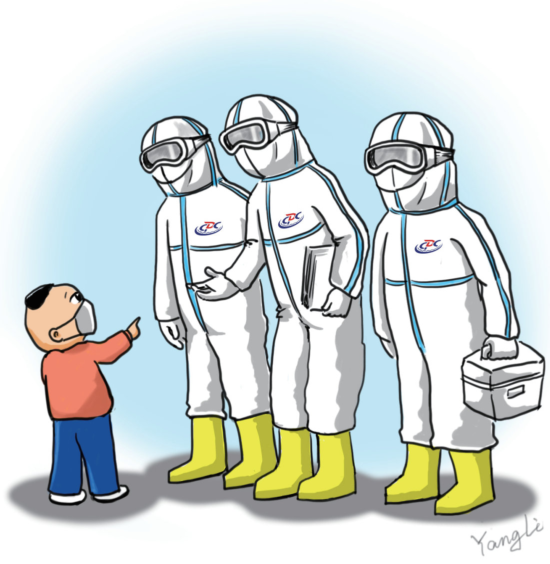
ISSN 2096-7071
CN 10-1629/R1

CHINA CDC WEEKLY

Vol. 2 No. 7 Feb. 14, 2020

CCDC weekly

中国疾病预防控制中心周报



Foreword

Preplanned Studies

ISSN 2096-7071
9 772096 707200 07

Foreword

New Source of Knowledge to Strengthen Global Defences Against Infectious Disease

How can we best respond to the myriad of new and old challenges that we face in public health today, with new viruses reaching across the globe within days if not hours, the effectiveness of antibiotics dwindling due to antimicrobial resistance, and the epidemics of scepticism towards immunization, a most effective public health intervention, spreading like a disease?

In the field of disease prevention and control, we have one extremely powerful tool, and this tool is knowledge. With knowledge, I mean the rigorous work we all perform in collecting, analyzing, and reporting data, producing and communicating strong evidence as well as the "softer" aspects of knowing each other, sharing our knowledge efficiently, and learning from each other's knowledge.

On behalf of the European Centre for Disease Prevention and Control (ECDC), I would like to express sincere congratulations to China CDC on the launch of *China CDC Weekly*. We expect this publication to quickly take up its rightful place as an important and authoritative source of knowledge that strengthens our global defenses against infectious diseases. With one fifth of the world's population, China's contribution cannot be overstated when considering global health, and we look forward to new advances in knowledge that will benefit us all. Indeed, congratulations should go to the whole public health community.

This year, we celebrate the 15th anniversary since the foundation of the European Centre for Disease Prevention and Control in 2005, in the aftermath of the SARS epidemic that demonstrated the need for Europe to have its own center for disease prevention and control. Located in Stockholm, Sweden, ECDC has 280 staff to cover the whole of Europe, and a broad mandate in strengthening Europe's defenses against infectious diseases. Our small size has taught us that strength lies in providing impactful services and knowledge as well as in strong partnerships and networks that help us create and spread this knowledge. We work closely with the European Commission and Member States of the European Union, coordinating a comprehensive set of networks in infectious diseases and public health functions across EU Member States and the European Economic Area. We equip Europe with risk assessment and continuous monitoring of infectious disease threats to human health. We support *Eurosurveillance*, a peer-reviewed weekly journal on infectious disease surveillance, epidemiology, prevention, and control, and we publish weekly communicable disease threat reports (CDTRs).

Our cooperation with China CDC goes back to the very beginnings of ECDC; throughout these years, it has enriched our knowledge and has helped us immensely in performing our work. As a testimony to this, we had the honor of receiving a delegation from China CDC, led by Dr George F. Gao, Director of China CDC, in our center in 2018. In order to foster multilateral cooperation among the centers for disease prevention and control we are closely collaborating with, ECDC and the other centers, including China CDC, agreed on the establishment of a forum for regular exchange in 2019. We are grateful to China CDC and all other centers for their unanimous support of this forum, and we look forward to intensified cooperation.

This is a time of unprecedented challenges posed to China and the world due to the ongoing SARS-CoV-2 outbreak. It underlines the importance of close collaboration and sharing of data and knowledge to understand and effectively respond to new threats. Once again, we welcome the new knowledge that becomes available to all of us in *China CDC Weekly*. May this important source of knowledge bring light and help us prepare for the known and unknown public health challenges of tomorrow.

Dr. Andrea Ammon, MD, MPH
Director, European Centre for Disease Prevention and Control

Preplanned Studies

Geographic Distribution of Alcohol Use Among Chinese Adults — China, 2015

Zhenping Zhao[1]; Limin Wang[1]; Mei Zhang[1]; Xiao Zhang[1]; Zhengjing Huang[1]; Chun Li[1]; Peng Jia[2]; Jing Wu[3,#]

Summary

What is already known on this topic?

Alcohol use is attributed to more than 200 diseases and injury conditions. Recent conventional and genetic evidence is beginning to counter the benefit of moderate drinking. The prevalence of current alcohol use was 35.7% in 2007 among the Chinese population aged 18–69 years, but comparable estimations on a provincial-level has not been reported in China.

What is added by this report?

The prevalence of current alcohol use in the preceding year was 41.3% among the Chinese population aged 18 years and above in 2015. The prevalence of current alcohol use and the average level of daily pure alcohol intake among drinkers showed clustered and diversified geographic distribution across provinces.

What are the implications for public health practice?

Given diversified demographics and geographic characteristics of the current alcohol drinking population, the alcohol control policies and intervention strategies should be adopted at a provincial level to reduce alcohol-related mortality and disability.

Alcohol use is a causal factor in more than 200 diseases and injury conditions and is the leading risk factor for premature mortality and disability among people aged 15–49 years by causing an estimated 3 million deaths per year, which is more than 5% of all deaths globally (*1*). In China, alcohol use resulted in 381,200 deaths in 2013, which reduced overall life expectancy by 0.43 years, and though drinking alcohol is common across diverse populations, its use varies considerably across demographic subgroups (*2–4*). In this study, cross-sectional data from the 2015 China Chronic Disease and Nutrition Surveillance (CCDNS) was used to report the demographic and geographic distribution of current alcohol use among Chinese residents aged 18 years and above on a national and provincial level. In 2007, the CCDNS reported that the prevalence of current alcohol use in those aged 18–69 years was overall 35.7%, in men 55.6%, and in women 15.0%, and this study uncovered a prevalence of current alcohol use among Chinese adults over 18 years overall to be 41.3% (95% CI*: 39.2%–43.4%), in men 61.7% (95% CI: 59.3%–64.1%), and in women 20.3% (95% CI: 18.4%–22.2%), which indicates an increase. There were important provincial variations in the prevalence of current alcohol use.

Recent studies have debunked perceived health benefits of consuming up to two drinks of alcohol per day, and current research states that there is no safe level of alcohol consumption (*5–6*). Due to this focus on dose, many previous studies (*3,7–8*) primarily examined harmful alcohol use rather than presenting a more comprehensive picture of all alcohol use. Therefore, identifying the demographic and geographic distribution of those with any alcohol use in the preceding year and quantifying pure alcohol intake by demographic subgroup is necessary to better reduce alcohol-related mortality and disability. This is the first study to present comparable estimates of current alcohol use on a provincial level in China.

In 2015, the CCDNS used 298 disease surveillance points across 31 provincial-level administrative divisions (PLADs) and a multistage stratified cluster randomized sampling method to select a representative sample of households. Local CDC's invited eligible residents aged 18 years and above in selected households to participate. Of the 88,250 households sampled, 189,605 subjects completed the survey, which yielded a 95.4% family response rate and 94.9% individual response rate. After excluding subjects with incomplete data (0.21%), 189,198 subjects who responded to the question of current alcohol use were included. Similar recruitment methods used in the CCDNS were reported elsewhere (*8–9*). The Ethics Committee for Research in Human Subjects of China CDC approved the study protocol (Approval Notice:

* CI=Confidence Interval.

No.201519-A). Interviewers obtained written informed consent prior to the start of the study. Trained local personnel conducted face-to-face interviews, physical measurements, and blood draw.

Current alcohol use was defined as those who self-reported any alcohol intake in the past 12 months. The average level of daily pure alcohol intake was recalibrated using alcohol type and the method was described elsewhere (*3*). The present study weighted all calculations based on the sampling scheme. The post-stratification adjustment used 2015 Chinese population estimates from the National Bureau of Statistics. We reported unweighted frequency and weighed proportion for the demographic characteristics. Prevalence was weighted to represent the national and provincial levels. Rao Scott χ^2 tests were used to test global differences, and a logistic regression model was used to test the trend for the ordinal categorical variables. Taylor's linearization method with finite population correction was considered when estimating the standard errors. All statistical analyses used the SAS software package (version 9.4; SAS Institute, Inc. Cary, NC, USA).

The study included a total of 189,198 Chinese residents aged 18 years and above; 88,842 males and 100,356 females; and 80,823 in urban areas and 108,375 in rural areas (Table 1). In 2015, the prevalence of current alcohol use among Chinese adults aged 18 years and above was 41.3% (95% CI: 39.2%–43.4%), with 61.7% (95% CI: 59.3%–64.1%) in men and 20.3% in women (95% CI: 18.4%–22.2%). There was an inverted U-shaped across all age groups for the prevalence of current alcohol use for both men and women. For women, the prevalence of current alcohol use in the urban areas was significantly higher than in rural areas (23.7% *vs.* 15.2%, p<0.0001). However, the prevalence was similar among men in urban and rural areas (61.9% *vs.* 61.5%, p=0.8474). Minority groups in China had a lower drinking prevalence than Han Chinese (35.8% *vs.* 41.7%, p=0.0245). Southern areas of China have the highest prevalence of current alcohol use for both men (69.1%) and women (28.4%), while the lowest prevalence for men is located in the northwestern areas of China (51.1%) and for women in the central areas of China (14.5%). The prevalence of current alcohol use varied significantly for both men and women across age groups, educational levels, marital status, occupations, and household income levels. The prevalence of current alcohol use increased with educational level and household income but decreased

TABLE 1. Prevalence of any alcohol use in the past 12 months and average daily pure alcohol intake[*] among drinkers in Chinese adults aged 18 years and above in 2015[†].

Characteristics[§]	Overall			Men			Women		
	N[¶]	Prevalence (%) (95% CI)	Grams (95% CI)	N[¶]	Prevalence (%) (95% CI)	Grams (95% CI)	N[¶]	Prevalence (%) (95% CI)	Grams (95% CI)
Total	69,037	41.3 (39.2−43.4)	15.9 (14.7−17.1)	51,929	61.7 (59.3−64.1)	20.7 (19.5−21.9)	17,108	20.3 (18.4−22.2)	3.2 (2.7−3.7)
Age group									
18−29 years	6,305	42.7 (39.3−46.1)	8.1 (6.8−9.5)	4,574	62.2 (58.0−66.4)	10.7 (9.3−12.2)	1,731	22.4 (19.4−25.3)	1.6 (1.0−2.1)
30−39 years	9,501	45.6 (42.5−48.7)	12.6 (11.5−13.8)	6,782	66.3 (63.0−69.7)	16.8 (15.5−18.1)	2,719	23.8 (20.8−26.7)	2.4 (1.7−3.0)
40−49 years	16,675	44.7 (42.3−47.1)	17.8 (16.4−19.2)	12,213	66.3 (63.7−68.9)	23.5 (21.9−25.2)	4,462	22.4 (20.0−24.9)	3.3 (2.8−3.8)
50−59 years	17,240	41.1 (39.6−42.5)	23.0 (21.6−24.4)	13,157	63.2 (61.4−64.9)	29.3 (27.5−31.0)	4,083	18.1 (16.5−19.6)	4.1 (3.6−4.6)
60−69 years	13,966	35.9 (34.5−37.3)	24.4 (22.8−25.9)	109,988	56.7 (54.7−58.6)	30.1 (28.3−32.0)	2,968	14.7 (13.4−16.0)	6.0 (4.7−7.2)
≥70 years	5,350	26.2 (24.2−28.2)	18.9 (17.3−20.6)	4,205	40.9 (39.0−42.9)	24.2 (21.7−26.7)	1,145	13.1 (11.0−15.3)	6.9 (5.5−8.4)
p value for trend		<0.0001	0.0020		<0.0001	<0.0001		<0.0001	<0.0001
Ethnicity									
Han	61,293	41.7 (39.5−43.9)	15.5 (14.3−16.7)	46,399	62.3 (59.7−64.8)	20.3 (19.1−21.6)	14,894	20.5 (18.6−22.5)	3.0 (2.6−3.4)
Minorities	7,744	35.8 (31.4−40.3)	20.9 (17.9−23.9)	5,530	54.9 (50.1−59.8)	25.9 (23.0−28.8)	2,214	17.2 (12.6−21.9)	6.8 (3.5−10.0)
p value for difference		0.0245	0.0026		0.0069	0.0043		0.2251	0.0243
Residency									
Urban	30,575	43.1 (40.0−46.3)	13.7 (12.2−15.2)	21,912	61.9 (58.2−65.7)	18.4 (16.9−20.0)	8,663	23.7 (21.0−26.5)	3.0 (2.3−3.6)

TABLE 1. (continued)

Characteristics§	Overall			Men			Women		
	N¶	Prevalence (%) (95% CI)	Grams (95% CI)	N¶	Prevalence (%) (95% CI)	Grams (95% CI)	N¶	Prevalence (%) (95% CI)	Grams (95% CI)
Rural	38,462	38.5 (36.7−40.2)	19.4 (18.2−20.6)	30,017	61.5 (59.2−63.7)	24.0 (22.5−25.5)	8,445	15.2 (13.6−16.7)	3.8 (3.2−4.4)
p value for difference		0.0114	<0.0001		0.8474	<0.0001		<0.0001	0.0694
Education									
Illiterate or below primary	14,386	27.3 (26.0−28.7)	22.9 (20.9−25.0)	8,892	52.1 (50.0−54.2)	34.3 (31.6−37.0)	5,494	15.2 (13.8−16.7)	7.2 (5.9−8.4)
Primary	13,457	38.1 (36.3−39.8)	21.5 (20.1−23.0)	10,682	58.5 (56.4−60.6)	27.2 (25.5−29.0)	2,775	16.6 (14.7−18.5)	3.9 (2.8−4.9)
Secondary	23,895	43.8 (42.0−45.6)	17.6 (16.6−18.6)	19,455	63.2 (61.3−65.1)	22.1 (21.0−23.2)	4,440	19.3 (16.3−22.3)	2.2 (1.7−2.8)
Tertiary or higher	17,299	47.1 (43.6−50.6)	10.3 (9.1−11.5)	12,900	64.5 (60.3−68.7)	13.6 (12.0−15.2)	4,399	26.4 (23.9−28.9)	2.0 (1.6−2.3)
p value for trend		<0.0001	<0.0001		<0.0001	0.0053		<0.0001	<0.0001
Marital status									
Married	63,165	41 (39.2−42.8)	17.3 (16.2−18.3)	47,712	62.7 (60.7−64.8)	22.5 (21.4−23.6)	15,453	19.4 (17.7−21.1)	3.3 (2.8−3.8)
Single	3,436	47.1 (42.9−51.4)	7.4 (5.9−8.8)	2,774	58.3 (52.9−63.7)	9.3 (7.7−10.9)	662	29.0 (25.1−32.9)	1.5 (0.9−2.1)
Widowed	1,753	22.3 (19.4−25.1)	14.8 (12.5−17.0)	938	44.1 (39.9−48.2)	26.0 (22.5−29.6)	815	15.8 (12.5−19.0)	6.3 (4.7−7.9)
Divorced or Separate	683	48.3 (43.1−53.6)	21.3 (17.2−25.4)	505	60.9 (53.4−68.5)	28.0 (23.1−33.0)	178	31.2 (24.6−37.7)	4.8 (2.4−7.2)
p value for difference		<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001
Occupation									
Office/shop/other non−manual	25,539	42.5 (39.4−45.5)	12.7 (11.4−13.9)	17,887	63.9 (60.2−67.6)	17.4 (16.0−18.8)	7,652	23.0 (20.6−25.4)	2.7 (2.3−3.1)
Farming related	30,928	38.5 (37.1−39.8)	22.3 (20.9−23.6)	24,460	59.7 (58−61.4)	27.1 (25.5−28.7)	6,468	14.9 (13.5−16.3)	5.1 (4.1−6.0)
Factory and construction manual	3,893	59.6 (56.0−63.2)	15.6 (13.6−17.7)	3,417	68.5 (65.1−71.9)	17.7 (15.7−19.7)	476	30.9 (23.1−38.8)	1.6 (1.1−2.2)
Retired	5,876	34.7 (31.6−37.7)	15.0 (13.2−16.7)	4,121	52.6 (49.4−55.8)	21.3 (18.7−24.0)	1,755	19.5 (16.5−22.6)	3.0 (2.4−3.6)
Not working	2,801	36.5 (33.7−39.3)	13.5 (11.6−15.4)	2,044	56.2 (52.8−59.6)	18.1 (16.0−20.3)	757	19.0 (15.8−22.2)	3.0 (1.3−4.6)
p value for difference		<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001
Household income									
Q1 (≤15,000 yuan)	12,589	34.6 (32.9−36.2)	20.8 (19.1−22.4)	9,865	54.0 (51.8−56.2)	25.7 (23.8−27.5)	2,724	14.3 (12.9−15.7)	4.8 (3.7−5.9)
Q2 (15,000−30,000 yuan)	14,653	39.0 (37.6−40.4)	19.2 (17.9−20.5)	11,350	60.8 (58.9−62.8)	24.1 (22.5−25.6)	3,303	16.5 (15.1−17.9)	3.5 (2.8−4.3)
Q3 (30,000−60,000 yuan)	17,215	42.6 (40.6−44.7)	15.7 (14.9−16.6)	12,795	63.0 (60.6−65.5)	20.6 (19.6−21.7)	4,420	21.6 (19.3−23.9)	2.9 (2.6−3.3)
Q4 (>60,000 yuan)	12,277	48.2 (44.1−52.2)	12.4 (10.7−14.1)	8,736	68.3 (63.3−73.3)	16.8 (14.7−18.8)	3,541	26.5 (23.9−29.2)	2.9 (2.3−3.5)
Unwilling to disclosure	12,303	38.4 (36.1−40.6)	14.7 (12.9−16.6)	9,183	58.5 (55.8−61.1)	19.3 (17.5−21.2)	3,120	19.3 (16.6−22.0)	3.1 (2.2−4.0)
p value for trend		0.0016	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001

* Average daily pure alcohol consumption was self-reported and estimated by types of alcoholic beverage including high spirit liquor (≥40% v/v), low spirit liquor (<40% v/v), wine, beer, and other fermented beverages made from rice or barley.

† Table presented weighted prevalence, which represents the overall national population. Standard population estimation for the year 2015 was from the National Bureau of Statistics of China.

§ CI=confidence interval, considered complex survey design.

¶ N stands for the number of participants who self-reported had any alcohol use in the past 12 months.

with age for both men and women.

In 2015, the average level of daily pure alcohol intake was significantly higher in men than in women (20.7 *vs*. 3.2 grams). Daily pure alcohol intake tended to increase with age, while men aged 60–69 years and women aged 70 years and above have the highest levels. There was an inverted trend for the prevalence of current alcohol use against the average level of daily pure alcohol intake across ethnicity, urban or rural residence, education level, and household income. The daily pure alcohol intake was higher in minorities, rural areas, lower education levels, and lower household income.

The color-coded maps in Figure 1 show the provincial-level geographic distribution of current alcohol use among Chinese men and women, respectively. The maps suggest that the prevalence of current alcohol use was highest in Shandong, Henan, Jiangsu, Yunnan, and Hainan provinces for men; and in Heilongjiang and Tibet for women. Figure 2 show the provincial-level disparity for the average level of daily pure alcohol intake among men and women, respectively. Tibet, Guizhou, Hainan, and Inner Mongolia were in the highest category of the average level of daily pure alcohol intake for men, and Tibet and Guizhou for women. Male adult residents aged 18 years and above who live in Xinjiang had both the lowest prevalence of current drinking and the lowest category of the average level of daily pure alcohol

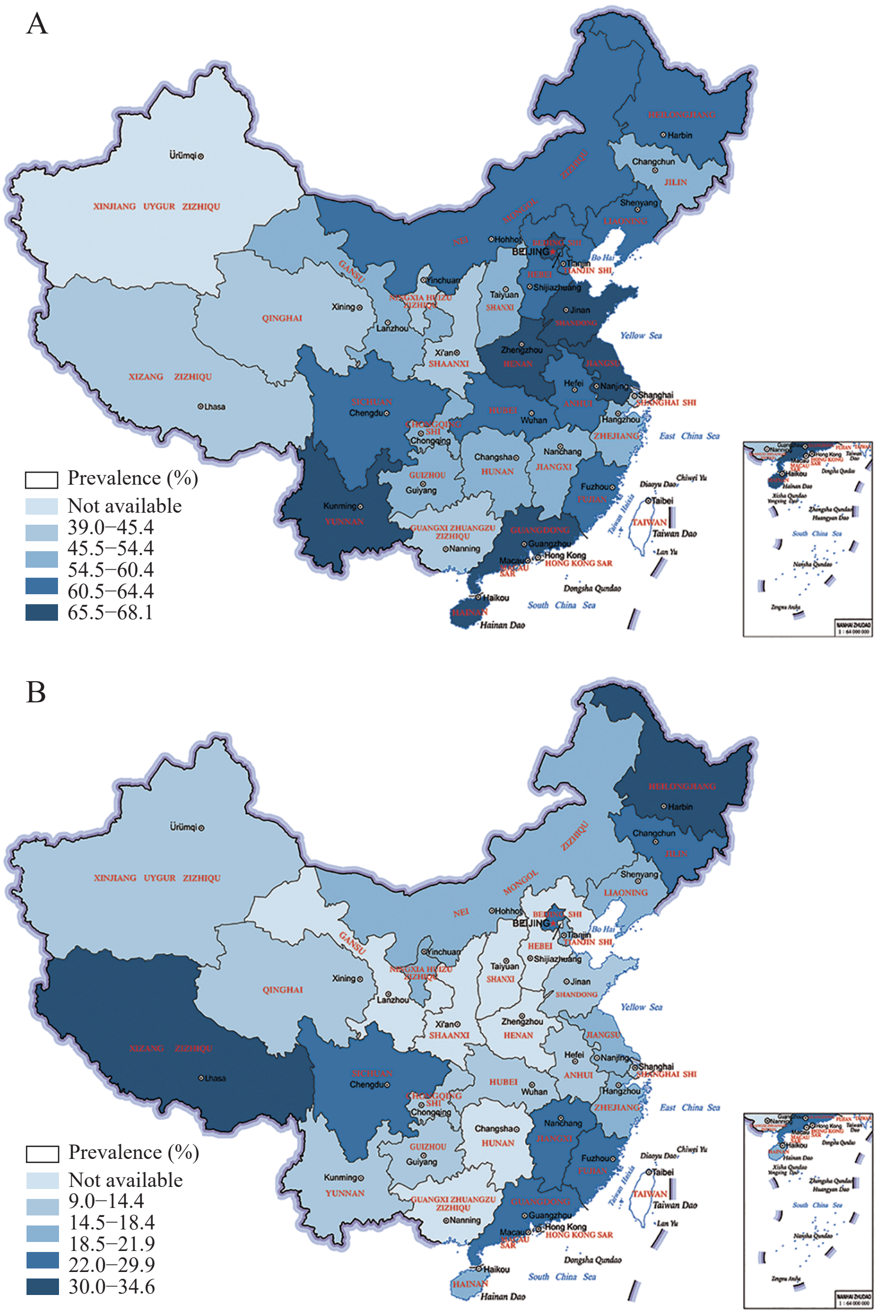


FIGURE 1. Age-standardized prevalence of alcohol use in the past 12 months among Chinese men (A) and women (B) by the province of China in 2015.

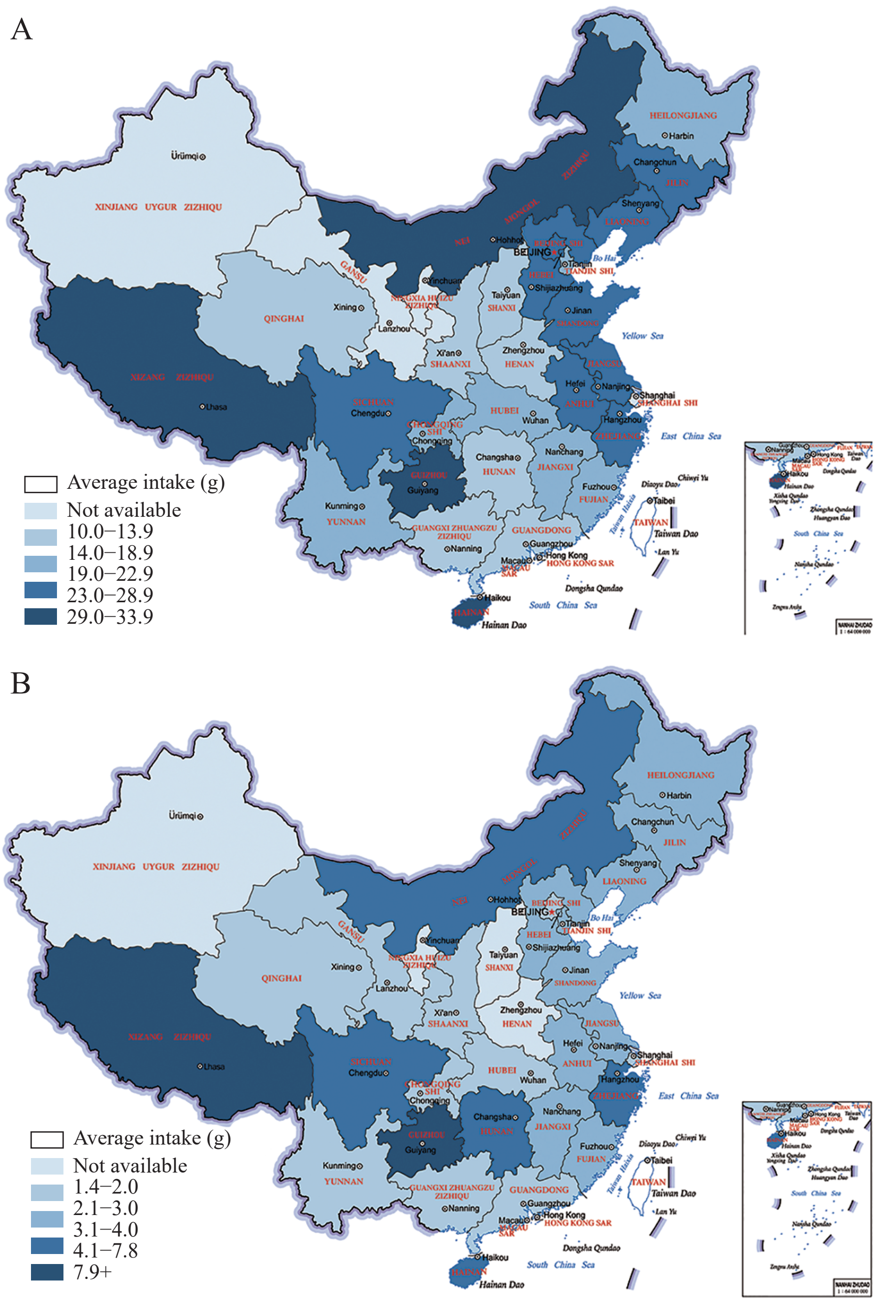


FIGURE 2. Average level of daily pure alcohol intake among Chinese men (A) and women (B) by the province of China in 2015.

intake across China.

Discussion

This is the first study to describe current alcohol use on a national and provincial level in China, yielding three key findings. First, our study showed that in 2015, the prevalence of current alcohol use among Chinese adults aged 18 years and above was 41.3% overall, 61.7% in men and 20.3% in women. Compared to women, men were consistently more likely to be current alcohol users across all demographic groups. Although China has a much lower prevalence of alcohol use compared to Western Europe (72.0%) and Australia (78.8%), the prevalence in China seemingly increased for both men and women compared to the years 2002 and 2007 (*3–4,10*). However, the age group for the study in 2007 was 15–69 years, and the definition of current drinking in the year 2002 was drinking at least once a week. Therefore, differing age groups and definitions limit direct comparisons in this study.

Second, a significant difference in alcohol use between urban and rural areas was observed in 2015 but not in 2007 (*3*). Our study illustrates this disparity was largely due to behavior changes among women but not among men. Among women, an increase was observed in the prevalence of current drinking from 2007 to 2015 in urban areas (14.9% *vs.* 23.7%, respectively) but not in rural areas (15.1% *vs.* 15.2%, respectively). Moreover, we found that the prevalence of current alcohol use was higher among Han population, urban residents, higher educated, and higher income level, however, the average level of daily pure alcohol intake was lower among the subgroups mentioned above. This may be explained by the characteristics of types of alcohol intake, which warrant further study.

Finally, our study is the first to show the comparative estimates of provincial alcohol use among all 31 PLADs in Mainland China. Study authors identified important provincial variations in the prevalence of current alcohol use, which reflects the impacts of diverse drinking cultures, socioeconomically development, and availability of alcohol beverage types. For most PLADs, more than 50% of men drank alcohol at least once in the past 12 months.

This study is subject to a few limitations. First, the definition of current alcohol use in this study was any alcohol intake in the past 12 months, which limited the direct comparison with national estimates reported using the definition of current alcohol use as drinking at least once a week (*4*,*7*). Second, although this study does not present any explanatory variables to indicate the notable geographic variations of alcohol use on the provincial level, it suggests future research directions for those who are interested in alcohol use patterns in China. Third, current alcohol use status and the average daily pure alcohol intake was self-reported, and therefore, information bias may lead to an underreported estimate.

Overall, given the diversified demographics and geographic characteristics of the current alcohol drinking population, alcohol control policies and intervention strategies should be adopted at a provincial level to reduce alcohol-related mortality and disability.

Corresponding author: Jing Wu, wujing@chinacdc.cn.

[1] Division of Surveillance, National Center for Chronic and Noncommunicable Disease Control and Prevention, China CDC, Beijing, China; [2] University of Twente, Enschede, the Netherlands; [3] National Center for Chronic and Noncommunicable Disease Control and Prevention, China CDC, Beijing, China.

Submitted: November 07, 2019; Accepted: December 25, 2019

References

1. World Health Organization. Global status report on alcohol and health, 2018. https://www.who.int/substance_abuse/publications/global_alcohol_report/en/. [2019-11-07].
2. Jiang YY, Liu SW, Ji N, Zeng XY, Liu YN, Zhang M, et al. Deaths attributable to alcohol use and its impact on life expectancy in China, 2013. Chin J Epidemiol 2018;39(1):27 – 31. http://dx.doi.org/10.3760/cma.j.issn.0254-6450.2018.01.005. (In Chinese).
3. Li YC, Jiang Y, Zhang M, Yin P, Wu F, Zhao WH. Drinking behaviour among men and women in China: the 2007 China Chronic Disease and Risk Factor Surveillance. Addiction 2011;106(11):1946 – 56. http://dx.doi.org/10.1111/j.1360-0443.2011.03514.x.
4. Li YR, Wang J, Zhao LY, Wang ZH, Yu DM, He YN, et al. The drinking status and associated factors in adults in China. Chin J Epidemiol 2018;39(7):898 – 903. http://dx.doi.org/10.3760/cma.j.issn.0254-6450.2018.07.007. (In Chinese).
5. GBD 2016 Alcohol Collaborators. Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet 2018;392(10152):1015 – 35. http://dx.doi.org/10.1016/S0140-6736(18)31310-2.
6. Millwood IY, Walters RG, Mei XW, Guo Y, Yang L, Bian Z, et al. Conventional and genetic evidence on alcohol and vascular disease aetiology: a prospective study of 500?000 men and women in China. Lancet 2019;393(10183):1831 – 42. http://dx.doi.org/10.1016/S0140-6736(18)31772-0.
7. Ma GS, Du SM, Hao LN, Li YP, Hu XQ, Kong LZ. The prevalence of heavy drinking among adults in China. Acta Nutr Sin 2009;31(3): 213 – 7. http://dx.doi.org/10.3321/j.issn:0512-7955.2009.03.002. (In Chinese).
8. Im PK, Millwood IY, Guo Y, Du HD, Chen YP, Bian Z, et al. Patterns and trends of alcohol consumption in rural and urban areas of China: findings from the China Kadoorie Biobank. BMC Public Health 2019;19:217. http://dx.doi.org/10.1186/s12889-019-6502-1.
9. Zhang M, Liu SW, Yang L, Jiang Y, Huang ZJ, Zhao ZP, et al. Prevalence of smoking and knowledge about the hazards of smoking among 170 000 Chinese adults, 2013-2014. Nicotine Tob Res 2019;21(12):1644 – 51. http://dx.doi.org/10.1093/ntr/ntz020.
10. Ritchie H, Roser M. Alcohol consumption. Published online at OurWorldInData.org. https://ourworldindata.org/alcohol-consumption. [2019-11-07].

Preplanned Studies

Trends in Adult Cooking Salt Intake — China, 1991–2018

Jiguo Zhang[1]; Huijun Wang[1]; Zhihong Wang[1]; Wenwen Du[1]; Chang Su[1]; Feifei Huang[1]; Xiaofang Jia[1]; Yifei Ouyang[1]; Li Li[1]; Yun Wang[1]; Hongru Jiang[1]; Gangqiang Ding[1]; Bing Zhang[1,#]

Summary

What is already known about this topic?

Sodium intake in China is among the highest in the world, the main source of which in adults is salt added during cooking. In 2012, the national average cooking salt intake was 10.5 g/d.

What is added by this report?

In 2018, median cooking salt intake was 6.3 g/d, which has decreased compared to that in 1991. The north-south gap in cooking salt intake was closing over time.

What are the implications for public health practice?

Effective policies and interventions need to be sustained and intensified to lower cooking salt intake, thus achieving the recommended level of sodium and total salt intake.

China is facing a rapidly increasing trend in hypertension prevalence with excessive sodium intake (*1*). Among Chinese adults, the main source of dietary sodium is cooking salt as a condiment (*2*). Data collected in the China Health and Nutrition Survey (CHNS) from 1991 to 2018 was used to observe trends in cooking salt intake among adults aged 18 years and above. Median cooking salt intake was found to decrease from 12.0 grams per day (g/d) in 1991 to 6.3 g/d in 2018. Through public health initiatives addressing the excessive cooking salt intake, overall population consumption of cooking salt has decreased, but challenges still exist for much higher consumption of sodium.

A national representative survey in 2012–2015 indicated that 23.2% of Chinese adults (≈244.5 million individuals) had hypertension (*3*), and strong evidence has shown that excessive salt intake is one of the most important etiological factors for hypertension and the onset of cardiovascular diseases (CVD) (*4*–*5*). The World Health Organization (WHO) has recognized salt reduction as one of the most cost effective and feasible approaches to prevent non-communicable diseases (NCDs) (*6*), and the Healthy China Action Plan for 2019–2030 has recommended consuming salt less than 5 g/d. Action groups and initiatives have been established to help China's population reach this target, and consistent monitoring of the situation is crucial for providing data on the effectiveness of salt-reduction interventions and for further policy development.

This study used data from the CHNS, which was an ongoing large-scale, longitudinal, household-based survey conducted from 1989 to 2018. The CHNS used a multistage random-cluster process to draw the sample in nine provinces/autonomous region*. The detailed design and sampling have been reported elsewhere (*7*). Three megacities (Beijing, Chongqing and Shanghai) were added in 2011, three new provinces (Shaanxi, Yunnan, and Zhejiang) in 2015, and Hebei in 2018. Overall, the CHNS covered 16 provincial-level administrative divisions that varied in demography, geography, economic development and public resources.

The analysis was based on 26,859 individuals in 4 waves of the survey in 1991, 2000, 2009, and 2018 with 8,407, 9,962, 9,644, and 14,619 adults having complete demographic and dietary data, respectively. Each wave of the survey assessed dietary intake using 3 consecutive 24-hour dietary recalls at the individual level in combination with weighing the amount of salt at the household level. Cooking salt in the home inventory and purchased at market were carefully recorded and measured at the start of the first 24-h dietary recall and at the end of the last 24-h dietary recall. The study allocated proportions of cooking salt at the household level to each individual based on the proportion of total energy that he or she consumed. In the study, cooking salt was only the salt added during cooking, not including other condiments like soy sauce or monosodium glutamate.

Nonparametric tests were applied to test differences

* From northeast to southwest: Heilongjiang, Liaoning, Jiangsu, Shandong, Henan, Hubei, Hunan, Guizhou and Guangxi.

between groups and waves for cooking salt intake. All statistical analyses were performed using the SAS software package (version 9.2; SAS Institute, Inc. Cary, NC, USA).

Table 1 showed the characteristics of participants from 1991 to 2018. The age distribution showed that the population had aged over time. The gender and area composition remained approximately similar. There were more participants living in the south than in the north. Median cooking salt intake decreased from 12.0 g/d in 1991 to 6.3 g/d in 2018 (Table 2 and Figure 1). Cooking salt intake was generally higher for younger age groups than the oldest age group, for men than for women, and for rural than for urban residents.

TABLE 1. Characteristics of participants of the China Health and Nutrition Survey, 1991−2018.

Items	1991	2000	2009	2018
No. of subjects	8,407	9,962	9,644	14,619
Age				
18−44	5,306 (63.1)	5,214 (52.3)	3,674 (38.1)	4,091 (28.0)
45−59	1,841 (21.9)	2,874 (28.9)	3,364 (34.9)	4,888 (33.4)
≥60	1,260 (15.0)	1874 (18.8)	2,606 (27.0)	5,640 (38.6)
Gender				
Male	3,964 (47.2)	4,812 (48.3)	4,614 (47.8)	6,738 (46.1)
Female	4,443 (52.8)	5,150 (51.7)	5,030 (52.2)	7,881 (53.9)
Area				
Urban	2,904 (34.5)	3,152 (31.6)	3,008 (31.2)	4,984 (34.1)
Rural	5,503 (65.5)	6,810 (68.4)	6,636 (68.8)	9,635 (65.9)
Region				
North	3,031 (36.0)	4,280 (43.0)	4,127 (42.8)	5,664 (38.7)
South	5,376 (64.0)	5,682 (57.0)	5,517 (57.2)	8,955 (61.3)

TABLE 2. Trends in cooking salt intake among adults of the China Health and Nutrition Survey, 1991−2018 (g/d).

Items	1991	2000	2009	2018
	Median (P_{25}, P_{75})	Median (P_{25}, P_{75})	Median (P_{25}, P_{75})	Median (P_{25}, P_{75})
All†	12.0 (7.4, 17.6)	10.0 (6.8, 14.8)	7.1 (4.8, 10.2)	6.3 (3.8, 9.8)
Age				
18−44	12.3 (7.6, 18.0)†	10.1 (6.7, 14.8)*	7.3 (4.9, 10.2)†	6.1 (3.6, 9.8)†
45−59†	12.0 (7.7, 17.8)	10.1 (7.1, 15.0)	7.5 (5.0, 10.7)	6.7 (4.1, 10.2)
≥60†	10.6 (6.0, 16.5)	9.5 (6.7, 14.6)	6.7 (4.5, 10.0)	6.1 (3.8, 9.5)
Gender				
Male†	12.8 (8.0, 18.8)	10.7 (7.4, 15.7)	7.8 (5.3, 11.0)	6.8 (4.1, 10.4)
Female†	11.4 (7.0, 16.7)	9.3 (6.4, 13.9)	6.7 (4.5, 9.6)	5.9 (3.6, 9.2)
Area				
Urban	10.8 (6.6, 16.4)†	9.8 (6.7, 14.5)*	6.7 (4.4, 9.7)†	5.9 (3.6, 9.0)†
Rural†	12.7 (8.0, 18.2)	10.0 (6.9, 15.0)	7.3 (5.0, 10.5)	6.6 (4.0, 10.2)
Region				
North	12.4 (7.3, 18.8)†	9.5 (6.1, 14.9)†	7.1 (4.6, 10.3)	6.2 (3.8, 9.7)*
South†	11.9 (7.5, 16.9)	10.2 (7.4, 14.8)	7.1 (4.9, 10.2)	6.4 (3.8, 10.0)

Note: Wilcoxon test was used for two groups. Kruskal-Wallis test was used for more groups and waves.
* $p<0.05$.
† $p<0.001$.

In 1991, cooking salt intake was higher in Northern China (12.4 g/d) than in Southern China (11.9 g/d),† while in 2018, cooking salt intake was higher in Southern China (6.4 g/d) than in Northern China (6.2 g/d).

Discussion

In order to reduce blood pressure and the risk of cardiovascular disease, stroke, and coronary heart disease in adults, the WHO recommends that all adults reduce their sodium intake to <2,000 mg/d (*8*). In China, sodium in the diet comes mainly from salt added during cooking (63.6%) (*2*). Therefore, public health initiatives are needed to reduce the amount of cooking salt.

The trend of decreased cooking salt intake was seen from 1991 to 2018 among Chinese adults. This could be attributable to the national campaigns focusing on salt reduction. For example, the Chinese Ministry of Health and the Shandong government collaboratively launched the Shandong-Ministry of Health Action on Salt Reduction and Hypertension (SMASH), 2011–2015, the goal of which was to reduce daily salt intake and increase awareness and control of hypertension among adults (*9*). The China Healthy Lifestyle for All (CHLA) campaign, which was launched in 2007, set salt reduction as a key component of its second stage. The campaign widely disseminated multiple messages regarding the effect of salt on health and the methods of limiting salt intake. Regionally, in some cities like Beijing and Shanghai, the governments distributed free salt spoons to families to encourage restricting the amount of salt

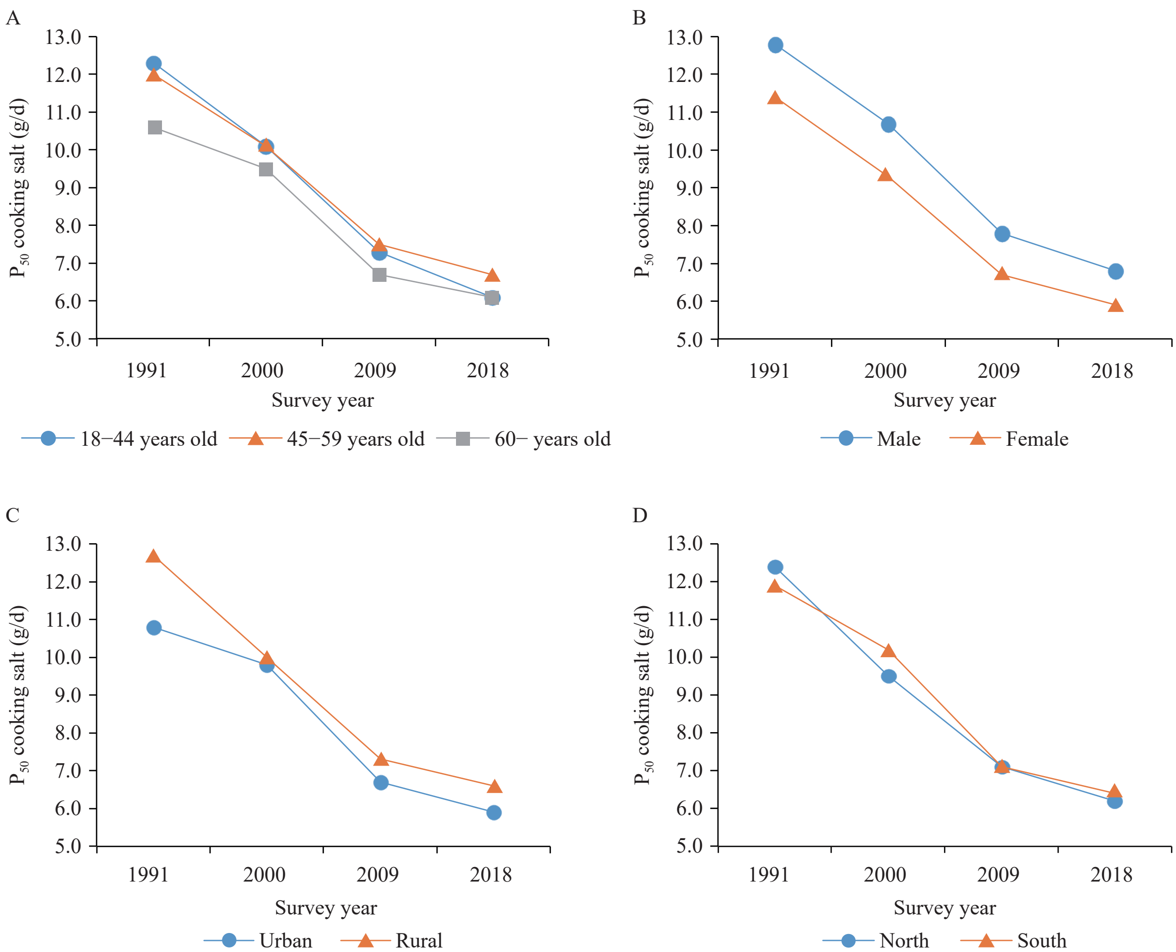


FIGURE 1. Trends in cooking salt intake among surveyed adults in subgroups from 1991 to 2018. (A) Trends in cooking salt intake among adults in age groups. (B) Trends in cooking salt intake among adults in gender groups. (C) Trends in cooking salt intake among adults in area groups. (D) Trends in cooking salt intake among adults in region groups.

† The division between China's North and South is historically a line running along the Qinling Mountains and the Huaihe River.

added during cooking and food preparation (*10*).

Another possible explanation for the decreased trend is the changing environment associated with eating behaviors. One of these is less reliance on salty and pickled foods because of modern agricultural technologies, fresh food transportation, and the widespread use of refrigerators (*11*). Because of Northern China's historical reliance on these pickled foods, these afore mentioned factors may also explain why cooking salt intake has decreased faster in the north than in the south and why the north–south gap is closing. Increased usage of salt-containing condiments such as soy sauce is another possible reason for the decrease in cooking salt. At the same time, there are rising trends of eating out-of-home and eating packaged foods. All this has come with the very rapid modernization of the restaurant and packaged food manufacturing and retail sectors (*12*). A study in Beijing indicated that 39.5% of dietary salt was consumed at cafeterias or restaurants in 2011 (*13*), so assessing and reducing salt used at restaurants and in packaged foods is a growing focus of salt reduction.

It is encouraging to see that cooking salt intake among adults decreased over time. However, cooking salt is only one source of sodium, and sodium intake in China is still among the highest in the world (*14*). A recent study showed that median sodium intake in adults was 3,960 mg/d in 2015, equivalent to 10 g/d of total salt, which far exceeded recommendations of the WHO (<5 g/d of salt) (*2*). Recently, the Healthy China Promotion Committee issued the Healthy China Action (2019–2030) at the national level, which established a target salt intake of less than 5 g/d by 2030. Moreover, an action group called Action on Salt China (ASC) has been set up to develop and implement an evidence-based, comprehensive, effective, and sustainable national salt reduction program to help achieve WHO's recommended salt intake in China (*15*).

This study is subject to at least three limitations. First is the lack of nationally representative results, even though the survey captured different demographic and geographic areas. Second, the study did not analyze factors such as lifestyle habits that may affect the trends. Third, the study may underestimate cooking salt intake because of the assessing method used. Despite these limitations, to the best of our knowledge, this is the first study to report the most recent cooking salt intake and trends for the past three decades based on a large sample.

In conclusion, cooking salt has decreased among Chinese adults from 1991 to 2018. Despite a decline, effective policies and interventions need to be sustained and intensified to lower cooking salt intake, thus achieving the recommended level of sodium intake. Monitoring sodium consumption at the population level is necessary, which could provide essential information to policymakers and all interested-stakeholders.

Acknowledgments

The authors are grateful to the participants and investigators for their involvement in the survey. The authors also thank the team at National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention, and the Carolina Population Center, University of North Carolina at Chapel Hill.

Corresponding author: Bing Zhang, zhangbing@chinacdc.cn.

[1] National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention, Beijing, China.

Submitted: August 08, 2019; Accepted: February 05, 2020

References

1. Li YC, Yang L, Wang LM, Zhang M, Huang ZJ, Deng Q, et al. Burden of hypertension in China: A nationally representative survey of 174, 621 adults. Int J Cardiol 2017;227:516 – 23. http://dx.doi.org/10.1016/j.ijcard.2016.10.110.
2. ZhangJG, Wang ZH, Du WW, Su C, Jiang HR, Huang FF, et al. Dietary sodium intake of adult residents in 15 provinces of China in 2015. Chin J Prev Med 2019;53(5):455-8. (In Chinese). http://www.pubhealth.org.cn/cn/wxshow.asp?id=6139.
3. Wang ZW, Chen Z, Zhang LF, Wang X, Hao G, Zhang ZG, et al. Status of hypertension in China: results from the China hypertension survey, 2012-2015. Circulation 2018;137(22):2344 – 56. http://dx.doi.org/10.1161/circulationaha.117.032380.
4. McLean RM, Petersen KS, Arcand J, Malta D, Rae S, Thout SR, et al. Science of salt: a regularly updated systematic review of salt and health outcomes studies (April to October 2018). J Clin Hypertens 2019;21(8):1030 – 42. http://dx.doi.org/10.1111/jch.13611.
5. Suckling RJ, Swift PA. The health impacts of dietary sodium and a low-salt diet. Clin Med (Lond) 2015;15(6):585 – 8. http://dx.doi.org/10.7861/clinmedicine.15-6-585.
6. World Health Organization. Global status report on noncommunicable diseases 2010. Geneva: World Health Organization. [2019-7-12]. https://www.who.int/nmh/publications/ncd_report2010/en/.
7. Zhang B, Zhai FY, Du SF, Popkin BM. The China health and nutrition survey, 1989–2011. Obes Rev 2014;15(Suppl 1):2 – 7. http://dx.doi.org/10.1111/obr.12119.
8. World Health Organization. Sodium intake for adults and children: Guideline. Geneva: World Health Organization.[2019-7-12] https://www.who.int/nutrition/publications/guidelines/sodium_intake/en/.
9. Bi ZQ, Liang XF, Xu AQ, Wang LH, Shi XM, Zhao WH, et al. Hypertension prevalence, awareness, treatment, and control and sodium intake in Shandong Province, China: baseline results from Shandong-ministry of health action on salt reduction and hypertension (SMASH), 2011. Prev Chronic Dis 2014;11:E88. http://dx.doi.org/10.5888/pcd11.130423.

10. Shao S, Hua YC, Yang Y, Liu XJ, Fan JR, Zhang A, et al. Salt reduction in China: a state-of-the-art review. Risk Manag Healthc Policy 2017;10:17 – 28. http://dx.doi.org/10.2147/RMHP.S75918.
11. Du SF, Neiman A, Batis C, Wang HJ, Zhang B, Zhang JG, et al. Understanding the patterns and trends of sodium intake, potassium intake, and sodium to potassium ratio and their effect on hypertension in China. Am J Clin Nutr 2014;99(2):334 – 43. http://dx.doi.org/10.3945/ajcn.113.059121.
12. Zhai FY, Du SF, Wang ZH, Zhang JG, Du WW, Popkin BM. Dynamics of the Chinese diet and the role of urbanicity, 1991-2011. Obes Rev 2014;15(Suppl 1):16 – 26. http://dx.doi.org/10.1111/obr.12124.
13. Zhao F, Zhang PH, Zhang L, Niu WY, Gao JM, Lu LX, et al. Consumption and sources of dietary salt in family members in Beijing. Nutrients 2015;7(4):2719 – 30. http://dx.doi.org/10.3390/nu7042719.
14. Tan M, He FJ, Wang C, MacGregor GA. Twenty-four-hour urinary sodium and potassium excretion in china: a systematic review and meta-analysis. J Am Heart Assoc 2019;8(14):e012923. http://dx.doi.org/10.1161/JAHA.119.012923.
15. He FJ, Zhang PH, Li Y, MacGregor GA. Action on salt China. Lancet 2018;392(10141):7 – 9. http://dx.doi.org/10.1016/S0140-6736(18)31138-3.

Preplanned Studies

HIV and HCV Infection Status Among Drug Users — China, 2010–2018

Lin Ge[1]; Dongmin Li[1]; Peilong Li[1]; Shuquan Qu[1]; Fangfang Chen[1]; Fan Lyu[1,#]

Summary

What is already known about this topic?

It is known that drug users (DUs) was brought into human immunodeficiency virus (HIV) sentinel surveillance as HIV related high-risk group since 1990s with a higher HIV antibody positive rate in the early stage.

What is added by this report?

This study not only showed that HIV antibody positive rate had decreased steadily since 2010 and maintained stable in past 4 years, but also showed that the proportion of the new narcotic and the mixed drug users increased since 2010 and HIV antibody positive rate of mixed abuse users increased year by year.

What are the implications for public health practice?

Some existing policies and strategies publicity, education and interventions require adjustments since new narcotic drug users contributed to DUs HIV infections. The challenge of HIV infection and transmission among drug users abusing both traditional and new narcotic drugs also require more attention.

The human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) epidemic in China remains at a low epidemic level nationwide but is highly concentrated in some regions and in some high-risk populations (*1*). The National HIV Sentinel Surveillance System (HSSS) was established in 1995 in China, but with changes in the HIV epidemic and increasing resources for HIV prevention and control, the development of the HSSS can be divided into 2 stages: active surveillance (1995–1998) and comprehensive surveillance (1999–present). After rapid expansion of national sentinel surveillance in 2010, this system included a nationwide surveillance network including serological and behavioral surveillance from 8 HIV-related populations. After 2010, there were 299 sentinel sites for drug users (DUs) across 30 provincial-level administrative divisions. This study was aimed to analyze serological results among the different types of DUs in HIV sentinel surveillance, for purpose of the providing information and evidence for prevention and scientific intervention to DUs.

Serial cross-sectional surveys were conducted annually among DUs from April to June. The sample size of each HSSS site was approximately 400, though if HIV prevalence within a site exceeded 10%, 250 participants were sampled. Over 60% of DUs were recruited from compulsory detoxification centers with the rest being from the community and methadone maintenance treatment (MMT) clinics. The participants in compulsory detoxification centers were recruited using consecutive sampling, and the participants from MMT clinics were required to have positive urine test results from a recent month before using consecutive sampling. When the participants were recruited from community, snowball sampling could be applied. After providing informed consent, participants completed an anonymous, structured questionnaire which included demographic information, HIV-related behaviors, and serological screening testing of HIV and hepatitis C virus (HCV) conducted by local CDC. Serological testing of HIV and HCV were conducted using the standard protocol and laboratory methods by National Center for AIDS/STD Control and Prevention (NCAIDS).

For both HIV and HCV, initial screening was done by using enzyme-linked immunosorbent assays (ELISA). If the screening result was positive, another test was required using another ELISA. Participants with 2 positive ELISA results in the surveillance system were defined antibody positive. Those who were finally confirmed positive would be referred to treatment and care in local institutions. If patients have been previously confirmed as HIV and/or HCV positive, they were not administered testing via ELISA and given the questionnaires only. Details on the criteria of HSSS have been described elsewhere (*2*–*3*). The antibody positive rates were analyzed at the national level annually from 2010 to 2018, and their trends in HIV and HCV antibody positive rates were assessed by the Linear-by-Linear Association test using SPSS software (version 18.0; IBM Corporation).

From 2010 to 2018, DUs sentinel surveillance indicated that the HIV antibody positive rate decreased from 4.5% to 2.6% (Linear-by-Linear Association χ^2=1,354.218, p<0.001) and that the HCV antibody positive rate decreased from 41.8% to 29.8% (Linear-by-Linear Association χ^2=10,220.375, p<0.001) (Figure 1). The proportion of traditional drug users (having used heroin, etc.) decreased from 79.7% in 2010 to 49.3% in 2018, and the proportion of new narcotic users (having used meth, etc.) increased from 14.9% to 42.3% with the proportion of mixed drug users (having used both of two kinds of drugs above) increasing from 5.4% to 8.4%. (Pearson χ^2=59,091.176, p<0.001). During 2010–2018, the HIV antibody positive rate of traditional drug users deceased from 5.4% to 4.3% (Linear-by-Linear Association χ^2=167.657, p<0.001), and the HIV antibody positive rate of new narcotic users fluctuated at level of 0.5% (Linear-by-Linear Association χ^2=0.074, p>0.5) with that of mixed drug users increasing from 1.7% to 3.1% (Linear-by-Linear Association χ^2=35.830, p<0.001) (Figure 2). Between 2010 and 2018, the HCV antibody positive rate of traditional drug users deceased from 47.1% to 44.1% (Linear-by-Linear Association χ^2=748.705, p<0.001), and the HCV antibody positive rate of new narcotic users deceased from 14.7% to 11.5% (Linear-by-Linear Association χ^2=240.490, p<0.001), with that of mixed drug users decreasing from 44.8% to 41.4% (Linear-by-Linear Association χ^2=61.704, p<0.001) (Figure 3).

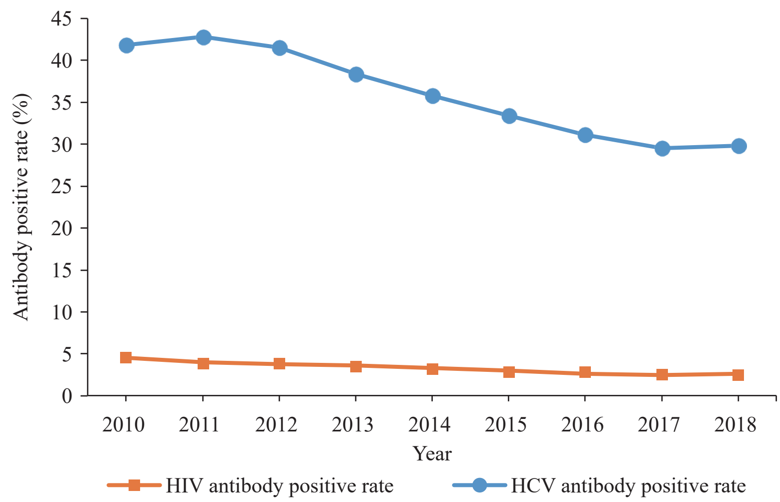


FIGURE 1. Trends of HIV and HCV antibody positive rates in drug user population in China, 2010–2018.

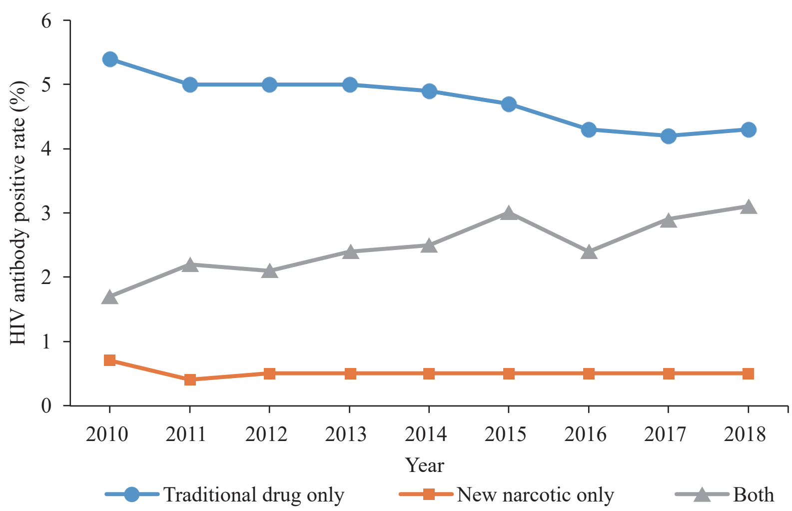


FIGURE 2. Trends of HIV antibody positive rates in different drug user types in China, 2010–2018.

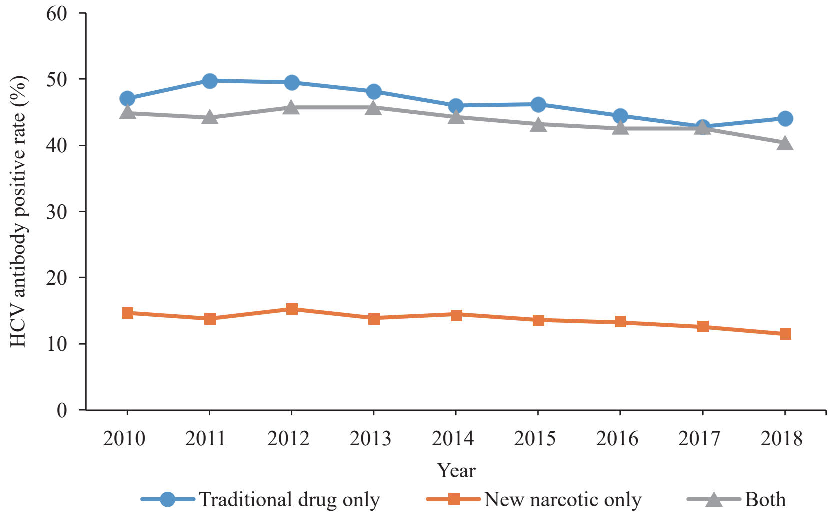


FIGURE 3. Trends of HCV antibody positive rates in different drug user types in China, 2010–2018.

Discussion and Conclusion

From 2010 to 2018, the overall HIV and HCV prevalence in DUs both showed decreases (*4*), and both were relatively stable from 2014 to 2018 at 2.5% and 30%, respectively. The decreases may not only result from decreasing proportion of traditional drug users with decreased HIV and HCV prevalence associated with continuous and effective prevention and comprehensive intervention strategy among injecting traditional drug users (*5–7*), but also may be related to the increasing proportion of new narcotic users with the lower HIV and HCV prevalence.

The HIV and HCV prevalence of traditional drug users decreased but remains at a relatively high level due to blood transmission. The HIV prevalence of new narcotic users fluctuated around 0.5%, and the HCV prevalence of new narcotic users decreased (from 14.7% to 11.5% between 2010 and 2018), but the overall levels were lower owing to sexual intercourse (*8–9*). Sentinel surveillance system data showed that the HIV prevalence of participants using both 2 kinds of drugs above increased year by year, while its HCV prevalence had a same level according to the traditional drug users.

In addition, the abuse of new narcotic drugs has become a major problem among drug users in China, especially the abuse of methamphetamine, which accounts for 56.1% of all registered drug users (*10*). In this study, the proportion of new narcotic users was nearly 50% in recent years, which was consistent with the current pattern of drug use in China (*10*). Although the proportion of participants using both traditional drugs and new narcotic drugs was less than 10% in sentinel surveillance system, it also showed an increasing trend which was similar to the situation of mixed abuse 2 kinds of drugs above among drug users in China (*10*).

In summary, HIV and HCV epidemics in DUs were controlled effectively in China during 2010–2018, but HIV and HCV infections were detected in the HSSS every year. Existing strategies and measures mainly target traditional drug users and have successfully reduced HIV transmission through intravenous injection, which needs continued maintenance and potential strengthening in the future. Some existing policies and strategies publicity, education, and interventions require adjustments since new narcotic drug users contributed to DUs HIV infections. The challenge of HIV infection and transmission among drug users abusing both traditional and new narcotic drugs also require more attention. The risk and reasons of transmission need to be evaluated and verified based on analysis of the existing data, combined with further epidemiological survey if necessary, in order to provide scientific evidence for the adjustment of HIV prevention control strategies and intervention measures for drug users.

This study is subject to some limitations. First, the study uses cross-sectional data, which is inherently descriptive and observational. Therefore, the trends described are unable to examine causal relationships. Second, sentinel surveillance data from DUs are based on stratified snowball sampling and convenience sampling and may not be representative of the overall population of DUs in China. Third, the antibody positive rate in sentinel surveillance can represent overall prevalence, which can often be overestimated because it does not account for the results of confirmation testing or RNA testing. Fourth, the recruitment process for this study was led by a mix of China CDC and non-governmental organization (NGO) staff, which may result in some selection bias. Finally, some significant results of the analysis may be due to the large sample size and would not otherwise be meaningful.

Acknowledgements

The authors thank all local public health officers and professional technical staff from local CDCs in the 30 provincial-level administrative divisions who conducted DUs sentinel surveillance surveys.

Conflict of interests

The authors declare no competing interests.

Corresponding author: Fan Lyu, fanlv@chinaaids.cn.

[1] National Center for AIDS/STD Control and Prevention, Chinese Center for Disease Control and Prevention, Beijing, China.

Submitted: November 18, 2019; Accepted: February 13, 2020

References

1. Wu ZY. New situation and challenge of HIV/AIDS prevention in China. Chin J Public Health 2011;27(12):1505 – 7. http://dx.doi.org/10.11847/zgggws2011-27-12-01. (In Chinese).
2. Wang L, Wang L, Norris JL, Li DM, Guo W, Ding ZW, et al. HIV prevalence and influencing factors analysis of sentinel surveillance among men who have sex with men in China, 2003-2011. Chin Med J (Engl) 2012;125(11):1857 – 61. http://dx.doi.org/10.3760/cma.j.issn.0366-6999.2012.11.003.
3. Mao YR, Wu ZY, Poundstone K, Wang CH, Qin QQ, Ma Y, et al. Development of a unified web-based national HIV/AIDS information system in China. Int J Epidemiol 2010;39(Suppl 2):ii79 – 89. http://dx.doi.org/10.1093/ije/dyq213.
4. Ge L, Li DM, Li PL, Guo W, Cui Y. Population specific sentinel surveillance for HIV infection, syphilis and HCV infection in China, during 2010-2015. Dis Surveill 2017;32(2):111 – 7. http://dx.doi.org/10.3760/cma.j.issn.0254-6450.2014.02.004. (In Chinese).
5. Cui Y, Guo W, Li DM, Wang LY, Shi CX, Brookmeyer R, et al. Estimating HIV incidence among key affected populations in China from serial cross-sectional surveys in 2010-2014. J Int AIDS Soc 2016;19(1):20609. http://dx.doi.org/10.7448/IAS.19.1.20609.
6. Luo W, Wu ZY, Poundstone K, McGoogan JM, Dong W, Dong L, et al. Needle and syringe exchange programmes and prevalence of HIV infection among intravenous drug users in China. Addiction 2015;110(Suppl 1):61 – 7. http://dx.doi.org/10.1111/add.12783.
7. Wang L, Guo W, Li DM, Ding ZW, McGoogan JM, Wang N, et al. HIV epidemic among drug users in China: 1995 to 2011. Addiction 2015;110(Suppl 1):20 – 8. http://dx.doi.org/10.1111/add.12779.
8. Ding YY, He N, Zhu WM, Detels R. Sexual risk behaviors among club drug users in Shanghai, China: prevalence and correlates. AIDS Behav 2013;17(7):2439 – 49. http://dx.doi.org/10.1007/s10461-012-0380-1.
9. Bao YP, Liu ZM, Li JH, Zhang RM, Hao W, Zhao M, et al. Club drug use and associated high-risk sexual behaviour in six provinces in China. Addiction 2015;110(Suppl 1):11 – 9. http://dx.doi.org/10.1111/add.12770.
10. Office of China National Narcotics Control Commission. 2018 office of China national narcotics control commission. Beijing: Office of China National Narcotics Control Commission. 2018. (In Chinese).

The inauguration of *China CDC Weekly* is in part supported by Project for Enhancing International Impact of China STM Journals Category D (PIIJ2-D-04-(2018)) of China Association for Science and Technology (CAST).

CCDC weekly

Vol. 2 No. 7 Feb. 14, 2020

Responsible Authority
National Health Commission of the People's Republic of China

Sponsor
Chinese Center for Disease Control and Prevention

Editing and Publishing
China CDC Weekly Editorial Office
No.155 Changbai Road, Changping District, Beijing, China
Tel: 86-10-63150501, 63150701
Email: ccdcwjournal@163.com

CSSN
ISSN 2096-7071
CN 10-1629/R1