

Universal Precautions in the Era of HIV/AIDS: Perception of Health Service Providers in Yunnan, China

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Published online: 20 July 2007
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Abstract With a rising HIV/AIDS epidemic, it has become especially important for health service providers in China to understand and correctly adhere to universal precautions. Using qualitative interview data, perspectives from both health administrators and service providers working at all levels of China's health care system were examined. Service providers admitted selective adherence and non-adherence to universal precautions in their daily medical practice, and gave their explanations for such behaviors. Lack of time to put on protective gear, gear's interference with medical procedures, lack of administrative support, heavy workload in hospitals, inaccurate risk assessment, and beliefs that compliance with universal precautions is unnecessary, time consuming and costly were mentioned as reasons behind noncompliance. Effective universal precaution interventions need to target both administrators and providers, and address both structural barriers and individual attitudinal and behavioral factors.

Keywords Universal precautions · China · HIV/AIDS · Qualitative research

Introduction

Health service providers in China have been facing an exponential increase in the number of HIV-positive patients in the last decade. Since the first AIDS case in China was identified in 1985, the number of annual reported HIV infections in China increased steadily at an average rate of 30% every year between 1995 and 2000 (China Center for Disease Control and Prevention 2004; Wu, Rou, & Cui, 2004). By the end of 2005, there were an estimated 650,000 people living with HIV/AIDS (PLWHA) in China, and of them, 75,000 had developed AIDS. AIDS has surpassed hepatitis B to become the 3rd deadliest infectious disease in China (China Ministry of Health, Joint United Nations Program on HIV/AIDS, & World Health Organization, 2006). With increased demand for HIV testing, counseling, diagnosis and treatment, the rapid spread of HIV infection has become a major challenge for service providers in China, who are at increased risk for occupational exposure to blood and bodily fluids. In developing nations, excessive handling of contaminated needles, high patient demand for injections, and lack of safe needle and sharp containers enhance the risk of occupational transmission of blood-borne pathogens (BBP; Sagoe-Moses, Pearson, Perry, & Jagger, 2001). The World Health Organization (WHO) estimates that about 2.5% of HIV cases and 40% of hepatitis B and C cases among health service providers worldwide are the result of working with related exposure (WHO, 2002).

Compliance with universal precautions has been shown to reduce the risk of exposure to blood and bodily fluids

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(Sridhar, Boopathi, Lodha, & Kabra, 2004). Wong et al. (1991) reported that implementation of universal precautions significantly increased the frequency of barrier use and decreased the number of actual exposure incidents during medical practice in hospitals in the U.S. Beekmann et al. (1994) reported that implementation of universal precautions contributed to decreased parenteral injuries, which represent the most common source of significant occupational exposure to BBP.

However, universal precautions are not fully practiced worldwide, especially in developing nations like China. In rural northern India, 40% of health care providers admitted recapping used needles (Kermode et al. 2005). In a rural area of Anhui, China, the rate of self-reported non-compliance with glove utilization and hand hygiene among obstetricians and gynecologists was 68% (Ji, Yin, & Chen, 2005). In Changsha, China, only 11% of student nurses used gloves during high exposure risk procedures (Wang, Fennie, He, Burgess, & Williams, 2003). In contrast, a study in Hong Kong showed 100% compliance with the disposal of sharps and 83% with blood and deep bodily fluid contact, while only 25.4% complied with the use of eye shields/goggles, and 44.9% with use of gowns or aprons when exposed to splashing of bloody discharge or deep bodily fluids (Chan et al. 2002). In many developing nations, universal precautions were not only insufficiently established and inappropriately applied, but also only selectively adhered to. As a result, developing nations report the highest number of needle stick injury incidences among providers (Pruss-Ustun, Rapiti, & Hutin, 2003).

In June 2004, in a response to increased concerns about occupational exposure and the rising number of HIV/AIDS cases, and based on the U.S. Centers for Disease Control and Prevention (CDC) and WHO recommendations, the China Ministry of Health issued an *Occupational Exposure Prevention Guideline for Health Care Providers Working in HIV/AIDS Care*. This study was conducted 2 months after the publication of the Guideline, and collected qualitative data on the understanding and practice of universal precautions by health service providers and health administrators working at all five different levels of health care facilities (provincial, city, county and township hospitals, and village clinics) in China.

Methods

Study Setting and Procedures

The study collected qualitative data from three different sites in Yunnan province of China. Yunnan province has the highest number of reported HIV infections in China (40% of all reported HIV cases; State Council AIDS

Working Committee Office & U.N. Theme Group on HIV/AIDS in China 2004; U.S. Embassy, 2000), and is one of China's less developed provinces, with more poverty-stricken counties than any other province. The recruitment procedures were built upon experience gained from previous and ongoing projects in the area. Research staff first sought administrative support from the Bureaus of Health at each of the three main study sites and Departments of Health at the subsequent study counties. Before the recruitment started, hospital information, such as number of beds, number of staff, reported HIV cases per hospital, and HIV screening test capability were gathered. From each level (provincial, city, county, township, and village), health care facilities with the highest number of reported HIV cases were selected. Convenience sampling was used and recommendations for interview participants were obtained from the head of each health care facility in order to include doctors and nurses from different departments who were relatively better informed. Using standardized recruitment scripts, staff approached the recommended individual health service providers and administrators. All participants joined the study voluntarily and the study only used materials and activities approved by both the UCLA and China CDC Institutional Review Boards. A Community Advisory Board (CAB) was formed to provide consultation on cultural appropriateness, applicability of the study design for the population, and administration. The CAB was composed of officials from the provincial Health Bureau, health providers from the Department of Infectious Diseases of provincial hospitals, administrators from the local CDC, PLWHA, and their family members. Before interviews were conducted, revisions were made to the guides according to suggestions provided by CAB.

Thirty-three health service providers and 27 health administrators participated in in-depth interviews between June and August 2004. Health administrators included hospital administrators and local government health agency administrators. Each interview was conducted in a private room on a one-on-one basis for 1–2 hours. During the interviews, service provider participants were asked open-ended questions about knowledge and personal practice of universal precautions, HIV knowledge, attitudes, and perceived risk of infection at work. Health administrators were asked about knowledge of universal precaution practice, monitoring of universal precaution compliance, and general regulations and policies, and policies in the specific health care facility or the region that their agency covered. To allow flexibility and spontaneity as new content was revealed during interviews, interview questions were not required to be asked in the same order or wording as in the interview guide. However, all questions in the interview guide were covered during the course of each interview.

For quality control purposes, 10% of all interview audiotapes were randomly checked by the project director.

All interviews were transcribed by the project interviewer and the quality of the transcription was cross-checked by another staff member. A local project staff member, fluent in the local dialect, transcribed the interview when the local dialect was used.

Study Participants

As shown in Table 1, more than half of provider participants were between the ages of 30 and 39 (57.6%), and about one-third were women (39.4%). Most of the providers had greater than 2 years of college education (78.8%); the majority of the providers worked in regional hospitals: provincial, city, and county hospitals (69.8%), and 84.8% of the providers were doctors. All providers had practiced medicine for at least 5 years; over 75% had

experienced some contact with PLWHA, and 84.8% had received some HIV-related training.

Compared to providers, Table 2 shows that health administrator participants tended to be of older age, have a slightly higher percentage of women (44.4%), and were relatively less educated. Administrator participants were almost equally divided between hospital administrators (51.9%) and government agency administrators (48.1%), such as administrators from different levels of local CDC and Health Bureaus.

Data Analysis

A first draft of the code list, which consisted of common themes discovered in the transcripts, was developed based on the interview guidelines and actual content of a number of interview transcripts. In order to reach better inter-coder reliability, one transcript was coded by the entire team together and the definitions of code categories were then fine-tuned (Sandelowski, 1986). After several versions of the code list were created, a total of 53 codes and 14 code “families” (a group of codes with the same theme) were developed for the health care providers and 55 codes and 14 code “families” were developed for the health administrators. Analyses were conducted by identifying the

Table 1 Provider participants’ demographic characteristics

Provider characteristic	Male (n = 20)	Female (n = 13)	Total (n = 33)	%
Age (years)				
20–29	3	2	5	15.2
30–39	11	8	19	57.6
40–49	6	3	9	27.3
Education				
High school/some high school	4	3	7	21.2
College/some college	14	9	23	69.7
Higher than college	2	1	3	9.1
Level of care				
Provincial hospital	4	2	6	18.2
City hospital	6	6	12	36.4
County hospital	4	1	5	15.2
Township hospital	3	3	6	18.2
Village clinic	3	1	4	12.1
Occupation				
Doctor	20	8	28	84.8
Nurse	0	5	5	15.2
Years in service				
5–10	7	6	13	39.4
11–20	10	5	15	45.5
More than 21	3	2	5	15.2
Contact with PLWHA				
Yes	14	11	25	75.8
No	6	2	8	24.2
HIV training				
Yes	17	11	28	84.8
No	3	2	5	15.2

Table 2 Administrator participants’ demographic characteristics

Administrator characteristic	Male (n = 15)	Female (n = 12)	Total (n = 27)	%
Age (years)				
30–39	4	8	12	44.4
40–49	6	4	10	37.0
50–59	5	0	5	18.5
Education				
Junior high school	0	1	1	3.7
High school/some high school	4	0	4	14.8
College/some college	11	11	22	81.5
Level of care				
Provincial	3	3	6	22.2
City	4	4	8	29.6
County	5	3	8	29.6
Township	2	1	3	11.1
Village	1	1	2	7.4
Occupation				
Hospital administrator	9	5	14	51.9
Government agency administrator	6	7	13	48.1
Years in service				
10–19	6	8	14	51.9
20–29	3	1	4	14.8
More than 29	6	3	9	33.3

themes occurring most frequently and putting them in the context of other information relayed by the participants.

To further facilitate theme development, the transcripts were also organized into smaller groups. Groups were created for providers who worked at the same level of health care facilities (provincial, city, county, township, and village) and for people of the same occupation (doctor, nurse, hospital administrator, and government health administrator), gender, age, amount of previous training, and amount of contact with PLWHA. This allowed easier examining of consistency of experiences within each group, and comparisons between groups. For example, one provincial doctor participant's description of selective adherence to universal precautions could be compared to that of another provincial doctor or a village doctor. ATLAS.ti (version 5.0) was used to analyze the data (Muhr, 1997).

Results

Themes were organized by the different perspectives expressed by health administrators and service providers, and providers' actual medical practices regarding universal precautions. From the administrators' perspective, we examined their perceived correct universal precaution practice in medical settings. Then providers' knowledge about universal precautions was looked at. After exploring individual perspectives from providers and administrators, providers' actual medical practice was examined through: (1) adherence, selective adherence and non-adherence to universal precautions, and (2) reason for non-adherence.

Administrators' perceptions of what was correct universal precaution practice was often outdated and incorrect when compared to the regulations published in the national guideline on occupational exposure, issued by China Ministry of Health (2006). Many service providers reported misunderstanding or significant incorrect interpretation on universal precaution practice. About half of the interviewed providers practiced either selective adherence or non-adherence to universal precautions, and their reasons for non-adherence varied from overburden with too many patients and lack of time, to inconvenience during medical procedures, to concerns of cost and interference with practice.

Administrators' Perspective on Universal Precautions

Determining who was responsible for correct compliance with universal precaution procedures became a key question because it related to responsibility for providing supplies, offering related training programs and opportunities,

and overseeing compliance with established regulations. It turned out that most administrators, especially the ones working in local level hospitals (village clinics and township and county hospitals), thought that the responsibility was primarily the providers', and that there was not much the hospital could do to reduce the risk of occupational exposure for providers:

I don't think the hospital has any better solution. The providers themselves...should try their best to not get hurt during procedures. They should take care of themselves. (Male township hospital director, age 52, 2-year college graduate, in service for 33 years)

This "providers have the primary responsibility" sentiment was not only prevalent among local hospital administrators, but also shared by health administrators working at regional CDCs and local Health Departments.

[The providers] think wearing a facemask is a big hassle, and I don't think they wash their hands enough. [Incidents of occupational exposure are] mainly caused by their lack of acceptance [of universal precautions]. (Male County Health Department Office of Disease Control deputy director, age 54, 2-year college graduate, in service for 30 years)

This indeed shows a lack of leadership among the administrators, and has contributed to a widely shared overly simplified conclusion about reasons for non-compliance with universal precautions being cost and inconvenience.

In order to save money, the departments let go of these [universal precaution] regulations. Besides, nurses usually have way too many patients to work with, and they don't wear gloves...they usually soak their hands [in disinfecting solution] before moving on to the next patient. (Female provincial hospital infection control department director, age 46, medical college graduate, in service for 30 years)

Hospital administrators had various degrees of understanding about correct and incorrect universal precaution practice. Many of them still considered bending used needles as the best practice, even though the 2004 national guideline issued by the China Ministry of Health (2006) clearly cautions against it.

Following quarantine and disinfection guidelines, I mean the national guidelines, and some standards set by the city CDC, we need to disinfect everything contaminated with blood. For example, after being disinfected, all syringes need to be bent...I think this is how it should be done now. (Female county hospital nursing department director, age 47, 2-year college graduate, in service for 30 years)

Compared to administrators working at lower levels of care, such as county hospitals, administrators working at higher levels of care, such as provincial hospitals, tended to think differently, and they did not consider bending used needles a safe practice. They felt, however, that the practice of not bending needles was only limited to providers in the AIDS care department and needles used for AIDS patients, instead of “universal” across all hospital departments or all patients.

We ask [providers] to not bend all needles used for AIDS patients...If you bend used needles, the rate of occupational exposure among our providers will increase. So we don't ask [providers] to bend [needles]...The other departments are all following the policy to bend used needles, but not our AIDS care department. (Female provincial hospital infection control office director, age 32, medical college graduate, in service for 12 years)

Providers' Perspective on Universal Precautions

Providers thought extra protections were needed to provide care for PLWHA. Many compared Severe Acute Respiratory Syndrome (SARS), a disease that can be spread through casual contact, to HIV.

The treatment for HIV-positive patients is definitely different. [Providers] wear foot covers and eye goggles. It's like treating SARS patients. We dress like robots. (Female city hospital gynecologist, age 37, medical college graduate, in practice for 15 years)

For us working in clinical settings, neither the central government nor the hospital provides us any [protective gears]. For example, when there was the SARS outbreak we had protective gowns, something specifically designed to fight SARS. There aren't such things for AIDS, ever! (Female city hospital surgery nurse, age 31, 2-year college graduate, in practice for 10 years)

In general, providers working in regional hospitals, provincial, city, and county level hospitals, expressed a good level of understanding about universal precautions. They understood that “every patient should be treated equally with standard universal precaution procedures as if they were HIV positive.” (Male city hospital STD/infectious diseases department doctor, age 33, 2-year college graduate, in practice for 16 years) They also acknowledge that universal precautions are good protections for both the providers and patients.

On the other hand, misunderstandings about correct universal precaution procedures still exist, especially among providers working in local health care facilities,

such as township hospitals and village clinics. It seems that providers working in infectious disease departments who have had contact with PLWHA have more correct and updated information about universal precautions. Among providers who do not know universal precautions as well, the most dangerous cases are providers who think they are following the right universal precaution procedures. When they think they are protecting themselves, but are in fact violating universal precautions, such as bending used needles, they put themselves and their patients' safety in jeopardy. Bending used needles was widely practiced in the Chinese medical field before, but it is clearly banned in the updated national guideline on universal precautions.

We protect ourselves very well. We strictly follow procedures such as wearing masks, disinfecting needles and bending used needles. We follow all the procedures well to protect ourselves. (Female village clinic doctor, age 28, vocational high school graduate, in practice for 10 years)

Providers' Universal Precaution Practice

After exploring individual perspectives from providers and administrators, providers' actual medical practice is examined in their: (1) adherence, selective adherence and non-adherence to universal precautions, and (2) reasons for non-adherence.

Adherence, Selective Adherence and Non-adherence to Universal Precautions

Many providers mentioned treating all patients in the same manner regardless of their HIV status, and that in addition to HIV, providers should treat all infectious diseases using proper protections. “It's not discrimination against patients. It's self-protection [for providers]. [Providers should] treat all patients as if they were HIV-positive.” (Female city hospital gynecologist, age 34, medical college graduate, in practice for 11 years)

There are providers following universal precaution procedures well; however, the majority of the providers we interviewed chose to only selectively adhere to universal precautions. Selective adherence to universal precautions practice occurs among our provider participants, regardless of amount of experience in the medical field.

If it's an AIDS or hepatitis B patient, [providers] will wear gloves when administering injections. [Providers] don't wear gloves for injections for patients with other conditions. (Male city hospital department of surgery doctor, age 29, medical college graduate, in practice for 5 years)

We went through trainings [on universal precautions], and we were tested on it, too. [The providers] all know about it, but most of them still treat different patients differently...I think this is a deficit [in our practice]. (Male city hospital department of surgery doctor, age 40, medical college graduate, in practice for 16 years)

In addition to selective adherence to universal precautions, some providers admitted non-adherence to universal precautions in their practice. One female provincial hospital doctor described how village doctors disinfected used needles: “Village doctors use iron lunch boxes to boil used needles for disinfections and reuse. Some just soak [used needles] in hot water and reuse them for patients.”

When treating patients with infectious diseases, [providers] should wear gloves. But as for myself, I don't wear gloves. (Male provincial hospital gastroenterologist, age 45, Master degree in medicine, in practice for 8 years)

Reasons for Non-adherence to Universal Precautions

Providers mentioned various reasons for selective adherence and non-adherence to universal precautions. Among them, administrator's concern about cost of universal precaution supplies was the most common.

There is a department in the hospital that calculates the hospital's profit, and it's really concerned about economics. Sometimes, some head nurses will think that you use too many gloves. They will think that you use [one pair of] gloves just for a little bit, and then throw them away. They feel the pain [of wasting]...this is quite a prevalent [feeling among them]. (Female provincial hospital department of infectious diseases doctor, age 35, Master degree in medicine, in practice for 7 years)

About protection procedures, our hospital is really doing more promotion than actual [material] support. The hospital asked us to tell them what we need, and said that if we raised concerns they would address them. But nobody will do so...When [providers] wear gloves, people will say, “You are wasting too much. This is not in accordance with our ‘Thrifty Principle.’ Why do you need to wear gloves?” (Male provincial hospital emergency department doctor, age 47, medical college graduate, in practice for 28 years)

Some providers mentioned that wearing gloves interferes with their practice, and that providers, especially nurses, are too busy taking care of too many patients to be able to always follow universal precaution procedures.

Usually we should wear gloves and wash hands before we see the next patient. But it's impossible in practice...the whole world is following the same [universal precaution] procedures, but not in [China]. Why? We have way too many patients [to take care of], and the nurses are just overwhelmed. (Male city hospital department of infectious diseases doctor, age 37, medical college graduate, in practice for 11 years)

One provider thought the reason for non-adherence to universal precautions was because the providers were already overburdened with too many government regulations and had lost faith.

There are some law and policies about [universal precautions]...um, sorry, there are too many [regulations] about how to treat PLWHA. [For providers, there are] too many regulations and restrictions [to remember or follow]. (Male city hospital department of infectious disease doctor, age 31, medical college graduate, in practice for 8 years)

There are also providers who thought the reason for non-adherence to universal precautions was because of inaccurate risk assessment by providers.

There are laws and policies regulating compliance with [universal precautions], but we aren't really [following them]...The most we do [to protect ourselves] is to wear gloves occasionally. Many times, we don't wear gloves, nothing. We don't even disinfect. [Providers] don't have the mindset for self-protection. (Male city hospital department of infectious diseases doctor, age 31, medical college graduate, in practice for 7 years)

Discussion

Universal precautions emphasize the need for health service providers to consider all patients as potentially infected with HIV or other BBP and to adhere rigorously to infection control precautions in order to minimize the risk of exposure to blood and bodily fluids of all patients (CDC, 1988). On the contrary, results of this study show that the majority of the providers we interviewed practiced selective adherence and non-adherence to universal precautions. These findings are similar to those reported by studies conducted in India and China (Kermode et al. 2005; Ji et al. 2005; Wang et al. 2003). On the one hand, providers do not wear protective gears when in contact with blood and bodily fluid. On the other hand, many providers expressed deep and irrational fears about HIV/AIDS, and

thought the hospital and government should provide excessive protective gears for treating AIDS patients. Many mentioned that the same gears used for treating SARS, a respiratory infectious disease, should be used for treating AIDS. Many providers practiced selective “universal” precautions, and mostly only when seeing PLWHA patients, which has resulted in unfair labeling of PLWHA and greater unfounded fear toward HIV/AIDS. In reality, providers do not make correct judgments about which patients are HIV-positive (Wenrich, Carline, Curtis, Paauw, & Ramsey, 1996). Providers’ lack of knowledge about HIV/AIDS and false impression about personal safety, in combination with the high prevalence of many other infectious diseases in China, such as hepatitis B, are putting providers at high risk of occupational exposure to all infectious diseases when they practice universal precautions selectively.

Many providers expressed deep fear toward HIV/AIDS because of risk of occupational exposure. Patients may be deprived from appropriate care due to service providers’ fears or misunderstandings about the handling of blood or bodily fluids (Walsh, 1992; Van Servellen, Lewis, & Leake, 1988). Studies (Wong et al. 1991; Beekmann et al. 1994) have shown that implementation of universal precautions can successfully decrease injuries and actual exposure incidents. At a time when China is facing an increasing number of HIV cases, encouraging infected people to get tested and treated is an important step forward in fighting the epidemic. Promotion of proper universal precaution education and practice can greatly reduce health service providers’ fears and potentially decrease their discriminatory treatment behaviors toward PLWHA.

Given the risk of non-compliance and benefits of compliance with universal precautions, providers still often fail to adhere to universal precautions. Studies have shown that the most common explanations given for non-compliance with universal precautions were lack of time to put on the protective gears, gear interference with medical procedures, and a belief that compliance with universal precautions is unnecessary, time consuming and costly (Ji et al. 2005; Roup, 1997; Wang et al. 2003). In addition, our data reveal that the primary reasons for noncompliance with universal precautions in health care facilities in China are lack of training, and lack of legal and management responsibility at the administrative level. Many of the existing Chinese hospital policies work against safe practice, such as directing nurses to remove needles from syringes after giving an injection or taking blood. Our data show that many administrators, both hospital administrators and administrators working at local government health agencies, believed that implementation of universal precautions is the sole responsibility of the providers. It is impossible, however, for the providers to comply with

universal precautions in their daily practice when they do not have access to universal precaution supplies, opportunities to attend trainings, or effective regular oversight of compliance. In addition, many of the hospital administrators had incorrect beliefs about safe practices (e.g., supporting the bending of used needles). Effective interventions on universal precautions in China need to address structural barriers and to educate both providers and administrators.

Aimed at addressing the structural problem of occupational exposure, the China Ministry of Health issued the *Occupational Exposure Prevention Guideline for Health Care Providers Working in HIV/AIDS Care*. This is the first official national document on universal precautions in China, and is great progress toward building a modern health care system. Yet it was not issued by a legislative body, and does not have legal authority. Guidelines in China equate government directives, and not legislations. This ambiguity between laws and government directives has in fact resulted in the variations in understanding and practices of universal precautions among providers and administrators. In addition, changes in government directives traditionally have been quite unpredictable and have therefore resulted in an excess number of regulations, which sometimes contradict each other, and a less serious attitude and effort toward compliance and understanding of the directives by users, such as administrators and providers.

All of the study interviews were conducted after the implementation of the national Guideline (from mid-June to late August 2004), yet knowledge about regulations and universal precautions was still alarmingly low among service providers. Our data suggest that having a national Guideline alone does not guarantee compliance by either hospital administrators or service providers. Studies have shown that training of providers on universal precaution knowledge is an important way to improve compliance (Diekema, Schuldt, Albanese, & Doebbeling, 1995; Sokas, Simmens, & Scott, 1993; Williams, Campbell, Henry, & Collier, 1994). There is an urgent need for training on universal precautions for service providers in China.

To improve adherence to universal precautions, interventions also need to attend to issues beyond knowledge. Studies (Gruber et al. 1989; Turner, 1993; Van Wissen & Siebers 1993) have shown that successfully addressing psychosocial and motivational aspects of service providers’ non-compliance is an important step in changing behaviors and increasing compliance with universal precautions. Providers will begin to take universal precautions seriously when they are given the necessary support. Many provider participants expressed frustration about the lack of support from their hospital for universal precautions, but the majority of providers did not fully comply with universal

precautions even when given the opportunity. Interventions need to address individual providers' attitudes and emphasize that universal precautions are standard practice and not just for a special group of patients.

Furthermore, the updated national Guideline has important advice about safe practices, but places too much emphasis on HIV/AIDS and not enough on universal precautions. This gives providers a false sense of security when they practice selective adherence to universal precautions and singles HIV out when there are many other infectious diseases to which providers might be occupationally exposed. The national Guideline should be revised to emphasize that precautions should be universal for all infectious diseases, and focus on compliance with using correct procedures with all patients. A better solution, as mentioned above, would be to pass a national law mandating the use of universal precautions and responsibility for providing adequate supplies for universal precautions, and to address this fundamental problem in the current health care delivery system.

There are some limitations to our research. The study was conducted in a province of China with the highest number of reported HIV/AIDS cases. Since the national guidelines on universal precautions focus on preventing infection from PLWHA, it is likely that our participants are better prepared and informed compared to their peers at other locations in China. Also, the study did not collect direct observational data on universal precaution practice among providers, but relied on self-report. This may result in underreporting of non-compliance with universal precautions. As a qualitative study, the sample is not representative of all service providers, limiting the generalizability of the results. All of these study limitations cause the results to lean toward reporting better compliance with universal precautions by providers. Major non-compliance by providers, however, was still evident, and the underlying causes still apply to most health care settings in China. The findings are important for designing future HIV interventions.

Acknowledgments This paper was completed with the support of National Institute of Mental Health grant R01MH070931. We thank Fan Zhang, Lin Lu, Yong Zhang, and other local investigators and data collection team members.

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