HIV Public Health Surveillance

(adopted from the HIV Manual 3rd Edition 2013)

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CME / CNE / PEM point accreditation *(please refer to the attached test paper for the number of credit points awarded)*

Introduction

Public health surveillance is the "continuous, systematic collection, analysis, interpretation and dissemination of health-related data needed for the planning, implementation, and evaluation of public health practice". It can serve "to estimate the magnitude of a health problem in a population at risk; as an early warning system for impending public health emergencies; to document the impact of a preventive intervention; to evaluate prevention and control programmes; to identify research needs; to allow priorities to be set and to inform public health policy and strategies".[1]

Being one of the most significant global public health challenges in the last decades, the surveillance of HIV/AIDS plays an important role in the control and monitoring of the epidemic. The main objectives of HIV/AIDS surveillance are to:[2] (a) determine the geographical spread of HIV; (b) monitor the trends of the epidemic; (c) provide information for estimates and future projections in a country; and (d) provide useful data for appropriate planning of health and medical care services. This chapter covers the layout of a national HIV surveillance programme, and discusses the main components of the surveillance systems in Hong Kong.

Layout of HIV surveillance

HIV surveillance is a regular and continuous process involving four major steps which are: data collection; data collation and analysis; information dissemination; and HIV prevention programme planning, implementation and evaluation, as illustrated in **Box 6.1.**

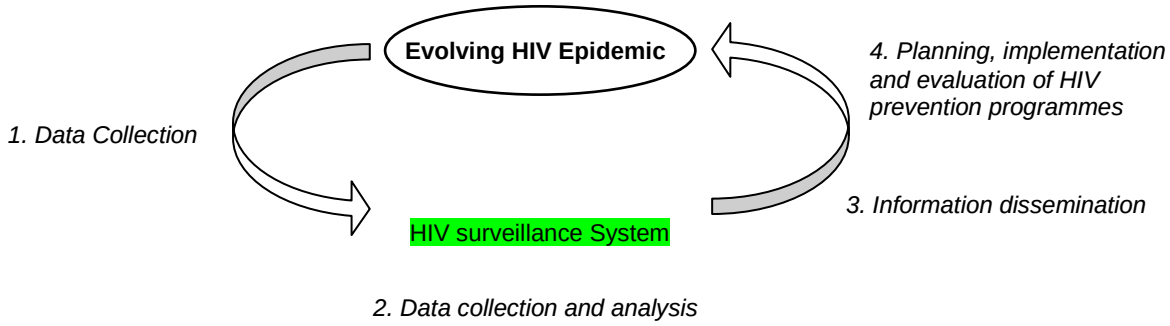
According to UNAIDS/WHO Guidelines for Second Generation HIV surveillance 2001, data collected in a HIV surveillance system should include:

a. Biological indicators such as HIV prevalence, sexually transmitted infection (STI) prevalence, tuberculosis (TB) prevalence, number of adult/paediatric AIDS cases. They can be collected by sentinel seroprevalence survey in defined at risk sub-populations, screening of donated blood for HIV, screening of specimens taken in special population surveys etc.

b. Behavioural indicators including condom use rate, needle sharing rate among drug users, frequency of sex with a regular and non-regular partner, age of sex debut, number of clients for sex workers. They can be collected from regular cross-sectional surveys in the high risk sub-population groups including drug users, STI clinic clients, female sex workers (FSW) and men having sex with men (MSM)

c. Socio-demographic indicators including age, sex, socioeconomic and educational status, parity (for antenatal sites) and marital status. They can be obtained from, for example, HIV case reporting system, behavioural surveys.

Box 6.1 HIV surveillance cycle



As the epidemic evolves, it is realized that each country/region has a unique epidemic, often punctuated by multiple sub-epidemics among different at-risk subgroups. Surveillance data shall provide information of the epidemics and allow countries to react efficiently to the rapidly changing situations. Three epidemic categories for different focus surveillance activities have been identified by UNAIDS/WHO (**Box 2.1** in Chapter 2).

In areas with low-level epidemics like Hong Kong, the first crucial step is to identify population at increased HIV risk from high-risk behaviours, which are:[3]

a. MSM - there is higher transmissibility of virus through unprotected anal versus vaginal sex, with the potential for high infection rate if the rate of condom use can be relatively low.[4]
b. Injecting drug users (IDU) - they are at increased risk because of the high transmissibility of HIV when injecting equipment is shared.
c. FSW - there is the tendency to have a large number of partners, often within short time, which increases their exposure to HIV and STI.
d. Clients of FSW - there is exposure risk arising from the sex workers' high turnover of sex partners, and they often act as a bridge to low-risk populations, for example, a client of a sex worker may transmit HIV to his spouse or regular sex partner.

After identifying the at-risk populations, the next step is to have these characterized, by:[3]

a. the size of sub-populations through size estimation;
b. HIV prevalence, from seroprevalence studies;
c. frequency of different risk behaviours, through behavioural surveys; and
d. their links within sub-populations and with the general populations by behavioural and qualitative studies.

HIV surveillance in Hong Kong

Conventionally, HIV/AIDS surveillance relied on individual case reporting in the early epidemic stage to track morbidity and mortality. As HIV continues to spread around the world, it became apparent that the epidemic does not follow the same course in all societies. As such, the scope of surveillance activities has been broadened to cover a wider range of areas in order to provide a more complete picture of the local situation. To achieve effective surveillance, collaborative effort of stakeholders is essential, the latter including physicians, laboratories, government and private clinics, non-government organizations, different rehabilitation institutions, prisons, members of the high-risk populations and

also people living with HIV/AIDS. An integration of data from multiple sources is necessary for analysis to be synthesized.

The current HIV/AIDS surveillance system in Hong Kong consists of five main sub-programmes, the results of which are integrated and disseminated through the annual HIV surveillance reports (http://www.info.gov.hk/aids/english/surveillance/off_surreport.htm):

a. Voluntary HIV/AIDS case-based reporting;
b. HIV sero-prevalence surveys;
c. Sexually transmitted infections (STI) caseload statistics;
d. Behavioral studies, and
e. HIV-1 genotyping studies

HIV/AIDS case reporting system

The HIV/AIDS case reporting system in Hong Kong has been in place since the 1980s. Attending Physicians of newly diagnosed HIV and/or AIDS cases contribute by completing the standardized reporting form (DH2293, available at DH Virtual AIDS Office website: http://www.info.gov.hk/aids/english/surveillance/form.pdf) and have it submitted to the Department of Health. This is an anonymous and voluntary reporting mechanism, with collected data treated in strict confidence.

Apart from basic demographic information, the reporting system captures specific data including suspected route of transmission (heterosexual, IDU, MSM etc), suspected location of infection, AIDS defining illness (**Box 6.2**), CD4 level at diagnosis, and last negative HIV test (if known). Under the reporting mechanism, a positive HIV case is defined as one that has been tested positive by screening and confirmation. The Public Health Laboratory Centre of Department of Health is providing free confirmation test service for screening positive samples submitted from any source (private or public), a mechanism that has contributed to the robustness of the reporting system.

Box 6.2 AIDS definition for adolescents & adults in Hong Kong for surveillance purpose. Scientific Committee on AIDS, 1995

- Candidiasis of bronchi, trachea, or lungs
- Candidiasis, esophageal
- Cervical cancer, invasive
- Coccidioidomycosis, disseminated or extrapulmonary
- Cryptococcosis, extrapulmonary
- Cryptosporidiosis, chronic intestinal
- Cytomegalovirus retinitis
- Cytomegalovirus disease (other than liver, spleen or nodes)
- Encephalopathy, HIV-related
- Herpes simplex, chronic ulcer, bronchitis, pneumonitis or esophagitis
- Histoplasmosis, disseminated or extrapulmonary
- Isosporiasis, chronic intestinal
- Kaposi's sarcoma

- Lymphoma, Burkitt's
- Lymphoma, immunoblastic
- Lymphoma, primary of brain
- *Mycobacterium avium* complex or *kansasii*, disseminated or extrapulmonary
- *Mycobacterium tuberculosis*, extrapulmonary or pulmonary/cervical lymph node (only if CD4 <200/μL) #
- Mycobacterium, other species, disseminated or extrapulmonary
- Penicilliosis, disseminated #
- *Pneumocystis carinii* pneumonia
- Pneumonia, recurrent
- Progressive multifocal leukoencephalopathy
- Salmonella septicemia, recurrent
- Toxoplasmosis of brain
- Wasting syndrome due to HIV

#Modification of the CDC 1993 Classification system : (1) Penicilliosis has been added and (2) pulmonary or cervical lymph node tuberculosis included only if CD4 <200/μL.

The case reporting system is useful to track the extent of infection, routes of transmission, gender/age/ethnicity distribution, testing pattern, receiving care at HIV specialized clinics, timeliness of diagnosis as inferred from CD4 level and progression to AIDS.

HIV seroprevalence surveys

HIV seroprevalence involves the measurement of prevalent HIV infection in a defined population, which is often conducted by HIV antibody testing. It has been conducted locally in communities and settings purposely or as a secondary output system from relevant testing service in Hong Kong (**Box 6.3**). Seroprevalence methods include voluntary HIV testing and unlinked anonymous screening (UAS).[5] Blood is the standard specimen, but other body specimen such as urine, has also been collected for surveillance.

The populations assessed through seroprevalence surveys can be broadly categorized by HIV risk: (a) community without obvious risk factors, e.g. blood donors, antenatal women, (b) community with predisposing risk factors, e.g. MSM, FSW, patients attending Social Hygiene Service (SHS) clinics, IDU, and (c) community not classified by defined risk, e.g. TB patients, prisoners.

Box 6.3 HIV seroprevalence studies in Hong Kong (UAS = unlinked anonymous screening)

Population	Settings	Methods	Sample used	Years	Sample size
Population with predisposing risk factors					
IDU	Methadone clinic attendees	Universal testing programme (Replaced UAS in 2003)	Urine	Since 2003 (1992-2003)	7000-9000/year
	Drug rehabilitation centres attendees	UAS	Urine	Since 1998	150-400/year
Social Hygiene Clinic Clients	Public STI clinics attendees	Voluntary testing	Blood	Since 1985	30000-40000/year
MSM	Community based VCT service by NGOs	Voluntary testing	Urine	Since 2002	200-900/year
	Community based survey (PRiSM)	UAS in 2006 and 2008 Voluntary testing in 2011	Urine	2006 2009 2011	800-1000
FSW	Community based survey (CRiSP)	UAS in 2006 Voluntary testing in 2009	Urine	2006 2008	900-1000
Population without risk factor					
Antenatal women	Women attending public antenatal clinics	Universal testing Programme (Replaced UAS in 2001)	Blood	Since 2001	40000-50000/year
Neonates	Testing of Cord blood from delivery women	UAS	Blood	1990-2000	4000/year
Blood donors	Hong Kong Red Cross Blood Transfusion Service	Routine screening	Blood	1985	150000-200000/year
Civil servants	Pre-employment health check	UAS	Blood	1991 (once)	1553
Population not classified by risk					
Tuberculosis Patients	Public TB clinics	Voluntary testing UAS (until 2008)	Blood	Since 1993 1990-2008	2000-4500/year 1000/year
Newly admitted prisoners	Prisons	UAS	Urine	Since1995	1000-2500/year

UAS is one of the means for seroprevalence studies, which refers to *"the testing of specimens for markers of infection after elimination (unlinking) of all personal identifying information from each specimen."* Two key principles of UAS are: (a) the result of a specimen cannot be traced back to its source, and (b) voluntary HIV testing for client's own diagnosis has to be in place. Informed consent for the surveillance per se may or may not be obtained under UAS.[6] UAS minimizes selection bias and can be conveniently conducted in settings where specimen are routinely collected for other purposes, for example, opiate screening for newly admitted inmates. There are the shortcomings of the inability to link positive patients to appropriate care and treatment, and the continued debates on the legal and ethical implications around the world. In Hong Kong, UAS was introduced in 1990. It has however been replaced by universal voluntary testing in the some target populations, e.g. pregnant women, TB patients and drug users attending methadone clinics.

Behavioural studies

In theory, HIV transmission is determined by the chance of being infected in a specified behaviour with a partner who is HIV positive (e.g. unprotected anal sex), chance of partner being HIV infected (e.g. prevalence of HIV among MSM community) and the frequency of the act (e.g. frequency of unprotected anal intercourse). In order to appreciate the dynamics of HIV transmission, an understanding of changing pattern of the implicating risky behaviours is crucial.[7] In this connection, the monitoring of behavioural risks of the high risk population, together with the sub-population prevalence, can provide early warning signals of HIV spread for informing timely response.

For surveillance purpose, regular behavioural survey are conducted in selected target populations in Hong Kong, including drug users (attending Drug Rehabilitation Centres and methadone clinics), newly admitted inmates of the prison, DH Social Hygiene Service clients, DH AIDS Counselling and Testing Service clients, MSM during HIV testing in NGOs (**Box 6.4**). This programme is supplemented by periodic behavioural surveys administered on MSM and FSW in the last few years. Specifically, the HIV Prevalence and Risk Behavioural survey of Men who have sex with men in Hong Kong (PRiSM) have been conducted in 2006, 2008 and 2011 respectively while the Community Based Risk Behavioural and Seroprevalence Survey for Female Sex Workers in Hong Kong (CRiSP) have been carried out in 2006 and 2009.

Box 6.4 HIV Behavioural studies in Hong Kong

Population	Settings	Methods			Started since
		Methods	**Content surveyed**	**Frequency**	
Injection drug users (IDU)	Methadone clinic attendees	**Admission survey** – all newly or readmitted attendees	▪ Proportion of current injectors ▪ Practice of current needle-sharing	Year round	1990
	Drug Rehabilitation Centre	**Admission survey** – all admissions	▪ Proportion of current injectors ▪ Practice of current needle-sharing	Year round	1995
	Street addict survey	**Community based survey** – subjects sampled and survey administered by peer drug users	▪ Proportion of current injectors ▪ Practice of current needle-sharing ▪ Knowledge and attitude	Yearly	1992
	Central Registry of Drug Abuse (CRDA)	**Case report** from law enforcement departments, treatment and welfare agencies, hospitals and clinics, and tertiary institutions	▪ Proportion of current injectors in all drug users ▪ Proportion of current injectors in new drug users	Yearly	1972
Sexually transmitted infection (STI) patients	Patients attending Social Hygiene Service (SHS) clinics	**New case survey**	▪ Recent history of commercial sex/casual sex ▪ Condom use in heterosexual men	One month every year, all cases newly diagnosed with STI	1996
Men having sex with men (MSM)	NGO HIV testing service	**Pre-test survey**	▪ Condom use in MSM	Year round	2002
	PRiSM (Gay venues, Internet based started in 2011)	**Community based**	▪ Sexual risk ▪ Condom use ▪ HIV/STI testing ▪ Access to HIV prevention information	Once every few years	2006, 2008, 2011
Female Sex Workers (FSW)	CRiSP (One-woman-brothel, nightclub, bars, karaoke.)	**Community based**	▪ Sexual risk ▪ Condom use ▪ Access to HIV prevention information ▪ HIV testing	Once every few years	2006, 2009
Clients of AIDS counseling service	DH AIDS Counselling and Testing Service (ACTS)	**Pre-test survey**	▪ Median no. of sexual partners among men ▪ Recent history of commercial sex ▪ Condom use in men ▪ No. of sexual partners and Condom use in MSM	Year round	1998

The HIV-related behavioural markers used in different populations may vary but are largely similar in broad areas, including basic demographic data (age, sex, ethnicity); behavioural risk factors (consistency of condom use, needle sharing rate, HIV testing pattern, number of sex partners etc); and access to HIV/STI prevention information. There are always problems in the consistency of survey mechanisms, making comparison between surveys in the same sub-populations and subsequent construction of a concrete picture difficult. To improve the representativeness of the HIV/AIDS behaviour surveys, standardization of behavioural indicators is the next crucial step.

Sexually transmitted infections (STI) caseload statistics

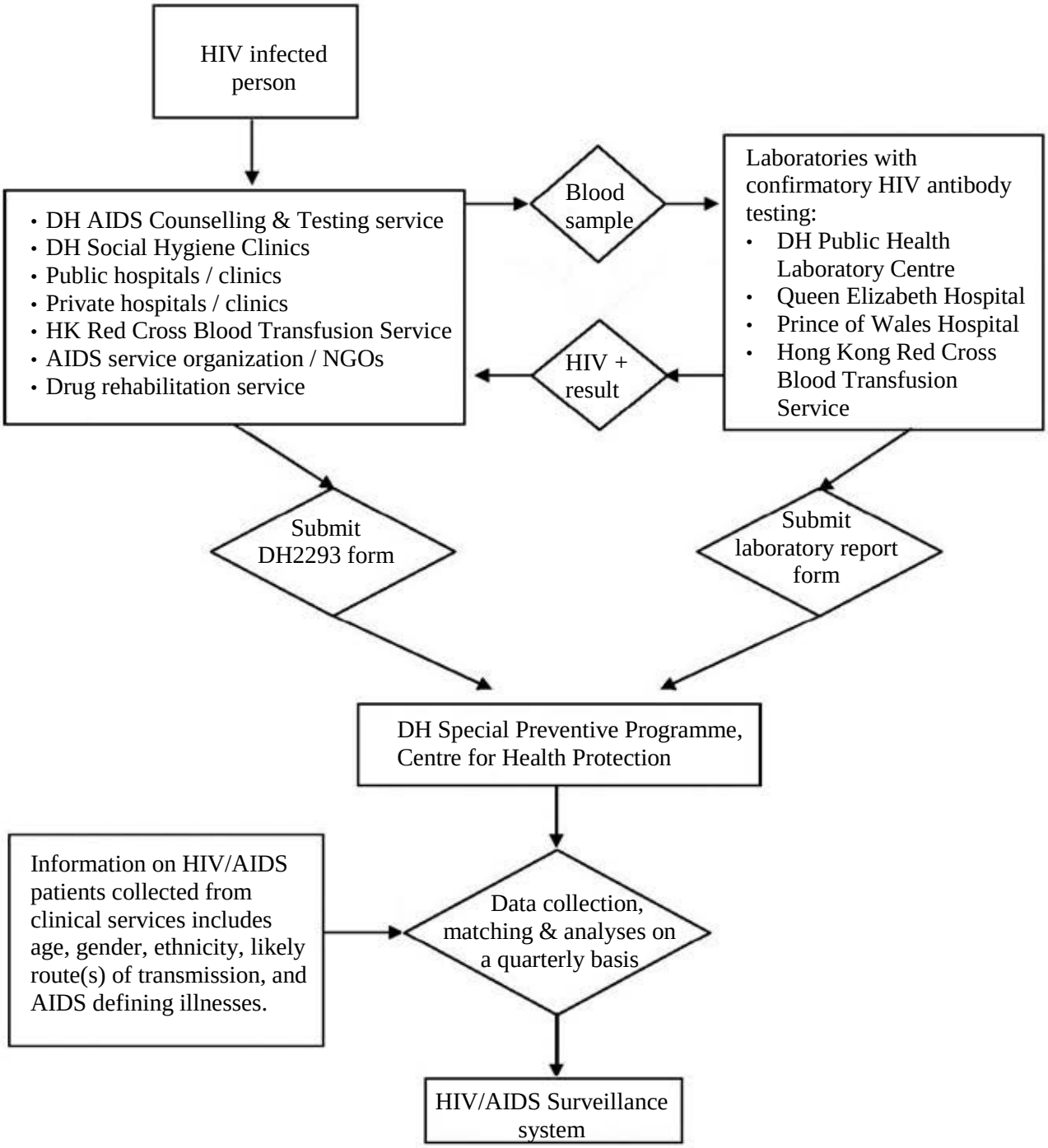
As a sexually acquired infection, HIV surveillance could benefit from an incorporation of data from STI surveillance. It is known that the occurrence of other STIs increases the likelihood of HIV transmission through sexual contact. In addition, presence of an STI is by itself an indicator of high risk sexual behaviours. On the other hand, the prevention and effective treatment of other STI have positive effects on the HIV prevention efforts. Naturally, STI surveillance can be considered a component of a comprehensive HIV surveillance programme as it can offer important insights into the trend of HIV epidemic.[8] In fact, linkages between HIV and STI prevention efforts are needed in order to control both epidemics.
Like HIV, STI is not a statutorily notifiable disease in Hong Kong. As a major provider of STI treatment service, Social Hygiene Clinics of the Department of Health maintains the clinical caseload statistics of patients, which can be used to track the patterns of STI in the community. On a regular basis, periodic surveys are conducted to complement with behavioural data (**Box 6.**4). Results of STI surveillance system are disseminated through the quarterly STD/AIDS updates (http://www.info.gov.hk/aids/english/surveillance/stdaidsupdate.htm)

HIV-1 genotyping studies

HIV is one of the fastest evolving microorganisms known. Several genetically distinct subtypes are present and new circulating recombinant forms (CRF) are continuously emerging.[9] Tracking for HIV-1 subtype has been started by researchers as early as 1996. It provides a systematic method for evaluating the introduction of new strains and movements of various strains across geographic regions, and facilitating prompt epidemiological investigation of unusual strain or transmission pattern.

To complement the surveillance system in Hong Kong, HIV-1 subtype determination was first explored in 2000. HIV-1 subtyping is performed using a standard laboratory method and followed by phylogenetic analysis to examine sequence variation and relationship. Today, genotyping findings are regularly fed into the HIV surveillance system. Summary of the latest findings are described in Chapter 2. HIV molecular studies carry special meaning in Hong Kong, a low-level epidemic area, as it enhances the sensitivity of the overall surveillance system by, for example, providing early signals of rapid local spread of HIV among MSM.

Algorithm 6: Work flow of HIV/AIDS reporting in Hong Kong (DH = Department of Health, Hong Kong Government)



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Further reading

A. UNAIDS/WHO. Guidelines for second generation HIV surveillance: the next decade. UNAIDS/WHO Working group on global HIV/AIDS and STI surveillance, 2000.

B. WHO/UNAIDS. Guidelines on surveillance among populations most at risk for HIV. UNAIDS/WHO working group on global HIV/AIDS and STI surveillance, 2011.

Test paper - HIV Public Health Surveillance

Expiration Date: 09 September 2015

CME point **#** ***/ CNE point: 1 / PEM point: 1*** *(Healthcare related which contributes to the enhancement of professionalism of midwives/nurses)*

- Please indicate one answer to each question.
- Answer these on the answer sheet and make submission by fax to Special Preventive Programme, Department of Health.

*Please contact respective authorities directly for CME/CPD accreditation if it is not on listed below.*

Accreditors	CME Point
Department of Health *(for practising doctors who are not taking CME programme for specialists)*	1
Community Medicine	1
Dental Surgeons	1
Emergency Medicine	1
Family Physicians	1
Obstetricians and Gynaecologists	1
Ophthalmologists	0.5
Otorhinolaryngologists	1
Paediatricians	1
Pathologists	1
Psychiatrists	1
Radiologists	1
Surgeons	1

1. Which of the following is not true about HIV public health surveillance?
   (a). It serves to estimate and monitor the magnitude of HIV in the population
   (b). It involves regular systematic collection, analysis, interpretation and dissemination of HIV and its related health data
   (c). It facilitates planning of public health policy and priorities setting to combat HIV
   (d). It can provide early warning signal for impending public health emergencies
   (e). None of the above

2. Which of the following data is not recommended to be collected for HIV surveillance?
   (a). Number of people who received HIV vaccine
   (b). Age and sex of HIV/AIDS patients
   (c). Frequency of sex and drug use behaviours that may contribute to HIV infection
   (d). Prevalence of complications, e.g. tuberculosis, resulting from HIV
   (e). None of the above

3. Which of the following is not a key population to target for HIV surveillance?
   (a). Men who have sex with men
   (b). Female sex workers
   (c). Injecting drug users
   (d). Male clients of female sex workers
   (e). None of the above

4. Which of the following is not a component of HIV/AIDS surveillance system in Hong Kong?
   (a). HIV seroprevalence surveys
   (b). HIV/AIDS reporting system
   (c). HIV genotyping studies
   (d). Sexually transmitted infections caseload
   (e). None of the above

5. Which of the following is not true regarding HIV/AIDS surveillance and its evolution?
   (a). It is useful to assess the size of at-risk populations and their sub-populations
   (b). Surveillance activities might have to adapt to the specificities of the epidemics in different countries
   (c). Public health authority alone without collaboration with other stakeholders is sufficient to achieve effective surveillance
   (d). Collation and integration of data obtained from multiple sources is necessary for analysis and interpretation
   (e). All of the above

6. Which of the following is not an AIDS defining illness in Hong Kong?(a). Pulmonary tuberculosis with CD4 <200/μl
   (b). HIV wasting syndrome
   (c). Cryptococcal meningitis
   (d). Disseminated herpes zoster
   (e). Burkitt's lymphoma

7. Which of the following is not true about HIV prevalence surveys in Hong Kong?
   (a). Community-based surveys have been done to gauge HIV situation in men who have sex with men
   (b). Methadone clinic is a site to monitor prevalence among opiate drug users
   (c). Voluntary HIV testing of tuberculosis patients is part of the HIV prevalence surveys
   (d). HIV screening of blood donors shed light on the situation in the general population though its primary purpose is for blood safety
   (e). Unlinked anonymous screening of neonates is in place to inform prevalence in pregnant women

8. Which of the following is not true regarding HIV behavioural studies in Hong Kong?
   (a). Drug user is among the key populations with most abundant HIV behavioural data
   (b). Serial PRiSM serves to monitor behavioural risks in the men who have sex with men community
   (c). Commercial sex history is assessed in clients attending the sexually transmitted diseases of the Department of Health
   (d). Besides needle-sharing, drug injection alone is an important marker to be monitored in drug users
   (e). None of the above

9. Which of the following is not true regarding the component of sexually transmitted infections (STI) and its incorporation in HIV surveillance in Hong Kong?
   (a). Caseload statistics of private doctors is regularly collected to track the local STI pattern
   (b). It is useful as STI increases the risk of HIV transmission via sexual contact
   (c). Occurrence of STI per se signifies unsafe sexual behaviours
   (d). Successful prevention of other STI also helps HIV prevention
   (e). All of the above

10. Which of the following is not true about HIV genotyping studies?
   (a). HIV genotyping studies can assess the spread of various strains and introduction of any new strain in a locality
   (b). New circulating recombinant forms have been found from time to time for HIV-2 subtype
   (c). Phylogenetic analysis is an integral part to examine relationship of the infected cases at laboratory level
   (d). It has provided early signal on rapid local HIV spread among men who have sex with men
   (e). None of the above