surveillance and monitoring susceptibility to antimicrobials that can cause urethral discharge in addition to Chlamydia and gonococcus¹⁷.

The Ministry of Health ordinance appears to be a small step forward, but it can change the current situation of utter lack of information. Perhaps national notification is a new step that can strengthen the information system and break the transmission chain.

The high resistance acquired by N. gonorrhoeae to all antimicrobials used for treatment since the 1930s causes the treatment options to decrease rapidly, with constant changes in antibiotics considered first-line treatment. This is a significant concern, and combating this STI as soon as possible is critical¹⁸.

One of the WHO's 2030 targets for eliminating STIs is a 90% decrease in acquired syphilis cases and a decline in congenital syphilis cases to \geq 50 per 100,000 live births².

Syphilis is a notifiable STI in Brazil. However, it is concerning that weekly reporting, which should be done, is not done this way in practice. In addition, the inability of health professionals to fill out various information on compulsory notification forms makes sociodemographic analysis problematic¹⁹. Garbin et al.²⁰ observed that, among the compulsory notification forms for acquired syphilis, those for partners were the most incomplete, with pending information.

It is possible to verify DATASUS data on acquired, congenital, and pregnant syphilis in Brazil from 2018 to 2021, observing a reduction of 59.66% in the number of acquired syphilis cases, falling below the WHO target of 90%. Congenital syphilis decreased by 56.6%, although the WHO target of less than 50 per 100,000 live births remains unmet, with a ratio of 407.74 per 100,000 live births in 2021.

The significant drop in records of gestational syphilis and congenital syphilis in 2021 is being highlighted. Gestational syphilis, which remained stable at approximately 60,000 cases, dropped to 30,505 cases in 2021, and congenital syphilis, which remained stable at approximately 20,000 cases, dropped to 11,556 cases. However, when the platform changes, these data are not verified, demonstrating that incorrect or incomplete data are available on official websites. In 2021, there is an increase in the three situations (acquired, gestational, and congenital) in the Integrated Health Surveillance Platform.

Between 2010 and 2020, there was a 31% increase in congenital syphilis cases and a 53% increase in gestational syphilis cases in Brazil. Additionally, the statistics reveal regional differences, indicating unequal access to healthcare²¹.

Several studies have demonstrated the role of prenatal care in the detection

and early treatment of syphilis. When the mother does not receive adequate treatment, the risk of congenital syphilis increases fivefold¹⁹. Data show that women who received a syphilis diagnosis and adequate treatment during their first trimester of pregnancy had similar outcomes to those who did not. Women diagnosed late or had inadequate treatment had identical results to those who did not undergo treatment²².

Bezerra et al. found that 78.4% of mothers of children diagnosed with congenital syphilis in 2015 sought medical attention during prenatal care, and 51.4% of these mothers were diagnosed with gestational syphilis using DATASUS data. However, more than half received inadequate treatment, and 27.3% had no access to treatment at all²³.

Increasing HPV vaccine coverage is a key component of eliminating cervical cancer²³. Santos et al. found that a lack of knowledge about the HPV vaccination campaign among Brazilian students is associated with a drop in vaccination rates, noting that this lack of knowledge is mainly related to black male individuals aged 15 to 17 yr without home internet access, with smoking, alcoholism, and drug use habits, and who report food insecurity and a history of physical aggression, in addition to low schooling expectations, a lack of pregnancy guidance and STI/AIDS at school, and who do not have the habit of seeking health services. The importance of an HPV vaccination campaign in the school environment was confirmed in this same study²⁴.

In 2021, coverage in Brazil was around 62.03%, based on the population potentially participating in vaccination campaigns since 2014.

Furthermore, noteworthy is the discrepancy between health information from DATASUS and the vaccinometer from the Ministry of Health, which only contains vaccination data from the 2014 and 2015 vaccination campaigns. Despite similar values, this fact raises questions about the reliability of the information.

Silva et al. found that nonadherence to vaccination is primarily due to a lack of knowledge of its importance, particularly among students in the public school system in the north and northeast regions of the country, after reviewing data from the 2019 National School Health Survey. They also found that fear of adverse reactions, prohibition of vaccination by those responsible, and discrediting the effect of the vaccine accounted for 17.5% of the causes for nonadherence²⁵.

Public policies that minimize inequalities in access to HPV prevention measures among vulnerable adolescents are essential to improve vaccination coverage. Because Brazil is a continental country, regional inequalities must be considered. The regional and economic influence on HPV vaccination in the Brazilian Amazon was analyzed in a study on specialized HPV vaccination strategies. Given the limited resources in the most disadvantaged region, implementing a more targeted vaccination strategy, mainly through school vaccination, could be more beneficial²⁶.

Low vaccination coverage is exacerbated by a lack of knowledge and false information regarding immunization. Integrating health care with schools and communities is essential to improving indicators because well-informed adolescents can communicate this information to their parents⁸. Interestingly, our data show that coverage was not close to 90% in any age group, with those born in 2002, 2004, and 2005 having the highest coverage (73.91%, 72.57%, and 73.86%, respectively).

Although the WHO recommends routine vaccination between 9 and 14 yr old, there is no clear guideline for women above 15 yr old. However, with the recovery of the population that did not vaccinate while they were at the age envisioned by the campaign, the rescue vaccination, up to 19 or 26 yr old, European and North American countries observed a faster and more significant decline in the prevalence of HPV²³.

In addition, in DATASUS data, the recovery of females who had not completed the HPV vaccination schedule, having vaccinated outside the recommended range, resulted in an increase of 10.39% among those born in 2001, 26.49% among those born in 2002, and 91.47% among those born in 2003, showing that rescue vaccination is effective in increasing vaccine adherence.

The main limitations of this study are the information systems, which are often unreliable, indicating possible inconsistencies. Failures in the DATASUS data have been detected in morbidity (information on syphilis) and health care information (immunizations for HPV vaccine), with conflicting data on different platforms.

A reliable and accessible information system is the basis for us to set goals to achieve the WHO objectives by 2030. In the case of gonorrhea, the present syndromic treatment has the disadvantages of low sensitivity and specificity and the use of antibiotics in women who may not require them. Although the WHO objective for gonococcal infection cannot be evaluated due to a lack of data, the development of diagnostic tests for asymptomatic women and the availability of treatment can reduce the incidence. Creating a database with up-to--date information can allow for monitoring. Meanwhile, expanding surveillance sites for male urethral discharge syndrome with active screening and treatment of female partners of men with the syndrome may result in more women being treated. To improve knowledge of the symptoms in men and encourage the use of condoms, awareness campaigns might be carried out. An awareness of the rational use of antibiotics for various diseases is also important in combating antimicrobial resistance.

In the case of syphilis, training health professionals to provide quality prenatal care and improve reporting patterns and the immediate availability of free diagnosis and treatment in basic health units and the care and treatment of partners to interrupt the chain of transmission are actions that can help to improve performance in the prevention of congenital syphilis. To increase adherence to treatment, campaigns to clarify the complications of untreated syphilis should be reinforced in prenatal care and primary care. In addition, educational campaigns in communities and schools that arouse the public's attention can promote the use of condoms in the fight against STIs and disseminate information through the media and the Internet.

As for the objective of HPV vaccination, rescue vaccination, the return of educational campaigns involving schools, and public policies aimed at places with low vaccine adherence can be of great value. This may be the objective with the greatest potential to be achieved. We must remember that the inclusion of males in HPV vaccination in 2017 can lead to a more promising result, even if it is below the target proposed by the WHO for vaccinating females.

CONCLUSION

There is no information about gonorrhea in Brazil. Despite having information systems, syphilis and HPV vaccination show divergent data on official platforms, suggesting that an important step toward accomplishing the goal is to update the information system, making it reliable and safe. Even in the implausible situation depicted by DATASUS data, WHO objectives would not be met, and in the case of syphilis, they appear guite distant. Vaccination against HPV has not yet reached the target of 90%, remaining at around 62% in 2021. Population education campaigns, rescue vaccination, provision of treatment and diagnostic tests, and an improved notification system can contribute to meeting the targets.

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Corresponding Author: Leila Cristina Soares lcs1507@yahoo.com.br

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