

## Preplanned Studies

## Epidemiological Characteristics of Newly-Reported HIV Cases Among Youth Aged 15–24 Years — China, 2010–2019

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### Summary

#### What is already known about this topic?

An estimated 1,400 new cases of human immunodeficiency virus (HIV) occur every day among youths globally. However, HIV distribution among youth aged 15–24 years in China has not been researched extensively.

#### What is added by this report?

Between 2010 and 2019, a total of 141,557 HIV cases among the group aged 15–24 years were reported in China with a male to female ratio at 4.07:1. The main route of HIV transmission was unprotected sex among men who have sex with men (MSM), and heterosexual transmission for females.

#### What are the implications for public health practice?

Effective HIV control and prevention measures need to target youth aged 15–24 years, especially among MSM. Sexual health education and HIV prevention should start from primary and secondary school levels.

The estimated number of people living with human immunodeficiency virus (HIV) has grown to 38 million globally by the end of 2019. About 1,400 new HIV infections occur every day (1–2) among the group aged 15–24 years, which the United Nations (UN) defines as ‘youths’ (3). Youths face a higher risk of HIV infection due to their increased sexual activity and related risky behaviors (4). In China, all new diagnoses of HIV infections are required to be reported to the HIV/AIDS Comprehensive Response Information Management System (CRIMS). This study described the epidemiological characteristics of newly reported HIV cases among the 15–24 age group between 2010 and 2019. The data were extracted from CRIMS on December 31, 2019. Newly reported HIV cases from the 15–24 age group during 2010–2019 were selected from the mainland of China. HIV case records include demographic characteristics, area of reporting, route of HIV infection, diagnosis site, etc. The spatial distribution was described in terms of reporting areas

and provincial-level administrative divisions (PLADs). A total of 141,557 HIV cases from the 15–24 age group were reported from 2010 to 2019 in China. The annual numbers showed an upward trend between 2010 and 2015 and remained stable from 2016 to 2019 with a male-to-female ratio at 4.07:1, and the route of HIV infection was mainly homosexual transmission among men who have sex with men (MSM). The results show that between 2010 and 2019, the number of HIV diagnoses among youth aged 15–24 in 2010 and 2019 were 9,373 and 15,790, respectively, with an average annual increase of 6.0%. The average annual increase was 10.0% for males (Table 1).

An estimated 80.3% of reported HIV cases were males. The male-to-female ratio was 4.07:1, and there was an increasing trend year over year. Over the past decade starting 2010, the average age for the overall population, males, and females were 22.2±3.34 years, 22.2±3.29 years, and 22.1±3.51 years, respectively. An estimated 78.9% of reported cases were in the 20–24 age group. The proportions of reported cases aged 15–19 increased from 15.7% in 2010 to 24% in 2019, while decreasing from 84.3% in 2010 to 76% in 2019 for those aged 20–24. The reported cases over the past decade were mainly of Han ethnicity (79.4%). The proportion of students among reported cases increased from 8.5% in 2010 to 21.7% in 2019. Over the past decade starting from 2010, Sichuan Province accounted for the highest number over the study period. There were increases in the proportions of reported cases in eastern (Shanghai, Zhejiang, Jiangsu, Anhui, Jiangxi, Fujian, and Shandong) and central (Henan, Hubei, Hunan) China, while decreases were found in southwestern [Chongqing, Sichuan, Guizhou, Yunnan, Xizang (Tibet)] China, which was the region that comprised the highest proportion in 2019. Males diagnosed with HIV were mainly distributed in southwestern, eastern, and central China, and the top 5 PLADs with the highest number of reported cases in 2019 were Sichuan, Guangdong, Hunan, Jiangsu, and Henan. Females were mainly distributed in southwe-

TABLE 1. Demographic characteristics of reported cases of HIV aged 15–24 years in China: 2010–2019 [n(%)].

Demographic characteristics	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Sex										
Male	5,841(62.3)	6,917(67.2)	8,222(71.9)	9,944(77.5)	12,624(82.0)	14,412(84.9)	14,226(85.1)	13,842(84.9)	13,881(84.4)	13,717(86.9)
Female	3,532(37.7)	3,382(32.8)	3,210(28.1)	2,885(22.5)	2,769(18.0)	2,574(15.1)	2,484(14.9)	2,465(15.1)	2,557(15.6)	2,073(13.1)
Sex ratio (male : female)	1.65	2.05	2.56	3.45	4.60	5.60	5.73	5.62	5.43	6.62
Age group										
15–19	1,472(15.7)	1,783(17.3)	2,190(19.2)	2,527(19.7)	3,267(21.2)	3,776(22.2)	3,706(22.2)	3,694(22.6)	3,716(22.6)	3,790(24.0)
20–24	7,901(84.3)	8,516(82.7)	9,242(80.8)	10,302(80.3)	12,126(78.8)	13,210(77.8)	13,004(77.8)	12,613(77.4)	12,722(77.4)	12,000(76.0)
Ethnicity										
Han	6,100(65.1)	7,245(70.4)	8,605(75.3)	10,009(78.0)	12,661(82.4)	14,151(83.3)	13,913(83.3)	13,394(82.1)	13,124(79.8)	13,137(83.2)
Other groups	3,273(34.9)	3,054(29.6)	2,827(24.7)	2,820(22.0)	2,732(17.6)	2,835(16.7)	2,797(16.7)	2,913(17.9)	3,314(20.2)	2,653(16.8)
Transmission route										
Homosexual transmission	2,404(25.6)	3,334(32.4)	4,721(41.3)	5,906(46.0)	8,418(54.7)	9,978(58.7)	9,842(58.9)	9,440(57.9)	9,362(57.0)	96,46(61.1)
Heterosexual transmission	4,676(50.0)	5,265(51.1)	5,593(48.9)	6,014(46.9)	6,131(39.8)	6,424(37.8)	6,307(37.7)	6,311(38.7)	6,546(39.8)	5,872(37.2)
Others	2,293(24.4)	1,700(16.5)	1,118(9.8)	909(7.1)	844(5.5)	584(3.4)	5,61(3.4)	556(3.4)	530(3.2)	272(1.7)
Regional distribution										
East	1,315(16.1)	1,518(17.2)	1,952(19.5)	2,185(19.3)	2,889(21.2)	3,212(21.8)	3,113(21.6)	3,004(21.5)	3,057(21.7)	2,932(22.0)
South	1,564(16.7)	1,625(15.8)	1,648(14.4)	1,752(13.6)	2,076(13.5)	2,395(14.1)	2,323(13.9)	2,273(13.9)	2,337(14.2)	2,370(15.0)
Central	720(7.7)	866(8.4)	1,025(8.9)	1,242(9.7)	1,566(10.2)	1,835(10.8)	1,810(10.8)	1,820(11.2)	1,939(11.8)	2,099(13.3)
Southwest	3,900(41.6)	4,012(38.9)	3,828(33.5)	4,221(32.9)	4,489(29.1)	4,665(27.5)	4,671(28.0)	4,536(27.8)	4,841(29.5)	4,139(26.2)
Others	1,874(17.9)	2,278(19.7)	2,979(23.7)	3,429(24.5)	4,373(26.0)	4,879(25.8)	4,793(25.8)	4,674(25.6)	4,264(22.8)	4,250(23.5)

Notes: 1. The data outside the brackets are the number of people, and the data in parentheses are the vertical composition ratio; The sex ratio is the ratio of men to women. 2. East includes Shanghai, Zhejiang, Jiangsu, Anhui, Jiangxi, Fujian and Shandong; South includes Guangdong, Guangxi, Hainan; Central includes Henan, Hubei, Hunan; Southwest includes Chongqing, Sichuan, Guizhou, Yunnan, Xizang (Tibet).

stern, northwestern (Shaanxi, Gansu, Qinghai, Xinjiang, Ningxia), and southern (Guangdong, Guangxi, Hainan) China, and the top 5 PLADs with the highest number of reported cases in 2019 were Sichuan, Yunnan, Xinjiang, Guangdong, and Guizhou (Table 1).

Among newly reported HIV cases between 2010 and 2019 among youth aged 15–24 years, the proportions of blood or plasma transfusion and injection drug use transmission decreased annually. Sexual transmission was the main route of HIV infection and the proportion of homosexual contact transmission showed an upward trend in 2010–2015 and remained stable after that (Table 1). Homosexual transmission was the main route of HIV infection among males, and heterosexual transmission was the main route of HIV infection among females (Table 2).

## DISCUSSION

Youth aged 15–24 years are at a critical stage in their development and protecting them from disease is a major task. Results from the study showed that the number of newly reported HIV cases among the 15–24 age group increased initially and then gradually stabilized during the 2010–2019 period. Although increases have occurred in recent years, epidemiological characteristics were more complicated and included imbalanced sex ratio and regional distribution, increased proportion of homosexual transmission, and increasing proportion of reported cases of 15–19 age group.

Although 78.9% of reported cases were among the group aged 20–24 years, their high-risk sexual behaviors might occur earlier. It was reported that the average age of first sexual experience of adolescents was

15.9 years old and a large proportion of adolescent men who have sex with men (AMSM) aged 15–19 years were already engaged in multiple HIV-related risk behaviors (5–6). Results from the study indicated that the proportion of reported cases of the 15–19 age group also increased year over year and may be related to the earlier age of sexual behavior. Early sexual behavior leads to prolonged exposure to HIV infection, which increases the risk of HIV infection (7). This also indicated the need to start HIV prevention education at the primary and secondary school levels. More comprehensive training on safe sex behaviors targeting middle school students should be strengthened and initiated to reduce high-risk sexual behaviors.

Previous studies have shown that the new HIV infection rate of young MSM (15–24 years old) in China is at a high level (8). This study showed that the reported HIV cases among the 15–24 age group are mainly among males transmitting primarily through unprotected homosexual intercourse, and this trend is increasing annually. Unlike in the past, MSM have access to a diverse range of information, and the Internet and online social media platforms have enabled increases in anonymous or near-anonymous sex (9). The increase of HIV infections among young students in China in recent years was mainly caused by unprotected sex among males (10). The trends in this group indicate that this public health challenge deserves greater attention from the government and relevant departments.

This study was subject to some limitations. First, the proportion of males reporting homosexual transmission may be underreported due to fear of social discrimination. Second, the increase in the number of

TABLE 2. Routes of transmission of reported cases of HIV by males and females aged 15–24 years in China: 2010–2019 [n(%)].

Year	Male			Female	
	Homosexual transmission	Heterosexual transmission	Others	Heterosexual transmission	Others
2010	2,404(41.1)	1,681(28.8)	1,756(30.1)	2,995(84.8)	537(15.2)
2011	3,334(48.2)	2,221(32.1)	1,362(19.7)	3,044(90.0)	338(10.0)
2012	4,721(57.4)	2,629(32.0)	872(10.6)	2,964(92.3)	246(7.7)
2013	5,906(59.4)	3,288(33.1)	750(7.5)	2,726(94.5)	159(5.5)
2014	8,417(66.7)	3,526(27.9)	681(5.4)	2,605(94.1)	164(5.9)
2015	9,978(69.2)	3,965(27.5)	469(3.3)	2,459(95.5)	115(4.5)
2016	9,842(69.2)	3,932(27.6)	452(3.2)	2,375(95.6)	109(4.4)
2017	9,440(68.2)	3,964(28.6)	438(3.2)	2,347(95.2)	118(4.8)
2018	9,362(67.4)	4,087(29.5)	432(3.1)	2,459(96.2)	98(3.8)
2019	9,646(70.3)	3,856(28.1)	215(1.6)	2,016(97.3)	57(2.8)

reported HIV cases over the 10-year period beginning in 2010 may be related to improvements in HIV testing capacity. The development of the surveillance system, therefore, may lead to a capturing a higher proportion of newly-diagnosed HIV cases in China.

The number of newly reported HIV cases from 2010 to 2019 among Chinese youth aged 15–24 years increased initially and then gradually stabilized, and the infections were mainly caused by unprotected sex among males. The proportion of reported cases in the 15–19 age group has increased year over year. As a next step sexual health education and HIV prevention should be strengthened for primary and secondary school students, while online social media platforms should be better utilized to carry out comprehensive prevention and treatment for young MSMs.

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