National Centre for Infectious Diseases

NATIONAL HIV PROGRAMME

National HIV Programme HIV Testing Recommendations

(Last updated 11 May 2023)

ABSTRACT

Background

In recognition of the morbidity and mortality associated with HIV, the Joint United Nations Programme on HIV/AIDS (UNAIDS) aims to end the epidemic by setting and striving to achieve the ambitious 95-95-95 targets. However, Singapore has yet to achieve the UNAIDS target. The National HIV Programme (NHIVP) developed this set of recommendations based on an adaptation of major international guidelines from the World Health Organization (WHO) and the US Centers for Disease Control and Prevention (CDC). The goals of this recommendation are to 1) increase the uptake of HIV testing, 2) allow earlier detection and identification of individuals with unrecognised HIV infection, 3) facilitate linkage to clinical services and 4) reduce further transmission of HIV infection in Singapore.

Methods

The major international guidelines from the World Health Organization (WHO) and the US Centers for Disease Control and Prevention were reviewed and adapted for local use. An expert committee consisting of representatives of the NHIVP, Enhanced HIV Programmes (EHIVP), National Public Health Laboratory (NPHL), Chapter of Infectious Disease Physicians and the NHIVP's Community Advisory Board (CAB) then discussed each recommendation and screened them for conflict of interest.

Summary of Recommendations

We recommend that HIV screening and opt-out screening* should be part of routine clinical care in all health-care settings. Individuals should retain their right to decline HIV testing. Individuals with high risk behaviours should be screened at least annually. Occupations which do not involve exposure prone procedures **do not** require HIV testing as part of pre-employment screening. All efforts should be exerted to ensure that individuals are counselled adequately pre-screening so that they understand the implication of HIV testing. All efforts must be made to ensure that individuals with HIV-positive results are linked to clinical care, counselling and support services as soon as possible, and no more than 2 weeks after diagnosis. HIV-negative individuals who are at high risk of HIV infection should be offered periodic rescreening and prevention services.

*HIV screening for inpatient adult patients in public health-care hospitals, unless they choose to opt out of testing

CONTENTS

Section 1. Introduction

1.1. Every year, approximately 1.5 million people are diagnosed with human immunodeficiency virus (HIV) infection worldwide (1). While the availability of antiretroviral therapy (ARV) has dramatically improved the quality of life and life expectancy of people living with HIV (2), 650 000 people still died of acquired immunodeficiency syndrome (AIDS)-related illness across the globe in 2021 (1). In recognition of the morbidity and mortality associated with HIV, the Joint United Nations Programme on HIV/AIDS (UNAIDS) aims to end the epidemic by setting and striving to achieve the ambitious 95-95-95 targets: by 2030, 95% of all people living with HIV will be aware of their diagnosis, 95% of all people diagnosed with HIV infection will receive sustained ARV and 95% of all people receiving ARV will achieve viral suppression (3).

1.2. In Singapore, HIV testing is traditionally performed in hospitals, clinics and through services provided by community-based organisations. Out of these sites, ten currently offer anonymous HIV testing (4). In 2008, the Ministry of Health (MOH) also implemented voluntary opt-out screening (VOS) programme for all adult inpatients in public restructured hospitals to improve detection rates and reduce the prevalence of undiagnosed and late-stage diagnosis of HIV infection. HIV self-testing kits have been introduced by the National HIV Programme since 1 August 2022 as part of a pilot programme, to complement the existing testing modalities, and encourage self-testing for those who prefer this testing option. HIV self-testing can be done in the privacy of one's home and involves self-collection of an oral specimen using a swab. The results can be obtained within 20 to 40 minutes. HIV self-testing kits are currently available at the Department of Sexually Transmitted Infections Control (DSC) Clinic and Action for AIDS (AfA) Anonymous Test Site (ATS)(5, 6).

1.3. Data from the aforementioned testing sites indicate that the number of new cases of HIV infection reported annually in Singapore remained fairly constant between 2008 and 2017, and ranged from 400-500 new cases annually (7). In 2021, 250 cases of newly-diagnosed HIV were notified to the National HIV Registry. This decline in the number of new diagnoses was also noted since 2018, with nearly 30% fewer reported cases than in 2017 (6, 7). This decrease is likely to be due to multiple factors, including ongoing campaigns focusing on conventional behavioural prevention strategies such as condom use, as well as biomedical strategies such as the widespread use of highly effective combination ARV for HIV-infected individuals for the prevention of transmission (8, 9). Pre-exposure prophylaxis (PrEP) has also been implemented at several centres in Singapore. However, of these newly diagnosed cases, 57% were detected in the course of provision of medical care. 62% of the newly diagnosed cases presented at a late stage of infection (6). 18% were detected during routine programmatic HIV screening and 16% were detected from self-initiated, or voluntary, testing (6). The cases that were detected during self-initiated testing were more likely to be at the early stage of infection.

1.4. These findings correlate with Singapore's performance on the UNAIDS 95-95-95 targets: estimates based on data from 2020 indicate that 83% of people in Singapore who have HIV infection know their status, 94% of those who are aware of their status are on therapy and 95% of those on ARV have sustained viral suppression (10). In addition, an unlinked anonymous HIV seroprevalence survey conducted in 5 public hospitals by MOH in 2007 reported the prevalence of undiagnosed HIV infection in Singapore to be 0.28% (11). More recent data from the Department of STI Control clinic (DSC) in Singapore on unlinked HIV surveillance in individuals seeking care for STI showed that HIV seroprevalence was found to range from 0.95% in 2019 to 0.81% in 2020 (12). Hence, more can be done to increase uptake of voluntary HIV testing with a view on reducing the number of late-stage infection at diagnosis.

1.5. There are numerous benefits to earlier detection of HIV infection. Early detection of infection allows earlier initiation of ARV, which reduces the risk of developing serious AIDS-related events, serious non-AIDS death or death by at least 50% (13, 14). In addition, many studies have also demonstrated that starting ARV within 1 week to 1 month of presentation results slows disease progression and decreases the size of the viral reservoir, reduces risk of treatment failure and improves immune recovery (15-18). Finally, treatment is crucial in preventing further spread of HIV infection. Treatment as prevention (TasP) refers to the use of ARV to prevent HIV transmission, and is one of the key strategies used in the ambitious global aim to end the HIV pandemic. Several trials have shown that HIV-infected individuals on effective ARV with undetectable HIV loads are effectively incapable of transmitting the HIV virus to their sexual partners (8, 9, 19, 20).

Section 2: Statement of Intent

2.1. The National HIV Programme (NHIVP) developed this set of recommendations based on an adaptation of major international guidelines from the World Health Organization (WHO) and the US Centers for Disease Control and Prevention (CDC) (21-23).

2.2. It is the intent of this document to:

a) Offer recommendations on HIV testing in settings where it is already being implemented to increase the uptake of HIV testing nationally;
b) Allow earlier detection and identification of individuals with HIV infection;
c) Facilitate timely linkage to clinical services; and
d) Reduce further transmission of HIV infection in Singapore by increasing testing and linking positive cases to care early.

It is not the intent of this document to address the barriers and challenges to HIV testing found in Singapore as these are complex in nature and cannot be adequately discussed within this document.

Section 3: Intended audience

3.1. This document is intended for:

a) All physicians practising medicine among the adult population in Singapore;
b) Healthcare providers and other personnel involved in the screening of adults in Singapore for HIV infection (i.e. anonymous test sites, community based organisation, outreach settings, mobile vans, etc); and
c) Laboratory personnel involved in the processing of blood and other biological samples for HIV diagnostics.

Section 4: Specific considerations

4.1. The following sections provide specific considerations:

a) *Section 5: Population to screen*: This section advises healthcare workers who require clarity on who should be screened for HIV infection, and who should have repeated screening.

b) *Section 6: Consent and pre-test counselling*: This section advises healthcare providers on the components and aspects of counselling that should be covered when taking consent for HIV screening.
c) *Section 7: Testing algorithm:* This section advises individuals who wish to understand how confirmatory testing for HIV infection is done can refer to this section.
d) *Section 8: Post-test care and counselling*: This section advises healthcare providers on the components and aspects of counselling that should be covered when conveying a negative/positive HIV test result.

Section 5. Population to Screen

5.1. We recommend that opportunistic HIV screening should be offered as part of routine clinical care in hospitals and clinic settings while opt-out screening should be part of routine clinical care in all tertiary hospitals. Individuals should retain their right to decline HIV testing. We also recommend community-based HIV testing, in addition to healthcare facility-based testing, with the provision of linkage to appropriate HIV prevention, care and treatment services:

a) Action for AIDS (AFA) is a non-profit organisation that provides both anonymous testing service and mobile testing services. For more information, kindly refer to afa.org.sg.
b) Besides AFA, there are other general practitioner clinics that offer anonymous HIV testing. For more information, kindly refer to healthhub.sg.

HIV self-testing is available in Singapore under the auspices of a pilot programme at the time of writing (5).

5.2. These are the following populations recommended for initial and repeat screening for HIV:

a) Initial screening

- All persons aged more than 21 years old should be offered HIV screening at least once in their lifetime, except for females above the age of 65 years, unless they have risk factors that warrant repeated screening (refer to subsection on repeated screening). Females above the age of 65 years old have a seroprevalence of less than 0.1% in our local population and do not need to be offered routine HIV screening (unpublished data, National Public Health and Epidemiology Unit, Singapore) (22).

- Individuals who do not meet the above criteria but have the following characteristics should be offered initial HIV screening as well:
    - All persons who are sexually active should receive a HIV screening at least once in their lifetime.
    - All persons who are diagnosed with tuberculosis (TB)(24). This is essential as HIV infection increases the risk of TB by 20-fold compared with HIV seronegative individuals in high HIV prevalence countries (25). While the prevalence of HIV infection in Singapore may not be as high, the estimated TB and HIV co-infection rate is 4.9% (24).

- All persons who have been recently diagnosed with a sexually transmitted disease (STI) or seeking treatment for STIs or viral hepatitis.
- Persons with clinical conditions or symptoms indicative of HIV infection– including HIV seroconversion. The three most common symptoms of HIV seroconversion in Singapore include fever, rash and diarrhoea, but may include other symptoms such as headache, myalgia, pharyngitis, mouth and genital ulcers, etc (26). In addition, individuals who have dengue-like febrile illness have been shown to have a high prevalence of acute HIV infection in Singapore (2.1%). In these groups of individuals, a sexual history should be taken and HIV screening should be offered to those with high-risk behaviours (27).
- All pregnant women should also be offered HIV screening at each first antenatal visit.
- All persons with an AIDS-defining illness (refer to Annex A).
- All persons with high-risk behaviours for HIV transmission (refer to section on repeat screening).

b) Repeat screening

Repeat screening should be performed at least annually for the following populations with high-risk behaviours:

- Sexual partners of HIV-infected persons whose viral load is above the limit of detection, especially if RNA>200 copies/ml (8, 9). Persons who are currently on pre-exposure prophylaxis (PrEP) should be screened for HIV more frequently e.g. 3 monthly as per prevailing PREP prescribing recommendations (28).
- Persons seeking treatment for or diagnosed with STIs (including viral hepatitis) should be routinely screened at each visit for a new complaint.
- Persons who exchange sex for money, and the partners of such persons.
- Persons with a history of injection drug use or who engage in sexual activities under the influence of alcohol or other drugs, and the partners of such persons.
- Persons with multiple sexual partners.

5.3. More frequent retesting (every 3-6 months) may be warranted based on individual risk factors (i.e. individuals with new sexual partners of unknown HIV status, individual with continuous high risk exposure, etc). In addition, individuals who had recent high-risk exposures within the window period of the screening test assays used should be advised to have a repeat test after the closure of the window period. For individuals who present with clinical syndrome suggestive of HIV seroconversion, and/or those with an indeterminate result on a HIV screening assay, considerations should be made to perform a HIV plasma RNA measurement instead (Please refer to the section 7: Testing Algorithm).

5.4. **No mandatory testing** unless required by prevailing legislation (i.e. Immigration Act). Employment-related screening for occupations that do not involve exposure prone procedures **does not** require routine HIV screening[1]. Exposure prone procedures are those invasive procedures where there is risk that injury to the worker may result in exposure of the patient's open tissues to the blood of the worker. These procedures include those where the worker's gloved hands may be in contact with sharp instruments, needle tips or sharp tissues (e.g. spicules of bone or teeth) inside a patient's confirmed anatomical space where the hands or fingertips may not be completely visible at all times, open body cavity or wound.

[1]Healthcare workers who perform exposure prone procedures do not need to undergo routine HIV testing. They are encouraged to know their status and undergo testing based on their non-occupational risk factors and the advice of their personal physician. They should undergo testing after any potential occupational exposure incidents e.g. needle stick injury.

Section 6. Consent and Pre-Test Information

6.1. The following principles can be applied when assessing the need for pre-test counselling:

a) For individuals who are regular testers or well aware of the implications of HIV test, pre-test counselling is not necessary. This will minimise unnecessary pre-testing counselling which can unintentionally deter regular testing.

b) For high-risk individuals who are first-time testers or not sufficiently educated on the implications of a HIV test, pre-test counselling is strongly encouraged to educate and prepare them on the possible implications and soften the impact during the communication of positive result.

c) For testing of low-risk individuals during the course of clinical care, pre-test counselling is not necessary. This prevents unintentional deterrence against testing. The end-to-end process from seeking consent, admission to administering of test should be reviewed to facilitate and lower barriers to testing. These include individuals who do not fall groups at high risk of infections particularly where routine HIV testing is performed (pre-dialysis, voluntary opt-out screening, etc).

d) Screening should be done voluntarily and undertaken with the individual's knowledge that HIV testing is planned. Consent for HIV testing should be obtained in a space that respects the individual's privacy and confidentiality.

e) Individuals should be informed verbally about HIV testing prior to the test being performed. Information that should be provided to individuals includes an explanation of HIV infection, the window period of the test used and the meanings of positive or negative results. Non-Singaporeans should also be made aware about the restrictions on long term passes and other residency or immigration matters in the setting of a positive result as part of informed decision making. Persons should be given the opportunity to ask questions, decline testing or opt for anonymous testing. In the healthcare setting, the discussion should be documented in the clinical records. Hence, consent for HIV testing should be incorporated into the person's general informed consent for medical care on the same basis as other screening or diagnostic tests. A separate written consent form for HIV testing is not required or recommended.

f) If a rapid HIV test is being done for an individual, the individual should be counselled that should the rapid HIV test returns positive, they will need a separate blood sample for a second confirmatory HIV test before the diagnosis can be confirmed.

g) The competence of interpreters to provide any required language assistance to individuals should be ensured.

h) If an individual declines an HIV test, this decision should be documented in the clinical records as well.

i) If an individual lacks the mental capacity to make a decision with regards to HIV testing, decision to screen for HIV should be made by the primary physician in the individual's best interest. In cases where the lack of decision-making capacity is deemed to be temporary, physicians should consider delaying screening for HIV until the individual has decision- making capacity. Information that should be provided to caregivers includes an explanation of HIV infection and the meaning of positive or negative results. Consent surrounding disclosure of results to

caregivers should be within the purview of the Infectious Diseases Act, Section 25, Chapter 137(29).

Section 7. Testing Algorithm

7.1. Any individual who has a positive result on a HIV rapid test kit will need to submit a separate specimen for HIV-1/2 antigen and antibody immunoassay test at a clinical laboratory for confirmation of HIV diagnosis.

7.2. This algorithm is not a technical guide describing what laboratory assays to use but reflects current best practice options. Laboratories should comply with prevailing legislation and licensing terms and conditions.

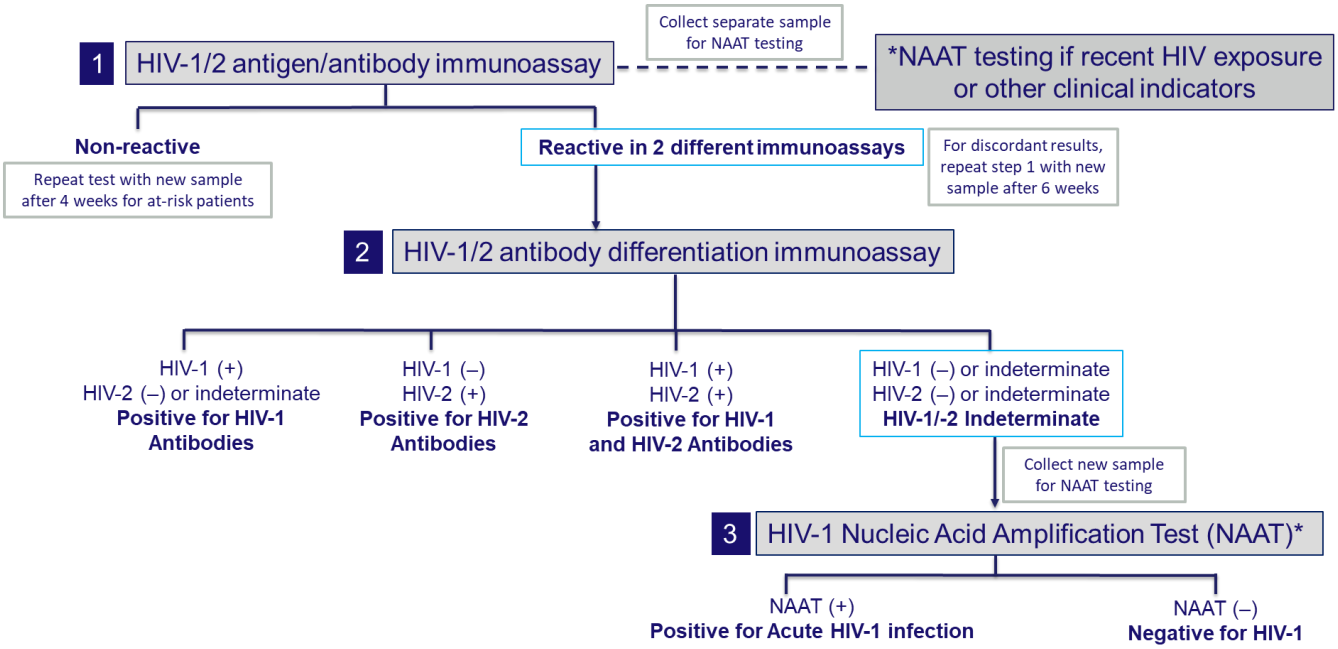

Figure 1. HIV testing algorithm
*Refer to Table 1 for HSA approved qualitative HIV-1 nucleic acid amplification test (NAAT) tests

7.3. **Interpretations** (refer to Figure 1):

a) All specimens are first tested with a HIV-1/2 antigen and antibody immunoassay (step 1).
- Specimens that are non-reactive usually indicate absence of HIV-1 and HIV-2 infection and are reported as 'Non-Reactive'. Non-reactive test results should be evaluated with caution in at-risk individuals and repeat testing with new specimen after 4 weeks. At-risk individuals refer to individuals who had a high-risk exposure within 4 weeks of their first HIV testing (Refer to section 5 for the list of high-risk exposures).

- Specimens that are reactive on the first HIV-1/2 antigen and antibody (Ag/Ab) immunoassay must be tested again using a different second Ag/Ab immunoassay. The second test can be conducted by a different laboratory if it is unavailable in the first testing laboratory.
- If the first and second Ag/Ab immunoassay results are discordant, collect another specimen for repeat testing after 6 weeks. A specimen that shows discordant results for both immunoassays even after repeat testing is regarded as HIV non-reactive and reported as HIV-negative. Such discordant results in low risks individuals in a low HIV prevalent setting is likely due to non-specific assay reactivity.
- Concordant reactive HIV-1/2 Ag/Ab test results suggest the presence of HIV infection but is not diagnostic for HIV infection and should be considered preliminary.
- If there is a possibility of very early infection or early ARV, qualitative HIV-1 nucleic acid amplification test (NAAT) could be performed (30-32) in parallel to steps 1 and 2 to aid in an earlier diagnosis. It is particularly important to note that early ARV may result in delayed seroconversion or other abnormalities in serology testing. A separate specimen must be collected for NAAT.

b) HIV specimens that are reactive on the first and second Ag/Ab immunoassays will trigger reflex testing to a more specific HIV-1/2 antibody differentiation immunoassay (step 2) for the confirmation of HIV infection (33) . If the antibody differentiation test result is also reactive, this confirms the presence of HIV infection. Together with reactive HIV-1/2 Ag/Ab test results in step 1, a HIV-positive diagnosis can be reported. Additional testing with a newly submitted sample is recommended to verify diagnosis in the correct patient prior to starting antiretroviral treatment[2]. This may be done by the primary attending doctor with immunoassays or after referral to the infectious disease physician as part of clinical management with a NAAT (i.e. quantitative HIV-1 RNA test for baseline viral load).

c) If the following results are obtained from the antibody differentiation immunoassay (step 2), the at-risk patient should undergo additional testing with qualitative HIV-1 NAAT (step 3):
   - HIV-1 and HIV-2 both negative or indeterminate
   - Indeterminate for HIV-1 and negative for HIV-2
   - Negative for HIV-1 and indeterminate for HIV-2

d) Detection of HIV-1 nucleic acids in step 3 of the algorithm can provide definitive evidence of HIV-1 infection when serological test results are inconclusive. A new specimen (not used in steps 1 to 2) must be collected for NAAT.
   - A NAAT-negative result indicates that HIV-1 DNA and RNA are not detected. Repeat testing with new specimen after 4 weeks is recommended.
   - If NAAT result is inconclusive, submission of a new specimen for testing is recommended.

[2] WHO recommends HIV testing services (HTS) to retest people diagnosed with HIV prior to starting lifelong treatment. The retesting is intended to catch human errors such as mislabelling of test results (21).

e) Screening or confirmatory serologic tests for HIV-1 or HIV-2 antibodies in infants below 2 years of age cannot distinguish between active HIV infection or passive transfer of maternal HIV antibodies. Diagnosis of HIV infection in newborns and infants up to 2 years old should be made by virologic detection of HIV-1 proviral DNA and RNA.

f) Under the Infectious Diseases Act, all laboratory staff are required to inform the ministry of a confirmed case within 72 hours of diagnosis (29). Anonymous testing clinics are exempted from this mandate as they do not require provision of personal identifying data or contact details.

g) Confirmation of positive results should occur within 5 days, but ideally this should occur within 24-48 hours as technology and workflows allow.

Table 1. HSA-approved, qualitative HIV-1 nucleic acid amplification test (NAAT) tests

	Cepheid Xpert HIV-1 Qual	**Roche Molecular Systems cobas6800 HIV-1/HIV-2 Qualitative Test**	**Abbott RealTime HIV-1 Qualitative**
HSA Registration Date	1/7/2020	12/5/2020	21/11/2012 & 19/10/2015
Other regulations	WHO-PQ and CE-IVD marked, but not FDA approved	CE-IVD, US-IVD	CE Marked, For In Vitro Diagnostic Use
Lab-instrument or POCT	Point-of-Care-Test	Lab-instrument	Lab-instrument
Intended Use	1. Qualitative IVD of HIV-1 total nucleic acid in human whole blood and DBS	1. Qualitative detection and differentiation of HIV-1 and HIV-2 in human serum, plasma and DBS	1. Qualitative detection of HIV-1 nucleic acids in human plasma, and DBS
	2. Aid in the diagnosis of HIV-1 infection in conjunction with clinical presentation and other lab markers. Intended for use by lab professionals or specifically-trained healthcare workers	2. Used as an aid in diagnosis of HIV-1/HIV-2	2. Used as an aid in diagnosis of HIV-1 in paediatric and adult subjects
	3. Not intended for blood donor screening test for HIV-1	3. May also be used to confirm HIV-1 or HIV-2 infection in an individual with specimens reactive for HIV-1 or HIV-2 antibodies or antigens	3. Not intended as a donor screening test for HIV-1
Technology	Real-time PCR (total nucleic acid based for RNA and proviral DNA)	Real-time PCR, clinically proven dual target design (gag and LTR) for HIV-1 which are not subject to selective drug pressure	Real-time PCR, Integrase region of polymerase gene is a conserved region of the HIV-1 genome
Targets	HIV-1 GpM (A,B,C,D,F,G,H,J,K,CRF01_AE,CRF02_AG,CRF03_AB); GpN; GpO	HIV-1M (A-D, F-H, J, K, CRF01_AE, CRF02_AG, CRF12_BF, CRF14_BG), HIV-1O, HIV-1N, HIV-2 (A and B)	Group M subtypes A, B, C, D, CRF01-AE, F, CRF02-AG, G, subtype H and Group N, Group O
Sample type	0.1mL WB or 0.06-0.07mL DBS	0.65mL EDTA plasma, serum and 0.07mL dried blood per spot (DBS)	0.2mL Plasma (EDTA and ACD) and 0.1mL Dried Blood Spots (2 spots 0.05mL each)

Section 8. Post Test Care

8.1. **Communication of test results**: The goal of HIV testing is to increase the number of people who are aware of their HIV status and to facilitate referrals for them to receive care and prevention services. Physicians and providers of HIV testing must ensure that protocols are in place to inform individuals of their test results. Conveying HIV-negative test results may be done without direct personal contact between physicians/providers and individuals. Individuals who are at high risk of HIV infection should be counselled for periodic rescreening, and prevention counselling should be provided. Positive HIV test results (screening or confirmatory test) should be conveyed confidentially and in person by physicians or other skilled staff. Because of the risk of discrimination and stigma, friends and family of individuals should not be present or used as interpreters when disclosing HIV-positive test results to individuals.

8.2. **Linkage to care**: All efforts must be made to ensure that individuals with HIV-positive results are linked to clinical care, counselling, support and prevention services as soon as possible, and no more than 2 weeks after diagnosis. HIV treatment sites should consider optimising their referral pathways to minimise waiting time to review patients on the same day as diagnosis – even while confirmatory testing is pending in cases of high clinical suspicion or pre-test probability. Persons should be counselled on the importance of early ARV and the concept of TasP at the point of diagnosis to encourage compliance and reassure individuals that HIV infection is treatable. Physicians and providers of HIV testing should also pay attention to the state of the individuals mental health and assess risk for suicide and self-harm after disclosure of test results. If individuals are at risk for suicide and self-harm, efforts should be made to monitor these individuals prior to definitive linkage to care and referral for counselling and support groups should be made immediately.

8.3. **Partner counselling and referral**: All healthcare and HIV testing service providers should encourage persons to disclose their HIV status to their spouse, current sex partners and previous sex partners. These partners should be encouraged to test for HIV infection. In addition, health officials or medical practitioners may assist persons and notify their partners to go for HIV testing without disclosing patient's identity under the Infectious Disease Act, Chapter 137, Section 25A (29). In the case of spousal notification, patient's identity will be made known. Providers should inform persons who receive a new diagnosis of HIV infection that they will be contacted by a public health officer for an index interview to discuss notification of their partners and collect epidemiological information under the Infectious Disease Act, Chapter 137, Section 55(1)(e)(29) .Individuals should also be informed that under the Infectious Disease Act, Chapter 137, Section 23, they are required to inform sexual partners on the risk of contracting HIV and the partner must accept the risk voluntarily prior to engaging in any sexual activity (29).

8.4. **Prevention services for HIV negative persons**: Although HIV testing should not be contingent on an individual's behavioural risk factors, efforts should be undertaken to obtain a risk assessment for infection with HIV and other STIs as long as these do not provide a barrier to HIV testing. This provides an opportunity to discuss HIV infection and how it can be prevented. Individuals with high-risk behaviours can also be encouraged to go for periodic rescreening and prevention services can be offered to those keen to reduce their risk of HIV infection.

Summary

The road to ending HIV infection is possible, but requires more work on the part of providers and stakeholders across the continuum of HIV care. The ending of the epidemic can be achieved by pursuing UNAIDS the 95-95-95 targets. In particular, Singapore needs to improve in the first UNAIDS target and more needs to be done to increase the uptake of HIV testing. This document provides guidance on which populations should be screened, how counselling should be done prior to screening, what the testing algorithm is and how post care counselling should be done. It is hoped that this document can guide and encourage physicians to offer HIV testing, thereby increasing its uptake and bring us closer to ending HIV.

Appendix A: AIDS-Defining Conditions

1. Bacterial infections, multiple or recurrent*
2. Candidiasis of bronchi, trachea, or lungs
3. Candidiasis of esophagus †
4. Cervical cancer, invasive
5. Coccidioidomycosis, disseminated or extrapulmonary
6. Cryptococcosis, extrapulmonary
7. Cryptosporidiosis, chronic intestinal (>1 month's duration)
8. Cytomegalovirus disease (other than liver, spleen, or nodes), onset at age >1 month
9. Cytomegalovirus retinitis (with loss of vision) †
10. Encephalopathy, HIV related
11. Herpes simplex: chronic ulcers (>1 month's duration) or bronchitis, pneumonitis, or esophagitis (onset at age >1 month)
12. Histoplasmosis, disseminated or extrapulmonary
13. Isosporiasis, chronic intestinal (>1 month's duration)
14. Kaposi sarcoma †
15. Lymphoid interstitial pneumonia or pulmonary lym• phoid hyperplasia complex*†
16. Lymphoma, Burkitt (or equivalent term)
17. Lymphoma, immunoblastic (or equivalent term)
18. Lymphoma, primary, of brain
19. *Mycobacterium avium* complex or *Mycobacterium kansasii,* disseminated or extrapulmonary†
20. *Mycobacterium tuberculosis* of any site, pulmonary,†§ disseminated,† or extrapulmonary†
21. *Mycobacterium* , other species or unidentified species, disseminated† or extrapulmonary†
22. *Pneumocystis jirovecii* pneumonia†
23. Pneumonia, recurrent†
24. Progressive multifocal leukoencephalopathy
25. *Salmonella* septicemia, recurrent
26. Toxoplasmosis of brain, onset at age >1 month †
27. Wasting syndrome attributed to HIV

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*Children younger than 13 years

† Added in the 1993 expansion of the AIDS surveillance case definition for adolescents and adults

Table taken from CDC AIDS-defining conditions (34)

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National HIV Programme

HIV Testing Recommendations Advisory Group Terms of Reference

Membership

The HIV Testing Recommendations Advisory Group will be a select group of stakeholders who are involved in the nation-wide HIV response. Members were chosen based on their expertise in the relevant fields to join the National HIV Programme's efforts. This Terms of Reference is effective from 1 June 2020 and will be ongoing until terminated by agreement between the parties. The Advisory Group will comprise of:

- A/Prof Raymond Lin, Director, National Public Health Laboratory
- Dr Carmen Low, Senior Scientific Officer, National Public Health Laboratory
- A/Prof Matthias Toh, Director, National Public Health and Epidemiology Unit
- Ms Flora Huang, Manager, National Public Health and Epidemiology Unit
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Purpose

The NHIVP's HIV Testing Recommendations Advisory Group serves to provide the National HIV Programme with input and guidance regarding its HIV testing strategies. To be effective, the advisory group will adopt the following operating procedures:

1. Provide input on improving the current HIV testing services
2. Adapting international guidelines for the Singaporean context
3. Drafting the National HIV Programme HIV Testing Recommendations
4. Providing review of materials once adapted to ensure quality control
5. Utilising local data to inform HIV testing policies

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