

Report of China CDC US CDC



National Center for AIDS/STD
Prevention and Control,
China Center for Disease
Control and Prevention,
Beijing, China



**CENTERS FOR DISEASE™
CONTROL AND PREVENTION**

Global AIDS Program
National Center for HIV/STD/TB
Prevention and Control
US Centers for Disease Control
and Prevention,
Atlanta, Georgia, USA

Table of Contents

Executive Summary.....	ii
Acknowledgments	vii
Introduction	1
China CDC and China public health organizational structure	4
Assessment Itinerary and Approach.....	5
HIV Sentinel Surveillance System.....	8
HIV-AIDS Case-Reporting System	13
Routine HIV Testing Programs.....	20
Laboratory System	21
Recommendations.....	25
<i>General Recommendations</i>	25
<i>Sentinel Surveillance System</i>	29
<i>HIV/AIDS Case-Reporting</i>	31
<i>Laboratory system</i>	33
<i>U.S. CDC - China CDC collaboration on HIV surveillance</i>	35
Appendix A: Summary of earlier surveillance assessments	39
<i>DFID-China/United Kingdom AIDS Prevention and Care Project</i>	39
<i>United Nations Children's Fund (UNICEF) Assessment</i>	40
<i>World Bank Assessment</i>	41
Appendix B: Province-Specific Findings.....	43
<i>Jiangsu Province</i>	43
<i>Guangdong Province</i>	45
<i>Shandong Province</i>	47

Executive Summary

Background

The growing HIV epidemic in China increasingly threatens the health and economic welfare of its people. According to recent United Nations Joint Programme on AIDS (UNAIDS) estimates, between 800,000 and 1.5 million Chinese are infected with HIV. The prevalence of HIV varies by region and is primarily fueled by injection drug use and commercial sex, with additional reports of large numbers of HIV infections due to commercial plasma donation. To respond to this threat, the government of China is strengthening its HIV surveillance system and is developing HIV education, prevention, and care programs. At the national level, it has tasked the National Center for AIDS/STD Control and Prevention (NCAIDS) within the newly created China Center for Disease Control and Prevention (China CDC) to coordinate the public health response to HIV. The Global AIDS Program of the United States CDC is developing a collaborative program with China CDC to provide technical assistance in the areas of HIV prevention, care, and surveillance and infrastructure development. Previous discussions between China CDC and U.S. CDC staff have identified surveillance as a priority area for possible collaboration to address the growing epidemic.

Between September 16-27, 2002, surveillance and laboratory experts from U.S. CDC joined staff from China CDC in an assessment of the HIV surveillance systems in Guangdong, Jiangsu, and Shandong Provinces. The team focused on HIV sentinel surveillance, HIV and AIDS case reporting, and HIV laboratory systems in these provinces. The goal of the assessment was to identify ways of strengthening these systems and to propose possible areas of technical assistance from the U.S. CDC Global AIDS Program. This report presents the results of the assessment.

Findings and Recommendations

General

To accurately monitor trends in HIV, persons at risk of infection need access to HIV testing; this access is currently very limited in China. Consequently, data from both the HIV sentinel and HIV/AIDS case reporting systems reflect and are biased by the lack of anonymous HIV testing with voluntary referral to counseling and care services, particularly for high-risk and hidden (e.g., men who have sex with men [MSM]) populations. Policy reforms are needed to increase the availability of free or low-cost HIV testing, promote education concerning HIV risks, and increase the availability and accessibility of HIV prevention and treatment services. The introduction of these policy changes and programs will improve the ability to collect unbiased, representative surveillance data, and will allow the government of China to respond to the HIV epidemic with more accurate and timely information on the true magnitude and diversity of the HIV epidemic.

The recent creation of China CDC, which has brought together the different agencies responsible for infectious-disease surveillance, represents an important opportunity for coordination of and leadership in surveillance efforts, leading to a higher quality national HIV/AIDS surveillance system. To achieve this, a substantially increased role for China CDC is needed in surveillance program management, review, and oversight at provincial and lower levels.

Sentinel Surveillance

China's HIV Sentinel Surveillance Program was created in 1995. At the national level, the program is coordinated by NCAIDS and at the provincial level by the respective Provincial Centers for AIDS Prevention and Control located within the provincial CDC offices. Among staff at the national, provincial and local levels, there is a high level of awareness concerning the conduct of sentinel surveillance. Although sites, in principle, implement a standard national HIV sentinel surveillance protocol, in reality, survey methods outlined in the protocol are not being implemented consistently or uniformly. Sentinel surveillance data are collected through mandatory testing of drug users and sex workers in some detention centers and through voluntary testing, primarily at sexually transmitted diseases clinics. Selection criteria vary at both types of sites, and in some STD clinics, patients are required to pay for the HIV test. Furthermore, oversight of the sentinel survey operations by national and provincial level staff is limited due primarily to the lack of human and financial resources at the national level.

To improve the existing sentinel surveillance system, China CDC should conduct, in collaboration with provincial CDC surveillance programs, a comprehensive review of the existing sentinel surveillance protocol and activities. A thorough inventory of population groups to be surveyed, selection of sentinel sites, methods being practiced for data and specimen collection, existing data management systems, and identification of specific challenges being encountered should be included in such a review. A workshop bringing together provincial and local surveillance coordinators should be convened to facilitate this process. Site visits by China CDC staff to provincial surveillance sites should be conducted to discuss specific issues regarding the surveillance activity.

To better assess the extent of HIV in risk groups, sentinel surveillance activities should be expanded. This expansion would include assessment of currently unstudied risk groups such as MSM and migrant workers, extension of surveillance to street-based venues (e.g., bars, massage parlors, cruising zones), particularly for injection drugs users (IDUs) and commercial sex workers (CSWs), and inclusion of behavioral surveillance. Ideally, this effort would collect both behavioral data to better understand the risk activities and networks, and HIV testing data to assess the prevalence of HIV in these populations. Formative research should be conducted to gain a better understanding of existing social networks among hard-to-reach populations in order to gain access to these populations for the conduct of surveillance and the planning of HIV and STD prevention programs.

Many persons are routinely tested for HIV. These include low-risk populations (e.g., premarital couples, pregnant women) and high-risk individuals (IDUs and sex workers in detention). Efforts are needed to systematically collect and report data from this testing, and this data should be summarized in a standard fashion across all provinces and reported to the provincial and central levels. Routine testing of other populations is being conducted for pathogens other than HIV (primarily hepatitis B). Samples from these programs could be tested for HIV in an anonymous-unlinked fashion to economically provide additional information on HIV prevalence in the general population. The first priority would be the inclusion of data among blood donors, since this would provide data from a low-risk population for the entire country at a low cost.

HIV and AIDS Case Reporting

Cases of HIV are reported in three separate surveillance systems: HIV, communicable diseases, and STD. There is a high degree of awareness of the importance of reporting HIV cases, and there is widespread recognition of and support for the three disease reporting systems. However, the separate reporting needs of the three case-reporting systems result in a complex system that leads to duplication of effort. A significant increase in the number of identified HIV/AIDS cases would strongly challenge the management of the current HIV/AIDS case-reporting system and the integrity of the collected data. Jiangsu Province has successfully implemented a case-reporting system that combines the three separate systems into one. This unified approach should be implemented in all provinces. Other recommendations include:

- The case-reporting system would benefit from increased standardization, greater attention to data quality control, and technical improvements for electronic data entry and management.
- Greater attention to protecting patient confidentiality would result in greater patient confidence in and acceptance of HIV testing. Currently, identifying information on HIV-positive persons is visible on paper copies of reports, interview sheets, log books, test request forms, and databases.
- The AIDS case definition should be reviewed. The current definition depends heavily on laboratory confirmation of opportunistic infections; but the necessary laboratory infrastructure to make these diagnoses is not widely available, limiting clinicians' ability to accurately diagnose clinical AIDS and limiting epidemiologists' capacity to uniformly collect information on AIDS cases.
- A standardized, nationally approved form for the collection of clinical, behavioral, and risk factor information is needed. This form would replace the different forms developed in each province and should allow for the classification of groups belonging to more than one risk category (e.g., a sex worker and drug user).

HIV Laboratory System

The HIV public health laboratories are organized in a five-tiered system represented at the national level by the National HIV Reference Laboratory (NARL). Although the national laboratory provides guidance to the lower-level facilities, its ability to influence them is limited since it has no direct authority or funding oversight. Laboratories that were visited were well

equipped and staff well trained. The provincial and CDC HIV laboratories play a central role in HIV surveillance since confirmation of HIV infection by Western blot is conducted at these laboratories. However, the centralized nature of HIV confirmatory testing results in extensive specimen transfer between laboratories and causes repeat testing.

- The overall laboratory infrastructure should be strengthened. This strengthening could be enhanced by general recognition of the role of NARL in coordinating HIV testing and could include strengthening the quality assurance system, standardizing training requirements, and enhancing the linkages among the public health laboratories and between these laboratories and surveillance epidemiologists.
- HIV confirmatory testing should be decentralized. As the number of HIV infections increases, and as the preventive and care services expand, there will be a need for HIV testing closer to the point of service. NARL should evaluate new HIV testing algorithms that allow faster return of confirmed results.

The U.S. CDC - China CDC collaboration

The U.S. CDC - China CDC collaboration is appropriately focusing on surveillance as its first priority. By so doing, it helps China achieve one of its HIV strategic plan objectives, and these activities could have an impact throughout the country. Possible areas and mechanisms of U.S. CDC technical assistance in the area of surveillance are:

Direct technical assistance from Atlanta-based CDC staff *Revision and standardization of protocols and procedures*

- Reviewing and standardizing the national sentinel surveillance protocol with a focus on the selection of population groups and sentinel sites.
- Reviewing and revising the AIDS case definition.
- Assisting in developing standardized HIV case reporting epidemiologic form, including behavioral risk assessments.
- Assisting with development of confidentiality principles and standard practices.
- Strengthening and expanding behavioral surveillance activities. The first step would be to conduct formative research among hard-to-reach populations to improve access for surveillance and prevention efforts.
- Developing a standard approach to collecting surveillance data from populations that are already having blood drawn for HIV testing, such as pre-marital couples and certain occupational groups.
- Developing behavioral surveys in high-risk populations as a first step in developing a comprehensive behavioral surveillance system.

Data Management Assistance

- Conducting evaluation of HIV surveillance data management system with the goal of developing a unified nationwide system.
- Upgrading sentinel surveillance data management software to a Windows-based system.

- Assisting in developing software for case reporting.
- Analyzing and synthesizing data from these various populations to develop an epidemiologic profile for the entire country and for each province to use for advocacy for resources.

Laboratory Technical Assistance

- Providing assistance with evaluation of simple HIV testing algorithms, including enzyme-immuno assay (EIA) and rapid tests.
- Developing standard testing guidelines for surveillance, voluntary counseling and testing (VCT), and prevention of mother-to-child transmission programs.
- Strengthening the External Quality Assurance program (EQA).

Capacity Building

A priority for all GAP country programs is building the capacity of the host country staff. This should be a priority of the GAP-China program and could be implemented using a variety of mechanisms including local contracts, hire of local experts, and technical assistance as stated above.

Development of a Surveillance Training Program

- Developing training materials for the conduct of sentinel surveillance activities.
- Developing a laboratory training program; providing technical assistance in developing training pamphlets, videos, and coursework for HIV testing, CD4 enumeration, and viral load testing.
- Strengthening the capacity to analyze, interpret, present, and disseminate sentinel surveillance data.
- Training in case surveillance methods, including case-finding, reporting, data analysis, and evaluation.

Strengthening the Capacity of China CDC to Coordinate Surveillance Activities

- Strengthening the capacity of China CDC to actively review and monitor the conduct of sentinel surveillance both at the local and provincial levels.
- Developing and implementing an evaluation and quality assurance program to assess surveillance performance and data quality.

Provincial Model HIV Surveillance Program

At the provincial level, U.S. CDC could select one or two provinces for the implementation of a model provincial-level surveillance program. This program would incorporate the above suggestions.

Acknowledgments

The U.S. CDC team wishes to express its heartfelt gratitude and thanks to the staff of the following organizations for their hard work in preparing the assessment and for the warm welcome and hospitality extended during the visit:

The Division of Epidemiology, National Center for AIDS/STD Control and Prevention, Beijing, China

The provincial, prefecture, and municipal/local CDC and health bureaus of Guangdong, Jiangsu, Shandong Provinces

In addition, the team would like to thank Mr. Kurt Tong, Science and Technology Advisor, U.S. Embassy, Beijing, and Mr. Gary West, Dr. R.J. Simonds, Ms. Hiari Imara, and Ms. Renee Maciejewski of U.S. CDC for their assistance and guidance.

Introduction

Background

The growing HIV epidemic in China poses a significant new threat to the health of its people. From a few, isolated case reports of HIV infection in the mid 1980s, United Nations Joint Programme on AIDS (UNAIDS) now estimates that between 800,000 and 1.5 million Chinese are infected with HIV. To date, the epidemic is concentrated in several provinces and predominantly affects marginalized population groups. The largest epidemic is occurring among injection drug users (IDUs), primarily in southwest China. Injecting drug use is becoming more common with many IDUs sharing needles; consequently, the introduction of HIV in these groups has resulted in a rapid spread of HIV. Based on sentinel surveillance conducted in 2000, more than 70% of IDUs in Yunnan and Xinjiang Provinces are HIV-infected. A second epidemic of HIV is occurring among heterosexuals, primarily in the eastern provinces of China. Heterosexual transmission is fueled by an increasing commercial sex trade and by the large number of migrants moving to these provinces in search of labor. A related problem is a dramatic increase in the prevalence of sexually transmitted diseases (STDs), particularly ulcerative STDs that are known to facilitate the transmission of HIV. The number of reported STDs has increased more than 100-fold between 1985 and 2001. Another worrisome factor is that many sex workers are also drug users, thereby providing a bridge between the high-risk IDU group and the general population. A third epidemic has developed through contamination during collection of plasma at commercial centers, inadequate screening of blood prior to transfusions, and the reuse of medical equipment. Finally, HIV has been identified in some urban areas among men who have sex with men (MSM), but this population is stigmatized and is difficult to reach in terms of conducting serologic surveys or prevention outreach.

To monitor the level and spread of HIV, the Chinese Ministry of Health (MOH) in conjunction with provincial government health authorities has developed a surveillance system that includes HIV and AIDS case reporting, HIV sentinel surveillance, and special studies focusing on HIV behaviors. The MOH conducts biannual sentinel surveillance in 158 sites among drug-users in detoxification centers, persons in public STD clinics, long-distance truck drivers, pregnant women attending antenatal clinics, and commercial sex workers in re-education camps. Cases of HIV and AIDS are reported through three separate national surveillance systems: HIV, communicable disease, and STD systems. Cases of HIV and AIDS have been reported from all 31 provinces, but case reporting is acknowledged to be incomplete and unrepresentative. Nevertheless by the end of 2001, a cumulative total of over 1,500 AIDS cases and approximately 30,000 cases of HIV (without AIDS) had been reported.

Previous assessments of the HIV surveillance system in China have raised questions concerning the quality and adequacy of the data to accurately monitor changes in HIV prevalence (see Appendix A for summary of these assessments). For sentinel surveillance, these assessments have questioned the geographical distribution of sites as well as the level of quality

control of the data collection methods. Furthermore, the focus on conducting surveys among institutionalized individuals (e.g., IDUs and sex workers) has raised questions concerning the representativeness of the data. For HIV case reporting, previous surveillance assessments have noted a lack of coordination and overlap between the reporting systems for communicable diseases, STDs, and HIV. Furthermore, the lack of access to HIV testing has resulted in the undercounting of HIV-infected persons. In part to address these issues in 2002, the China MOH created the China Center for Disease Control and Prevention (China CDC). This new agency brought together the entities within the MOH that are responsible for these different case-reporting systems, thereby presenting an opportunity for combining, simplifying, and strengthening HIV as well as other communicable disease reporting. China CDC is making efforts to improve HIV testing capacity, improve laboratory quality assurance, and expand the capacity for surveillance.

China CDC- U.S. CDC Collaboration

As part of the United States government's expanded response to the HIV pandemic, the U.S. CDC's Global AIDS Program (GAP) is working in a number of countries to assist in HIV prevention and care efforts and to enhance surveillance. At the request of the Chinese government, U.S. CDC experts visited China from July 30 - August 10, 2001, to conduct an initial assessment of the HIV epidemic and the government's response, and to identify areas where U.S. CDC could provide technical assistance. The assessment findings were discussed with Minister Zhang, the China Minister of Health, in a follow-up visit later in August 2001. Agreed-upon areas for collaboration included:

1. Voluntary HIV counseling and testing.
2. Behavioral interventions and other prevention modalities.
3. Enhanced surveillance and epidemiology.
4. Training.
5. Blood safety.
6. Care and treatment of infected persons.

A follow-up visit occurred in May 27-31, 2002, to identify specific areas of focus in order to initiate the collaboration. It was agreed that U.S. CDC would:

1. Assess the HIV surveillance system.
2. Assess the HIV testing algorithm.
3. Evaluate current capacity in voluntary counseling and testing.
4. Develop plans for a permanent AIDS training center in China.
5. Conduct a seminar on structural interventions for HIV prevention.

This report summarizes the results of U.S. CDC's assessment of the China government's HIV surveillance and laboratory systems. The objectives of the assessment were to review existing policies and practices, make recommendations, and identify specific areas where U.S. CDC could provide technical assistance in the areas of:

- HIV and AIDS case reporting.

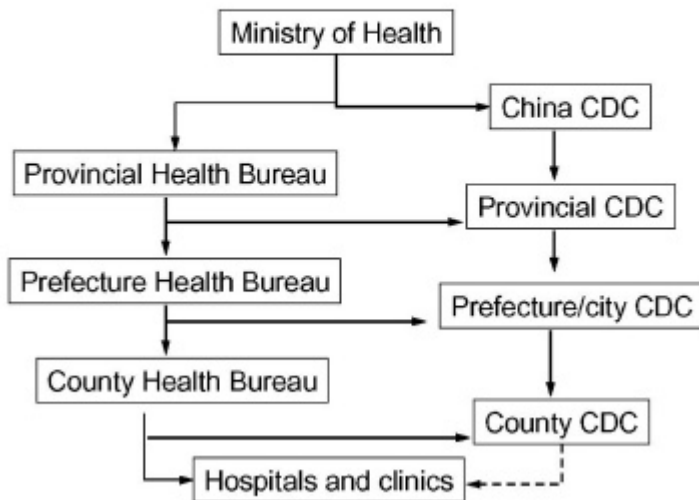
- HIV sentinel surveillance.
- HIV behavioral surveillance.
- HIV testing

China CDC and China public health organizational structure

The National Center for AIDS/STD Prevention and Control (NCAIDS) was established in July 1998 as part of the Chinese Academy of Preventive Medicine (CAPM). In January 2002, the CAPM was restructured and named the Chinese Center for Disease Control and Prevention. NCAIDS is the leading agency in the prevention and control of AIDS/STD at the national level. Four of China CDC’s 11 divisions are involved in HIV surveillance: the Division of Epidemiology within the Institute of Infectious Disease Control and Prevention is responsible for coordinating the national communicable diseases-reporting system (which includes HIV); a separate Division of Epidemiology within NCAIDS coordinates the national HIV sentinel and HIV and AIDS case reporting systems; the National AIDS Reference Laboratory (NARL) within the Division of Reference Laboratories oversees and coordinates HIV testing throughout China; and the STD Prevention and Care Division is responsible for the STD case-reporting surveillance system.

When the China CDC was created, a similar reorganization occurred at the provincial and lower levels of the public health system. Provincial and municipal Epidemic Prevention Stations were reorganized as provincial, prefecture, and county or municipal CDC offices. These offices are responsible for the conduct of the sentinel and case-reporting surveillance system and for HIV laboratories that conduct HIV confirmatory testing. These CDC offices receive their oversight and funding from the respective health bureaus. Therefore, although China CDC provides guidance to provincial CDC offices and coordinates their surveillance and laboratory activities, it has limited ability to directly influence their activities.

Figure 1 – The CDC and health bureau systems at the national, provincial, prefecture, and county levels



Assessment Itinerary and Approach

The assessment was coordinated by the Division of Epidemiology of NCAIDS, China CDC, and was conducted by U.S. CDC from September 16-27, 2002. The assessment visit began with a briefing at China CDC offices by the Division of Epidemiology staff and a review of the assessment itinerary and methods. The team then visited three provinces selected by China CDC: Jiangsu, Guangdong, and Shandong. At each provincial, municipal, or local site, a meeting was first held at the CDC office with appropriate staff from the site and representatives from the health bureaus. During these sessions, site staff described the surveillance system, presented surveillance data, and led a discussion of the material presented. Following the discussion, the team commenced the assessment, focusing on data management and laboratory activities. Site visits to health care and surveillance sites followed. At each site, the assessment team interviewed health care workers, surveillance, and laboratory staff, reviewed log books, and observed data entry. In general, the team attempted to gain an in-depth understanding of the entire data collection and reporting system. The team held a debriefing at the end of each provincial visit, during which they discussed initial findings and recommendations. Similarly, they held a debriefing at China CDC at the end of the visit. It should be noted that the assessment team did not visit any of the provinces that have experienced significant HIV transmission due to commercial blood plasma donation; therefore, this report does not deal with the surveillance of HIV among populations affected by that route of transmission

Assessment Itinerary

Province	City	Sites visited
Beijing	Beijing	China CDC offices and laboratory
Jiangsu	Nanjing	Jiangsu Provincial CDC offices and laboratory
	Suzhou	Suzhou City CDC Suzhou STD clinic Suzhou Maternal Child Hospital Suzhou University Affiliated II Hospital Pingjiang district Epidemic Prevention Station
	Kunshan	Kunshan CDC Kunshan Maternal Child Hospital Kunshan STD clinic Kunshan People’s Number Two Hospital
Guandong	Guangzhou	Guangzhou CDC offices and laboratory
	Shenzhen	Shenzhen city CDC offices and laboratory

Shenzhen Institute of Chronic Disease Prevention and Control

	Bao Ann district	BaoAn district CDC Guong Ming General Hospital
Shandong	Jinan	Shandong Provincial CDC offices and laboratory Jinan Detention House for Women
	Qingdao	Qingdao CDC Qingdao University Affiliated Hospital
	Jiao Zhou	Jiao Zhou County CDC

Assessment Team Members

U.S.CDC:

Dr. Stefan Wiktor	Chief, Surveillance, Infrastructure and Development Branch, Global AIDS Program, National Center for HIV, STD, and TB Prevention
Dr. Patricia Fleming	Supervisory Epidemiologist, Surveillance Branch, Division of HIV/AIDS Prevention, National Center for HIV, STD, and TB Prevention
Dr. Mark Rayfield	Associate Director for Science, Research Microbiologist, Division of AIDS/STD and TB Laboratory Research, Office of the Director, National Center for Infectious Disease
Dr. Chris Murrill	Epidemiologist, Surveillance, Infrastructure and Development Branch, Global AIDS Program, National Center for HIV, STD, and TB Prevention

National Center for AIDS/STD Control and Prevention, China CDC

Dr. Sun Jiangping	Deputy Director, National Center for AIDS/STD Control and Prevention
Dr. Lu Fan	Deputy Director, Division of Epidemiology
Dr. Qu Shuquan	Associate Professor, Division of Epidemiology

Dr. Tian Fang	Assistant Professor, Division of Epidemiology
Dr. Li Dongmin	Assistant Professor, Division of Epidemiology
Ms. Wang Liyan	Masters Candidate, Division of Epidemiology
Dr. Jiang Yan	Director, National AIDS Reference Laboratory
Dr. Lin Xudong	National AIDS Reference Laboratory
Dr. Gong Xiangdong	Technical Guidance Center for STD Control and Prevention

HIV Sentinel Surveillance System

Introduction

China's HIV sentinel surveillance program was created in 1995. At the national level, the program is coordinated by NCAIDS, and at the provincial level by the respective Provincial Center for AIDS Prevention and Control, located within the provincial CDC office. Within NCAIDS, the Division of Epidemiology is responsible for the sentinel surveillance program.

Sentinel surveillance staff at the national level have developed a standardized operations protocol for survey activities that includes directives for data and specimen collection, data management, and transfer of data to China CDC. Staff from China CDC are also responsible for providing necessary training, data-management software (including pre-designed data entry programs), and support for the oversight of survey operations. The Division of Epidemiology within China CDC organizes an annual surveillance conference at which provincial-level coordinators meet to review the previous year's survey results and discuss operations for the upcoming round of serosurveys. National level staff, therefore, collaborate with provincial CDC staff who in turn work with prefecture and county-level staff as well as site-specific clinic staff. In addition to coordinating the sentinel surveillance program, staff from China CDC have also conducted and/or assisted with small-scale, community-based behavioral surveys among MSM and commercial sex workers (CSW) in a few of the provinces outside of Beijing.

Data Collection

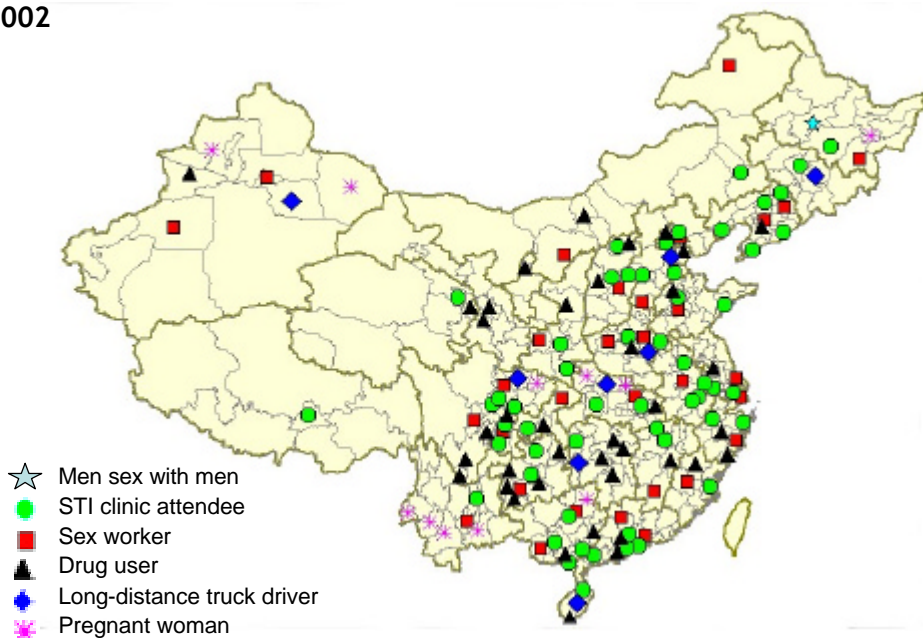
In 2002, the number of HIV sentinel surveillance sites increased from 101 to 158 sites. Although there are sites in all 31 provinces, most are in the Eastern and Southern regions of the country (Figure 2). Sentinel surveillance is conducted among public STD clinic attendees, female sex workers in detention, drug users in detention, long-distance truck drivers, and antenatal clinic attendees. All surveys are facility-based and are conducted in STD clinics, drug-user detoxification and sex-worker re-education centers, trucking company clinics, and maternal-child health clinics (Table 2 and Figure 2). Army recruits are tested by the China military, but the results of this testing are not available to the Ministry of Health (MOH). Routine sentinel surveillance is not currently being conducted among other vulnerable or representative populations such as MSM, military recruits, TB patients, incarcerated persons or persons admitted to hospitals. In addition to the sentinel surveillance coordinated by China CDC, each of the provincial CDC offices carries out additional seroprevalence surveys that vary in geographic coverage, number of sites, and the population groups targeted. In 2002, there were 411 such provincial sentinel sites (Table 1). However, except for limited studies, all province-led surveillance of drug users and sex workers occurs in institutional settings.

The national sentinel surveys are conducted twice yearly (April-May and October-November), and each survey lasts 2-3 months. In principle, blood samples and data are collected from consecutive attendees with a target sample size of 250-400 persons per site. Provincial CDC staff are responsible for providing oversight and ensuring the quality assurance of site-specific data collection operations. As specified by the national protocol, sites collect blood specimens as well as demographic and limited behavioral data on a standard data collection form. For example, among attendees of STD clinics, collected data elements include gender, year of birth, marital status, residential status, limited behavioral data on condom use and number of sexual partners, and STD diagnosis.

Table 1: Distribution of populations assessed by HIV sentinel surveillance in China, 2002. The national sites are coordinated by China CDC and provincial sites by provincial CDC offices.

	STD Patients	Female Sex Workers	Drug Users	Long-Distance Truck Drivers	Pregnant Women	Men/Sex With Men	Other	Total
National	63 (40%)	34 (22%)	38 (24%)	9 (6%)	13 (8%)	1 (0.6%)	---	158
Provincial	147 (37%)	57 (14%)	92 (23%)	23 (6%)	45 (11%)	---	47 (12%)	411

Figure 2: Geographical distribution of national sentinel sites in China, 2002



Data Management and Reporting

Serum specimens are tested at the provincial level CDC laboratories following the national HIV testing algorithm for surveillance purposes (see Laboratory System section). Demographic and test result data are entered by provincial CDC staff into a DOS-based Epi-Info data management system that is provided by the national program. Data are electronically submitted to the national program office via modem from the provincial CDC at the end of the survey period. Data are maintained at the national level using a password-protected Epi-Info database. Summary reports of findings are disseminated annually to both the Ministry of Health and to officials in each province and are presented and discussed at the annual surveillance conference organized by China CDC.

Results of sentinel surveillance

Median rates of HIV prevalence from 1995 to 2001 for China have remained at 0.0% among STD patients, female sex workers, and long-distance truck drivers attending the national sentinel survey sites. However reflecting the concentrated nature of the HIV epidemic in China, prevalence rates have increased in selected sites over the years and among specific population groups, as indicated by the maximum prevalence observed among the groups in Table 2. For example, among drug users, the highest observed prevalence was 0% in 1995 and by 2001 had increased to 76.8% at one site. Similarly, among STD clinic attendees, the maximum rate was 0.3% in 1995 and rose to 1.9% in April 2001.

Table 2: HIV prevalence rates (median and maximum) by risk groups in China 1995-2001

Population Group	April, 1995 # sites (median / max)	April, 1998 # sites (median / max)	April, 2001 # sites (median / max)
STD Clinic Pts.	17 (0.0% / 0.3%)	32 (0.0% / 0.7%)	39 (0.0% / 1.9%)
Sex Workers	12 (0.0% / 0.0%)	19 (0.0% / 0.5%)	26 (0.0% / 11.1%)
Drug Users	8 (0.0% / 0.0%)	19 (0.3% / 82.2%)	25 (0.0% / 76.8%)
Truck Drivers	4 (0.0% / 0.0%)	7 (0.0% / 0.5%)	8 (0.0% / 0.5%)
Pregnant Women	-----	1 (0.2%)	4 (0.0% / 0.6%)

Source: Shuquan Q, Xinhua S, Xiwen Z, Jie S, et al. National Sentinel Surveillance of HIV Infection in China from 1995 to 2001. 16th International AIDS Conference, Barcelona, 2002. Poster presentation.

FindingsOverview

This assessment did not take place during the scheduled rounds of sentinel surveillance; hence, it was not possible to directly observe field operations. Therefore, the following observations draw primarily from discussions with surveillance staff. In general, there was a high level of awareness concerning the conduct of sentinel surveillance among staff at the national, provincial, and local levels. During the provincial CDC briefings, sentinel surveillance data were

expertly presented and the weaknesses of the system openly acknowledged. Staff were particularly interested in identifying ways to strengthen the system and, in particular, to expand behavioral surveillance efforts. However, although sites in principle implement a standard national HIV sentinel surveillance protocol, in reality, survey methods outlined in the protocol are not being implemented consistently or uniformly. Data management at the provincial level varied in quality. Due to a scarcity of human and financial resources, oversight of the sentinel survey operations by national and provincial level staff is limited. In addition, as with the national HIV/AIDS case-reporting system, several factors and existing policies limit the ability of the national sentinel surveillance system to provide accurate and useful information concerning HIV prevalence among specific population groups.

For sentinel surveillance data to be maximally useful, they must be collected in a consistent manner across all sites and from year to year. Two approaches are generally recommended. In clinical settings where blood is being collected as part of the patients' clinical care, these blood samples can be tested for HIV anonymously without consent (anonymous-unlinked testing). Alternatively, in settings where patients are offered voluntary HIV testing, surveillance can be conducted by collecting the results of HIV testing along with demographic and behavioral information (linked-voluntary testing). Due to the lack of HIV testing in most sites, China CDC appropriately recommends anonymous-unlinked testing. In practice, however, sentinel surveillance is conducted using a mix of these two approaches as well as mandatory testing of institutionalized persons. This mix of approaches leads to significant bias and lack of representativeness of the data that are collected.

Specific findings

Subjects are not enrolled consecutively - Enrollment procedures varied significantly at the STD clinic sentinel surveillance sites that were visited. At some, all patients were offered HIV testing during the time of the survey, while in others only patients with risk behaviors (defined as having an STD) were offered testing. Thus consecutive sampling of patients, as outlined in the protocol, does not occur in any of the STD clinics we visited. Furthermore, as part of the revenue generating policies mandated by health sector reform, all patients must pay for STD treatment with an additional charge weighed for those wishing to obtain an HIV test, regardless of whether or not they are participating in the serosurvey. The cost of HIV testing varied by province, but in general, the cost is high, with an average cost of \$10 U.S. Such policies result in significantly lower participation/inclusion rates for the survey. Due to the high cost of treatment, and the fear of lack of confidentiality, it is likely that those at highest risk for HIV infection (i.e., CSW and MSM) are not accessing the clinic. Therefore, any meaningful interpretation of HIV prevalence data obtained from such a site is extremely difficult. At drug detoxification and sex worker re-education centers, subjects are enrolled consecutively, and HIV testing is free. However, even at these sites enrollment procedures are not being implemented uniformly. For example, at one detoxification center, if the sample size could not be met during the enrollment period by consecutively enrolling new entrants, other IDUs already enrolled in the center were added to the survey sample.

Data are not collected anonymously - In principle, data are collected anonymously; however, unlinked anonymous methods were not being implemented uniformly. Data collection forms from the previous rounds of surveys conducted among drug users were reviewed at one site. All of the forms that were reviewed contain patient name and other personal data; thus not adhering to protocol procedures. Positive HIV results were returned to the director of the detention center.

Data on multiple risks are not collected, and positive results are generally reported to the HIV case-reporting system (and the STD and communicable-disease reporting systems) while the patient names and other reporting data are available on the survey forms. Thus it appears that data for the sentinel surveillance program are being mixed with data for the case-reporting system. Also, it appears that there is more of a focus on reporting data based on the risk behaviors associated with acquisition of HIV than there is on targeting specific venues or population groups at higher risk for HIV infection (e.g., IDUs with STDs).

On-site supervision of data collection - Due to limited human and financial resources at both the national and provincial levels, there is a limited ability to conduct on-site supervision of survey operations, including data and specimen collection procedures. This limited oversight of operations by the coordinating office at China CDC and province-specific CDCs may lead to non-adherence to survey operations as specified in the survey protocol.

Limited scope of sentinel surveillance sites - As mentioned, all sentinel surveillance of drug users and sex workers is conducted in detention centers. By limiting selection of drug users and sex workers to those held in these centers, a bias is introduced, because those persons in detention may have a different prevalence of HIV than those not in detention. Effective approaches must be developed to contact these communities, and include them in surveillance and prevention efforts.

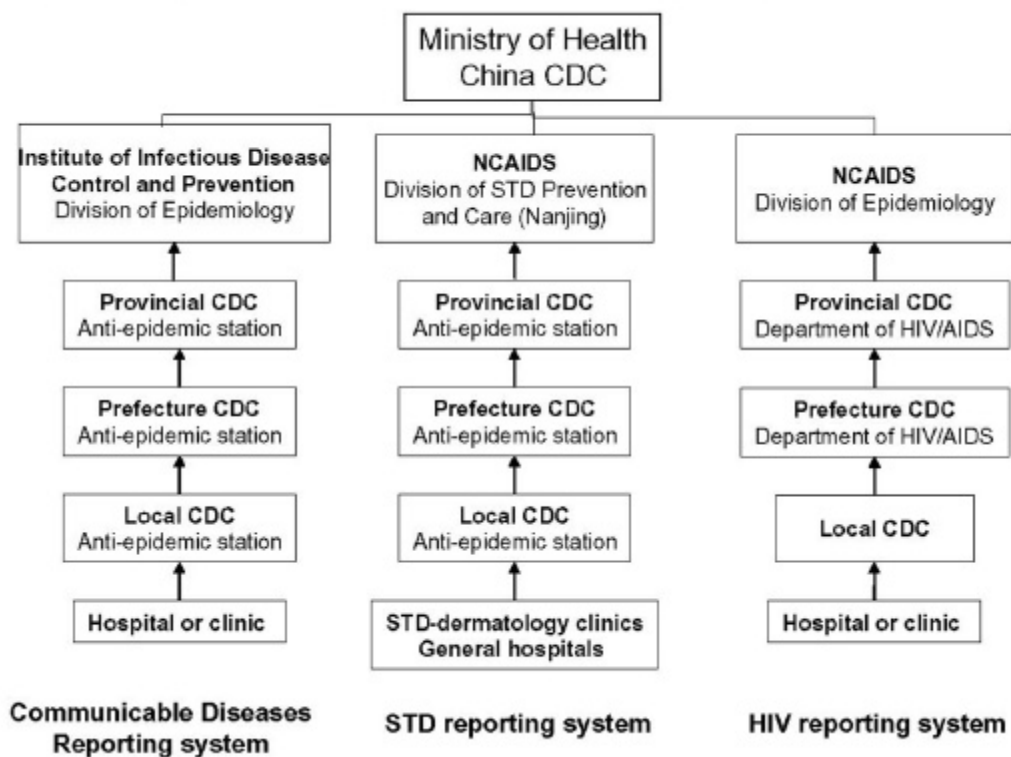
Lack of behavioral data - To fully understand the behavioral dynamics that drive the HIV epidemic, one needs to understand the behaviors that facilitate transmission of HIV. Currently, very little behavioral research is being conducted; most of the existing efforts are being coordinated by external entities such as the World Health Organization (WHO) or U.S.-based universities, with little involvement or coordination at the national level. Furthermore, there is limited in-country capacity and experience in the conduct of such studies. A major effort is needed to develop standardized approaches (i.e., surveys) to access and study these groups so that the data are comparable over time and between regions. This needs to be associated with an effort at training, focusing on formative research that is necessary to effectively engage these marginalized populations.

HIV-AIDS Case-Reporting System

Introduction

The China Ministry of Health (MOH) implemented HIV/AIDS case reporting in 1985. Currently, HIV is reportable through three separate MOH surveillance systems. The first is the HIV/AIDS reporting system that is coordinated by the Division of Epidemiology, NCAIDS of China CDC. The second is the Communicable Diseases Reporting system that is coordinated by the Division of Epidemiology, Institute of Infectious Disease Control and Prevention, China CDC, and collects data on 35 infectious diseases, including HIV. The third system is the National STD Surveillance system in which information on eight STDs is reported to the National Center for STD in Nanjing. In October 2002, the Nanjing STD Center became part of China CDC’s NCAIDS. In all three systems, case reports flow from the health facilities or clinics to the local district, prefecture, and provincial health bureaus, and then to the respective national organizations within the MOH. Until recently, the three systems were independent, but with the creation of China CDC in 2002, the national-level institutions responsible for the three systems are now all components of China CDC. This presents an opportunity for streamlining and eventually combining the three HIV-reporting systems.

Figure 3: Organizational structure of HIV case reporting system in China



Data collection
HIV-Reporting System

Data collection in the HIV/AIDS case-reporting system begins with the laboratory test request form. Serum specimens for HIV testing are sent from the test clinic to the local, district, and/or prefecture labs for screening by EIA. Reactive specimens are confirmed by Western blot testing at the provincial CDC, but may have also been Western blot-confirmed at the prefecture level in order to more promptly return test results to the physician and patient. When a sample is confirmed as HIV-positive, a standard Western blot report form is sent to the national-level as well as the local-level CDC and to the clinic sending the sample (Figure 4). At the municipal level, a public health worker contacts the patient by telephone or in person (in the home or at a clinic) and collects additional information concerning demographics, risk behavior, and health status. Based on the information collected on this epidemiologic questionnaire, the local physician, local AIDS-case review board, or the provincial-level epidemiologist determines whether the patient meets the clinical criteria for AIDS. If so, the patient is reported as having AIDS through the HIV-reporting system. The epidemiologic data are entered manually into a log book for local use and may be transmitted to higher jurisdictional levels in hard copy, or selected data elements may be entered into a nationally developed HIV database. In some provinces, follow-up interviews are conducted periodically to assess the health status of the patient. These reporting procedures are not yet standardized, limiting the usefulness of the epidemiologic data for public health action.

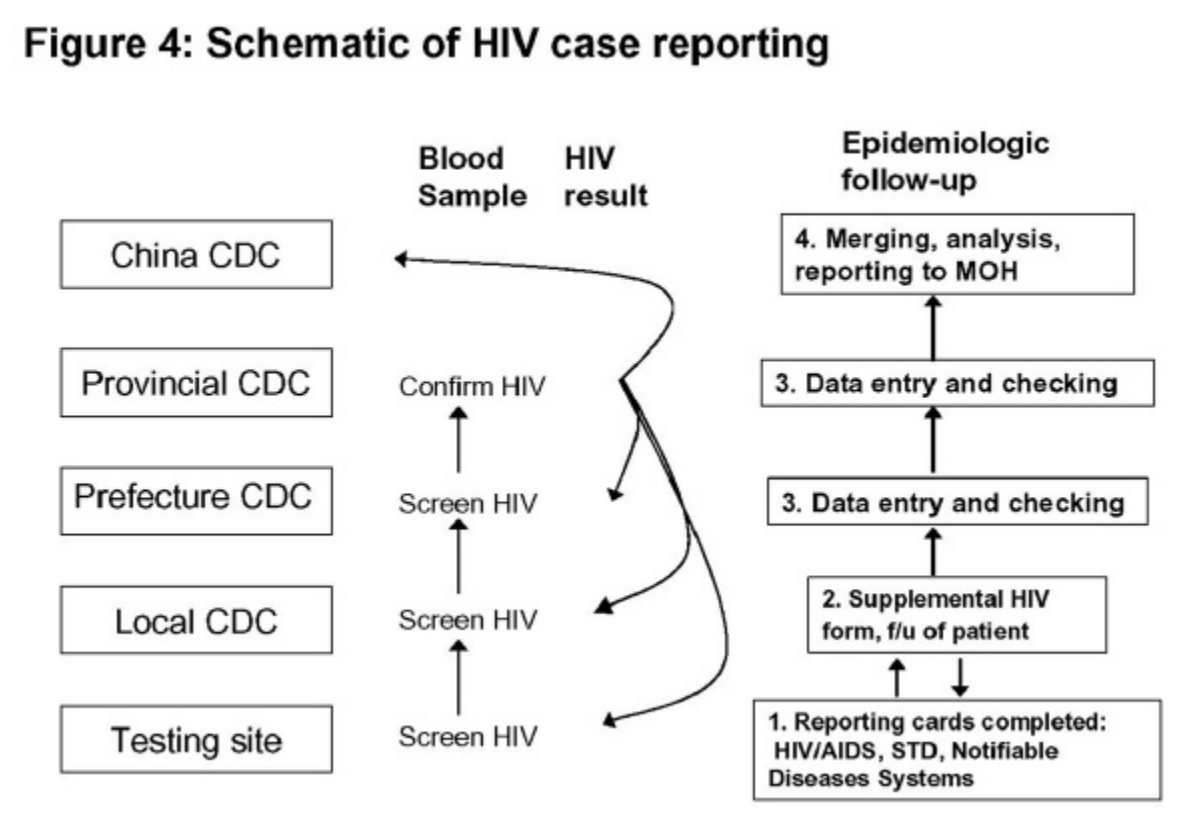
Communicable Diseases-Reporting System

For the communicable diseases-reporting system, persons identified as HIV-positive through EIA screening and Western Blot confirmation are reported to China CDC/MOH. This system is established in health care facilities (e.g., hospitals and clinics) nationwide for reporting 35 notifiable diseases, and it is facilitated by a standard physician report card with check-off boxes for reportable conditions. China CDC/MOH provides a standard system for electronic data entry and reporting.

STD-Reporting System

Cases are reported from public STD clinics and general hospitals via a standard physician report card with a check-off box noting the diagnosis of one or more of the STDs. Only descriptive demographic data and limited clinical data are collected in this system. Cards are collected within the clinic and may be forwarded in hard copy to the next highest jurisdictional level or may be entered into a database for electronic reporting up the chain to the national level.

Figure 4: Schematic of HIV case reporting



Data Management and Reporting

HIV-Reporting System

The provincial- and national-level China CDC HIV/AIDS databases contain information collected in two formats: laboratory test results and patient interviews. Data are managed using a combination of paper-based and electronic systems. Interview data are recorded as both check-off boxes and as handwritten notes on a paper form which includes detailed demographic, clinical, and behavioral risk assessments. In the laboratory, paper logs of HIV laboratory test results are maintained at each testing level. These logs generally contain patient name, date of birth, sex, resident status (resident or immigrant to the district), test type, and test results. At the provincial CDCs, the laboratory staff generally enter the test results into a locally developed database. Also at the provincial CDC level, hard copies of Western blot forms are collected from the laboratories by the epidemiologist responsible for surveillance, who then enters the data into the case-reporting database for epidemiologic purposes. This electronic data entry system was developed by NCAIDS for case surveillance.

Two data entry formats are available, depending on the level of computer skills of the provincial CDC staff: FoxPro and Microsoft Excel. These databases standardize the entry of data elements from the Western blot form, as well as selected data elements from the

epidemiologic follow-up interviews. Data are entered into three separate sub-databases: HIV cases without AIDS, AIDS cases, and deaths of persons with HIV/AIDS. Death ascertainment does not appear to be systematic. Various logs, notebooks, and hard copies containing interview data on infected persons may be maintained at several jurisdictional levels.

Some manual cross-checking of the laboratory and epidemiologic databases appears to be done at the provincial levels. Electronic reporting from provincial levels to NCAIDS occurs on a quarterly basis. The NCAIDS case counts are based on the dual-reporting (i.e., electronic via e-mail and hard copy of Western blot forms via registered mail) of confirmed HIV-positive tests.

Summary data reports are generated at each level (municipal, prefecture, provincial); the reports provide summary statistics and simple frequencies on the number of HIV and AIDS cases. Two-way cross-tabulations are provided; however, the limited number of data elements and the limited epidemiologic capacity in most jurisdictions hampers the usefulness of the data reports for public health purposes. In addition, reported HIV cases reflect the prevailing testing policies. Thus, the inherent biases and limitations of the reported data make accurate interpretation of the case surveillance data challenging. A national report is issued based on the number of Western blot confirmed cases reported from all 31 provinces.

Communicable Diseases and STD-Reporting System

In most clinics and hospitals, a standardized data management system using Systems Query Language (SQL) is used for communicable disease reporting (including HIV cases) and a separate SQL-based system is used for STD reporting. The physicians in the various clinics complete reporting cards. They are then collected centrally within the facility and taken to a data-entry room where a trained worker enters the data into the software. Data are transmitted electronically to higher jurisdictional levels. The HIV data are compiled at the national level and a report is issued.

Jiangsu Province Integrated Disease Surveillance System

In Jiangsu Province, an innovative integrated STD/HIV surveillance system was introduced that combines the three reporting systems. A single STD/HIV/communicable disease reporting card was developed that includes all 35 notifiable diseases and is being used in all clinical settings. For HIV, providers complete the report card following the receipt of a report of a Western blot-confirmed, HIV-positive test result. Since the report card does not collect any HIV-specific clinical or behavioral information, the supplemental behavioral questionnaire is completed for all HIV case reports. Once completed, the data are entered into an SQL-based database at the municipal/local levels and are transmitted electronically to the provincial level and then to the national level. Some cross-checking of the number of cases in the STD/HIV reporting system to the number of Western blot-confirmed lab reports occurs at the provincial level. For STD and HIV, this system collects less data than the separate systems used in other provinces; however, the integrated approach is well accepted by clinicians because it reduces their workload. Discussions are ongoing to extend this system to all of China's provinces.

Findings

Overview

From health facilities through all levels of the public health system, there is a high degree of awareness of the importance of reporting HIV test results. In health facilities, the HIV, communicable disease report form, or the STD report forms were readily produced and providers were familiar with the reporting processes. In laboratories, staff were, in general, familiar with the multiple facets of the HIV case-reporting process and were able to produce examples of Western blot report forms and testing logs. Despite the limited amount of data that are collected in any of the three reporting forms, the infrastructure functions well, and support for and recognition of the three disease reporting systems appears to be widespread.

The serious threat posed by the HIV epidemic is well recognized by health care professionals and government officials alike. There appears to be a genuine receptivity to technical assistance and a willingness to adopt or adapt technologies that have proven successful elsewhere. Furthermore, the professional and committed staff in the health care facilities that were visited and at the CDC offices at all levels of government attest to the potential to achieve a high-quality HIV/AIDS reporting system and accessible, HIV testing, care, and treatment for high-risk populations.

The most significant barrier to a more reliable HIV reporting system to track the HIV epidemic in China is the lack of a consistent policy concerning the promotion and delivery of HIV testing. This results in a significant under-reporting of the number of persons with HIV infection and a bias among those that are included in the surveillance system. Although HIV testing is available in most clinics and facilities, it is not being routinely offered by health care workers to persons at high risk of HIV infection, in particular, STD patients. When it is offered, most persons decline the HIV test due to the high cost of testing, denial of risk, fear of breaches of confidentiality, or resignation that treatments for HIV infection are unavailable. Furthermore, hard-to-reach, high-risk populations, such as drug users out of detention centers or MSM, are not being accessed for prevention or testing, and the very large migrant population, which includes sex workers and their clients, poses serious challenges to testing, reporting, prevention and control.

The fee-for-service policy for voluntary HIV testing is a significant deterrent to achieving a comprehensive and accessible voluntary HIV testing program. Thus, the representativeness and the usefulness of the data in the HIV/AIDS case-reporting system will continue to be limited by the lack of a science-based, national comprehensive and strategic policy on testing, education, prevention, treatment and de-stigmatization.

Specific findings

Complexity and duplication of information flow – A great number of duplicate papers and reports flow up and down the chain to accomplish reporting to higher levels and feedback of results to lower levels. A significant increase in the number of identified HIV/AIDS cases would strongly challenge the integrity of the data and the ability to manage the current

HIV/AIDS case-reporting system. Inefficiencies in the system also pose challenges to ensuring that individuals are not reported multiple times, and that data are of a high and consistent quality across multiple reporting sources. The system would benefit from increased standardization, attention to data quality control, and technical improvements in electronic data entry and management. At the local levels, multiple systems are used for data entry/management. Where cases are identified through voluntary testing in clinics that are also sentinel surveillance sites, the case may be included in the sentinel surveillance Epi-info database, and the case may also be reported through the HIV case-reporting system. At prefecture and district levels, there appears to be considerable variation in capacity for data entry/management. Some provincial- and even municipal-level CDC offices have developed their own data management systems for laboratory use and for the entry and analysis of case reports while others use paper-based systems.

Data quality - Because the link between patient identifiers (generally the patient's name) and test results are only maintained below the provincial level, it is difficult to check for duplicate reports or to match to data from other sources (e.g., the HIV reports in the communicable diseases system). Some areas conduct laborious manual cross-checking against laboratory logs at provincial or prefecture levels. Furthermore, the existence of the two additional systems (STD and communicable disease) for reporting HIV/AIDS cases is resource-intensive. There is no systematic way to verify that all identified cases are being reported to all three systems. The number of HIV/AIDS cases is reportedly highest in the NCAIDS system, presumably due to under-reporting of HIV on the report cards in the other systems. Evaluation studies of the performance of the HIV case-reporting system, in terms of completeness, representativeness, and data quality, have not yet been conducted systematically.

Confidentiality procedures - According to national laws, HIV/AIDS infection is not secret information, but, as a matter of policy, information is required to be kept confidential during the process of testing, reporting, storing, and transferring data. However, at the provincial and local levels, identifying information was observed on multiple paper copies of reports, interview sheets, log books, and test request forms, as well as multiple databases containing identifying information on HIV-positive patients. This profusion of identifying information in both the laboratory and the epidemiologic components seriously challenges the system's ability to maintain confidential data.

AIDS case definition - The AIDS case definition (MOH 1996) that is being used is a combination and adaptation of the WHO 1994 and the U.S. CDC 1993 definitions. Persons are determined to have AIDS based on level of immunosuppression (i.e., CD4-count <200 cells/ μ L) or based on laboratory diagnosis of specific opportunistic infections. However, most hospitals that were visited do not have the laboratory capacity to diagnose these opportunistic infections nor to perform lymphocyte phenotyping (CD4+ counts). Furthermore, the identification of patients with AIDS is not standardized. In some instances, medical records are reviewed by a professional committee to determine if a case meets the

AIDS criteria, while in other instances, a single epidemiologist reviewing the case-report form makes that determination. An increase in the number of persons with HIV-related morbidity will challenge the capacity of the current system and the quality and consistency of the AIDS case data.

Lack of standard collection of behavioral and risk information – Behavioral risk and clinical data are collected on cases through interviews as part of the case-reporting system; however there is no standard form for the collection of these data; rather each province has developed its own form. There is no systematic way of classifying or entering behavioral risks; therefore, cases are classified by the venue in which they were tested as opposed to the behavior that may be associated with infection or transmission. Furthermore, there is no mechanism to capture dual or multiple risks. For example, sex workers who also use injection drugs but who are found to be positive as part of mandatory testing in sex worker re-education centers will be classified in both sentinel surveillance data reports and HIV/AIDS case reports as commercial sex workers but not as drug users. For persons with more than one possible mode of infection, the municipal epidemiologist enters the most probable mode into the database. The efficiency of the system and the usefulness of the epidemiologic data collected could be improved with the implementation of standardized data collection forms and software.

Routine HIV Testing Programs

Throughout China, many populations undergo routine serologic testing. The scope of this testing varies considerably by province, and although the testing is done primarily for the control of hepatitis B, it increasingly includes HIV testing. Groups that are tested include couples applying for a marriage license, pregnant women, occupational groups such as restaurant and night-club workers, health care workers, persons returning from overseas, and high-risk groups, including drug users and sex workers in detention/re-education centers. Concerning HIV testing, some of these persons are tested voluntarily; for example STD patients, while others are tested routinely (e.g., premarital testing, testing of pregnant women, occupational testing, and screening of IDUs and CSWs in detention). Shenzhen prefecture in Guangdong Province, which has more financial resources than most municipalities, has an extensive HIV testing program; more than 180,000 persons are tested there annually (see Table 3). Laboratories that conduct this testing provide summary reports quarterly to provincial and China CDC on the number of persons tested and the number who were HIV-positive. However, the completeness of this reporting varies by province, and no province collects or reports demographic information (i.e., age, sex).

Routine blood collection provides an important, untapped opportunity for providing additional HIV surveillance information at very low cost. Efforts could be initiated to routinely collect and systematically report basic demographic information and HIV results that should be analyzed at the provincial level and reported and collated at the national level. Secondly, in areas where the routine testing does not include HIV screening, identifying information could be removed for a subset of samples to be tested for HIV using anonymous-unlinked method. This would, again, provide additional information on populations representative of the general population (e.g., premarital screening).

Table 3: Number of persons tested annually for HIV in Shenzhen (Source: Shenzhen CDC)

Population	Sites	No. of sites	No. of persons tested
Patients with HIV symptoms	Hospitals, clinics, health centers	All medical units	3,000-5,000
Premarital exam	MCH Centers	7	~4,500
Pregnant women	MCH Centers Hospitals	1 48	~75,000
STD patients	Prefecture STD clinic	1	4,500-5,000
	Local STD clinics	6	~5,000
	Hospitals	All	~7,000
Injection drug users	Detoxification centers	4	~5,000
Sex workers	Re-education centers	1	~2,200
Blood donors	Transfusion center	3	70,000
Restaurant/entertainment workers	Municipal and Local CDC	26	~3,000
Other	CDC		~7,000

Laboratory System

Introduction

A network of laboratories exists for HIV diagnosis and for HIV case-reporting and surveillance. This network consists of NARL of China CDC, 42 provincial level confirmatory laboratories housed within province-level CDC offices (Level II), 60-80 additional confirmatory laboratories in provincial hospitals and medical schools (Level III), and approximately 100-140 central screening laboratories (Level IV). These laboratories are guided by the NARL and form a public health laboratory system that is separate from clinical laboratories in a variety of health care settings (Level V) which are regulated by the provincial health administrations (Table 4). The NARL defines HIV testing algorithms and policy, develops and oversees the quality control program, and provides training of staff. The provincial-level laboratories serve primarily as confirmatory laboratories by performing Western blot testing of samples sent from lower-level laboratories. As such, they play a critical role in HIV case-reporting by centralizing the information on all diagnosed cases of HIV. At the national level, a number of areas have been identified by China CDC as priorities for technical assistance and training. These include developing standard laboratory quality control serum panels and providing training to provincial laboratorians, increasing proficiency in new laboratory techniques such as viral resistance testing, developing laboratory strategies for a voluntary counseling and testing program, and modifying laboratory algorithms to incorporate a variety of rapid testing protocols. Within NARL, a new bio-safety Level III national laboratory is under construction.

Table 4: Organizational structure of HIV testing laboratories in China

Level	Number	Type of laboratory
Level I	1	National AIDS Reference Laboratory (NARL / China CDC)
Level II	42	Provincial-level confirmatory lab
Level III	60-80	Confirmatory labs in hospitals and medical schools at provincial level
Level IV	100-140	Central screening labs, many in city and county CDC, blood bank and STD clinics
Level V	800-1000	HIV screening labs in hospitals and clinics

Laboratory screening and confirmatory testing for HIV are integral components of the sentinel surveillance system and of the HIV case-reporting system. Separate HIV testing algorithms have been developed by NARL for HIV diagnosis and sentinel surveillance. For the clinical diagnosis of HIV infection and for case-reporting purposes, specimens are tested by two different EIAs at a designated screening laboratory (Levels IV and V). Specimens that are repeatedly non-reactive are reported to the physician as negative; repeatedly reactive specimens

and those with discordant EIA results are sent to a designated confirmatory laboratory, generally at the provincial level (Levels II and III) for Western blot testing. Positive and negative Western blot results are reported to the physician, while for indeterminate results, follow-up testing in three months is recommended. For sentinel surveillance, all samples are tested with two EIAs; those with a signal-to-cutoff ratio ≥ 6 on both EIAs are considered as HIV-positive, while those positive on only one EIA or those with a signal-to-cutoff ratio between 1 and 6 are tested by Western blot.

HIV testing is generally performed on a fee-for-service basis, and the cost of testing varies among the provinces and by type of clinic/hospital. In general, EIA screening costs between U.S. \$10–20 per test. The cost of Western blot testing is generally not borne by the patient and is conducted by the government at a cost of about U.S. \$30 per test. Because reactive specimens are forwarded to municipal and provincial levels for replicate EIA screening and possible Western blot testing, specimens are tested multiple times, increasing the cost of handling and testing (see Figure 4).

Findings

The NARL exercises its greatest influence at the provincial level (Level II), while the provincial laboratories exercise their greatest influence over the screening laboratories for which they provide confirmatory testing. At the provincial and municipal levels several confirmatory laboratories (Level III) may be operating, each supporting a different subset of point-of-service laboratories (Level IV and V). This approach has the advantage of decentralizing HIV screening services. However, the high ratio of screening laboratories to confirmatory laboratories results in extensive specimen transfers and repeat testing. The impact of this repeat testing is currently not great, because of the low prevalence of HIV in most provinces. However, the small number of confirmatory laboratories will limit the ability to provide timely service if the prevalence of HIV increases.

Funding of laboratories at the different levels comes from different sources: screening laboratories receiving their funding through municipal, county, or district governments; provincial laboratories from the provincial government; and the NARL from China CDC. These separate sources of funding limit the ability of China CDC to develop national programs for quality assurance, standardization of testing protocols, training, and implementation of simple alternative testing algorithms.

The pyramidal structure of the public health laboratories facilitates vertical flow of information and recognizes the public health responsibilities of participating laboratories at each level. However, this system also represents a multi-tiered disconnect from the national level to point-of-service laboratories, without clear vertical lines of authority or direct funding streams.

General Observations

Need for minimal standards for equipping reference laboratories - The primary role of the CDC confirmatory laboratories at the provincial level and the national reference laboratory is to confirm presumptively positive HIV results. As noted above, in a low prevalence population the number of confirmatory specimens reaching these facilities will be quite low. Consequently, most HIV confirmatory laboratories are not equipped or staffed to handle large numbers of samples. Conversely, the HIV screening laboratory within a large metropolitan hospital or teaching facility may be equipped with the most advanced high through-put serodiagnostic equipment and designed to handle one thousand specimens a day. In such instances the technically advanced screening facility is left waiting on the resource-limited confirmatory laboratory to validate its findings. A second limitation of the HIV laboratory system is that the number of HIV screening facilities is insufficient to adequately monitor an epidemic within a population the size of China's. There are thus two related limitations: an under-utilized capacity at the municipal level to conduct both screening and confirmation, and a general unrecognized need for screening facilities to meet the needs of the population. There is also an unmet need for the national and provincial CDC laboratories to provide external quality assessment (EQA) services to their laboratory community. To meet these needs, minimal equipment standards will have to be addressed within the reference facilities, including increased specimen handling and storage capacity, computerized data management, and redundant serodiagnostic workstations.

Staff have limited understanding of the laboratory's role in supporting surveillance - In all the facilities visited by the team, the staff were well trained and experienced in the diagnostic procedures for which they were responsible. At screening laboratories, these responsibilities include testing for multiple infectious agents, reflecting the broad public health mandate of these facilities. At all levels, supervisors reported that their laboratories were understaffed. In the provincial CDC laboratories, staff were well versed in diagnostics procedures; however, the laboratory staff's understanding of their role in surveillance is limited to performance of the diagnostic procedure and record keeping. Laboratory staff do not appear to be involved in the planning of surveillance activities; consequently, the laboratorians are unable to provide technical consultation to the epidemiologists or to identify procedural flaws, thereby limiting their ability to provide insightful support of surveillance efforts. Including senior laboratory staff in the planning of surveillance efforts would result in improved specimen handling and management and the development of alternative testing strategies that would better serve surveillance programs.

Role of CDC in maintaining quality assurance - Most laboratories were implementing procedures to meet international standards of laboratory conduct. The CDC laboratories should be leaders in promoting the implementation of such standards of quality assurance and external quality assessment. This needed expansion in responsibilities will further tax the CDC laboratory system's limited personnel and will necessitate a better understanding by Levels II and III laboratory managers of their key role in developing/implementing this national program. This understanding will facilitate a decentralized approach for communication and management

of assurance measures; however, the definition and coordination of these activities must emanate from NARL.

Strategies for rapid diagnosis and confirmation of HIV infection. As previously mentioned, HIV screening laboratories conduct HIV screening by EIA and send their screen-positive samples to the provincial-level HIV laboratories for confirmatory Western blot testing. Although this strategy helps to assure high-quality HIV testing and helps to facilitate HIV case-reporting, it limits the capacity of clinical services to provide timely HIV results. As the number of HIV testing sites increase, particularly those providing voluntary counseling and testing services, it will be critical that these sites provide same-day test results. Therefore, it is vital that China CDC evaluate HIV rapid tests, develop testing algorithms based on these tests, and help to implement their use throughout China. Since it is feasible to confirm HIV infection using rapid tests, an additional benefit of this strategy would be the decentralization of HIV confirmation. This would significantly reduce the need to transfer specimens between laboratories and thereby simplify the process and shorten the time required to provide test results. Decreasing the need for repeat HIV testing would also reduce costs to the system overall, but the case-reporting system, which currently depends on Western blot testing at regional CDC laboratories to identify cases, would need to adapt to match this decentralized system of HIV confirmatory testing. As part of this decentralization, it would be important to put in place procedures to assure the quality of testing.

Recommendations

General Recommendations

The goal of this assessment was to identify areas where the China HIV surveillance system could be strengthened and to focus on the ways that China CDC could implement these improvements. However, during the conduct of the assessment, it became clear that a number of existing practices and policies directly affect the quality and completeness of the surveillance system. Some of these can only be addressed by the government of China at the central level, while others could begin to be addressed by China CDC and provincial CDC offices with the assistance of external agencies working in China, such as the Global AIDS Program.

Existing Policies That Affect the Completeness of Surveillance Data in China

The government of China has instituted efforts to improve surveillance for HIV/AIDS in concert with programmatic efforts to implement HIV education, prevention, and care. The threat of rapid HIV spread is occurring at a time of major social and economic changes. These include changes in the health care system; specifically, increased reliance on user fees to generate revenues for hospitals and clinics. Despite numerous other competing health and political priorities, a review of existing policies by the government of China could result in a more effective and rapid response to the emerging HIV crisis. Policy reforms are needed to increase the availability of HIV testing, promote education concerning HIV risks, and increase the availability and accessibility of HIV prevention and treatment services. Both the HIV/AIDS seroprevalence and case surveillance data reflect and are biased by current policies. Care providers repeatedly indicate that the factors mitigating against acceptance of HIV testing by their clients include denial of HIV risk behaviors, cost, fear of discrimination, and the belief that no treatment is available for infected persons. Until appropriate policy changes are instituted to improve the ability to collect unbiased, more representative surveillance data, the government of China will be responding to the HIV epidemic with limited information on the true magnitude and diversity of the HIV epidemic. If China is successful in mounting prevention efforts guided by high-quality surveillance data, it may forestall further HIV spread. To improve the allocation of scarce prevention and care resources, the government of China should review the impact on surveillance data of policies that underlie determinants of health-related behaviors, including access to testing, stigma and discrimination, knowledge and attitudes toward HIV in the general population, and access to care and treatment. Examples of these policy issues include:

HIV Testing The lack of accessible, voluntary, anonymous testing should be addressed with a comprehensive voluntary counseling and testing program.

- The cost of an HIV test serves as a deterrent to HIV testing among STD clinic clients. This high-risk population should be offered testing at no or low cost; voluntary HIV testing should be actively promoted; HIV prevention education should be provided to all STD clients; and the hidden population being treated in private clinics must also be reached.

- Similarly, in health clinic settings, patients who present with risk factors for HIV or conditions indicative of HIV infection are not routinely offered HIV testing, resulting in bias in case surveillance data, and missed opportunities for prevention and treatment. This problem will only increase as unrecognized HIV infections progress to symptomatic HIV disease.
- The ability to conduct anonymous, unlinked seroprevalence surveys is affected by the lack of distinction at the clinic level between HIV testing for diagnostic purposes and HIV testing as part of the anonymous screening of a designated population for surveillance purposes. When a single specimen is used for both purposes in fee-for-service settings, voluntary participation in seroprevalence surveys and lack of anonymity introduce bias into the survey data.
- The lack of “street” outreach to promote HIV testing in high-risk populations introduces bias into surveillance data and misses important prevention opportunities. Some high-risk groups are only tested when they are in detention or re-education centers.
- Mandatory HIV testing in “vulnerable” populations such as incarcerated drug users and sex workers raises ethical concerns, particularly given the risks of discrimination and the lack of availability of treatment and medical follow-up.

HIV Prevention

- In general, there is a high level of awareness of the importance of HIV in the health sector. However, there is a general lack of HIV education and prevention materials in clinics serving both high-risk and general populations. Where materials exist, they are generally made available preferentially to those who test positive; high-risk clients who test negative should also be the focus of HIV prevention efforts.
- Efforts are needed to educate the general population regarding HIV risks: how to prevent HIV transmission, where to go to receive an HIV test, the importance of reducing stigma and discrimination, that HIV test results are confidential and will not be released for non-health purposes, and that the government is committed to increasing treatment availability.
- Few provinces provide treatment options to HIV-infected pregnant women to prevent mother-to-child transmission of HIV. These should be expanded.

HIV Care and Treatment

- The lack of HIV care and treatment options for HIV-infected persons is a deterrent to acceptance of HIV testing and to providers offering HIV testing. Investment is needed in developing and promoting specialized HIV treatment, particularly to marginalized populations such as drug users who currently represent the majority of persons with HIV.

General Social Climate

- Extra-marital and pre-marital sex are reportedly increasing. However, such behavior remains “hidden” and speaking about HIV prevention and risk reduction among the

general adult heterosexual population is not well accepted, even among health professionals. The homosexual population is largely unacknowledged. Prostitution and drug use are evident in urban areas, and widespread in some of these areas, but these populations are highly stigmatized. The stigma, criminalization, and discrimination against people with HIV threaten HIV prevention and surveillance efforts by driving HIV “underground.” Policies and laws that address these issues are needed to improve HIV prevention effectiveness.

- The very large migrant worker population known as the “floating” population is recognized to be at high risk for HIV. However, policies appear to exclude such persons from services and programs that are available to provincial “residents.” Outreach to provide HIV testing and health services as well as efforts to include this population in the surveillance systems are urgently needed.

Coordination and Cooperation Among Government Agencies

- To better understand the scope and impact of the HIV epidemic in China, policies to promote information exchange and cooperation in conducting testing and prevention should be instituted at all levels of government. There appears to be limited sharing of data and information between different departments; e.g., military recruit test data, or HIV data from the multiple reporting systems.

Emphasis on Sentinel Surveillance

- Considerable resources and time are spent on HIV and AIDS case reporting. While this is an important part of HIV surveillance, the top priority should be sentinel surveillance, in view of China’s concentrated and diverse HIV epidemic. China CDC needs to play an active role in stressing the importance of sentinel surveillance and in promoting it at the provincial level.

Use of Data

- In the provinces that were visited, there was a strong awareness of the importance of surveillance. However, often this awareness was limited to the process of surveillance rather than the use of the data emanating from it. There were very few examples of surveillance data being analyzed at the provincial level and being used for program planning. This is partly due to the lack of epidemiologically trained staff at the provincial and local levels. Training in case surveillance methods, analysis and presentation of data, and evaluation methods are needed to improve the consistency and comparability of collected data and to improve the quality and usefulness of the reporting system.

Role of China CDC in Strengthening the Surveillance System

The recent creation of China CDC, which has brought together the different agencies responsible for infectious-disease surveillance, represents an important opportunity for coordination of and leadership in surveillance efforts, leading to a higher-quality national HIV/AIDS surveillance system. To achieve this, a substantially increased role for China CDC is needed in surveillance program management, review, and oversight at provincial and lower

levels. Ultimately, China’s ability to achieve a comprehensive national HIV/AIDS surveillance system will depend on the leadership of China CDC. Active involvement in the surveillance processes and procedures at lower levels will enhance the ability of the national team to advocate for surveillance program needs and promote the use of surveillance data to allocate resources for prevention and care to areas most in need. For example, the national team should periodically visit the facilities and laboratories in towns and municipalities in the provinces where testing, seroprevalence surveys, and case reporting occur. Likewise, their ability to convene national and provincial training workshops is important in identifying problems and taking steps to resolve inconsistencies.

The national CDC team should have the lead role in developing operational guidelines and standards for best practices that can be applied throughout the system to ensure comparability of system performance. Efforts should be made through increased staffing, training, and resources to develop authority over national HIV/AIDS surveillance that is based in technical expertise. The national program can become more active and “hands-on” in monitoring provincial and lower-level surveillance activities by offering expertise, funding, training, and support such as standard protocols, software, forms, and reports. At the same time, active involvement in local surveillance procedures will enable the national leadership to build in the flexibility and autonomy that provinces need in order to adapt national methods to their local situation while still maintaining common national standards.

Clearly this increased role will require a significant increase in human and financial resources. China CDC should critically review its resource needs and advocate for strengthening its capacity.

Sentinel Surveillance System

Strengthening the Existing System

China CDC, in collaboration with provincial CDC surveillance programs, should conduct a comprehensive review of existing sentinel surveillance protocol and activities. Such a review would include a thorough inventory of population groups to be surveyed, the selection of sentinel sites, the methods being practiced for data and specimen collection, and the existing data management systems. A workshop bringing together provincial and local surveillance coordinators should be convened to facilitate this process. Site visits by China CDC staff to provincial surveillance sites should be conducted to discuss specific issues regarding the surveillance activity. Recommendations for specific areas where the sentinel surveillance system could be strengthened include the following:

- A more strategically and epidemiologically sound selection of sentinel population groups and sites based on the currently understood dynamics of HIV/AIDS should occur so that selected groups truly reflect the current epidemiological situation.
- There should be further development, implementation, and oversight of standardized protocols for the selection of sites, sentinel groups, eligible clients, data and specimen collection, data management, data analyses, and dissemination of findings.
- Sentinel surveillance sites that are selected for unlinked anonymous surveys should have a routine diagnostic testing program (e.g., syphilis screening) so that all eligible persons accessing the site are included in the survey. Alternatively, at sites where voluntary HIV testing is ongoing, in particular STD clinics, sentinel surveillance could be conducted on a voluntary basis by offering HIV testing to all clients during the survey period.
- A more formal separation between diagnostic HIV testing (frequently fee-based) and unlinked anonymous testing conducted for the purposes of surveillance should be created.
- Bi-annual conduct of the serosurveys should be decreased to once per year with inclusion of a sufficiently large sample of clients at each of the sites.
- A series of training workshops to include all coordinating and site-specific staff should be provided by the national program to familiarize such staff on any revised survey operations.
- Adequate oversight of survey procedures as they are implemented at the selected sites should be conducted by both national and provincial staff.
- Existing software for the sentinel surveillance program should be updated to a Windows-based data management system and distributed to provincial surveillance staff.
- Further training at the national and provincial level in data analysis, interpretation, and reporting of data to key policy decision makers should be conducted.

Expansion of the Sentinel Surveillance Activities

- In order to provide a more representative picture of the current HIV/AIDS situation in China, sentinel surveillance activities should be expanded. This expansion would encompass the inclusion of new risk groups such as MSM and migrant workers, the

extension of surveillance to street-based venues (e.g., bars, massage parlors, cruising zones), particularly for IDU and CSWs, and inclusion of behavioral surveillance. Ideally, such surveillance would include the collection of biologic (i.e., HIV) as well as behavioral data.

- Formative research should be conducted to gain a better understanding of existing social networks among hard-to-reach populations in order to gain access to these populations for the conduct of surveillance and the planning of HIV and STD prevention programs.
- Efforts are needed to systematically collect and report data from routine testing activities. The first priority would be the inclusion of data from blood donors, since this would provide data from a low-risk population for the entire country at a low cost.

HIV/AIDS Case-Reporting

Recommendations

Several factors hamper the ability of the current system to provide representative, unbiased and useful demographic and behavioral data on persons who have been diagnosed with HIV. The lack of a nationwide strategy to promote voluntary testing at no or low cost in high-risk populations leads to bias in diagnosing and ascertaining HIV cases, notably among STD clients. The lack of an efficient (electronic) standardized data collection and entry system at all levels and redundancy in testing and reporting HIV cases through multiple systems will likely compromise the quality and timeliness of case reporting should the number of cases increase significantly. Addressing these factors will require action in a number of domains, as follows:

- Policy changes are needed at a national level to promote HIV testing in high-risk populations with concomitant education campaigns, efforts to destigmatize HIV, and institution of referrals to prevention and care services for positive persons. The practice of requiring payment for HIV tests deters clients/patients from seeking and accepting HIV testing. A free, voluntary, anonymous testing program at designated accessible sites would improve test acceptance and improve case ascertainment through referrals to clinical sites for diagnostic testing, case reporting, and care and treatment.
- Serious consideration should be given to instituting a single system for HIV/AIDS case reporting instead of the multiple parallel systems currently in place. This would require educating providers on the case-reporting process and providing feedback to reporting sources. This would reduce burden and improve consistency and reliability of the data by resulting in a single national data set rather than the current three sets of numbers (which differ and may contribute to skepticism regarding the basis for national prevalence estimates). The apparently successful implementation of such an integrated system in Jiangsu Province could be extended to all provinces.
- A standardized behavioral assessment questionnaire for all HIV case reports should be developed and implemented and training provided to municipal epidemiologists who collect such data. NCAIDS should provide uniform software to permit entry and analysis of laboratory, demographic, clinical, and behavioral data at lower levels of the system and to standardize reporting to NCAIDS. The development of this questionnaire should be part of an effort to develop a behavioral surveillance system that includes surveys in high-risk populations. In planning to collect these data, consideration should be given as to how they will be used to guide prevention and control programs.
- Concerns regarding the confidentiality of HIV testing data contribute to reluctance to offer the test by providers and deter acceptance of testing by high-risk persons. Procedures should be put in place to reduce the risk of inappropriate access to HIV data, including reducing the number of paper copies, training staff, and instituting additional physical security measures and restrictions on access to data. Educating providers and the public about the privacy and security of public health databases would contribute to increased acceptance of counseling, testing, and care.
- With the increase in the number of private clinics and hospitals, China CDC should

develop procedures to assure that information from persons seen at these facilities is included in the case-reporting system.

- NCAIDS should develop models of how to use HIV surveillance data to address local public health planning needs and provide training in analysis, presentation, and interpretation of the data.
- Consideration should be given to revising the AIDS case definition to one that does not rely on complex diagnostic techniques that are generally unavailable. This new definition could be based on the WHO 1994 AIDS case definition that relies on clinical syndromes among persons with confirmed HIV infection. Alternatively, a sentinel AIDS case-reporting system could be developed by selecting a number of sentinel clinical sites. These sites would receive necessary laboratory equipment and training in order to offer HIV testing to all persons presenting with clinical conditions associated with HIV and to accurately diagnose these conditions and report them for persons meeting the AIDS case definition.
- Efforts should be made to assure quality, accuracy, and validity of epidemiologic data. Evaluation projects should be conducted to assess the quality and completeness of the case-reporting system to guide efforts to improve the performance of the overall system.
- Links between surveillance data and public health activities should be strengthened by supplementing the multiple audit reports with critical analysis of data and synthesis of information to guide public health practice.
- Training in case surveillance methods, analysis and presentation of data, and evaluation methods are needed to improve consistency and comparability of data collected and to improve the quality and usefulness of the reporting system

Laboratory system

Common Requirements

- *National Standards of Training* – National standards need to be established for laboratory supervisors, technicians, and diagnostic test performers. This curriculum should familiarize the participants with acceptable diagnostic strategies, laboratory ethics, and the role of the laboratory in HIV surveillance and prevention programs. Similar informational packets should be developed for the community health care worker, explaining the benefits and role of HIV diagnostics in patient care, outreach programs, and risk-reduction counseling.
- *Quality Assurance* - External Quality Assessment (EQA) standards should be established and implemented widely. The NARL should provide EQA reagents and procedural guidance to the provinces. Provincial CDCs should work with their constituent laboratories to develop quality assurance plans for the district, municipal, and county programs. The provincial CDC would then provide EQA to these constituent labs. These plans should include proficiency testing and observed performance of testing in Level IV and V facilities.
- *Reliable Reagent Supply* – Reliable reagent supply and management guidelines should be established to promote best practices for inventories. These include inventorying and reagent tracking to insure that the oldest stocks are used first and onsite storage of test kits reflecting immediate needs. These practices are most relevant to facilities that do only a limited amount of HIV testing and thus risk cycles of overstocking and reagent shortages. Consideration needs to be given to logistical management of supplies to CDC laboratories at the national and provincial levels.
- *Guidance for Standard Operating Procedures* – Guidance should be developed nationally along International Standards Organization (ISO) criteria. The NARL and provincial CDC laboratories should work with their constituent laboratories to tailor these procedures to the needs of each point-of-service laboratory.
- *Data Management and Linkages between the Laboratory and Public Health Epidemiologist* - These linkages need to be strengthened at all levels. Basic epidemiologic training relevant to surveillance should be provided to senior laboratorians and standardized protocols established for computerized data management.

Recommendations

- *Recognize throughout the public sector the authority of NARL to oversee and support the laboratory elements of the national HIV surveillance and prevention program.* This authority should be exercised in a project officer role, coordinating and liaising between the various collaborating laboratories rather than that of direct-line supervision, which would fall outside of existing administrative structures. Such recognition will facilitate the NARL's leadership in establishing national policies and achieving programmatic goals that are national in scope. NARL staff should partner with surveillance staff in identifying programmatic needs and implementing projects. To this end, project teams should be established that incorporate NARL staff. These multidisciplinary project teams

would be responsible for project design, implementation, and assessment. They would be expected to visit participating provincial programs, assess needs, and provide integrated support.

- *Establish Laboratory Working Groups* - Technical working groups should be established between laboratories at every level. These groups would be responsible for reviewing guidance and standard operating practices for specimen management and transport between laboratories, data sharing, and establishment of common safeguards including serologic controls. These professional working groups would also provide policy guidance to the provincial government and establish a network for technical assistance within the province. Professional workgroups composed of technical experts can similarly provide guidance to the China CDC for strategic planning. These workgroups would in turn serve to bridge the communication gap between the NARL and Level V laboratories.
- *Build better linkages among Public Health Laboratories* – In the absence of a single vertical line of authority or funding stream, an association of public health laboratories or laboratory professionals should be fostered which could serve as advocates for laboratory needs and provide professional consultation to regional and national programs.
- *Further decentralize HIV confirmatory testing by developing alternative testing strategies that do not rely heavily on Western blot interpretation.* Multiple EIA/rapid test algorithms exist for screening and confirmation that are consistent with WHO guidelines and would permit the decentralization of confirmatory testing to Level IV laboratories. The NARL in partnership with provincial laboratories should validate alternative testing strategies.
- *Strengthen national standards and external quality assessment program* – These programs are seen by the participating laboratories as national in scope. China CDC should work with the provincial laboratories through the NARL to establish uniform standards and provide guidance for the implementation of these practices from the provincial level down.

U.S. CDC - China CDC collaboration on HIV surveillance

In previous discussions between U.S. CDC and China CDC staff, surveillance was identified as a key area for potential collaboration between the two institutions. The findings of this assessment confirm this decision: strengthening surveillance was a priority specified in the government of China’s HIV strategic plan, and it is an area of expertise for U.S. CDC and one where focused input at the central level can have a national-level impact. Based on the recommendations of this assessment, there are a number of possible areas for U.S. CDC to provide technical assistance to China CDC to strengthen HIV surveillance. The extent of the collaboration remains to be determined, and will depend on the overall budget and on the administrative mechanisms of the collaboration (i.e., Will GAP funds be used to hire staff? Will these funds be expended in Beijing only or also in provinces?). Other considerations include the number of program areas other than surveillance, the capacity of U.S. CDC to provide ongoing technical assistance, and the capacity of China CDC to absorb this technical assistance in view of its small staff and other priorities. The following section identifies possible areas of collaboration between the two institutions and the mechanism to provide this assistance.

Direct Technical Assistance from Atlanta-Based CDC Staff – Direct technical assistance could also be provided by U.S. CDC partners such as cooperative agreement recipients (e.g., recipients from the University Technical Assistance Program and the Association of Public Health Laboratories).

Revision and Standardization of Protocols and Procedures

- Review and standardize the national sentinel surveillance protocol with a focus on the selection of population groups and sentinel sites.
- Review and revise the AIDS case definition.
- Assist in developing standardized HIV case-reporting epidemiologic form including behavioral risk assessments.
- Assist with development of confidentiality principles and standard practices.
- Strengthen and expand behavioral surveillance activities. The first step would be to conduct formative research among hard-to-reach populations to improve access for surveillance and prevention.
- Develop standard approach to collect surveillance data from populations that are already having blood drawn for HIV testing, such as pre-marital couples and certain occupational groups.

Data Management Assistance

- Conduct evaluation of HIV case-reporting and surveillance data management system with the goal of developing a unified nationwide system.
- Upgrade sentinel surveillance data management software to a Windows-based system.
- Assist in developing software for case reporting and reviewing the data management system.
- Assist in developing a standardized laboratory data management system.

- Analyze and synthesize data from the various populations to develop an epidemiologic profile for the province, and use this for advocacy for resources.

Laboratory Technical Assistance

- *Provide assistance with evaluation of simple HIV testing algorithms* – The evaluation would include EIA and rapid tests. To facilitate these efforts U.S. CDC, in collaboration with China CDC, should conduct pilot studies to validate alternative algorithms involving multiple EIAs and simple/rapid tests. The activities could be modeled in three provinces, preferably representing high-, middle-, and low-prevalence populations. These pilot programs would provide the opportunity to fully integrate testing services with program objectives and quality assurance efforts. During this pilot phase the operational relationships between national, provincial, and point-of-service laboratories should be reviewed and revised as needed to meet programmatic goals. For example, the implementation of a simple multi-test algorithm for screening and confirmation based on rapid tests would greatly facilitate the decentralization of confirmatory testing thus permitting the same day delivery of *voluntary counseling and testing* (VCT) services. It would similarly support outreach programs in mobile populations.
- *Develop standard testing guidelines for Surveillance, VCT, and programs for the prevention of mother-to-child transmission (PMTCT)* - The projection of national standards of laboratory practices in the absence of strong vertical structures can be achieved through the adoption of common operating procedures. The U.S. CDC can support the development of standard operating procedures that incorporate appropriate quality assurances and are readily integrated into diverse testing environments. Accomplishment of these integrated practices requires both programmatic and laboratory expertise; however leadership in this effort will greatly enhance the authority of the NARL with public health laboratories at all levels.
- *Strengthen Quality Assurance Program* - The U.S. CDC, in partnership with experts from the U.S. Association of Public Health Laboratories, can provide guidance in developing national quality assurance measures that are appropriate to China. U.S. CDC laboratories could also be involved in these efforts by helping to develop appropriate proficiency-testing reagents for serodiagnostic procedures and dried blood spot technologies.

Capacity Building – A priority for all GAP country programs is building the capacity of the host country staff. This should be a priority of the GAP China program and could be implemented using a variety of mechanisms, including local contracts, hire of local experts, and technical assistance as above.

Development of a Surveillance-Training Program

- Develop training materials for the conduct of sentinel surveillance activities.
- Develop a laboratory training program; provide technical assistance in developing training pamphlets, videos, and coursework for HIV testing, CD4 enumeration, and viral load testing.

- Strengthen the capacity to analyze, interpret, present, and disseminate sentinel surveillance data.
- Provide training in case surveillance methods, including case-finding, reporting, analysis, and evaluation

Strengthening the Capacity of China CDC to Coordinate Surveillance Activities

- Strengthen the capacity of China CDC to actively review and monitor the conduct of sentinel surveillance both at the local and provincial levels.
- Develop and implement an evaluation and quality assurance program to assess surveillance performance and data quality.

Development of a Pilot Provincial Surveillance System

Most of the recommendations from this assessment focus on China CDC activities. However, to successfully implement the above recommendations, it is critical that action be taken at the provincial and local levels. One possible approach to achieve this would be for the China GAP program to select one province and to work in a comprehensive fashion to strengthen the surveillance program. Some of the recommendations from this assessment go beyond surveillance issues and involve access to voluntary counseling and testing and HIV treatment. Depending on the budget and the level of commitment, this model province surveillance effort could also include efforts by China GAP program to address these issues. The components of this proposed program would include:

- *Expanded Surveillance Among High-Risk Groups*
 - Sentinel surveillance – Following the revision of the sentinel surveillance protocol at the national level, China CDC staff would work with provincial-level staff to implement the revised protocol. These protocols would focus on data collection through anonymous-unlinked method. Attempts would be made to identify high-risk persons such as injecting drug users and sex workers outside of institutional settings.
 - Behavioral surveillance studies would be initiated among risk groups to better understand patterns of and changes in risk behavior. This would include formative research and links with community groups to facilitate access to these populations and would require agreements with law-enforcing authorities to assure the safety of the individuals tested and the confidentiality of the information collected.
- *Expanded Surveillance Among General Populations* – In view of the large number of persons from the general population that are tested for infectious diseases other than HIV (e.g., premarital screening for syphilis and hepatitis), it would be possible to assess HIV prevalence among these populations at low cost. This would be accomplished through anonymous unlinked HIV testing of these blood samples. In settings where HIV

testing is being conducted in these populations (e.g., antenatal testing in Shenzhen or blood donors), links would be created between the centers conducting the testing and local CDC offices to collect information. This would be anonymous and include limited demographics and HIV results. In areas where prevention efforts were being targeted at the general population, knowledge, attitudes, and practices surveys could be conducted among these populations to obtain baseline data.

- *Increased Access to Voluntary Counseling and Testing* – As previously mentioned, to more fully access at-risk populations, these must be tested for HIV. Therefore, sites where this testing can be done at low or no cost, in a safe environment, with specific efforts to access risk groups, such as injecting drug users and sex workers, should be established.
 - Anonymous, voluntary, free counseling and testing centers where testing is based on rapid tests should be established so that results can be returned to the client. Individuals found to be HIV-positive should be referred to sites specializing in the treatment of persons for HIV to assess their health and initiate preventive therapy (e.g., prophylaxis for tuberculosis, or antiretroviral therapy).
 - Promote HIV testing at low or no cost in STD clinics to all patients diagnosed with an STD. STD clinic laboratories would perform on-site HIV testing using rapid tests so that clients could receive results the same day, and appropriate referrals could be arranged. Similarly, staff in primary care clinics, tuberculosis centers, and hospitals would promote HIV testing for patients with selected sentinel diagnoses (e.g., STD, tuberculosis).
- *Decentralized HIV Testing* – At the clinics, HIV testing would be conducted using rapid testing and simpler confirmatory algorithms would assure that results were returned to the individuals more rapidly.
- *Promoting Better Use of Data* – Training and technical assistance would be conducted at the local and provincial levels concerning data analysis and report writing to assure that the data being collected were being used appropriately.

Appendix A: Summary of earlier surveillance assessments

DFID-China/United Kingdom AIDS Prevention and Care Project

Background

During the time period of April-June 2001, the China/U.K. Project on AIDS Prevention and Care Project (DFID) conducted an assessment of the capacity of the HIV/AIDS/STD surveillance program in Sichuan and Yunnan Provinces. The goal was to appraise the capability of the provincial-level public health programs to collect, analyze, and utilize data obtained from surveillance activities, including both HIV/AIDS case reporting and sentinel surveillance.

Principal Findings

Principal findings from this assessment concluded that both Sichuan and Yunnan had existing HIV/AIDS/STD case-reporting systems being coordinated by three separate organizations using three different reporting systems/cards. Failure of reporting within the system was identified at various degrees with STD reporting being the most limited. Both provinces also had national and provincial HIV sentinel sites monitoring HIV prevalence among STD patients, drug users, female sex workers, long distance truck drivers, and pregnant women. Out of all of the sentinel sites, 9 out of 59 of the sites were part of the national serosurveillance program. Yunnan Province had the greatest number of sites (47). Geographic distribution of the sites included a total of 28 regions and prefectures within both provinces. Behavioral surveillance activities have been limited to a few KAP surveys. Additional data sources related to HIV/AIDS and STDs also exist in the two provinces including a variety of HIV/STD screening test programs among blood donors, reproductive health patients, army conscripts, and persons in detention programs. Local organizations that may be tapped into as a resource for further enhancement of the surveillance program are the China Academy of Social Sciences and the Family Planning System.

Several areas for improvement were identified, including a need for standardization and improved coordination of case reports, integrating the three reporting systems into one, implementation of behavioral surveillance to complement biological data, using available data from ongoing screening programs, training in surveillance operations, and the application of best practices being implemented in other parts of the country/region.

Recommendations

Specific recommendations in the assessment report include the following:

- Update the local government's current understanding of AIDS.
- Establish an integrated AIDS/STD surveillance program.
- Intensify the utilization of potential human resources and available institutions.
- Intensify the oversight and evaluation of the program.
- Intensify the training of surveillance personnel.

United Nations Children's Fund (UNICEF) Assessment

Background

During October-November 2000, the United Nations Children's Fund (UNICEF) and UNAIDS in collaboration with China Ministry of Health (MOH), the Academy of Preventive Medicine, NCAIDS, and the National STD Center, conducted an assessment of HIV/AIDS activities in four provinces: Guangdong, Jiangsu, Jilin and Xinjiang. The goals of the UNICEF assessment were to review the collection of HIV/AIDS/STD/RTI data in health care facilities other than those designated as national HIV and STD sentinel surveillance sites and to assess the usefulness of surveillance data for formulating a public health response to the HIV/AIDS epidemic. The methods of the assessment included site visits by a multi-disciplinary team, interviews with health officials, and completion of a 20-page questionnaire to obtain standardized data on the organization and structure of the disease-reporting systems.

Principal Findings

The existing infrastructure for clinical services and case reporting was reviewed at provincial, prefecture and district levels. Facilities surveyed included STD clinics, mother-child clinics, blood banks, epidemic prevention stations, health bureaus, re-education centers, and family planning clinics. At these sites, demographic and clinical data are collected for disease-reporting purposes during the provision of routine services. Very limited behavioral data are collected through the case-reporting processes. In most clinics, HIV testing is offered on a fee-for-service basis. Thus, many persons refuse HIV testing. In some settings, HIV testing is universal and involuntary and may target populations at low risk (e.g., pregnant women) or at high risk (e.g., drug users in detention). Persons who are found to be HIV-positive are reported through several disease-reporting systems, including general communicable diseases-, STD-, and HIV- reporting systems. Reports flow from local facilities up to successively higher government levels, through the district, prefecture, and provincial epidemic prevention stations, to the national level.

Multiple systems, each of which reports minimum data on HIV cases, likely contribute to limitations in data quality and lack of representativeness of affected populations. Thus, case surveillance data are limited in their ability to guide the formulation of prevention and control strategies.

It was also found that provincial capacity for prevention and control is limited, in part, as a result of lack of education concerning HIV risks in the population, and stigma and discrimination against HIV-infected persons. Case management for people living with HIV/AIDS is also limited due to lack of diagnostic and treatment capacity for HIV-infected persons.

The team concluded that risk behavior is increasing in the population as a result of changing social norms. The large internal migrations resulting from economic development contribute to difficulties in conducting prevention outreach activities. The low level of knowledge of risks and prevention in the population and harsh discrimination against people in risk groups for, or infected with, HIV must be addressed to mount an effective HIV prevention program.

Recommendations

The assessment identified a number of underlying problems and challenges to the provision of testing and care services to at-risk and other populations. Recommendations included the following:

- Revamp the HIV testing practices to reduce indiscriminate and involuntary HIV testing, and address the issue of HIV testing for income generation by facilities.
- Strengthen the anonymous sentinel surveillance system for high-risk populations. Collect anonymous HIV data on low-risk populations that are being routinely screened for other purposes.
- Develop a behavioral surveillance system.
- Integrate HIV with STD surveillance as well as data on HIV-related conditions (e.g., hepatitis and tuberculosis).
- Emphasize the link between data collection and public health decision making.
- Improve the design, monitoring, and evaluation of surveillance systems.
- Policies and protocols for management, referral, counseling and protection of people with HIV should be instituted with attention to confidentiality and public education to improve prevention awareness and combat stigma.

World Bank Assessment

Background

A report prepared by China CDC/NCAIDS dated May 10, 2002, summarizes an assessment of the capacity of HIV screening laboratories to test blood donations in four provinces (Fujian, Shanxi, Guangxi, and Xinjiang). The assessment was conducted by national and provincial CDC officials and invited experts during April 15-21, 2002, under the sponsorship of the World Bank. Laboratories were visited to investigate the availability of HIV diagnostic equipment, laboratory procedures such as specimen handling and quality control activities, and methods of financial accounting and reimbursement for testing materials and equipment. At provincial, prefecture, municipal and township levels, laboratories visited included CDC laboratories set up to conduct confirmatory HIV tests and screening laboratories such as those in hospitals, clinics, blood centers, and epidemic prevention stations. The assessment did not address blood donation procedures per se or how donated units that screen positive are identified and dispositioned.

Principal Findings

While some improvements in laboratory capacity and procedures were found, overall, the assessment team identified ongoing limitations and challenges to the successful implementation of a comprehensive HIV screening program in these provinces. Improvements were noted in the designation and function of four provincial confirmatory laboratories which are able to achieve designated performance criteria. A laboratory network consisting of 148 “antibody-testing” laboratories and 779 “running screen” laboratories has been set up in the four provinces in order to meet the needs of preventing HIV transmission through the blood supply. The team noted lack of adequate training and equipment, particularly at “first line” laboratories. They also called attention to complicated accounting procedures which appear to impede timely and efficient acquisition of testing materials and equipment.

Specific findings include:

- The local officials of the Health IX project are frustrated at the lack of local matching funds and equipment due to the lack of appropriations from the national project fund. As a result, many laboratories lack EIA microplate readers and washers, and, in general, the experience and training of the laboratory personnel are inadequate.
- Funding problems and delays are attributed to burdensome World Bank accounting procedures which are not understood by the Chinese treasurers and accountants.
- In one province (Guangxi), laboratory assessment panels are not yet established; therefore laboratories are not checked and accepted.
- There appears to be a lack of coordinated management of laboratories and testing procedures given that there are two separate administrative groups (i.e., CDC and the health administration) governing laboratory performance in hospitals and blood donation centers.

Recommendations

- In response to the expressed needs of all four provinces, improve planning, inspection, and assessment by promoting coordinated leadership of the World Bank project. Unified leadership is also needed to reduce conflict and lack of coordination between managers in AIDS prevention and control and the health administration. HIV screening/confirmatory laboratories and those in hospitals and blood stations are accountable to different leadership teams at provincial and central government levels.
- Increase the acquisition of laboratory equipment to improve the provision of HIV testing and other diagnostic capabilities, including the ability to conduct CD4/CD8, viral load, and resistance testing. User fees for HIV testing are a deterrent in impoverished rural areas; increase the funding allocations to the provinces to conduct testing in these areas.
- Additional laboratories are needed in remote areas
- Address the problems in disbursement of funds to procure equipment and general difficulties with accounting procedures.

Appendix B: Province-Specific Findings

Jiangsu Province

HIV and AIDS Case Reporting

Jiangsu Province has a population of 77 million. It has reported 177 HIV cases to the national HIV-reporting system. Of these, 98 were migrants from other provinces, 13 were AIDS cases, and 5 had died. Nanjing City is the provincial capital and the site of the provincial CDC HIV confirmatory laboratory where one person is responsible for sentinel surveillance and case reporting. Visits were made to the municipal and CDC facilities/laboratories in Suzhou, Pinjiang and Kunshan. As is the case in the other provinces we observed, HIV/AIDS case reporting is intermingled with HIV sentinel surveillance. That is, selected populations are targeted for screening, including those in the sentinel surveillance system as well as others in which routine mandatory testing is carried out. When a positive screening test is identified, confirmatory testing with feedback to the lower levels results in epidemiologic follow-up on the case (except where the case is lost to follow-up, such as migrant laborers) and a case report through one or all of the multiple reporting channels. In Jiangsu, an innovative integrated STD/HIV-reporting system has reduced redundancy across at least two of the multiple systems seen in other provinces. The integrated form contains a check-off box for HIV. In addition to the sentinel populations, screening occurs among patients in dermatology clinics in hospitals and, in some local jurisdictions, among all pregnant women. Positive persons are interviewed to collect more detailed information including demographic, behavioral, and clinical data. However, reporting of such data to higher levels is inconsistent; there is no standard database for entry and management of the data collected through interviews.

In the Maternal-child hospital in Nanjing, there are about 6,000 deliveries per year; all mothers are offered HIV testing and all accept; however, there have been no positive pregnant women identified yet. There are 20,000 registered drug users who are taken to detention centers for compulsory detoxification for three-six months. Reportedly, not all drug users are screened because there is insufficient capacity. A large number of tests (80,000-100,000 per year), are conducted on in- and out-migrants. Once people test positive, they reportedly go home to their province of origin because treatment is largely unavailable. Only two hospitals have the capacity for flow cytometry, and only a few patients have had CD4 testing. In Nanjing, epidemiology staff expressed an interest in obtaining sample epidemiologic profiles from the U.S. as examples of how to use and apply the data from case and sentinel surveillance, and in adapting the U.S. slide sets available on the U.S. CDC Web site.

In Suzhou, with a population of 5.8 million residents and a 1.3 million floating population, the Suzhou CDC, together with 13 county/district CDCs (formerly anti-epidemic stations), multiple general hospitals (numbering 182), STD clinics, blood banks, and MCH

clinics, constitutes a network for HIV prevention. Multiple efforts to check completeness of reporting through audit logs and review of patient records are made. Checking is more frequent at lower levels and irregular at the level between provinces and national. Health officials noted the need for health education, improved laboratory testing and training, and improved monitoring and tracking of HIV. They also expressed concern for the deterrent effect of the high cost of testing/treatment and the resistance to condom acceptance. In the Suzhou University hospital, there was impressive awareness of clinical indicators of HIV and willingness on the part of the physician staff to discuss risk behaviors for HIV. However, the cost of HIV testing and the stigma associated with risk behaviors as well as HIV infection negatively impact their ability to promote HIV testing. Licensed physicians are routinely screened for HIV, and all hospital staff are tested once per year.

Kunshan district is near to Shanghai and economically well-developed. The city has a population of about 600,000 (as of 2001) and 700 health department staff are involved in disease control and prevention. The local Red Cross performs over 13,000 tests each year among blood donors. The Kunshan CDC tests a sample of 50 of these specimens for quality assurance purposes. In 2001, about 1,300 patients were seen in STD clinics, but only 580 were tested for HIV. At the MCH clinic, the facilities, patient management, and referrals were excellent. Screening for STDs and hepatitis occurs. Premarital screening and education are provided there (4,000 couples per year), as are well-baby visits, prenatal blood tests (about 4,000 per year), and teacher screening (over 1000 each year). HIV screening is voluntary. At a street-based STD clinic, staff reported that they treat numerous STDs, and frequently see prostitutes, many of whom are IDU as evidenced by visible needle-tracks.

Sentinel Surveillance

The Jiangsu Provincial CDC has been collaborating with the national surveillance program since 1995 and has conducted sentinel surveillance in four sites for the national survey (two STD clinics, one CSW re-education center, and one IDU re-education center) and eight sites for the provincial survey. Provincial sites have included STD clinics, IDU detoxification/re-education centers, CSW re-education centers, blood donor centers, and physical examination centers for long-distance truck drivers. Over 15,000 persons have been included in serosurveys conducted during 1995-2001. Overall HIV prevalence was observed to be 0.1%. Positive specimens originated from STD patients, IDUs, CSWs, and long-distance truck drivers.

In addition to these sites, behavioral data is collected from female sex workers recruited at their work sites. This is being done as part of the evaluation of a WHO-sponsored 100% condom program in Jingjiang City and is conducted by local and national China CDC staff in collaboration with WHO. Among 355 sex workers interviewed at various street-based venues (bars, karaoke establishments, and massage parlors), none to date have been found to be HIV-infected. Sex workers reported irregular use of condoms.

The U.S.-CDC and China-CDC assessment team visited one of the STD sentinel sites in Suzhou City. The team discussed routine operations which are implemented during the time that the surveys are in operation (April-May and October-November). Discussions with the clinic site resulted in the determination that survey operations as outlined in the national surveillance protocol were not being adhered to during the conduct of the survey (see Page 11).

Guangdong Province

HIV and AIDS Case Reporting

Guangdong is a relatively wealthy province, located along the southern coast near Hong Kong. Guangzhou city serves as the provincial capital. This area has been affected by HIV for a number of years and appeared to be more sophisticated in terms of acknowledging the disease, behavioral risks that spread HIV, and incorporating effective prevention strategies; e.g., methadone treatment. The provincial CDC laboratory reportedly conducts about 2,500 confirmatory HIV tests per year. It functions as the screening laboratory for the national sentinel surveillance sites; prefecture level laboratories conduct screening for the provincial sentinel surveillance sites. At Guangdong CDC, a Foxpro database is used to enter laboratory test results from the laboratory log, and the program generates the four copies of the Western Blot report form. Once per month, the epidemiologist takes the same laboratory log and enters the data into the epidemiologic database. Data on HIV-positive persons are also received electronically via the communicable disease-reporting system from 22 cities. Summary data reports are generated monthly and shared with neighboring provinces and NCAIDS.

At a local STD clinic in Guangzhou which serves as a national sentinel surveillance site, screening is conducted for STD clients, and for drug users and prostitutes whose blood is drawn in re-education centers. At this site, it appeared that screening for clinical purposes and screening for sentinel surveillance were intermingled in terms of procedures and reporting. Apart from the sentinel period, limited HIV testing is done at this clinic, which therefore relies on rapid tests for HIV screening. HIV testing is voluntary for STD clients, and testing is recommended if the client has syphilis or herpes. Less than half of persons who are offered HIV testing accept the test, in part due to the cost of the test (60 Yuan, province-wide). Brochures and condoms were available in an HIV/STD counseling room.

Shenzhen prefecture is a highly developed, high-income area located in a special enterprise zone. Health officials estimate there are 5000 HIV-infected persons in their district. The majority of the population is “floating” (people from other provinces) and most of the HIV cases have occurred in this population. The concentration of HIV in the migrant population poses problems for prevention and control. A comprehensive HIV testing/screening/ surveillance program includes sentinel surveillance in blood donors, prostitutes and drug users in detention, and STD clients. Testing is free in most groups; however, for STD clients, payment is required for HIV screening tests (90 Yuan). Confirmatory testing is done locally for the purpose of

returning test results to the clinic/provider to inform the client. An epidemiologic interview must be done within 24 hours. A tally sheet recording the number of specimens tested by group/site and the number of positives is sent every month to the provincial CDC, where data are compiled and forwarded to NCAIDS.

Within the prefecture level, we visited BaoAn health district, including the CDC site and an MCH hospital where all pregnant women are screened for HIV for free. We also visited a small rural hospital in Guang Ming, a local district with a population of 30,000. In BaoAn, the HIV prevention and control system is focused on prenatal screening. Entertainment and restaurant workers are routinely tested for hepatitis, but not for HIV. Drug users are HIV-tested at entry to detention and again three months later to detect recent HIV infections that may have been missed by the test done at entry. Extensive, mandatory free testing occurs in blood donors, pregnant women, and drug users in treatment centers, but HIV testing among STD patients is voluntary. In Guang Ming, at the local hospital, no HIV screening is done. However, all premarital specimens and specimens from the 1,000 deliveries per year are screened in BaoAn. HIV testing is voluntary for STD patients and about 10 per month accept HIV testing.

HIV Sentinel Surveillance

The Guangdong Provincial CDC conducts sentinel HIV surveillance on behalf of the national surveillance program as well as for its own province-specific program. Sites include STD clinics and re-education centers and total 42 in 21 separate prefectures.

The assessment team visited the Guangzhou STD clinic to discuss site-specific surveillance operations. The clinic conducts sentinel screening for the national sentinel surveys which includes female sex workers once a year; STD patients once a year; and drug users twice a year. Staff from the clinic go to the re-education centers to complete data collection forms and obtain blood specimens from drug users and CSWs. Local testing algorithms follow national algorithms for surveillance purposes. During the sentinel period, 300-500 blood samples are screened for HIV and syphilis. All STD patients are provided free and anonymous testing if they request it and if the patient has a diagnosis of syphilis or herpes.

In Shenzhen prefecture two sites are participating in the national sentinel surveillance program: an STD clinic and a re-education center for CSWs. There are also several screening programs which include population groups such as pregnant women, IDUs, and blood donors.

Different testing policies exist with CSWs and IDUs being tested for free, whereas a charge is placed on STD patients for initial HIV screening. A program of free HIV screening of all pregnant women exists, although testing appears to be mandatory and not anonymous. The team visited an MCH hospital in BaoAn district (2,300 pregnant women per month are seen there). From July 1, 2001, through the date of the assessment (September 25, 2002), 2,212 women had been screened for HIV with no positives at this clinic. In all of BaoAn, 10,200 pregnant women district wide have been screened with only 1 positive found. In the same

prefecture, IDUs are tested on entry to the local detention center and again three months later, due to concern about missing recent infections.

Shandong Province

HIV and AIDS Case Reporting

Shandong Province has reported a total of 120 HIV cases, 16 AIDS cases, and 14 deaths to NCAIDS through the national HIV-reporting system. Jinan City is the provincial capital where the CDC laboratory is housed within the Institute of AIDS/STD Prevention and Control. Visits were made to facilities/laboratories in Jinan, Qingdao, and Jiaozhou. Most of the epidemiologic work, including data entry and management, at the provincial level is carried out by the laboratory staff as there appeared to be little specialized epidemiological capacity. Although there are only a few AIDS cases, health officials indicate that diagnosing AIDS is challenging because of the lack of diagnostic equipment to assess CD4+ counts. The sources of the positive reports largely emanate from the extensive testing (mandatory and voluntary) that is occurring among sentinel populations; i.e., the intermingling of the sentinel surveillance system with the case-reporting system for prostitutes, long-distance truck drivers, drug-users, persons returning from abroad, paid plasma donors, foreigners, entertainment workers, etc. According to provincial policy, all blood donors are voluntary and all donations are screened for HIV and syphilis and hepatitis. HIV-infected persons are reportedly provided case management, in-home health education, and testing for partners and free condoms are offered. Health education programs target HIV-infected persons and their families, persons in re-education centers, migrant laborers, entertainment industry workers, college students, and persons in STD clinics. A large proportion of the population is migrants from other provinces (i.e., a floating population) because of economic development, posing challenges for HIV prevention and follow-up of HIV-positive cases.

HIV Sentinel Surveillance

Similar to Jiangsu Province, the Shandong Provincial CDC has also been collaborating with China CDC on conducting sentinel surveillance activities. Five sentinel sites (two national and three provincial) exist in the province and include access points for blood donors, STD clinic patients, CSWs, and IDUs. During the past seven years, over 8,900 persons have been included in sentinel surveys. None of the persons were HIV-infected. Plans are underway to expand the number of sentinel sites to 21, and select additional population sub-groups.

Household-based surveys conducted by provincial CDC staff focusing on assessing general HIV/AIDS knowledge have been conducted intermittently during the previous ten years. Additional surveys among specific occupational groups (long-distance truck drivers, restaurant workers, etc.) have also been conducted. Repeated cross-sectional surveys documented an

increase in the level of knowledge of HIV/AIDS and that condom use was more common. The Shandong CDC is planning to do a street-based behavioral and HIV prevalence survey in Jinan among female sex workers.

The Qingdao municipal CDC surveillance program also has collaborative relations with academic researchers who have been working with hard-to-reach population groups MSM and female sex workers. Opportunities exist for developing further collaborations for implementing additional street-based surveillance activities among these hard-to-reach population groups