

# Temporal Trends in Syphilis Epidemiology in the UAE: A Five-Year Retrospective Analysis (2018-2022)

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## Research Article

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## Abstract

**Objectives:** This study examined the frequency and dynamics of syphilis in the United Arab Emirates (UAE) between 2018 and 2022. Recognizing the significance of understanding syphilis trends, this study intends to conduct further research on sexually transmitted diseases in the context of the UAE.

**Methods:** This was a retrospective cross-sectional study. This study focused on patients who underwent syphilis screening between January 2018 and December 2022. Cases were classified as conclusive only if they passed the first screening and subsequent confirmatory tests.

**Results:** The findings demonstrate that Syphilis frequency varied throughout the UAE during the study period. Demographic trends and sex variations were discovered, providing insight into how syphilis patterns change. Additionally, this study identified a broad spectrum of clinical manifestations, confirming the complexity of the disease. It was also noted that males had a higher frequency of syphilis than females.

**Conclusion:** Understanding the complexity of the frequency of syphilis is critical for developing effective public health interventions. Variations in frequency, demographic trends, sex disparities, and clinical manifestations indicate the need for personalized preventive and control measures. This study provides important information that may be utilized to motivate focused initiatives to address the difficulties associated with syphilis in the UAE, thus enhancing overall public health.

## Introduction

Syphilis is a contagious illness caused by *Treponema pallidum* subsp. *Pallidum* (T. *Pallidum*) may be transferred sexually or from mother to child through gestation [1]. Syphilis is an international health emergency because it is underdiagnosed and undertreated despite the fact that it is treatable and can be easily prevented via barrier techniques (such as condoms) [2]. Syphilis may be transmitted through sexual intercourse with an individual infected with the disease [3]. Syphilis progresses through four distinct stages: primary, secondary, latent, and tertiary. Primary and secondary syphilis manifests as an outbreak that frequently results in conspicuous indicators, including brownish-red rashes and lesions [3]. If left untreated, the infection moves to the latent phase and does not cause discernible symptoms. Although latent syphilis is not contagious in this phase and can persist for years, receiving medication is crucial for preventing problems [3]. Ultimately, those who are not treated may progress to the tertiary care phase. When this occurs, it may cause breakdowns in many organ systems, which can be fatal [3]. Syphilis may affect the nervous system, resulting in neurosyphilis [4], altered vision, Ocular Syphilis, and impaired hearing, resulting in otosyphilis [5]. Persistent syphilis may lead to severe health implications, including cognitive difficulties, diminished hearing, and blurred vision, along with a higher risk of acquiring other sexually transmitted infections such as HIV [6]. Further complications, such as pregnancy loss, premature delivery, birth defects, or even infant mortality, may occur in pregnant women with syphilis [7]. Thus, it is important to evaluate the incidence trends and estimate the frequency rates of syphilis in the UAE to develop an appropriate prevention and treatment strategy.

Previous research has shown a general trend of increasing syphilis infection rates. For example, [8] collaborated with the Global Burden of Disease Group to calculate the worldwide frequency of syphilis. Significant increases in the instances of syphilis were observed between males and those residing in affluent nations. Furthermore, [9] calculated that the frequency of syphilis in Germany increased from 5 cases per 100,000 residents to 6.2 cases per 100,000 individuals over a span of three consecutive years. This equated to an average annual cost of €20,292,110 in the German medical sector. Research conducted by [10] in Southern India revealed that the incidence of syphilis in non-pregnant individuals increased from 0.5% in 2015 to 2.1% in 2020. These statistics emphasize the need for more safety measures and policies. In addition, [11] advocated for the implementation of COVID-19 preventive and control measures to combat syphilis, such as the adoption of novel detection approaches (e.g., testing themselves for STDs), traceability of contact initiatives, and the active involvement of the general population.

The frequency of syphilis was 0.45% in a study conducted at a tertiary hospital in Saudi Arabia [12]. In contrast, the frequency recorded in the United States increased by 164% between 2008 and 2018, with men accounting for more than 70% of infections [13]. A systematic review conducted by [14] found that the rates of syphilis reported in the United States varied from 0-18% among the population. However, such data on the frequency of syphilis are not accounted for in the context of the UAE.

It is critical to acknowledge the importance of determining the frequency of syphilis in a particular population, given the substantial disease burden it presents and the ongoing difficulties it causes. In 2023, [15] conducted a seminal study that revealed a worldwide frequency of syphilis of 49.71 million cases. Additionally, this research [15] endeavored to evaluate the disease burden, which was calculated in disability-adjusted life-years. The frequency to be 7.36 million instances. Regrettably, the research findings revealed that the incidence of syphilis peaked at an all-time high rate from 1990 to 2019.

Syphilis has far-reaching consequences that surpass physical health. In addition to its substantial

numerical impact. This gives rise to increased social exclusion and discrimination, which may further compound the mental health difficulties experienced by affected individuals [16]. A thorough understanding of the frequency rates and temporal trends of syphilis in the UAE is crucial, considering its easily manageable nature, especially during its early phases. Acquiring such knowledge not only promotes the efficient distribution of resources but also acts as a catalyst for cultivating consciousness and guaranteeing prompt diagnosis and treatment.

Given the aforementioned context, the principal aim of our research was to thoroughly examine the frequency rates of syphilis in the UAE, providing a comprehensive analysis that extends from 2018 to 2022. Through an examination of the intricacies of syphilis dynamics within this particular time period, our study aims to make a scholarly contribution towards the development of focused approaches that target the reduction of frequency, alleviation of the associated challenges, and protection of the public health environment in the UAE. Our overarching objective with this undertaking is to strengthen public health initiatives, increase awareness, and ultimately improve the general welfare of the populace.

## Methods

The present study was a retrospective cross-sectional study that evaluated the frequency of syphilis among patients attending STD clinics within Dubai Health Authority (DHA), in the UAE between 2018 and 2022. Conducting an exhaustive retrospective analysis, our research focused on individuals who underwent syphilis screening tests within the expansive timeframe of January 2018 to December 2022. Rigorous criteria were applied to ascertain definitive positivity for syphilis, and samples that exhibited positive outcomes in both initial screening and subsequent confirmatory tests were meticulously categorized as conclusive cases.

During the first clinic session, comprehensive screening was extended to all patients aged  $\geq 18$  years, ensuring a broad and inclusive demographic representation. Syphilis was identified using a multifaceted approach, leveraging advanced diagnostic tools. Specifically, the chemiluminescence immunoassay, quick plasma reagin test, and detection of specific antibodies targeting *Treponema pallidum* were employed with precision and rigor.

The chemiluminescence immunoassay, recognized for its sensitivity and accuracy, serves as a pivotal component in the screening process, illuminating potential cases of syphilis. Complementing this, the quick plasma reagin test, renowned for its rapidity, provides a swift initial assessment, enabling efficient triage of cases. Additionally, the identification of specific antibodies targeting *Treponema pallidum*, the causative agent of syphilis, is integral to confirming the diagnosis with a high degree of specificity.

Our methodology, which combines a comprehensive screening approach with advanced diagnostic techniques, aims to provide a nuanced understanding of syphilis frequency within a specified timeframe. By utilizing a diverse set of screening tools, we not only enhanced the accuracy of our findings but also contributed valuable insights that can inform targeted interventions and public health strategies aimed at curbing the spread of syphilis and improving overall health outcomes.

During our retrospective investigation, it is crucial to highlight that the data collection was carried out without any direct engagement or contact with the patients. The retrospective nature of the study indicates that data were obtained from pre-existing records, archives, or databases without requiring active involvement from the people whose data were analyzed. This data-collection strategy, referred to as non-intrusive or passive data collection, preserves the privacy and independence of patients by using their regular healthcare records for analysis. There was no direct interaction or interference with

participants participating in the syphilis screening tests during the duration of the trial. Utilizing preexisting data mitigates any possible interference with the patient's regular activities and medication regimens. It is important to emphasize that ethical issues remain of utmost importance even in retrospective investigations. Maintaining the secrecy of patient data, complying with data protection standards, and acquiring the necessary authorizations for accessing and using healthcare records are all essential elements of ethical research protocols. Our study meticulously addressed these ethical issues to ensure the protection of the rights and privacy of persons whose data contributed to the research results.

Descriptive statistics provided a thorough summary of the occurrence rates, enabling us to measure the frequency and dispersion of syphilis cases within a defined period. The data were analyzed by tabulating the outcomes and calculating percentages and ratios for data interpretation. Mathematical calculations were carried out using the SPSS program. Furthermore, a t-test was employed to assess disparities in gender and nationality between 2018 and 2022.

Results

A total of 290 cases were identified between 2018 and 2022, with annual variations reflecting distinct trends. In 2018, modest 11 cases, constituting 4% of the total, were recorded. Subsequently, 2019 witnessed a noteworthy surge with 79 cases (27%). The year 2020 maintained a substantial caseload of 75 (26%), followed by a peak in 2021, with 105 cases (36%). However, 2022 has declined, with 20 cases (7%) documented.

Table 1 here

| Table 1. Results of Trends Analysis |          |           |           |            |           |             |
|-------------------------------------|----------|-----------|-----------|------------|-----------|-------------|
|                                     | 2018     | 2019      | 2020      | 2021       | 2022      | Grand Total |
| Total Number of Cases               | 11 (4 %) | 79 (27 %) | 75 (26 %) | 105 (36 %) | 20 (7 %)  | 290 (100 %) |
| Age in Years (Mean ± SD)            | 39 ± 8   | 37 ± 9    | 37 ± 11   | 35 ± 9     | 32 ± 7    | 36 ± 10     |
| <b>Gender n (%)</b>                 |          |           |           |            |           |             |
| Female                              | 4 (36 %) | 31 (39 %) | 16 (21 %) | 37 (35 %)  | 9 (45 %)  | 97 (33 %)   |
| Male                                | 7 (64 %) | 48 (61 %) | 59 (79 %) | 68 (65 %)  | 11 (55 %) | 193 (67 %)  |
| <b>Nationality n (%)</b>            |          |           |           |            |           |             |
| Locals                              | 7 (64 %) | 45 (57 %) | 46 (61 %) | 55 (52 %)  | 10 (50 %) | 163 (56 %)  |
| Expats                              | 4 (36 %) | 34 (43 %) | 29 (39 %) | 50 (48 %)  | 10 (50 %) | 127 (44 %)  |
| Number of Symptomatic               | 2 (18 %) | 18 (23 %) | 54 (72 %) | 40 (38 %)  | 16 (80 %) | 130 (45 %)  |
| <b>Types of Syphilis n (%)</b>      |          |           |           |            |           |             |
| Primary / Secondary Syphilis        | 1 (9 %)  |           | 4 (5 %)   | 4 (4 %)    |           | 9 (3 %)     |
| Secondary / Tertiary Syphilis       | 3 (27 %) | 3 (4 %)   |           | 7 (7 %)    | 1 (5 %)   | 14 (5 %)    |
| Latent Syphilis                     | 3 (27 %) | 66 (84 %) | 55 (73 %) | 53 (50 %)  | 15 (75 %) | 192 (66 %)  |
| Neurosyphilis                       |          | 3 (4 %)   |           |            |           | 3 (1 %)     |
| Maternal syphilis                   |          | 8 (10 %)  | 11 (15 %) | 13 (12 %)  | 2 (10 %)  | 34 (12 %)   |

Furthermore, analyzing the median age of individuals testing positive for syphilis between 2018 to 2022, it was found that the mean age  $\pm$  standard deviation (mean  $\pm$  SD) across the years was as follows: 2018 ( $39 \pm 8$ ), 2019 ( $37 \pm 9$ ), 2020 ( $37 \pm 11$ ), 2021 ( $35 \pm 9$ ), and 2022 ( $32 \pm 7$ ). The mean age of the patients was  $36 \pm 10$ . The data revealed a consistent decrease in the mean age over the study period, indicating a demographic shift in the affected populations. The standard deviation values provide insights into age group heterogeneity.

Over the entire period, 290 cases were identified of which 67% were male. Yearly analyses revealed consistent disparities, with males consistently comprising a higher proportion of positive cases. In 2018, males accounted for 64% of the positive cases. The following year, 2019 saw 61% of male cases. Notably, in 2020, 79% of the patients were male, with the highest percentage over the five-year span. In 2021, males constituted 65% of the cases. Finally, 2022 displayed a similar pattern, with 55% of positive cases being male. The cumulative grand total for the entire period indicates that 67% of the positive cases were male. Across the time period from 2018 to 2022, there was a significant difference between gender differences in the cases ( $p < 0.01$ ), with males having a higher representation than females in the number of positive cases.

Across the entire study period, 56% of the positive cases were among locals, while 44% were expatriates. In 2018, 64% of the cases were identified among locals, decreasing to 57% in 2019, and subsequently fluctuating over subsequent years. Furthermore, the analysis also revealed that there is a significant difference between the local and expatriate incidence of positive syphilis cases, with locals being significantly higher ( $p < 0.01$ ) between 2018-2022.

Examining the symptomatic presentation of cases, the data underscores intriguing trends. In 2018, 18% of cases presented with symptoms, a proportion that increased to 23% in 2019. However, a substantial shift occurred in 2020, when symptomatic cases surged to 72%, declined to 38% in 2021, and rose again to 80% by 2022. These insights provide a foundation for developing nuanced strategies for the prevention and control of syphilis, tailored to the specific demographics and symptomatic characteristics of affected individuals.

The analysis revealed distinct patterns in the diagnosis of syphilis. Primary/Secondary Syphilis cases varied from 9% in 2018, to 3% in 2022. Secondary/Tertiary Syphilis cases fluctuated over time, peak of 27% in 2018, varying from 4 to 7% in other years. Latent Syphilis cases exhibit varying frequency, representing 27% in 2018, 84% in 2019, 73% in 2020, 50% in 2021, and 75% in 2022. Neurosyphilis cases were documented at 4% in 2019 and constituted 1% of the total cases over a five-year span. Maternal syphilis cases were identified at 10% in 2019, 15% in 2020, 12% in 2021, and 10% in 2022, accounting for a total of 12% of cases.

## Discussion

Our data show a significant variation in syphilis cases over a five-year period, with a peak in 2021 followed by a fall in 2022. The observed fluctuations highlight the significance of ongoing monitoring for detecting developing trends and executing timely adjustments. The frequency, although lower than the worldwide projections [14,15], highlight the need for close monitoring and effective public health actions.

The research found a steady decline in the average age of those who tested positive for syphilis, indicating a demographic change in the afflicted communities. This discovery calls for further research on the underlying variables that contribute to age-specific vulnerability [17]. This phenomenon may be

influenced by evolving sexual behaviors, heightened propensity for risk-taking among younger people, or insufficient availability of information about sexual health and preventative measures. Further research is required to ascertain the underlying factors and formulate focused solutions for this susceptible age cohort. Furthermore, gender discrepancies, with men regularly accounting for a greater percentage of positive cases, are consistent with worldwide trends [13]. One reason for the gender discrepancy could be due to the fact that males comprise roughly 70% of the UAE population and non-UAE males make up roughly 90% of males in the UAE. The observed trend might be shaped by cultural standards, stigma, and possible obstacles to men's access to healthcare. Implementing culturally appropriate public awareness campaigns and customized preventative actions might effectively mitigate these risks that are particular to gender. Such discrepancies demand focused public awareness campaigns and preventative initiatives customized to the individual needs of certain communities.

A notable observation is the considerable disparity in the incidence of syphilis between citizens and expatriates. The increased frequency among locals emphasizes the need for culturally responsive public health measures. Addressing the cultural and environmental variables that contribute to the spread of syphilis is critical for establishing effective preventive and treatment methods suited to the UAE's varied demographic mix. Furthermore, the changing patterns in symptomatic presentation underscore the dynamic character of syphilis, with various percentages of individuals presenting symptoms throughout the course of research [11]. This realization emphasizes the significance of adaptable and flexible public health methods. Furthermore, the frequency of latent cases is shown by the distribution of syphilis types, underscoring the difficulty of diagnosing and treating asymptomatic individuals. Tailored treatments focusing on early diagnosis and treatment of latent cases are critical for lowering the overall disease burden.

Our findings, when placed in the context of the global environment, are consistent with recent studies demonstrating an increasing trend in the frequency of syphilis. Although the scale of the identified trends in the UAE is relatively minor, they require notice and rapid response. Drawing similarities with worldwide experiences, our results reinforce [11]'s demand for comprehensive public health initiatives such as new detection techniques and community participation.

This in-depth examination of syphilis frequency in the UAE from 2018 to 2022 offers useful information to public health officials and practitioners. The observed changes in frequency, demographic alterations, and clinical presentation highlight the need for targeted and adaptive therapies. Culturally sensitive techniques, together with ongoing monitoring and awareness efforts, are critical for reducing the burden of syphilis and improving the general well-being of UAE communities. This research adds to the global conversation on syphilis dynamics by underlining the relevance of localized tactics in dealing with this global health catastrophe.

## Conclusion

The results of this study on public health in the UAE are significant given that it is the first study on this subject in the UAE. The findings revealed demographic trends and sexual variations alongside the trend in syphilis patterns in the population over time. This study also identifies a broad spectrum of clinical manifestations confirming the complexity of the disease and the difference in the frequency between the sexes showing a higher frequency in men compared to women in the UAE. The changes in syphilis frequency observed over a five-year period highlight the need for dynamic and adaptive therapies. Public health planners should build targeted solutions by assessing demographic transitions, gender

inequities, and shifting symptomatic manifestations. The large variation in the incidence rates between locals and expats emphasizes the significance of culturally responsive treatments, which are critical for successful interventions in the UAE's heterogeneous demographic mix. Furthermore, the frequency of latent syphilis cases underscores the need to concentrate on early detection techniques and therapies aimed at asymptomatic patients in order to reduce the total disease burden and avoid consequences. This work adds to the current literature by providing a thorough

examination of the temporal dynamics of syphilis frequency in patients who visited the STD clinics within Dubai Health Authority in the UAE over a five-year period. Recommendations for further research on this topic, include a more in-depth study over a longer period of time and with a larger patient sample size, to further explore the trends in syphilis in the UAE and the impact of public health measures on the trends over time.

## Statements

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### Statement of Ethics

**Study approval statement:** This study protocol was reviewed and approved by [committee name withheld for review], approval number [withheld for review].

**Consent to participate statement:** None of the participants were employed. The study did not require consent to participate, because the data were retrospectively analyzed. All patients who are treated in Dubai Health signed the general consent form, which states that their data will be used for research purposes without revealing their identity.

### Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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### Author Contributions

Author 1 conceptualized the study and drafted the manuscript. Authors 2 and 3 served as principal co-investigators and helped finalize the manuscript. Author 4 is an assistant researcher. Authors 5 and 6 served as the research coordinators. Authors 7, 8, and 9 were responsible for the data collection. Author 10 contributed to the data analysis.

### Data Availability Statement

Data supporting the findings of this study are available upon request from Author 1.

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