Preplanned Studies

Implementing Routine HIV Screening in Hospitals: An Effective Practice to Expand HIV Testing — Xishuangbanna Prefecture, Yunnan Province, China, 2019–2020

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Summary

What is already known about this topic?

Research evidence is insufficient to suggest whether routine human immunodeficiency virus (HIV) screening in healthcare settings is effective in promoting greater awareness of HIV-positive status.

What is added by this report?

This study found that, following the implementation of routine HIV screening in hospitals in Xishuangbanna Prefecture, Yunnan Province, there was a significant increase in the number of HIV screenings, positive results, and the positive rate of HIV screening in primary-level hospitals.

What are the implications for public health practice?

Routine hospital-based HIV screening is effective in identifying HIV infections in areas with concentrated epidemics.

Human immunodeficiency virus (HIV) testing is the gateway to antiretroviral treatment and behavior prevention; however, due to several real-world challenges and barriers, HIV testing in healthcare settings often falls short of desired uptake (*1*–*2*). Yunnan Province is a high HIV prevalence area in China (*3*). To further expand HIV testing services and help more HIV-infected individuals learn their status, a policy was implemented in January 2020 offering free opt-out HIV screening tests to all patients receiving bloodwork testing in hospitals. This study retrospectively analyzed the impact of this policy by incorporating HIV screening into routine services in hospitals in Xishuangbanna Prefecture, Yunnan Province, where the estimated HIV prevalence was 0.26% in 2019 (Unpublished data from Yunnan Provincial CDC). Results showed that following the implementation of routine HIV screening in Xishuangbanna Prefecture, the number of HIV screenings and positive results increased 2.08-fold and 1.88-fold, respectively, and the positive rate of HIV screening in primary-level hospitals increased significantly from 0.12% to 0.14%. To our knowledge, this is the first study in China to provide practice-based evidence of the effectiveness of implementing routine HIV testing in healthcare settings.

After implementing a policy of routine HIV screening in hospitals, patients were informed of a free opt-out HIV screening test provided in bloodwork testing. Prominently posted signs in the blood collection area stated that HIV testing was provided at no cost for all patients who received bloodwork testing and that those who did not wish to have HIV testing could refuse. This ensured that patients were fully informed about routine HIV testing in hospitals and that physicians did not require additional consultation or informed consent.

In this study, HIV testing data from all 43 public hospitals in Xishuangbanna, including 2 tertiary hospitals, 4 secondary hospitals, and 37 primary hospitals, were collected through an official survey organized by the health administration in Xishuangbanna from January 2019 to December 2020, with January to December in 2019 and 2020 as the reference and implementation periods, respectively. SPSS (version 22.0, IBM Corp., Armonk, NY.) was used for data analysis. The positive rate of HIV screening was compared using the Pearson chi-square test, and $P<0.05$ was considered statistically significant.

A total of 1,078,845 HIV screening tests were recorded from January 2019 to December 2020. During the 2020 implementation period, HIV screening and positive results increased 2.08-fold (728,331/350,514) and 1.88-fold (1,413/752), respectively, compared to the 2019 reference period. However, the overall positive rate of HIV screening decreased slightly but significantly from 0.21% to 0.19% ($P=0.026$) (Table 1).

According to the tiers of hospitals, HIV screening tests increased 1.82-fold (153,960/84,815), 1.25-fold (91,214/72,704), and 2.50-fold (483,157/192,995) in tertiary, secondary, and primary hospitals, respectively.

TABLE 1. Volumes and yields of routine HIV screening in 43 hospitals in Xishuangbanna Prefecture, Yunnan Province, January 2019 to December 2020.

Visit types	Reference period				Implementation period				*P* value§
	Screening *N*	Positive *N*	Positive rate % (95% *CI*)	*P* value*	Screening *N*	Positive *N*	Positive rate % (95% *CI*)	*P* value†	
Total	350,514	752	0.21 (0.20–0.23)		728,331	1,413	0.19 (0.18-0.20)		0.026
Hospital tiers				<0.001				<0.001	
Tertiary	84,815	314	0.37 (0.33–0.41)		153,960	488	0.32 (0.29–0.35)		0.031
Secondary	72,704	214	0.29 (0.25–0.33)		91,214	260	0.29 (0.26–0.33)		0.728
Primary	192,995	224	0.12 (0.11–0.14)		483,157	665	0.14 (0.13–0.15)		0.027

Abbreviation: HIV=human immunodeficiency virus; *CI*=confidence interval.
* *P* value of Chi-square test compares the positive rate of HIV screening among different hospital tiers in the reference period (January to December 2019).
† *P* value of Chi-square test compares the positive rate of HIV screening among different hospital tiers in the implementation period (January to December 2020).
§ *P* value of Chi-square test compares the positive rate of HIV screening for the same hospital tiers between the reference and implementation periods.

HIV-positive results increased 1.55-fold (488/314), 1.21-fold (260/214), and 2.97-fold (665/224) in the hospitals at tertiary, secondary, and primary levels, respectively. In both the reference period and implementation period, the positive rate of HIV screening showed statistical significance (χ^2_{2019}=205.07, P<0.001; χ^2_{2020}=238.55, P<0.001) in different tiers of hospitals. Following implementation of the policy, the positive rate of HIV screening in primary hospitals increased significantly from 0.12% to 0.14% (χ^2=4.89, P=0.027). In contrast, the positive rate of HIV screening in tertiary hospitals decreased significantly from 0.37% to 0.32% (χ^2=4.63, P=0.031) (Table 1).

When investigating the effect of routine HIV screening in specialized departments, we only used information from tertiary and secondary hospitals, as primary hospitals generally do not have many specialized departments. The positive rate of HIV screening varied among different departments (χ^2_{2019}=297.32, P<0.001; χ^2_{2020}=369.15, P<0.001) in both reference and implementation periods. The top four departments with high positive rates of HIV screening were the Dermatovenereal Department, Infectious Diseases Department, Rehabilitation Department, and Emergency Department. Following implementation of the policy, the positive rate of HIV screening in the Dermatovenereal Department decreased significantly from 1.57% to 0.90% (χ^2=10.06, P=0.002) (Table 2).

DISCUSSION

This retrospective study demonstrated a substantial increase in the number of HIV screenings and positive results within one year of implementing routine HIV screening in hospitals in Xishuangbanna. During the reference period, the hospital-provided HIV testing and counseling services in Yunnan mainly adopted a risk-based screening strategy (*3*). Under this strategy, HIV screening services in hospitals were targeted at key populations of patients at high risk of HIV infection, such as those with HIV/AIDS-related symptoms or HIV-related risk behaviors, those attending sexually transmitted disease clinics, and those prior to surgery or blood transfusion. After the implementation of routine HIV testing, free opt-out HIV screening tests were provided to all patients who received bloodwork testing in hospitals.

Hospitals are the most important resource to find HIV-infected people in China (*4*). Although the previous HIV testing services in hospitals had covered key populations in Xishuangbanna, there were still some HIV-infected people who could not be identified and missed the opportunity to be tested (*1*–*2*). Through integrating routine HIV screening in hospitals, these people who might have been missed before could be better identified. Consistent with this tremendous effort to expand HIV testing in hospitals, the estimated proportion of HIV-positive people who were aware of their status increased rapidly from 81.9% in 2019 to 90.8% in 2020 in Xishuangbanna (*5*). Yunnan Province took the lead in achieving the first aim of 90-90-90 targets for HIV/AIDS prevention and control by the end of 2020 (*3*,*6*).

The implementation of hospital-based routine HIV screening resulted in a stronger increase in the number of screenings in the primary hospitals than in the upper tiers of hospitals, likely due to the larger number of

TABLE 2. Volumes and yields of routine HIV screening in 6 secondary/tertiary hospitals in Xishuangbanna Prefecture, Yunnan Province, January 2019 to December 2020.

Visit types	Reference period				Implementation period				*P* value§
	Screening *N*	Positive *N*	Positive rate % (95% *CI*)	*P* value*	Screening *N*	Positive *N*	Positive rate % (95% *CI*)	*P* value†	
Total	157,519	528	0.34 (0.31–0.37)		245,174	748	0.31 (0.29–0.33)		0.097
Departments				<0.001				<0.001	
Internal medicine	35,270	128	0.36 (0.30–0.43)		48,318	148	0.31 (0.26–0.36)		0.159
Gynecology and obstetrics	31,377	42	0.13 (0.10–0.18)		40,184	60	0.15 (0.12–0.19)		0.587
Emergency	26,186	119	0.45 (0.38–0.54)		31,349	171	0.55 (0.47–0.64)		0.125
Medical examination	21,179	40	0.19 (0.14–0.26)		64,511	95	0.15 (0.12–0.18)		0.185
Surgery	19,320	52	0.27 (0.21–0.35)		29,250	104	0.36 (0.30–0.44)		0.100
Ophthalmology and otorhinolaryngology	5,944	18	0.30 (0.19–0.47)		6,086	17	0.28 (0.17–0.45)		0.811
Infectious diseases	5,115	54	1.06 (0.81–1.38)		2,070	32	1.55 (1.10–2.18)		0.084
Pediatric	4,536	9	0.20 (0.11–0.38)		3,633	8	0.22 (0.11–0.43)		0.830
Dermatovenereal	3,059	48	1.57 (1.19–2.08)		9,706	87	0.90 (0.73–1.11)		0.002
Traditional Chinese medicine	2,463	2	0.08 (0.02–0.29)		6,315	11	0.17 (0.09–0.31)		0.309
Rehabilitation	1,528	10	0.65 (0.35–1.19)		1,788	8	0.45 (0.23–0.88)		0.419
Other	1,542	6	0.39 (0.18–0.85)		1,964	7	0.36 (0.18–0.74)		0.874

Abbreviation: HIV=human immunodeficiency virus; *CI*=confidence interval.

* *P* value of Chi-square test compares the positive rate of HIV screening among different hospital tiers in the reference period (January to December 2019).

† *P* value of Chi-square test compares the positive rate of HIV screening among different hospital tiers in the implementation period (January to December 2020).

§ *P* value of Chi-square test compares the positive rate of HIV screening for the same hospital tiers between the reference and implementation periods.

primary hospitals covering more local residents. In addition, the positive HIV screening rate increased significantly from 0.12% to 0.14% in primary hospitals. Because tertiary and secondary hospitals mainly focus on hard-to-treat patients, routine screening at primary-level medical institutions may help detect some HIV-infected individuals who go to local hospitals for minor illnesses, and this could be more effective in early detection of HIV infection.

In a similar study that evaluated the effect of offering HIV testing to all patients presenting to three hospitals as part of routine care between October 2011 and December 2016 in Vancouver, Canada (*7*), the researchers found that the number of HIV tests increased elevenfold and that of new diagnoses increased by 17% among inpatients. They also found that the average diagnostic yield decreased from nine to two diagnoses per 1,000 tests among inpatients, and the detection efficiency may be diluted by the increased HIV screening. The study in Vancouver showed that the routine HIV screening in the Emergency Department was effective in early diagnosis of HIV-infected individuals (*7*), while the study in Xishuangbanna showed that the HIV screening in the Emergency Department yielded a high positive rate of HIV screening. Notably, in this study, the Rehabilitation Department, which mainly helps elderly patients restore function, showed a high positive rate of HIV screening, which could be due to the increasing epidemic of HIV infection among the elderly in China (*8*).

This study has several limitations. First, the increase in HIV-positive results cannot exclude the effect of repeat testing. Second, the number of patients who opted out of HIV testing is unknown. Third, the characteristics of individuals with positive HIV screening results and the data of late diagnosis are not available. Lastly, people's health-seeking behaviors may have been affected to some extent by the coronavirus disease 2019 (COVID-19) epidemic in 2020, and a

study showed that non-pharmaceutical interventions were associated with a decrease in HIV testing in China (*9*). In this study, it is difficult to quantify the impact of COVID-19 epidemic because the data of weekly HIV testing were not collected. However, Xishuangbanna did not experience a major COVID-19 epidemic in 2020, and HIV testing volume still increased in this region, suggesting that this limitation would not affect the main findings of this study.

The findings of this study suggest that incorporating routine HIV testing into existing clinical services can effectively increase testing volumes and identify more infected individuals, without the need for additional clinical staff or a separate process. Hospital-based routine HIV screening should be recommended as an effective measure to expand HIV testing, particularly in regions with high HIV prevalence.

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