

**Unlinked anonymous screening for  
HIV surveillance in Hong Kong  
1997-2004**

**Scientific Committee on AIDS**

**co-sponsored by the Hong Kong Advisory Council on AIDS  
and  
the Centre for Health Protection,  
Department of Health**

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## **About the Scientific Committee on AIDS (SCA)**

The Scientific Committee on AIDS (SCA) was renamed from the former Scientific Working Group on AIDS. Its terms of reference and membership are as follows:

### **Terms of reference**

- (a) to advise on the effective surveillance of HIV/AIDS, and the monitoring of the situation as it relates to Hong Kong;
- (b) to advise on the development of effective clinical and public health programmes on HIV/AIDS in Hong Kong;
- (c) to establish rationale and develop principles on the effective prevention, treatment and control of HIV infection in Hong Kong;
- (d) to promote the development of research agenda on HIV/AIDS and its related areas in Hong Kong; and
- (e) to promote regional and international collaboration of research activities in HIV/AIDS. (Note : new item proposed by SCA members)

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|               | Prof | SETO Wing-hong            |
| Secretaries : | Dr   | WONG Ka-hing              |
|               | Mr   | WONG Man-kong             |

### **Correspondence**

Address : 5/F, Yaumatei Jockey Club Clinic  
145 Battery Street, Yaumatei, Kowloon, Hong Kong  
Tel : (852) 2304 6100  
Fax : (852) 2337 0897  
E-mail : [aca@dh.gov.hk](mailto:aca@dh.gov.hk)

*\*pdf version of this Report can be downloaded from [www.aids.gov.hk](http://www.aids.gov.hk)*

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## **Executive Summary**

Based on the recommendations of the World Health Organisation and the Scientific Committee on AIDS, unlinked anonymous screening (UAS) has been an integral component of the HIV/AIDS surveillance system in Hong Kong for over a decade. A report of the findings from 1990 to 1996 was published in 1997.

Between 1997 and 2004, UAS was continued in populations with defined HIV behavioural risk (drug users at methadone clinics, treatment centres and street), no apparent HIV risk (pregnant women, elderly) and undefined HIV risk (prisoners, tuberculosis patients). A total of 63588 blood, urine and saliva samples were tested under the programme. UAS for two populations, viz pregnant women and methadone clinic users had been replaced by universal voluntary testing in late 2001 and 2004 respectively. The yearly UAS prevalence found in the various groups ranged between 0% to 0.87%, echoing findings from other surveillance systems of a low HIV prevalence locally.

The UAS in Hong Kong is characterised by its simplicity, flexibility, acceptability and stability in methodology; quality and sensitivity of the laboratory testing; and timeliness in data reporting. However, generalisability of the data to the entire populations of interest is unsure. UAS serves as a first step of surveillance to community groups for which voluntary testing is constrained. Gaining access to the hard-to-reach populations remains a challenge for HIV surveillance in Hong Kong.

## **Introduction**

1. Public Health surveillance is described as *“the ongoing systematic collection, analysis, and interpretation of health data, essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know”*. [1] Data from HIV/AIDS surveillance provides information for strategic planning of services and intervention activities for the prevention, care and control of this disease.

2. The HIV/AIDS surveillance system in Hong Kong consists of four components: HIV/AIDS reporting, seroprevalence studies, sexually transmitted diseases workload statistics and behavioural monitoring studies. Introduction of HIV antibody test in 1985 led to the launch of seroprevalence surveillance in Hong Kong. The seroprevalence studies can be further divided into unlinked anonymous screening (UAS), voluntary testing and screening of blood donors. UAS was introduced in November 1990 under the auspices of the then Scientific Working Group on AIDS, after endorsement by the Advisory Council on AIDS. In 1997, the Scientific Committee on AIDS published a report on the implementation of UAS for HIV surveillance in Hong Kong from 1990 to 1996. This Report, as a continuation of the previous effort, presents the findings of UAS from 1997 to 2004, and also serves to evaluate the programme.

## **Organisation framework**

3. In 1989, the Global Programme on AIDS of World Health Organization (WHO) established a guideline proposing UAS for public health surveillance of HIV infection.

The Scientific Working Group (latter renamed as Scientific Committee on AIDS of the Advisory Council on AIDS) published a local guideline on UAS in 1993, basing on the principles proposed by WHO. UAS was defined as “*the testing of specimens for markers of infection after elimination (unlinking) of all personal identifying information from each specimen.*” [2] 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.

4. Special Preventive Programme<sup>1</sup> of the Department of Health is the agent responsible for coordinating the UAS programme. Since its introduction, populations that have been covered by UAS in Hong Kong can be divided into three categories: (a) those with defined HIV behavioural risk, (b) those with no apparent or additional HIV behavioural risk and (c) those with undefined HIV behavioural risk. The first category comprises drug users attending government methadone clinics, drug users admitted to treatment and rehabilitation centres, and street drug users. The second category consists of pregnant women and senior citizens attending elderly health centres. The third category includes newly admitted correctional institute inmates and patients with tuberculosis.

### **Laboratory testing**

5. Blood, urine or saliva samples were collected in different settings, mainly public institutions, for another clinical indication. An aliquot of the specimen was sent to the

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<sup>1</sup> With the establishment of Centre for Health Protection under the Department of Health in June 2004, Special Preventive Programme came under its Public Health Services Branch while Government Virus Unit became part of the Public Health Laboratory Services Branch.

Department's Virus Unit<sup>1</sup> for HIV testing under UAS protocol. Enzyme linked immunosorbent assay (ELISA) and particle agglutination test were employed for HIV antibody screening. Western blotting (WB) was used for confirmation of positive result from screening, following WHO recommendations for selection and use of HIV antibody tests. The sequences of testing for different specimens are as follows: (a) blood - ELISA, followed by another ELISA if the first one is positive, and then WB; (b) urine - IgG Antibody Capture Particle Agglutination Test (GACPAT), followed by IgG Antibody Capture ELISA (GACELISA), and then WB; (c) saliva - GACELISA followed by WB. Since 2003, GACPAT positive samples were directly confirmed by WB because of the cease of GACELISA supply. Normally, the specimens were processed and tested as soon as possible after collection though blood/urine could be stored for a short while if necessary. The HIV antibody testing by the above-mentioned methods using urine and saliva specimens had been validated in 1991 and 1992. [3]

### **Schema of sampling for the populations screened**

6. From 1997 to 2004, specimens for UAS had been collected in the following groups: (a) drug users attending methadone clinics, (b) drug users attending inpatient drug treatment centres, (c) street drug users, (d) pregnant women, (e) elderly, (f) correctional institutes' inmates and (g) tuberculosis patients. A summary of the subjects and methods is at Table 1. A description of the characteristics of the various groups, including their sampling methodology, is given below.

#### **Drug users attending methadone clinics**

7. There are currently 20 (21 previously, up to year 2002) methadone clinics in Hong Kong. Upon and after admission to the methadone treatment programme (MTP), all drug users will undergo drug/HIV risk assessment by the attending physician. As part of the programme monitoring, urine is collected from each drug user and sent to the Government Laboratory for opiate testing. The urine samples have been aliquoted for HIV testing by UAS since 1992. The screening programme was conducted in rotation for both day and night methadone clinics; on average 3-4 clinics participated at each time and for a duration of about 3 months. It takes about 2 years to complete one round covering all clinics per a roster. After the collection of samples from all clinics, a second round would be started. The UAS programme in methadone clinics was stopped and replaced by universal HIV antibody urine testing in 2004.

#### Drug users attending inpatient drug treatment centre

8. The UAS programme for inpatient drug treatment centre was launched in 1998. Most of the data were collected from Shek Kwu Chau Treatment and Rehabilitation Centre, the Society for the Aid and Rehabilitation of Drug Abusers (SARDA). Normally, urine is collected from every drug user for opiate testing on Day 14 of admission. A portion of the urine sample collected is sent for HIV antibody testing. This is a year-round exercise and 20-30 samples are randomly selected and sent for screening every week. This programme was paused in March 2004 because of logistics problem but is resumed in April 2005. One round of UAS targeting other institutionalised drug users was also conducted in Hei Ling Chau Correctional Institution in 1998.

#### Drug users on street



9. Saliva specimen is collected from drug users in the street by trained peer counsellors who are ex-drug users, with the support of Pui Hong Self-help Association. This was performed as a yearly one-day exercise from 1993 till 1997 as part of the outreaching prevention and education programme. A special exercise was conducted in 2002 in view of the increasing number of HIV-positive injecting drug users captured by the reporting system. Drug users are identified in places of aggregation, usually in the vicinity of methadone clinics, and they are asked to surrender a sample of saliva for HIV surveillance. All personal identifying data is de-linked before transporting the samples to the laboratory. This is a modified system with clients' consent as they are aware of their saliva samples being taken for HIV tests.

#### Pregnant women having deliveries in hospitals

10. In Hong Kong, routine screening for glucose-6-phosphate-dehydrogenase (G6PD) deficiency and congenital hypothyroidism is performed using neonatal cord blood samples collected at delivery. The remaining samples are used for HIV testing; the results of which reflected those of the mothers. This exercise has been conducted for one month each year since 1991, covering both public and private hospitals. The programme was stopped when universal antenatal screening was introduced in 2001.

#### Senior citizens attending Elderly Health Centres

11. To better understand the situation of HIV infection in elderly, a round of UAS was conducted in June and July 2004. Blood samples of clients aged over 65 years

were collected for annual health check-up or for clinical purposes in 18 Elderly Health Centres under the Department of Health. A portion of the blood samples was delinked and sent for HIV testing during the defined period.

#### Correctional institute inmates

12. UAS has been performed in prisoners since 1992. As from 1995, only newly admitted prisoners and inmates were included in the yearly UAS programme except in 1999 during which a special exercise was additionally conducted for long-stay prisoners to assess their sero-prevalence. A portion of urine samples collected for opiate screening is sent for HIV antibody testing for 2-3 months each year.

#### Tuberculosis patients

13. Tuberculosis patients attending the TB & Chest Clinics of the Department of Health are asked to undergo urinalysis (for glucose and protein) before initiating the supervised outpatient treatment. A portion of the urine collected is sent for UAS. This exercise lasts for 3-4 months each year since 1990.

#### **Results of UAS 1997-2004**

14. The first round of UAS was performed in 1990 on neonatal cord blood. From 1997 to 2004, a total of 65288 tests were performed under various UAS programmes, including 15872 blood samples, 48848 urine samples and 568 saliva samples. One hundred and forty-eight samples were found to be HIV positive, which were spread across years and target groups. The annual HIV prevalence found ranged from 0% to

0.87% in different populations, which was similar to the UAS findings of 1990 to 1996. The results are summarised in Table 2 and 3, and depicted in greater details below.

#### Individuals with defined HIV behavioural risk

15. The major risk behaviours underlying HIV spread are those related to sexual contact and injection drug use. To date, UAS has only been conducted in people practising drug-taking behaviours. A voluntary HIV testing programme for clients attending Social Hygiene Clinics (sexually transmitted disease clinic) cover another population at higher sexual risk of contracting HIV.

16. Under the MTP, some 2000 to 4000 urine samples from drug users were tested each year from 1997 to 2003. The average methadone clinic attendance is about 7000 per day. In these seven years, 38 positive samples were identified. The annual HIV prevalence was about 0.2% (range, 0-0.27%).

17. The UAS programme in inpatient drug treatment centre was mainly conducted in Shek Kwu Chau Treatment and Rehabilitation Centre. The number of samples collected dropped from 2286 in 1998 to 361 in 2003. Of the 7402 samples collected in the last 7 years since 1998, 16 samples were found to be positive. The yearly prevalence is about 0.2% (range, 0-0.60%). Two exercises of UAS on street drug users were performed in 1997 and 2002. Five hundred and sixty eight saliva samples were collected in total and none of them was positive.

18. Overall, the annual HIV prevalence in drug users in the three sampled settings

under UAS has remained low at  $\leq 0.6\%$ . There was no definite trend of rise, despite the increase in the number of reported infections relating to drug use in recent years. [4] The figures obtained in methadone clinic users were more stable. The fluctuations in the figures from Shek Kwu Chau Treatment & Rehabilitation Centre might be related to the smaller number of samples tested. The very small number of street drug users makes it difficult for conclusion to be drawn, though the zero positivity could be used to confirm the relatively low HIV prevalence in the drug-taking communities. It must be cautioned that “drug users” rather than “injection drug users” were sampled under the UAS system. The actual HIV prevalence in injection drug users could be higher as they are at higher risk of contracting the infection.

#### Individuals at no additional HIV risk

19. Neonatal screening was used to determine HIV prevalence in pregnant women, which in turn served as a surrogate for the general population. UAS using neonatal cord blood was stopped when universal antenatal screening was introduced in September 2001. Between 1997 and 2004, more than 3000 samples were collected from a selected month every year. From 1998 to 2000, 1 positive sample was identified each year. The HIV prevalence in women of reproductive age was therefore found to be stable at around 0.03%. As essentially all births in Hong Kong are delivered in public or private hospitals, the coverage of this programme should be representative of all women who had given birth.

20. Two criticisms were often raised in the evaluation of UAS using neonatal cord blood. Firstly, the mechanism missed out women who had aborted. Notwithstanding its heterogeneity, abortion could be associated with sexual risk behaviours. Its

exclusion might have under-estimated the prevalence in women of child-bearing age. Secondly, a low prevalence in women may not imply a similarly low level in male adults; hence the applicability of this surrogate for the general population remains a question. Arguably it takes time for a male-predominant epidemic to spread to women in the general population.

21. In the special round of UAS in Elderly Health Centres in 2004, 2907 blood samples were collected with only 1 positive sample. The prevalence was 0.03%. The prevalence was not exceptionally higher than but similar to delivering women.

#### Individuals with undefined HIV behavioural risk

22. Though imprisonment per se has no direct relationship with HIV, prisoners formed a unique population in HIV surveillance and control. Behavioural monitoring studies revealed that about 35% of the prisoners in Hong Kong were drug users. Surveillance findings of the prison inmates might thus shed light on the HIV situation of a heterogeneous group of people who have varying risk behaviours and not necessarily been in contact with the health and social services network. About 1500 samples had been collected from newly admitted prisoners every year. Of 12625 samples obtained from 1997 to 2004, 44 HIV positive samples were found. The annual prevalence rate ranged between 0.2% and 0.6%, which was similar but slightly higher than that in drug users of methadone clinics and other treatment services. The significance of the pattern is not known.

23. HIV patients are at risk of developing tuberculosis. The testing of TB patients offers a measurement of the trend of HIV related complications. Since 1990, with the

exception of 1994, about 1000 urine samples from patients attending government TB & Chest Clinics were collected annually for UAS. Of the 8052 samples collected between 1997 and 2004, 46 HIV infections were identified. The annual HIV prevalence ranged from 0.2% to 0.9%. No specific temporal pattern can be discerned from the results. The highest HIV prevalence found in TB patients across all UAS populations supports universal HIV screening of TB patients, in line with WHO recommendations. [5]

### **Evaluation of UAS in Hong Kong**

24. UAS was first proposed in USA [6] when data based on volunteer studies were found to be inadequate for monitoring the epidemic because of selection and participation bias. World Health Organization's guideline on second generation surveillance for HIV recognised its potential contributions and suggested to position it in a much broader surveillance framework. [7] Other than USA, UAS has been implemented in many countries like England and Wales. More and more developing countries employed this method to monitor the HIV situation in selected high risk populations and in pregnant women. The application of this methodology was even extended to the surveillance of Hepatitis C infection in UK. [8]

25. The US Centers for Disease Control and Prevention suggested that the evaluation of public health surveillance systems should involve the assessment of the following system attributes: simplicity, flexibility, data quality, sensitivity, timeliness, stability, representativeness and acceptability. [9] This same framework is used for evaluating the UAS of HIV infection programme undertaken by the Department of Health in Hong Kong. A summary of the strengths and weaknesses of the local UAS

is shown at Table 4.

#### Simplicity & flexibility

26. In Hong Kong, as most of the UAS samples for HIV antibody testing were collected for other purposes, many systems for specimen collection was established before the implementation of the UAS programme. Training requirement is thus minimal and can be focussed on the procedure to de-link personal particulars and the transfer of specimen to laboratory, instead of the technique of sample collection. With the excellent correlation of results of blood samples and the alternative urine and saliva samples, non-medical personnel can also carry out specimen collection and the conduct of UAS is facilitated.

27. The simplicity of the programme allows a greater flexibility. The system is simple and well established. The programme can be re-launched easily in case of an upsurge or unexpected deviation of patterns observed in other sources. For example, a special exercise in the long stay prisoners was performed in 1999 when a higher HIV prevalence of new prison inmates was observed. The use of urine and saliva sample can also allow sample collection to be performed in settings other than clinics. Such practice carries the potential of expanding the collection network for enhancing surveillance.

28. Nevertheless, UAS often can only be performed in settings with routine clinical sample collection in the studied population. There are not many settings available for conducting screening in an unbiased population. In particular, for those hard-to-reach populations without established targeted services, carrying out UAS is difficult if not

impossible. It must be cautioned that quite a number of communities vulnerable to HIV are “hard to reach” and the introduction of UAS as a surveillance method may not be applicable.

#### Data quality & sensitivity

29. Reliable and reproducible HIV testing over time is an important attribute of HIV serosurveillance. The Virus Unit of Public Health Laboratory Centre serves as the central HIV testing laboratory in Hong Kong. It is responsible for the vast majority of HIV testing in the public service as well as confirmation of screening positive samples from both private and public sectors. All the UAS testing had been done by the Virus Unit. It plays a key role in upkeeping good quality of HIV surveillance in Hong Kong. Over the years, the laboratory has taken rigorous measures to ensure the quality of the HIV test results, including joining international quality assurance programme and organising parallel local programmes. The laboratory employed testing methods in line with the Joint United Nations Programme on HIV/AIDS (UNAIDS)/WHO recommendation. Currently, most HIV antibody tests have an over 98% sensitivity and specificity. [10]

30. The results from UAS, on one hand, supplement other surveillance data and provide a more complete picture of the HIV epidemic. On the other hand the results must be interpreted in context of figures derived from other surveillance methods. UAS often leads to the determination of prevalence of a specific population group. Without critical assessment, the significance of the prevalence figures cannot be easily established. Moreover, the design of UAS limits the availability of detailed information about infected cases. This gap is somehow supplemented by data from



the case-based reporting system.

31. Currently, UAS is conducted in yearly cycles. Superimposed on the chronic nature of HIV infection and the doubtful generalisability in some settings, the system may not be sensitive enough to detect early changes in seroprevalence. Instead, the results are useful when interpreted in conjunction with other surveillance information in an integrative approach.

#### Timeliness & stability

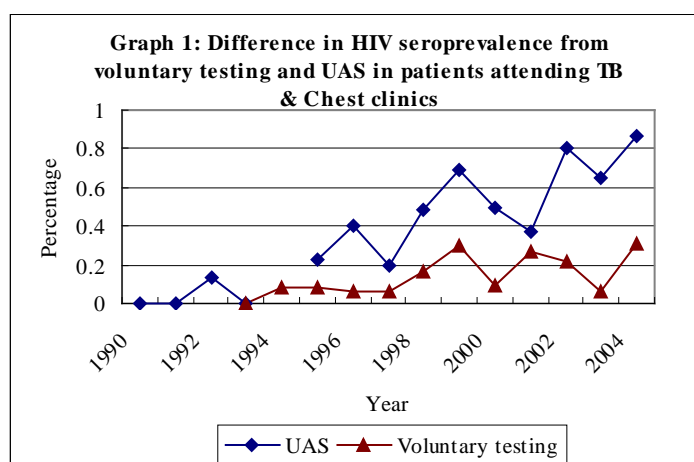
32. Generally speaking, UAS for individual population groups is undertaken on a yearly basis. The results, analysed and interpreted by year, were published in the annual HIV surveillance report in conjunction with the data from other sources. The report is distributed to government services, people and organisations working on HIV/AIDS, health professionals and other stakeholders. General public can also access the surveillance reports through internet (Virtual AIDS Office: <http://www.aids.gov.hk>). These arrangements were made to ensure a timely dissemination of information to those who need to know.

33. The methodology of UAS has not changed significantly since its implementation in 1990. This applies for the specimen used, indication of collection and laboratory testing. All the programmes in different settings have been conducted annually except for selected groups. The cease of supply of GACELISA was the cause of a change in laboratory testing method for urine sample in 2003. Overall, the UAS methodology has been consistent in the past 7 years, allowing comparisons to be made as appropriate.

## Representativeness

34. Testing behaviour in voluntary HIV testing programmes may vary with racial, ethnic, socioeconomic and behavioural risk factors. The use of voluntary HIV test results for surveillance purpose is therefore subject to a person's decision to seek or not seek HIV screening. The major strength of UAS is the relative lack of participation bias. This method can improve the representiveness of the data to reflect the situation in specific population groups. The results are normally not affected by the response rate.

35. HIV prevalences in patients with tuberculosis demonstrate the importance of UAS. Data from voluntary HIV antibody testing in TB & Chest clinics, which had over 90% response rate, showed that the



seroprevalence was about 0.2% across the years. However, UAS from the same setting revealed that the seroprevalence had stayed at 0.4% - 0.9% in the past 5 years. (Graph 1) The discrepancy might have resulted from the speculation that TB patients with a higher HIV prevalence were more likely to not undergo voluntary HIV testing.

36. However, whether the UAS results can be generalised to the entire population is debatable, and may vary from one setting to another. This is particularly important in communities with defined HIV behavioural risk. The representiveness of some

samples, for example, street drug users, is questionable because of the small size and the recruitment method. The samples from clinics or in-patient drug treatment centres are also subject to biases. If drug users not attending treatment services were more liable to have engaged in high risk behaviours, the prevalence from UAS might have underestimated the HIV situation of the entire drug user population. On the other hand, drug users attending in-patient drug treatment centres are more likely to have a longer history of drug taking. Their cumulative risk of contracting HIV may therefore be higher. With this, UAS may, to a certain extent, overestimate the HIV prevalence in drug users. Moreover, because of the non-random selection of settings, results cannot be extrapolated to those without the same characteristics.

37. In general, certain existing sampling frames for at-risk populations shall at least be representative of a significant proportion of the sub-populations because of an extensive network of sentinel sites reaching many individuals of the population. For drug users, the network has included 20 methadone clinics all over Hong Kong, which provide service to a big number of clients at an extremely low cost. The low threshold approach has attracted a significant portion of drug users.

38. For populations selected not for the underlying behavioural risk, the situation is similar. TB & Chest service is another example of an extensive network for accessing individuals for a common health condition. It has been estimated that the free service takes care of over two-thirds of the tuberculosis patients in Hong Kong. For the general healthy population, neonatal screening provides a useful sampling frame. There is the added advantage that nearly all pregnant women in Hong Kong give birth in public or private hospitals. Data should be representative of the childbearing population, which in turn may serve as a surrogate for the general population, albeit

with limitations.

### Acceptability

39. The collection of urine or saliva as specimen usually does not involve invasive procedure. UAS generally does not require additional sample collection. It is therefore believed that the programmes are acceptable both to staff and clients. Acceptability has, however, not been systematically evaluated over the years.

40. The ethics of UAS is a frequently raised issue of debate. The Office for Protection from Research Risks in USA has determined that UAS is ethical if (a) no interaction takes place with the screening participant solely for the purpose of the screening and (b) information that may inadvertently identify a person is not retained. [11] However, controversy has been provoked in some European countries like UK. The Netherlands and Denmark refused to adopt formal unlinked anonymous testing programmes for HIV. They were concerned that no consent had been obtained for the specimen testing, an act that had violated patient's autonomy. Some also thought that it is unethical in failing to pass the information of a HIV positive result to the patient and has let him/her live without appropriate intervention.

41. United Kingdom and Canada have adopted a system of prior notification and acknowledged the right to spontaneous refusal. The Council for International Organizations of Medical Sciences issued guidelines in 2002, suggesting that individuals retain the right to refuse to have their stored records and specimens used for such studies. [12] However, there are no international ethical guidelines requiring consent for UAS. World Health Organization suggested that communities should be

“broadly notified” that blood collected for one purpose may be anonymously tested for HIV and the wishes of individuals to opting out such surveillance should be respected where possible. [6] In Hong Kong, UAS has been implemented under the recommendation by the Advisory Council on AIDS and its SCA, with legal advice sought from the government.

42. There is no information on the awareness and acceptance of UAS in Hong Kong. In UK, a study revealed that only one third of general population was aware of UAS for HIV and a quarter of the public disagreed with this screening. [13] However, the ultimate proportion of those objecting to subject their specimens for screening was low in UK. [14] It was suggested that public acceptance to UAS could be raised after sufficient information was given.

43. On the other hand, workers in HIV/AIDS services generally support the programme. Most of the HIV/AIDS health planners in UK found information from UAS useful. Over half of them agreed that it would make some difference if the screening was not available. [15]

### **The Way forward**

44. UAS has been an effective tool for HIV surveillance in Hong Kong. The principles in use over the years are still applicable nowadays. UAS not only helps to monitor the HIV situation, especially in those at-risk populations, but also narrows the gap of information. Participation bias is minimised by this special methodology. Many of the systems under UAS programme in Hong Kong have been established with efforts over the years and they are invaluable access to the surveillance of the

respective populations. The advantage and usefulness of the data obtained from UAS is evident locally, as exemplified by the difference in HIV prevalence from voluntary and UAS screening in TB patients. As such, the UAS programme with its present coverage shall be continued as part of the HIV surveillance systems in Hong Kong. Picking up changes in HIV prevalence may provide early warning signal for necessary actions.

45. UAS may serve as the first step of surveillance to a defined population. Applying standard method of UAS in settings with established infrastructure is efficient, as demonstrated by the special round conducted for elderly attending Elderly Health Centres in 2004. This exercise provides the data of baseline prevalence in the population for epidemiological analysis, programme planning and resource allocation. It is true that voluntary HIV testing makes possible the clarification of HIV status at individual level for care and also more detailed collection of information from an epidemiologic point of view. Nevertheless, HIV testing for personal diagnosis may not be acceptable to all patients, especially among the vulnerable communities because of fear of potential stigmatization and other adverse consequences of HIV diagnosis. Hence, UAS may be the only entry point for implementing testing in some populations. Locally, UAS had provided essential public health information that cannot be obtained in other way.

46. The expansion of UAS to other populations is limited by the design of UAS itself. Not many settings offer routine specimen collection. This methodology may not be readily feasible in those hard-to-reach populations. Thus far, the local surveillance has not been able to have a wide coverage of some at-risk populations, such as commercial sex workers and men who have sex with men in Hong Kong. Nonetheless,

the success of universal urine HIV antibody voluntary testing in methadone clinics with 90% coverage rate suggested the high acceptance to HIV testing in Hong Kong, even among the at-risk groups. It thus remains challenging to further improve the usefulness of UAS programmes, especially in expanding its surveillance among the hard-to-reach populations through exploration of access points.

47. There have been many scientific and programmatic developments in HIV/AIDS since the implementation of UAS in Hong Kong more than one decade ago. Notably, advances in HIV treatment have turned the infection into a chronic manageable condition, instead of an invariably and rapidly fatal disease after progression to AIDS. In parallel, more HIV testing or even massive screening has been advocated [16] as an overall effective strategy. In line with these developments and recommendations, the local UAS systems of antenatal women and methadone users were turned into universal testing programmes in 2001 and 2004 respectively. These examples provide support that UAS can set a solid foundation to facilitate transformation to universal testing programme in targeted populations as appropriate. International and local developments in surveillance and other AIDS programme shall be kept under review for effectively responding to the epidemic.

### **Acknowledgements**

The unfailing support of all participating organizations/services is much appreciated; their participation has contributed to a better understanding of the HIV/AIDS situation in Hong Kong.

**Table 1: An overview of the subjects and methods of UAS (1997-2004)**

| <b>Population Group</b> | <b>Setting</b>                                | <b>Consent*</b> | <b>Specimen</b>     | <b>Clinical indication for specimen collection</b> | <b>Year of conduct</b> | <b>Frequency of UAS</b> | <b>Sample size (per year)</b> |
|-------------------------|---|-----------------|---------------------|--|------------------------|-------------------------|-------------------------------|
| Drug users              | Methadone Clinics                             | No              | Urine               | Opiate screening                                   | 1997-2003              | 12 months /year         | 2000-4000                     |
| Drug users              | Inpatient drug treatment centres              | No              | Urine               | Opiate screening                                   | 1998-                  | weekly                  | 300-2000                      |
| Drug users              | Street addicts approached by outreach workers | Yes             | Saliva              | Voluntary collection                               | 1997, 2002             | 1 day /year             | 100-500                       |
| Pregnant women          | Neonatal screening upon delivery              | No              | Neonatal cord blood | Screening for G6PD deficiency and hypothyroidism   | 1997-2000              | 1 month /year           | ~3000                         |
| Elderly                 | Elderly Health Centres                        | No              | Blood               | Health assessment or other clinic purposes         | 2004                   | 1 month                 | ~3000                         |
| Prisoner                | Newly admitted to correctional institutions   | No              | Urine               | Opiate screening                                   | 1997-                  | 2-9 months /year        | 1500-2000                     |
| TB patients             | TB & Chest Clinics                            | No              | Urine               | Screening for renal disease                        | 1997-                  | 2-3 months/year         | ~ 1000                        |

\*Consent refers to that specifically for the UAS to be undertaken. Consent for the original clinical indication was obtained in all cases



**Table 2: HIV UAS – pooled results of the number of samples tested, with positives in bracket (1997-2004)**

| <b>Target group</b>                                   | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>2003</b> | <b>2004</b> |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Drug users attending methadone clinic                 | 1816(0)     | 2838(6)     | 2674(3)     | 3644(10)    | 3811(4)     | 4037(10)    | 1949 (5)    | -           |
| Drug users attending inpatient drug treatment centres | -           | 2286(3)     | 1675(3)     | 1165(7)     | 1137(2)     | 761(0)      | 361(1)      | *17 (0)     |
| Street drug users                                     | 473(0)      | -           | -           | -           | -           | 95(0)       | -           | -           |
| Pregnant women  | 3331(0)     | 3031(1)     | 3125(1)     | 3478(1)     | -           | -           | -           | -           |
| Elderly   | -           | -           | -           | -           | -           | -           | -           | 2907(1)     |
| Newly admitted prisoners                              | 1474(3)     | 1571(4)     | 1580(10)    | 1516(4)     | 1502(5)     | 1500(6)     | 1502(5)     | 1980 (7)    |
| TB patients   | 1003(2)     | 833(4)      | 1166(8)     | 1018(5)     | 1071(4)     | 1000 (8)    | 920 (6)     | 1041 (9)    |

\* suspended since March 2004

**Table 3: HIV prevalence, with its 95% confidence intervals, in different groups across years (1997-2004)**

| <b>Target group</b>                                   | <b>1997</b>            | <b>1998</b>              | <b>1999</b>              | <b>2000</b>              | <b>2001</b>            | <b>2002</b>            | <b>2003</b>            | <b>2004</b>            |
|---|------------------------|--------------------------|--------------------------|--------------------------|------------------------|------------------------|------------------------|------------------------|
| Drug users attending methadone clinic                 | 0.00%<br>(-- - --)     | 0.21%<br>(0.078-0.460)   | 0.11%<br>(0.023-0.328)   | 0.27%<br>(0.132-0.505)   | 0.11%<br>(0.029-0.269) | 0.25%<br>(0.119-0.456) | 0.26%<br>(0.083-0.599) | -                      |
| Drug users attending inpatient drug treatment centres | -                      | 0.13%<br>(0.027-0.384)   | 0.18%<br>(0.037-0.523)   | 0.60%<br>(0.242-1.238)   | 0.18%<br>(0.021-0.635) | 0.00%<br>(-- - --)     | 0.28%<br>(0.007-1.543) | 0.00%<br>(-- - --)     |
| Street drug users                                     | 0.00%<br>(-- - --)     | -                        | -                        | -                        | -                      | 0.00%<br>(-- - --)     | -                      | -                      |
| Pregnant women  | 0.00%<br>(-- - --)     | 0.03%<br>(0.0008-0.1838) | 0.03%<br>(0.0008-0.1783) | 0.03%<br>(0.0007-0.1602) | -                      | -                      | -                      | -                      |
| Elderly   | -                      | -                        | -                        | -                        | -                      | -                      | -                      | 0.03%<br>(0.001-0.192) |
| Newly admitted prisoners                              | 0.20%<br>(0.042-0.595) | 0.26%<br>(0.069-0.652)   | 0.63%<br>(0.303-1.164)   | 0.26%<br>(0.072-0.676)   | 0.33%<br>(0.108-0.777) | 0.40%<br>(0.147-0.871) | 0.33%<br>(0.108-0.777) | 0.35%<br>(0.142-0.728) |
| TB patients   | 0.20%<br>(0.024-0.720) | 0.48%<br>(0.130-1.229)   | 0.69%<br>(0.296-1.352)   | 0.49%<br>(0.159-1.146)   | 0.37%<br>(0.102-0.956) | 0.80%<br>(0.345-1.576) | 0.65%<br>(0.239-1.420) | 0.87%<br>(0.395-1.641) |

**Table 4: Strengths and limitations of unlinked anonymous screening in Hong Kong**

| <b>Issue</b>       | <b>Strength</b>   | <b>Limitation</b>  |
|--------------------|---|--|
| Simplicity         | <ul style="list-style-type: none"> <li>Established methods of sample collection</li> <li>Only simple training on the logistics is needed</li> <li>Can be launched easily</li> </ul> | -  |
| Flexibility        | <ul style="list-style-type: none"> <li>A variety of specimens can be used for testing</li> <li>Can be performed in non-clinic settings</li> </ul>                                   | <ul style="list-style-type: none"> <li>Not many settings are suitable for conducting UAS</li> </ul>  |
| Data quality       | <ul style="list-style-type: none"> <li>Quality assurance programme has been introduced by the laboratory</li> </ul>   | <ul style="list-style-type: none"> <li>Only prevalence data can be obtained</li> <li>Small sample size making interpretation difficult, especially in low prevalence settings</li> </ul> |
| Sensitivity        | <ul style="list-style-type: none"> <li>Sensitivity of the methodological part of the UAS has been established</li> </ul>  | <ul style="list-style-type: none"> <li>Insensitive on its own for picking up early changes</li> </ul>  |
| Timeliness         | <ul style="list-style-type: none"> <li>The results were reported yearly</li> <li>Results have been disseminated regularly</li> </ul>  | -  |
| Stability          | <ul style="list-style-type: none"> <li>The methodology had not been changed in the past 7 years</li> </ul>  | -  |
| Representativeness | <ul style="list-style-type: none"> <li>Minimal participation bias</li> <li>Results representative of the sampled population</li> </ul>  | <ul style="list-style-type: none"> <li>Doubtful generalisability</li> </ul>  |
| Acceptability      | <ul style="list-style-type: none"> <li>High acceptance to sample collection method</li> </ul>   | <ul style="list-style-type: none"> <li>Acceptance to the programme is unknown</li> </ul>   |

## References

1. Last JM. A Dictionary of epidemiology (4<sup>th</sup> Edition). New York: Oxford University Press; 2001. pp. 174-5
2. Scientific Working Group on AIDS. Recommended Guidelines for Undertaking UAS for Public Health Surveillance of HIV Infection in Hong Kong. Hong Kong: Advisory Council on AIDS; 1993.
3. Scientific Committee of the Advisory Council on AIDS. UAS for HIV Surveillance in Hong Kong 1990-1996. Hong Kong: Advisory Council on AIDS; 1997.
4. Special Preventive Programme. HIV Surveillance Report 2002 Update. Hong Kong: Department of Health; 2003.
5. WHO Regional Office for the Western Pacific. TUBERCULOSIS AND HIV: A framework to address TB/HIV co-infection in the Western Pacific Region. 2004.
6. WHO/UNAIDS Surveillance Working Group. Ethical issues to be considered in second generation surveillance. Available at [http://www.who.int/hiv/pub/epidemiology/sgs\\_ethical/en/](http://www.who.int/hiv/pub/epidemiology/sgs_ethical/en/) (Accessed on 29 October 2004)
7. UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance. Guidelines for second generation HIV surveillance: The next decade. UNAIDS/WHO; 2000.
8. Unlinked Anonymous Surveys Steering Group. Prevalence of HIV and hepatitis infections in the United Kingdom 2001. London: Department of Health; 2002.
9. Guidelines Working Group. Updated Guidelines for Evaluating Public Health Surveillance Systems: Recommendations from the Guidelines Working Group. MMWR 2001;50(RR13):1-35.
10. UNAIDS/WHO Working Group on Global HIV/AIDS/STI Surveillance. Guidelines for using HIV testing technologies in Surveillance: Selection, Evaluation, and Implementation. UNAIDS/WHO; 2001.
11. Centers for Disease Control and Prevention. National HIV Prevalence Surveys, 1997 Summary. Atlanta, GA: Centers for Disease Control and Prevention; 1998.
12. CIOMS. *International Ethical Guidelines for Biomedical Research Involving*

*Human Subjects. Geneva: Council for International Organizations of Medical Sciences; 2002.*

13. Kessel A, Watts, C, Weiss HA. Bad blood? Survey of public's views on unlinked anonymous testing of blood for HIV and other diseases. *BMJ* 2000;320:90-91.
14. Nicoll A, Gill N, Goldberg D, Peckham C. The ethics of unlinked anonymous testing: Surveys provide essential information. *BMJ* 2000;320:1275.
15. Kessel A, Watts CJ. Evaluation of the unlinked anonymous prevalence monitoring programme for HIV in England and Wales: science, ethics and health policy. *Med Sci Monit* 2001;7:1052-1063.
16. Bozzette SA. Routine screening for HIV infection--timely and cost-effective. *N Engl J Med.* 2005;352:620-621.