

**FACTORS ASSOCIATED WITH HIV INFECTION  
AMONG SEXUALLY TRANSMITTED  
INFECTION- CLINIC ATTENDEES  
IN KELANTAN, 2016- 2022**

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SEXUALLY TRANSMITTED INFECTION- CLINIC ATTENDEES  
IN KELANTAN, 2016- 2022**

**by**

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## LIST OF SYMBOLS

$>$	More than
$<$	Less than
$=$	Equal to
$\geq$	More than and equal to
$\leq$	Less than and equal to
$\alpha$	Alpha
$d$	Precision or detectable deviation
$\beta$	Beta
$\%$	Percentage
$P$	The population proportion

## LIST OF ABBREVIATIONS

AIDS	Autoimmune Deficiency Syndrome
ARV	Anti-Retroviral
HAART	Highly active antiretroviral therapy
HIV	Human Immunodeficiency Virus
IBBS	Integrated Bio-Behavioural Survey
MCH	Maternal Child Health
MREC	Medical Research Ethics Committee
MOH	Ministry of Health
NMRR	National Medical Research Registry
PITC	Provide initiated testing and counselling
PMTCT	Prevention of Mother to Child Transmission
PLHIV	People living with HIV
PWID	People who injects drugs
IVDU	Intravenous Drug User
STI	Sexually Transmitted Infection
TB	Tuberculosis
USM	Universiti Sains Malaysia
VCT	Voluntary and Counselling Testing
WHO	World Health Organization

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**FAKTOR- FAKTOR BERKAITAN YANG MENJURUS KE INFEKSI  
HIV DI KALANGAN KEDATANGAN PESAKIT DI KLINIK JANGKITAN  
KELAMIN DI KELANTAN, 2016- 2022**

**ABSTRAK**

**Latar Belakang:** Perubahan landskap jangkitan Virus Imunodefisiensi Manusia (HIV) yang beralih dari penyalahgunaan dadah kepada hubungan seks sebagai penularan utama HIV membawa cabaran baru dalam memerangi penyebaran HIV di seluruh dunia, dan Malaysia tidak terkecuali. Sebagai tindak balas, Malaysia memulakan klinik kesihatan seksual berasaskan negeri pada tahun 2016 untuk menjangkau individu yang berisiko. Yang mana terbukti berkesan dalam menyediakan perkhidmatan HIV yang termasuk pengesanan awal dan pencegahan penularan HIV di kalangan individu berisiko tinggi serta penyediaan rawatan untuk pesakit HIV positif. Bagi negeri Kelantan, klinik dikenali sebagai klinik jangkitan yang ditularkan secara seksual (klinik STI) pertama kali ditubuhkan di Klinik Kesihatan Bandar Kota Bharu pada tahun 2016 dan diperluaskan untuk melibatkan semua 10 daerah tiga tahun kemudian.

**Objektif:** Kajian ini bertujuan untuk menentukan kadar positifiti HIV dan faktor-faktor yang mempengaruhi jangkitan HIV di kalangan pesakit STI yang menghadiri klinik STI di Kelantan dari tahun 2016 hingga 2022.

**Metodologi:** Kajian ini menggunakan kaedah hirisan lintang berdasarkan rekod retrospektif pendaftaran kedatangan pesakit di klinik penyakit bawaan seksual di Kelantan dari tahun 2016- 2022 menggunakan data sekunder yang diperolehi daripada

tiga klinik daerah iaitu Kota Bharu, Pasir Puteh dan Tumpat. Kajian ini dijalankan dari Januari 2016 hingga Mei 2023 dan dianalisa dengan menggunakan model regresi logistik untuk mengenalpasti faktor-faktor yang berkaitan dengan HIV positif dikalangan pesakit yang dijangkiti penyakit kelamin di Kelantan.

**Keputusan:** Daripada 247 pesakit yang menghadiri klinik STI yang terlibat dalam kajian ini, 228 kes (93.3%) mempunyai keputusan ujian HIV yang terekod, di mana 75 kes (32.9%) adalah HIV positif. Faktor-faktor yang signifikan yang berkaitan dengan jangkitan HIV di kalangan pesakit STI termasuk usia  $\geq 30$  tahun (AOR: 1.857, 95% CI 1.010, 3.416,  $p < 0.046$ ), jantina lelaki (AOR: 5.807, 95% CI 1.324, 25.466,  $p = 0.020$ ), status bercerai (AOR: 9.407, 95% CI 1.074, 82.398,  $p = 0.043$ ), bekerja dalam sektor swasta (AOR: 3.844, 95% CI 1.744, 8.473,  $p = 0.001$ ), dan mempunyai sifilis (AOR: 6.612, 95% CI: 3.567, 12.259,  $p < 0.001$ ).

**Kesimpulan:** Hampir satu pertiga daripada responden didapati positif HIV dan berdasarkan kepada model akhir berkaitan dengan tiga faktor- jantina, bercerai dan didiagnosa menghidap syphilis. Strategi yang diperlukan untuk mengekang dan mencegah HIV positif dikalangan pesakit klinik jangkitan yang ditularkan secara seksusal mesti meneliti dan focus kepada 3 faktor yang dikenalpasti terlebih dahulu.

**Kata kunci:** Jangkitan Seksual, klinik penyakit bawaan seksual, Virus Imunodefisiensi Manusia, Faktor-faktor Berkaitan

**FACTORS ASSOCIATED WITH HIV INFECTION AMONG  
SEXUALLY TRANSMITTED INFECTION- CLINIC ATTENDEES IN  
KELANTAN, 2016- 2022**

**ABSTRACT**

**Background:** The changing landscape of Human immunodeficiency virus (HIV) infection shifting from drug abuse to sexual contact as the primary of HIV transmission brought about new challenges in combating the spread of HIV worldwide and Malaysia is no exception. In response, Malaysia initiated state- based sexual health clinics in 2016 to reach out to those at risk, which was found to be effective in delivering HIV services that include early detection and prevention of HIV transmission among high-risk individuals as well as providing treatment for HIV positive patients. For Kelantan state, the Sexually Transmitted Infection (STI) clinics as they are known, was first established in Klinik Kesihatan Bandar Kota Bharu in 2016 expanded to include all the 10 districts 3 years later.

**Objective:** This study aimed to determine the proportion of HIV positivity and factors influencing HIV infection among patients with STI who attended STI clinics in Kelantan from 2016 to 2022.

**Methodology:** This study utilized a cross-sectional design whereby data were collected by extracting information from the records of patients who visited STI clinics in Kota Bharu, Pasir Puteh and Tumpat from the year 2016 to 2022. Logistic regression analyses and model were performed to identify factors related to HIV positivity among patients who attended STI clinics in Kelantan.

**Results:** Out of 247 patients who attended the STI clinics involved in the study, 228 cases (93.3%) had documented HIV test results, of which 75 cases (32.9%) were HIV-positive. Significant factors associated with HIV infection among STI patients included age  $\geq 30$  years (AOR: 1.857, 95% CI 1.010, 3.416,  $p < 0.046$ ), male gender (AOR: 5.807, 95% CI 1.324, 25.466,  $p = 0.020$ ), divorced status (AOR: 9.407, 95% CI 1.074, 82.398,  $p = 0.043$ ), working in private sector (AOR: 3.844, 95% CI 1.744, 8.473,  $p = 0.001$ ), and had syphilis (AOR: 6.612, 95% CI: 3.567, 12.259,  $p < 0.001$ ).

**Conclusion:** About one third of the respondents were HIV positive and based on the final model, were associated with 3 factors- male gender, divorced and confirm STI diagnosis of syphilis. Strategies needed to prevent HIV positivity among the STI clinic attendees should address and focus on these 3 factors first.

**Keywords:** Sexually Transmitted Infections, Sexually Transmitted Infection- clinic, Human immunodeficiency virus, Factors associated

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

STIs (Sexually Transmitted Infections) are not new. Although STIs have long been a substantial cause of illness and mortality, it has only been after the discovery of HIV that STI control has gained more attention in both developed and developing nations (Anwar and Sulaiman, 2008). Nearly one million new cases of treatable STIs are diagnosed every day globally estimated based on the prevalence and incidence of chlamydia, gonorrhoea, trichomoniasis, and syphilis in adult women and men all over the world (Newman *et al.*, 2015). The statistically demanded from the public health authorities and communities to work actions methods for the prevention, screening, diagnosis, and treatment of STI.

Both the HIV (human immunodeficiency virus) and STI (sexually transmitted infection) can be spread through sexual contact. When an individual has HIV, they are more susceptible to contracting other STI, and having another STI can increase the risk of transmitting or acquiring HIV. This is because the presence of STI can cause genital inflammation, which can create tiny tears in the mucous membranes of the genitals, providing an entry point for the HIV virus (Katz *et al* 2016).

Some of the most common STI that can be transmitted through sexual contact include gonorrhea, chlamydia, syphilis, herpes, and human papillomavirus (HPV). These STI can be spread through vaginal, anal, or oral sex. When an HIV-infected person has an STI, the virus can be present in their genital secretions, making it easier to transmit to their sexual partners (Chong *et al.*, 2021).



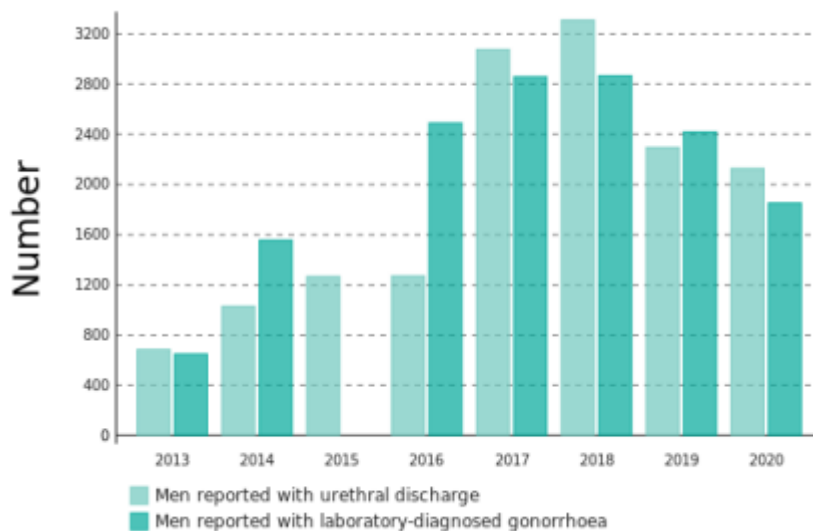
Additionally, having a STI can increase the amount of HIV virus in the genital secretions of an HIV-infected person, even if they are receiving antiretroviral therapy. Engaging in unprotected sexual intercourse, may increase the chance of HIV transmission between sexual partners.

HIV and other STI transmission can be prevented by practicing safe sex or physical barrier such as condoms, getting tested regularly for STI and receiving prompt treatment if they are diagnosed with STI. People living with HIV should also receive regular medical care, take their antiretroviral medications as prescribed, and tell their partners if they have HIV before having a sexual activity.

### **1.1.1 STIs in Malaysia**

The true or actual burden load of STI problems in Malaysia remained largely unknown, could be due to underreporting, underdiagnosis, and the asymptomatic expression of the diseases, the precise scope of the problem in Malaysia remains unknown. The epidemiological information on STIs in Malaysia should be read with care in light of these constraints (Anwar and Sulaiman, 2008). The frequency of STIs is declining in Malaysia at a noticeable rate, but at the same time, the number of HIV infections is rising, according to information provided by the Ministry of Health Malaysia in its report issued in April 2001 (Malaysia, 2001).

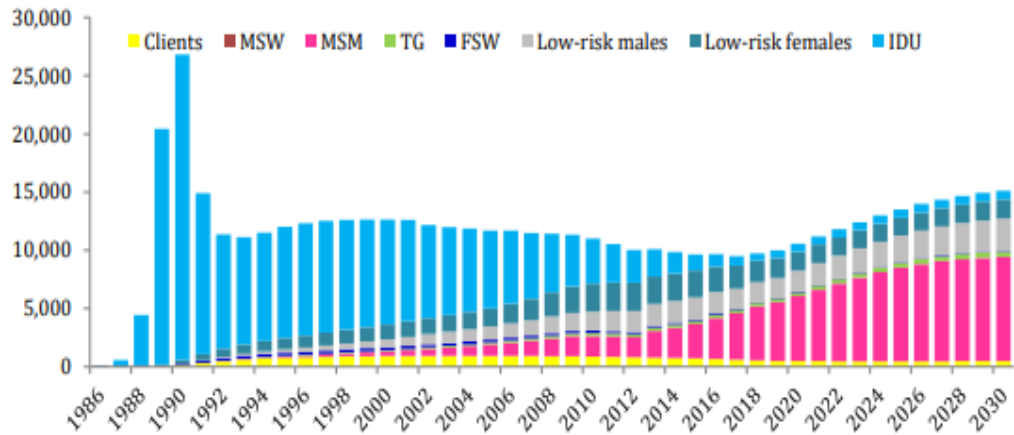
**Figure 1.1 Number of men reporting urethral discharge and laboratory- diagnosed gonorrhoea in the past 12 months. (Source: HIV/STI/Hep C Sector, MOH Malaysia, 2020)**



### 1.1.2 HIV prevalence among STI patients in Malaysia

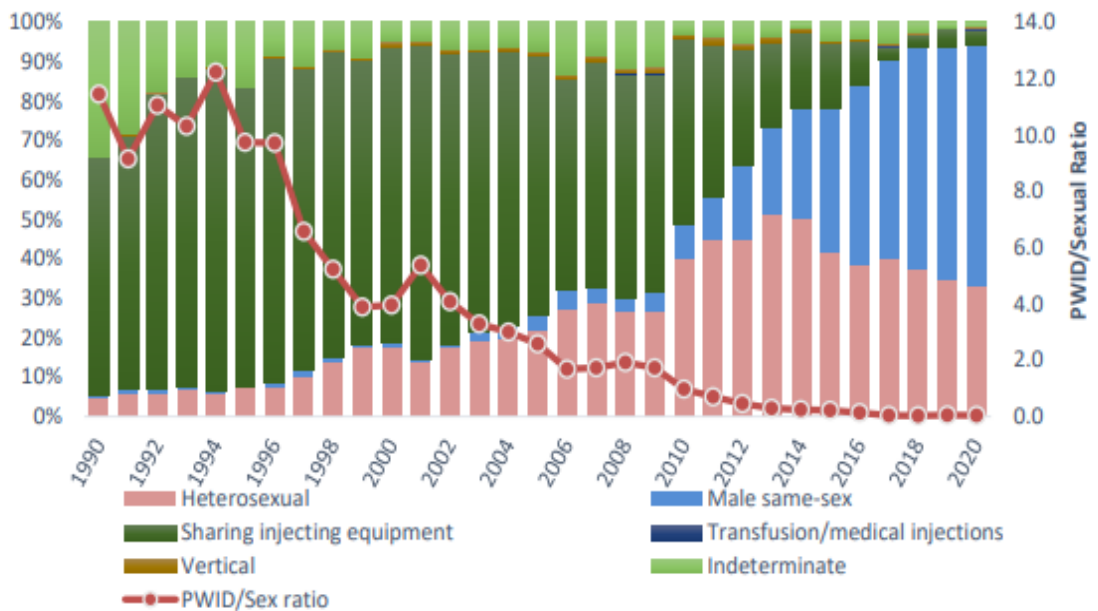
Figure 1.2 shows a projection of Malaysia in 2030 based on the Asian Epidemic Modelling (AEM). The projections depict how the key population's landscape of HIV infection trends is shifting from intravenous drug users to sexual intercourse, particularly men sex with men (MSM). This shifting was giving the big impact of management for prevention and control of HIV. According to Figure 1.3, which uses surveillance data, the PWID/sexual transmission ratio in Malaysia has been trending downward from 3.95 in 2000 to 0.04 in 2020, which is consistent with the projection.

**Figure 1.2 HIV infection trend and projection (using AEM), Malaysia by key population in Malaysia, 1986-2030 (Source: HIV/STI/Hep C Sector, MOH Malaysia, 2020)**



Note: MSW= Men Sex with Women, MSM= Men Sex with Men, TG= Transgender, IDU= Intravenous Drug user

**Figure 1.3 Trend of HIV infection by mode of transmission, Malaysia 1990-2020 (Source: HIV/STI/Hep C Sector, MOH Malaysia, 2020)**

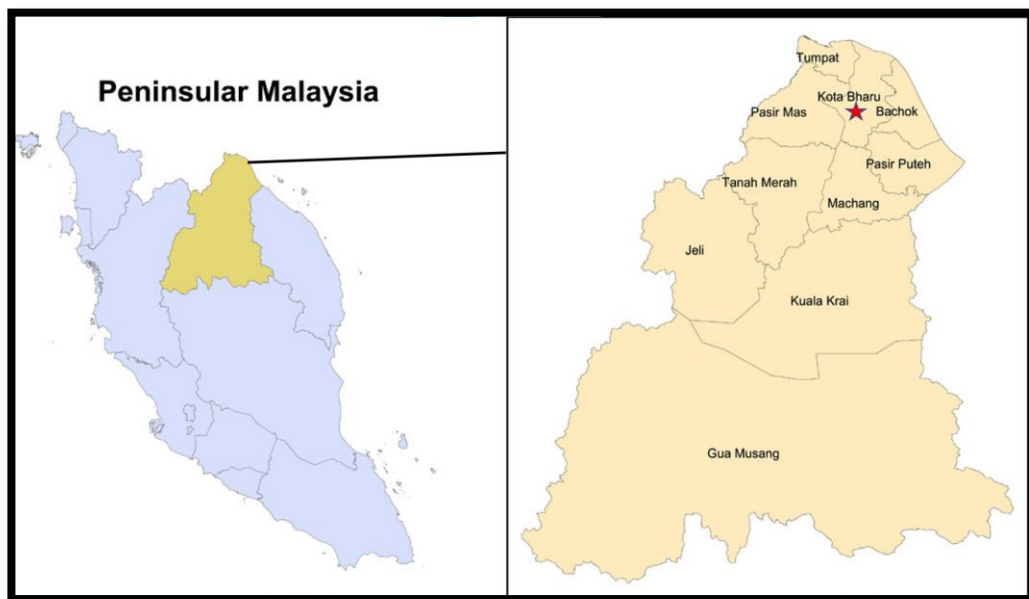


### **1.1.3 Implementation of STI Clinic in Malaysia**

Recognizing the changing landscape of HIV infections from IVDU to sexual transmission, the Ministry of Health Malaysia has introduced STI clinics in 2016 at primary care-led STI clinic in all states involving 23 health clinic all over Malaysia. The clinics were mostly located in urban and densely populated areas enabled them to capture young working population from all work sectors and students from higher learning institution. This strategy increases accessibility to the service increase accessibility to the service, as compared to the specialist-led clinics which were not easy to access by the target population as they are normally run in the same premises as other specialist clinics.

For the state of Kelantan, Klinik Kesihatan Bandar Kota Bharu (Figure 1.4) was selected as the 1<sup>st</sup> health clinic for STI clinic trial in 2016. The successful pilot project at Klinik Kesihatan Bandar Kota Bharu led to the expansion of STI clinics establishment throughout Kelantan involving all the 10 districts in 2019.

**Figure 1.4** The map shown the location of Klinik Kesihatan Bandar Kota Bharu (stared) which is the 1<sup>st</sup> health clinic to implement STI clinic in 2016 in Kelantan.



## 1.2 Problem Statement

In order to improve the management of HIV, numerous programs were introduced into health clinics in the year 2000 that include programs initiated and run by the MOH, or in collaboration with non-government organizations. These include the launch of clinical practice guidelines (CPG) on HIV management in primary care. Despite all programs, determining the actual magnitude of STI and HIV burden remained difficult and inaccurate due to under reporting as the diagnosis carries with in social stigma and other consequences.

The proportion of HIV-positive cases among STI patients attending STI clinics in Kelantan from 2016 to 2022 remains undefined, indicating a gap in our understanding of the HIV burden within this specific population.

The factors contributing to HIV positivity among STI clinic attendees in Kelantan during the period from 2016 to 2022 have not been systematically explored, leaving healthcare practitioners and policymakers without essential insights needed to develop targeted strategies for HIV prevention and management within this context.

### **1.3 Rationale of study**

Given the absence of prior research on this specific subject within the context of STI clinics in Kelantan, through it had been established since 2016, this study holds the potential to shed light on factors contributing to the HIV burden within the study population. The insights garnered from this research can be leveraged to formulate strategies aimed at enhancing the effectiveness and relevance of STI clinics in Kelantan, aligning with the goals of the Ministry of Health and contributing to the broader framework of Sustainable Development Goals related to public health and disease prevention.

### **1.4 Research Question**

1. What are the proportions of HIV infection among STI patients attending STI clinics in Kelantan?
2. What are the factors associated with HIV infection among STI patients attending STI clinics in Kelantan?

## **1.5 Objectives**

### **1.5.1 General Objective**

To study factors associated with HIV infection among STI clinic attendees in Kelantan from 2016- 2022.

### **1.5.2 Specific Objectives**

1. To determine the proportion of HIV positivity among STI patients attending STI clinics in Kelantan from 2016- 2022.
2. To determine factors associated with HIV positive among STI patients attending STI clinics in Kelantan from 2016- 2022.

## **1.6 Hypothesis**

HIV infection positivity among STI clinic attendees in Kelantan are associated with sociodemographic, sexual modality, group risk and STI diagnosis.

## **CHAPTER 2**

### **LITERATURE REVIEW**

Manuscripts and articles for references were obtained form databases and online search engines such as PUBMED, Scopus, Google Scholar, Springer Link, and Science Direct. The Boleean operators "AND", "OR", and "NOT" were used, along with other search techniques. The keywords utilised were HIV, STI, variables related, and people who visited STI clinics.

## **2.1 Sociodemographic characteristics of HIV infection among STI patient**

The sociodemographic characteristics of HIV infection positive among individuals with STI vary depending on the population studied. However, several studies have identified some common sociodemographic factors associated with HIV and STI co-infection.

### **2.1.1 Age**

Although age alone may not be a risk on its own, age-related risk factors may include longer exposure to potential risk factors or more frequent engagement in higher-risk sexual behaviors. Numerous studies have demonstrated that age was an important factor in STI and HIV epidemiology (Wang *et al.*, 2011). Younger individuals, particularly those in their late teens and early twenties, often have higher rates of STIs compared to older age groups. However, other studies have shown that older individuals, may have a higher risk of HIV infection (Katz *et al.*, 2016). Young people are more likely to engage in risky sexual behaviours, such as unprotected intercourse and having several sexual partners, which increases their susceptibility to STIs (Wojcicki, 2005).

### **2.1.2 Gender**

It is noted that males generally have a higher risk of HIV infection compared to females (Bellan *et al.*, 2013; Wang *et al.*, 2011). However, it is important to consider that HIV and STI risk can vary within gender groups, particularly among specific subpopulations such as men who have sex with men (MSM) and transgender individuals. In many regions, women may face a higher risk of acquiring STIs due to biological factors that increase the exposure areas and social dominance of men that created gender-based power imbalances. In contrast, men are often at higher risk of HIV infection, particularly through behaviors such as unprotected sex with multiple partners or engaging in high-risk sexual practices (Wojcicki, 2005; Wang *et al.*, 2011)



### **2.1.3 Ethnicity**

Ethnic disparities in STI and HIV prevalence have been observed in some settings. Variations in social determinants of health, access to healthcare, cultural factors, and sexual networks contribute to differences in STI and HIV risk among different ethnic groups. Understanding these disparities is crucial for tailoring prevention and intervention strategies to address the specific needs of different populations (Wi et al., 2019; Wojcicki, 2005).

### **2.1.4 Education**

Another study conducted in sub-Saharan Africa found that younger age, low education level, and low socioeconomic status were all associated with an increased risk of HIV and STI. These factors were attributed to limited access to healthcare, lack of education about safe sex practices, and economic barriers to obtaining condoms and other preventative measures (Katz et al., 2016).

### **2.1.5 Occupation**

Socioeconomic status (SES) has been identified as a risk factor for HIV infection among women in East, Central, and Southern Africa according to the systematic study undertaken by Wojcicki (2005). Although the cited source did not specifically address occupation-related characteristics, the results showed a link between SES and HIV infection. An increased risk of HIV transmission has been linked to socioeconomic issues such as poverty, lack of resources, uncertain work, restricted educational opportunities, and limited access to healthcare.

The risk of HIV infection has been found to be higher in many low-income communities where jobs with high degrees of vulnerability, like sex work, migrant labour, and informal employment, are common. For instance, individuals involved in sex work, healthcare workers, and those in occupations with high mobility or exposure to high-