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## Mass Media and HIV/AIDS in China

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### Abstract

**Background**—Exposure to mass media related to HIV/AIDS has been linked to attitudinal and behavioral changes. This study aims to identify the source(s) of HIV information for the general Chinese population and examine their association with HIV transmission knowledge and stigmatizing attitude towards people living with HIV/AIDS (PLWHA).

**Method**—A total of 3,716 market workers in Fuzhou, China participated in a face-to-face survey. Multiple regression models were used to describe correlations among respondents' HIV/STD information sources, HIV transmission knowledge, and stigmatizing attitude towards PLWHA.

**Results**—Mass media sources, such as TV programs, newspapers and magazines, were more frequently identified as the channels for HIV information than interpersonal sources, such as friends and service providers. Exposure to multiple sources of HIV information (where at least one source is mass media) was significantly related to HIV knowledge and less stigmatizing attitude towards PLWHA.

**Discussion**—Mass media in China has been a major source of HIV information to the public. Enhancing the content and penetration of HIV/AIDS campaigns within various channels of the media can be an important strategy in disseminating HIV knowledge and reducing HIV related discrimination.

### Keywords

HIV; mass media; knowledge; stigma; information source(s)

### Introduction

Over the past two decades, mass media have been used all around the world as a tool in the combat against HIV/AIDS (Liskin, 1990; Myhre & Flora, 2000). Although there have been theoretical debates on how and why mass media communications influence behavior, there is considerable empirical evidence showing that the mass media can be used for attitude and behavioral changes associated with HIV/AIDS (Bertrand, et al., 2006; Benefo, 2004). In the

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early stage of the HIV epidemic, many countries used mass communication to raise awareness of HIV/AIDS, its transmission routes and methods of prevention (Myhre & Flora, 2000; Oakley, Fullerton, & Holland, 1995). In the late 1980s and throughout the 1990s, mass media intervention programs focused on behavioral change that limits one's risky behavior and promotes safer sex. More recent mass media intervention programs have expanded to addressing the full continuum of HIV/AIDS issues, from prevention to treatment to care and support (McKee, Bertrand, & Becker-Benton, 2004). The target audience of most mass media campaigns has been the general public, especially youth (Bertrand, O'Reilly, Denison, Anhang, & Sweat, 2006).

Mass media HIV/AIDS campaigns utilize multiple channels of delivery (Myhre & Flora, 2000). Those that employ television media appear to be most cost-effective, as television broadcasts reach the majority of the population. Television campaigns usually yield the strongest impact in terms of HIV/AIDS awareness, transmission knowledge, interpersonal communication and behavioral change, as opposed to campaigns using other channels, such as radio or print media (Chatterjee, 1999; Keating, Meekers, & Adewuyi, 2006; Sood & Nambiar, 2006). The effectiveness of interventions is influenced not only by the type of channel of delivery but also by the level of exposure to media messages. For example, a study of an HIV/AIDS mass media campaign in Kenya (Agha, 2003) revealed a dose-response relationship, whereby a higher intensity of exposure to the campaign media led to more favorable outcomes such as safer sex, higher perceived self-efficacy in condom use negotiation and higher perceived condom-efficacy.

One of the desired effects of mass media interventions is an increase in knowledge about HIV/AIDS. In India, Valente and Bharath (1999) found significant improvement in responses to 12 HIV knowledge questions among their study's intervention group, which watched an educational theater performance that included HIV/AIDS topics. Millerliri and colleagues (Millerliri, Krentel, & Rey, 2003) found significant increases in knowledge of HIV transmission among Gabonese high school students after they read a comic book about condom use. In a study in China that incorporated educational videos and radio broadcast, the intervention group exhibited significant increases in knowledge of modes of HIV transmission (Xiaoming, Yong, Choi, Lurie, & Mandel, 2000). Since higher HIV knowledge has been shown to be significantly associated with safe sex behaviors (Meundi, Amma, Rao, Shetty, & Shetty, 2008), educating the general population about HIV is an important strategy in the control of the HIV epidemic.

The educational role of mass media as a whole is crucial, as HIV/AIDS communication is most often received from this channel rather than from interpersonal sources (Bertrand, O'Reilly, Denison, Anhang, & Sweat, 2006; Joint United Nations Programme on HIV/AIDS, 2004; Ross & Carson, 1988). Moreover, there is evidence that mass media exposure may promote interpersonal communications about HIV/AIDS. A study conducted in India suggested that people with media exposure to HIV/AIDS information were significantly more likely to discuss HIV related topics within social networks (Chatterjee, 1999). Although mass media campaigns have shown improvements in knowledge of HIV transmission, their implications for HIV-related discrimination are not well documented. This is unfortunate since HIV/AIDS related stigma has been identified as a key barrier to fighting the epidemic. Prejudicial attitudes have not only hindered PLWHA from accessing HIV testing and disclosing their serostatus to sexual partners, but have also made it difficult for them to access health care (Li et al., 2007; Lieber et al., 2006; Wu, Rou, & Cui, 2004). These challenges highlight the urgent need to enhance mass media messages to better communicate about HIV/AIDS related stigma and discrimination.

China has been emerging as a mass media superpower in recent years. Based on a study of mass media in China in the last few decades (Lee, 1994), television has become the most rapidly developing medium, while radio and print media have also been growing but at a decreasing rate. As of the end of 2000, there are 354 television stations and 304 radio stations in China, covering 94% and 93% of the national population, respectively. By the end of 2005, there were 125.69 million households with access to cable television, and 1.22 million households in 30 cities with access to cable digital television in China, covering 94.5% and 95.8% of the population respectively (China Internet Information Center, 2006). In 2006, the Chinese government launched a project to improve TV broadcasting services in rural areas (Xinhua News Agency, 2006a). As for print mediums, the numbers of different newspapers and magazines have reached 2,007 and 8,725, respectively (China Academy of Broadcasting, 2001). In China, news media has served as the major stock of social knowledge and has played an important role in helping to build consensus within society (Chang, Wang, & Chen, 1994).

Given the capacity and infrastructure of mass media in China, it has been employed by health agencies to raise awareness of HIV/AIDS in recent years. The crucial role of mass media in China in disseminating HIV related knowledge is underscored by the scarcity of access to such information via interpersonal channels. Earlier work has found that the general public in China has very limited access to knowledge about HIV (as compared to other diseases) from interpersonal sources such as friends, co-workers, or schools because of the long-standing social taboos (Bu & Liu, 2004). On the other hand, mass media coverage of HIV related topics in China has substantially increased between 1995 and 2001 (Bu & Liu, 2004). The Chinese government is increasingly employing mass media for HIV prevention campaigns, as exemplified by the Premier Wen Jiabao who appeared on Chinese central television on Dec. 1<sup>st</sup>, 2003 and comforted patients living with HIV/AIDS at a hospital, which signaled a new commitment by the government to fight the disease (Washington Poster Foreign Service, 2003). Also some celebrities in films and sports circles such as Cunxin Pu, Wenli Jiang, Yao Ming and Magic Johnson were invited as AIDS spokespersons on TV to fight HIV discrimination since 2000 (Wang, 2005; Xinhua News Agency, 2006b).

This increased exposure of HIV in the media parallels a continued spread of the epidemic over two decades after it began. As of late 2007, the estimated number of people currently living with HIV/AIDS in China was 700,000, and the epidemic has already begun to spread among the general population. (State Council AIDS working committee office & UN theme group on AIDS in China, 2007; Wu, Sullivan, Wang, Rotheram-Borus, & Detels, 2007). In spite of the increase of HIV infection, HIV knowledge among the Chinese population is relatively limited, and HIV related stigma remains a serious problem in the era of HIV/AIDS (China Ministry of Health, UNAIDS, & WHO, 2006). In addressing these issues, one must consider the efficacy of the current mass media campaigns in the fight against the HIV epidemic. Although the increase of HIV coverage in the media is encouraging, for example, a recent launch of a TV campaign of video clips encouraged condom use nationwide (Kaiser Daily HIV/AIDS Report, 2007), most of the messages involve general HIV/AIDS news, rather than knowledge or stigma reduction education, which accounts for less than 4% of all coverage (Bu & Liu, 2004). In addition, the information may be outdated or inaccurate as it is mostly delivered by secondary sources such as government agencies and major domestic and international news agencies, instead of HIV/AIDS researchers or medical professionals.

This study aimed to offer a better understanding of how the Chinese general population receives HIV information and how mass media influences people's HIV knowledge and attitude. Using a large sample of market workers in eastern China, we aimed to describe: (1) sources of HIV/AIDS information for the general population, (2) what information sources they trust the most, (3) level of HIV transmission knowledge, and (4) HIV related stigma towards people living

with HIV/AIDS (PLWHA). We are interested in determining the association between source of HIV information and HIV knowledge and stigmatizing attitude towards PLWHA.

## Method

### Study Background and Sample

This study was part of a National Institute Mental Health (NIMH) Collaborative HIV/STD Prevention Trial being conducted with five populations at risk for HIV and STDs in China, India, Peru, Russia, and Zimbabwe (NIMH Collaborative HIV/STD Prevention Trial Group, 2007). The primary objective of the intervention trial was to reduce HIV/STD incidence and risky sexual behavior (NIMH Collaborative HIV/STD Prevention Trial Group, 2007) using the Community Popular Opinion Leader (C-POL) model. The study phases consisted of an ethnographic study, pilot studies, an epidemiological study, and a randomized controlled trial. This paper will focus on results from the China-specific survey and baseline data for the main trial.

The data were collected between 2005 and 2007 in Fuzhou, a large, eastern city in China. A high STD prevalence of more than 10% has been reported in the city (Chen et al., 2005; Detels et al., 2003). However, the HIV rates in this city are moderate to low compared to other regions in China. As of October 2007, the cumulative number of reported HIV positives in this region was between 1,001 and 5,000 (State Council AIDS working committee office & UN theme group on AIDS in China, 2007).

Participants were recruited from 40 food markets throughout Fuzhou. Normally, a market has 50 to 150 stalls, with a total of 150 to 300 stall owners and employees. Food market workers in China are often stable migrants. The market vendors were chosen as the target population because this was an identifiable group with clearly defined physical or social boundaries. They often live close to work, and their social activities are usually localized to within a few blocks of each market. Moreover, they are relatively affluent group to engage in high-risk sexual behavior (Detels et al., 2003; NIMH Collaborative HIV/STD Prevention Trial Group, 2007). There were approximately 150 food markets in the study city (NIMH Collaborative HIV/STD Prevention Trial Group, 2007). The market selection was based on the size and geographic location of the markets, and only the markets with more than 100 workers were selected to ensure enough sample size. All workers 18 to 49 years old were invited to participate in the study with a refusal rate of less than 8%. A total of 3,716 market workers participated in the study. All participants were paid 20 Yuan (U.S. \$2.50) in cash for their participation. The study only used materials and procedures that had been approved by both the UCLA IRB and China CDC IRB.

### Measures

The survey questionnaire for the study contained 65 questions regarding demographics, health communications, HIV/STD information sources, HIV transmission knowledge, and stigmatizing attitude towards PLWHA. It was developed and reviewed by all Community Advisory Board members of this study to be both scientific and practical, and also fit the local situation well. The questionnaire was administered as a face-to-face personal interview, and participant answers were filled in by interviewers.

HIV transmission knowledge was measured using a multiple choice question. The participants were asked to choose all possible ways of HIV transmission from: 1) handshakes, 2) casual contact at workplace, 3) unprotected sexual contacts, 4) mosquito bites, 5) kisses, 6) sharing needles, and 7) sharing meals. These categories were selected based on widely reported myths regarding HIV transmission in China. The interviewer read the options one by one to the

participants, and the participants were asked if it is a possible way of HIV transmission to each of the options. Those who selected options 3 and 6 but no other options were considered as having accurate knowledge of HIV transmission.

HIV/STD information sources were assessed by asking the question, “*Where do you get information about Sexually Transmitted Diseases or HIV?*” The HIV/STD related information included HIV/STD transmission knowledge, epidemic, treatment and care, and HIV/STD related social events etc. The participants were asked to choose all items that applied to them from the following choices: radio broadcast, TV programs, publications (newspapers and magazines), posters, cell phone, text messages, service providers, friends, relatives, and other. They were also asked to indicate which of the mentioned information source(s) they trusted the most. The information sources can be classified into *mass media* (TV, radio, publications, posters and internet) and 2) *interpersonal sources* (e.g., friends, relatives, service providers). If a participant responded cell phone or text message as an information resources, the interviewer would furthered confirm if the phone calls or text messages were from friends, relatives or service providers, then coded it as “interpersonal sources”.

HIV mass media exposure was further assessed with two other questions. First, participants were asked to select those, from a list the four persons, they believed were the spokesperson (s) for HIV/AIDS issues in China. Answers that correctly identify at least one of the two correct spokespersons listed would be coded as confirmative. The second question was about a participant's awareness of the well-publicized event of Premier Minister Wen Jiabao visiting patients living with HIV/AIDS in a hospital. This event had been repeatedly reported by major mass media channels, including TV programs, radio, and newspapers. The question in the interview read as, “Has the Premier Minister Wen Jiabao ever visited HIV/AIDS patients in the hospital?” We used these two questions as a proxy to measure mass media exposure in China, with the understanding the some of the participants might have learned about the spokespersons and Premier's visit through interpersonal channels.

The stigmatizing attitude towards PLWHA variable was developed based on the HIV stigma indicators defined in the HIV/AIDS-related Stigma and Discrimination Indicators Development Workshop Report (USAID Inter-Agency Working Group on Stigma and Discrimination, 2004). In this study, we adapted the following 10 questions from the list of original items: 1) AIDS is a punishment for bad behavior; 2) People with AIDS deserve what they get; 3) People who have promiscuous behaviors should be blamed for AIDS; 4) I would feel ashamed if someone I know got HIV/AIDS; 5) I would feel ashamed if someone in my family got HIV/AIDS; 6) I would not be ashamed to go to a social event with a person known to be HIV-positive; 7) I would not be embarrassed to tell people that my relative died of AIDS; 8) I would not buy from a food seller with HIV/AIDS; 9) I would not share utensils with a person with HIV/AIDS; and 10) I would not sit next to a person with HIV/AIDS. The response categories ranged from 1 (strongly agree) to 5 (strongly disagree). The directions of some items were reversed so that the higher score indicates a higher level of stigmatizing attitude towards PLWHA. The inter-item reliability of the scale is high (Cronbach's alpha=0.94). We conducted factor analysis with two methods (principal component, iterated principal component) on the stigma scale, and both suggested one factor underlying the 10 items.

In addition to basic demographic variables such as age, gender, marital status, and education, we also measured participants' self-reported discretionary income per month.

## Data analysis

All analyses were performed using SAS statistical software. Descriptive statistics were used to describe demographics and sources of HIV/STD information. We calculated the proportion of participants who: 1) sought HIV/STD related information from more than one channel, 2)



had accurate knowledge of HIV transmission, 3) was aware of the Premier Minister's visit to PLWHA, and 4) could name at least one HIV/AIDS spokesperson correctly. Pearson correlation coefficients were calculated to assess the associations among the selected variables. A series of multiple regression analyses were conducted to examine associations between HIV transmission knowledge, correctly identifying one of the AIDS spokesperson(s), and level of HIV related stigma, controlling for the simultaneous effects of participants' age, gender, education, marital status and discretionary income.

## Results

Demographic characteristics of the sample are presented in Table 1. Slightly more than half of the participants (55.5%) were female. Approximately 24% of the participants were 30 years old or younger and 38.2% were 41 years old or older. The majority or 86.4%, of the participants were married, and about 46.5% had primary school education or no formal schooling. Two-thirds of the sample reported having discretionary money of 500 Yuan (\$66.67) or less per month.

Table 2 shows patterns of HIV/STD information sources and participants' most trusted source. All of the study participants had heard of HIV/STD. The majority of the sample (77.4%) reported getting HIV/STD information from TV programs, followed by publications (54.8%), friends or relatives (26.5%), radio broadcast (22.9%), service providers (21.2%), posters (18.0%), and other sources (10.5%). With respect to participants' most trusted source, TV was ranked at the top (70.6%), followed by publications (49.1%), service providers (36.1%), and radio (19.6%). In comparing the responses to the two parallel questions, it is worth noting that over 36% of participants reported trusting service providers as a source of HIV/STD information, while only 21.2% reported actually getting the information from service providers. Contrastingly, while 16% of respondents reported trusting friends or relatives as a source of information, a higher proportion (26.5%) reported actually getting information from them.

Slightly more than 64% of the sample reported receiving HIV/STD information from more than one source. Among them, about 48% obtained information from both mass media and interpersonal sources, and 51.2% relied solely on various forms of mass media sources, but no interpersonal sources. Taken together, almost all respondents (99.2%) who reported multiple sources had depended on at least one form of mass media. This finding has highlighted the relationships between mass media exposure and access to HIV/STD related information. Since about a half of those who reported multiple channels include both mass media and interpersonal sources, we anticipate the possibility that mass media exposure and interpersonal communications facilitate each other in disseminating HIV/STD information.

Being able to identify an HIV/AIDS spokesperson was an alternative way to assess mass media exposure to HIV information. Among the 3,716 participants in this study, only about one-quarter (24.8%) correctly named at least one HIV/AIDS spokesperson. Approximately 37% of the participants reported that they knew that Premier Minister Wen Jiabao visited PLWHA in a hospital. Nearly 38% of the sample reported accurate knowledge on HIV transmission.

Correlation coefficients among the selected variables are reported in Table 3. Young age ( $r = .22, P < .0001$ ), better education ( $r = .40, P < .0001$ ) and having more discretionary money ( $r = .11, P < .0001$ ) were positively associated with reports of multiple sources of HIV/STD information. Being female ( $r = -.15, P < .0001$ ) and being currently married ( $r = -.14, P < .0001$ ) were negatively associated with having multiple information sources. Those who reported multiple sources of HIV/STD information were more likely to correctly answer HIV transmission knowledge questions ( $r = .26, P < .0001$ ), to be aware of the premier minister's

visit with PLWHA ( $r = .31, P < .0001$ ), and to correctly identify an HIV/AIDS spokesperson ( $r = .28, P < .0001$ ). Moreover, HIV related stigma was significantly negatively associated with multiple sources of HIV/STD information ( $r = -.35, P < .0001$ ), correctly identifying a spokesperson ( $r = -.39, P < .0001$ ), and awareness of the Premier Minister's visit with PLWHA ( $r = -.34, P < .0001$ ). Those participants who reported having multiple HIV/STD information sources, ability to correctly identify an HIV/AIDS spokesperson, or awareness of the Premier Minister's visit with PLWHA were likely to be associated with a low level of stigmatizing attitude towards PLWHA.

The results of multiple regression analyses are presented in Table 4. Logistic regression of HIV transmission knowledge showed that, after controlling for potential confounders, having multiple HIV/STD information sources was an important predictor for accurate HIV transmission knowledge (AOR=1.92,  $p < 0.0001$ ). Similarly, use of multiple sources of HIV/STD information was also significantly related to being able to correctly name an HIV/AIDS spokesperson (AOR=2.83,  $p < 0.0001$ ). As for other predictors, education, having more discretionary money, and being married were also positively related to the ability to name a spokesperson correctly.

The third column of Table 4 summarizes findings from regression of HIV related stigmatizing attitude towards PLWHA. Females ( $b = 1.49, p < 0.0001$ ) and older people ( $b = .14, p < 0.0001$ ) were associated with a higher level of stigmatizing attitude towards PLWHA. Education ( $b = -.27, p < 0.0001$ ), multiple sources of HIV/STD information ( $b = -1.83, p < 0.0001$ ), being able to name a spokesperson ( $b = -3.11, p < 0.0001$ ), and HIV transmission knowledge ( $b = -5.47, p < 0.0001$ ) remained negatively associated with stigmatizing attitude towards PLWHA, while other variables were held constant.

## Discussion

This study examined the relationships between HIV/STD information sources, levels of mass media exposure to HIV/STD information, HIV/AIDS knowledge and HIV stigmatizing attitude among market vendors in Fuzhou, China. Several important findings merit further consideration. First, mass media sources (TV programs, newspapers, and magazines) were reported to be the major channels of HIV/STD information flow in China. This confirms the patterns observed in many other developing settings and that have long been speculated to exist in China. This result is consistent with a study conducted among university students in Hunan, China, which reported that use of mass media (television, newspapers, and magazines) was an important source of HIV information, reaching more than 92% of study participants (Huang, Bova, Fennie, Rogers, & Williams, 2005).

In our study, the majority of respondents quoted TV programs and publications as their prime and most trustworthy sources of information about HIV/STD. These results call for increased utilization of mass media for HIV prevention, in particular via television. Given the large growth of mass media networks and technologies in China in the past few decades, expanding HIV/AIDS campaigns through mass media should not be a difficult task. In fact, strengthening mass media communications has been specified in the China's Action Plan (2006-2010) as one of the country's strategies to reach the objectives on HIV prevention and treatment (State Council of China. (2006).

Another finding worth noting is that 36% of the participants reported that they trusted HIV/STD information from service providers but only 21% actually received information from them. A possible explanation of the discrepancies between trusted and actual reporting of information source is the limited utilization of health care services in health information diffusion (Zhao et al., 2008). This result lends support to the findings from Bu and Liu's study

(2004) that showed that participants received HIV/AIDS information mainly from sources other than service providers or HIV/AIDS research specialists. The study result is also consistent with Mallinson's study (Mallinson, Rajabium, & Coleman, 2007) where the participants expressed that providers play a pivotal role in the process of engagement and retention of PLWHA in HIV primary care. By acknowledging people's trust in service providers and the central role of mass media in HIV/AIDS campaigns, this study implied that combined exposure to both mass media and service provider messages (as an interpersonal source) would likely yield the strongest benefits. Furthermore, this implication offers the opportunity of exploring the possibility of merging interpersonal sources with mass media by, for example, involving service providers in television campaigns may increase the level of trustworthiness of the HIV/STD information and education.

Based on our analyses, exposure to mass media sources of HIV/STD information was significantly related to HIV knowledge and less stigmatizing attitude towards people living with HIV/AIDS. This highlights the crucial role of mass media education in influencing HIV knowledge and attitudes, especially in the Chinese setting where HIV knowledge is low and social stigma remains a serious problem. Accordingly, education and prevention programs would find it effective to imbed health information in different forms of media such as TV programs, radio, internet sites and posters. A recent review of HIV prevention programs suggests that in resource-poor settings, mass media campaigns can be among the most cost-effective strategies given the widespread use of mass media as a major stock of social knowledge (Hogan, Baltussen, Hayashi, Lauer, & Salomon, 2005). In addition, the findings of this study illustrated the benefits of accessing information from multiple information sources including but not limited to mass media, suggesting that more comprehensive and multi-faceted mass media programming could be particularly effective in contexts where there are sufficient monetary and human capital resources.

The findings on HIV transmission knowledge were not encouraging because the important transmission routes were identified by only 37% of the study participants. Approximately one third of the participants thought that HIV could be transmitted by mosquito bites. This finding is consistent with the still widely held misconceptions in Chinese society about how HIV is transmitted. This may be attributed to the focus of the Chinese media on overly general HIV-related issues, neglecting the importance of HIV transmission knowledge and perceptions of stigma. As previous studies (Hamra, Ross, Orrs, & D'Agostino, 2006; Meundi et al., 2008) show, having HIV transmission knowledge is associated with less stigmatizing attitude towards PLWHA. This calls for the Chinese media and health educators to rethink the content and quality of HIV communication, for instance, to include details of HIV transmission. In turn, this would help breakdown misconceptions of transmission via casual contact and thus help reduce stigma. It is also important to evaluate the process and outcomes of the media campaigns and understand the way the audiences make use of the campaigns they are exposed to.

Despite the important findings of this study, there are limitations. First, the data used for this study are cross-sectional. Therefore, we cannot make causal inferences from the results. Second, the data were collected in only one geographic region of China and with only market vendors. There should be caution in generalizing these findings to a different population or other geographic locations. In logistical regression analysis, HIV transmission knowledge was computed as a dichotomous variable; this simplified measure failed to take into account the levels of knowledge and understanding regarding HIV transmission and it did not allow for an understanding of correct and comprehensive knowledge. In addition, this study relied entirely on self-report data, for which issues of recall bias can always be raised.

As a final note, the sample size limitations compromise our ability to make further distinctions among different types of multiple-source users and single-source users of HIV/STD



information. As a way to inform and facilitate the design of HIV intervention and education, we would ideally like to disentangle the impact of mass media from interpersonal sources, as well as different forms of media channels within the category of mass media. Furthermore, another interesting question left unanswered is whether and how mass media exposure may lead to more interpersonal communication about HIV/STD in China. We hope our work inspires similar studies to advance the field in these directions.

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## References

- Agha S. The impact of a mass media campaign on personal risk perception, perceived self-efficacy and on other behavioral predictors. *AIDS Care* 2003;15(6):749–762. [PubMed: 14617497]
- Bertrand JT, O'Reilly K, Denison J, Anhang R, Sweat M. Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviors in developing countries. *Health Education Research* 2006;21(4):567–597. [PubMed: 16847044]
- Bu, W.; Liu, X. Zhongguo dazhong meijie zhong de aizibing baodao yanjiu. 2004. Retrieved Mar 31, 2008, from:  
[http://antiaids.home.sunbo.net/show\\_hdr.php?xname=O26NL01&dname=AJ9NL01&xpos=2](http://antiaids.home.sunbo.net/show_hdr.php?xname=O26NL01&dname=AJ9NL01&xpos=2)
- Chang TK, Wang J, Chen CH. News as social knowledge in China: The changing worldview of Chinese National Media. *Journal of Communication* 1994;44(3):52–69.
- Chatterjee N. AIDS-related information and exposure in the mass media and discussion with social networks among married women in Bombay, India. *AIDS Care* 1999;11(4):443–446. [PubMed: 10533537]
- China Internet Information Center. Mass media. 2006. Retrieved November 10, 2008, from:  
[http://www.china.org.cn/archive/2006-12/27/content\\_1193358.htm](http://www.china.org.cn/archive/2006-12/27/content_1193358.htm)
- Chen XS, Yin YP, Liang GJ, Gong XD, Li HS, Poumerol G, et al. Sexually transmitted infections among female sex workers in Yunnan, China. *AIDS Patient Care STDS* 2005;19:853–860. [PubMed: 16375618]
- China Academy of Broadcasting. Yearbook of Chinese Radio & TV 2001. Beijing: The Yearbook of Chinese Radio & TV publishing company; 2001. p. 447-448.
- Detels R, Wu Z, Rotheram MJ, Li L, Guan J, Yin Y, et al. Sexually transmitted disease prevalence and characteristics of market vendors in eastern China. *Sexually Transmitted Diseases* 2003;30:803–808. [PubMed: 14603085]
- Hamra M, Ross MW, Orrs M, D'Agostino A. Relationship between expressed HIV/AIDS-related stigma and HIV-beliefs/knowledge and behaviour in families of HIV infected children in Kenya. *Tropical Medicine and International Health* 2006;11(4):513–527. [PubMed: 16553935]
- Hogan DR, Baltussen R, Hayashi C, Lauer JA, Salomon JA. Cost effectiveness analysis of strategies to combat HIV/AIDS in developing countries. *British Medical Journal* 2005;331(7530):1431–7. [PubMed: 16282380]
- Huang J, Bova C, Fennie KP, Rogers A, Williams A. Knowledge, attitudes, behaviors, and perceptions of risk related to HIV/AIDS among Chinese university students in Hunan, China. *AIDS Patient Care and STDs* 2005;19(11):769–777. [PubMed: 16283837]
- Joint United Nations Programme on HIV/AIDS. The media and HIV/AIDS: making a difference. Menlo Park, CA: The Henry J. Kaiser Family Foundation; 2004 Jan.
- Kaiser Daily HIV/AIDS Report. China launches nationwide video campaign to promote condom use in effort to prevent spread of HIV. Menlo Park, CA: The Henry J. Kaiser Family Foundation; 2007 Dec 07.
- Keating J, Meekers D, Adewuyi A. Assessing effects of a media campaign on HIV/AIDS awareness and prevention in Nigeria: results from the VISION Project. *BMC Public Health* 2006;6(123) 10.1186/1471-2458-6-123

- Kelly JA, Murphy DA, Sikkema KJ, et al. Randomized, controlled, community-level HIV-prevention intervention for sexual-risk behavior among homosexual men in US cities. *Community HIV Prevention Research Collaborative. Lancet* 1997;350:1500–1505. [PubMed: 9388397]
- Lee PS. Mass communication and national development in China: Media roles reconsidered. *Journal of Communication* 1994;44(3):22–37.
- Li L, Wu Z, Zhao Y, Lin C, Detels R, Wu S. Using case vignettes to measure HIV-related stigma among health professionals in China. *International Journal of Epidemiology* 2007;36(1):178–84. [PubMed: 17175545]
- Lieber E, Li L, Wu Z, Rotheram-Borus MJ, Guan J, NIMH Collaborative HIV Prevention Trial Group. HIV/STD stigmatization fears as health-seeking barriers in China. *AIDS Behaviors* 2006;10:463–471.
- Liskin L. Using mass media for HIV/AIDS prevention. *AIDS Care* 1990;2:419–20. [PubMed: 1982517]
- Mallinson RK, Rajabium S, Coleman S. The Provider Role in Client Engagement in HIV Care. *AIDS Patient Care and STDs* 2007;21(Suppl 1):s77–84. [PubMed: 17563293]
- McKee, N.; Bertrand, JT.; Becker-Benton, A. *Strategic Communication in the HIV/AIDS Epidemic*. New Delhi: SAGE Publications; 2004.
- Meundi AD, Amma A, Rao A, Shetty S, Shetty A. Cross-sectional population-based study of knowledge, attitudes, and practices regarding HIV/AIDS in Dakshina Kannada District of Karnataka, India. *Journal of the International Association of Physicians in AIDS Care* 2008;7:27–34. [PubMed: 17554143]
- Milleliri JM, Krentel A, Rey JL. Sensitization about condom use in Gabon (1999): Evaluation of the impact of a comic book. *Cahiers d'Études et de Recherches Francophones/Santé* 2003;13:253–64.
- Myhre SL, Flora JA. HIV/AIDS communication campaigns: progress and prospects. *Journal of Health Communication* 2000;5(Suppl):29–45. [PubMed: 11010355]
- NIMH Collaborative HIV/STD Prevention Trial Group. Methodological overview of a five-country community-level HIV/sexually transmitted disease prevention trial. *AIDS* 2007;21(Suppl 2):S3–S18.
- Oakley A, Fullerton D, Holland J. Behavioural interventions for HIV/AIDS prevention. *AIDS* 1995;9:479–86. [PubMed: 7639973]
- Ross MW, Carson JA. Effectiveness of distribution of information on AIDS: A national study of six media in Australia. *New York State Journal of Medicine* 1988;88:239–241. [PubMed: 3380383]
- Sood S, Nambiar D. Comparative cost-effectiveness of the components of a behavior change communication campaign on HIV/AIDS in North India. *Journal of Health Communication* 2006;11:143–162. [PubMed: 17148103]
- State Council of China. China's Action Plan for Reducing and Preventing the Spread of HIV/AIDS. (2006-2010). 2006. Retrieved December 12, 2008, from: <http://www.biotech.org.cn/news/news/show.php?id=31691>
- State Council AIDS working committee office & UN theme group on AIDS in China. *A Joint Assessment of HIV/AIDS Prevention, Treatment and Care in China*. Beijing: Ministry of Health; 2007.
- USAID Inter-Agency Working Group on Stigma and Discrimination. *HIV-related Stigma and Discrimination Indicators Development Workshop Report*. Washington DC: USAIDS; 2004.
- Valente TW, Bharath U. An evaluation of the use of drama to communicate HIV/AIDS information. *AIDS Education and Prevention* 1999;11:203–11. [PubMed: 10407454]
- Wang, LD. Fighting Stigma and Discrimination of HIV/AIDS in China: Media Art and Social Policy. 2005. Retrieved November 10, 2008, from: <http://www.asiasociety.org/speeches/longde.html>
- Washington Poster Foreign Service. Chinese leaders break AIDS taboo: Premier's appearance with patients signals end to silence about epidemic. 2003 Dec 2. Retrieved November 10, 2008, from: [http://www.media.tsinghua.edu.cn/data/2006/0225/article\\_44.html](http://www.media.tsinghua.edu.cn/data/2006/0225/article_44.html)
- Wu ZY, Rou KM, Cui H. The HIV/AIDS epidemic in China: History, current strategies and future challenges. *AIDS Education and Prevention* 2004;16(Suppl A):7–17. [PubMed: 15262561]
- Wu ZY, Sullivan S, Wang Y, Rotheram-Bonus MJ, Detels R. Evolution of China's response to HIV/AIDS. *Lancet* 2007;369:679–690. [PubMed: 17321313]

- Wu ZY, Rotheram-Borus MJ, Detels R, Li L, Guan JH, Liang GJ, Yap L, The NIMH Collaborative HIV/STD Prevention Trial Group. Selecting at-risk populations for sexually transmitted disease/HIV intervention studies. *AIDS* 2007;21(suppl 8):S81–S87. [PubMed: 18172396]
- Xiaoming S, Yong W, Choi WK, Lurie P, Mandel J. Integrating HIV prevention education into existing family planning services: results of a controlled trial of a community-level intervention for young adults in rural China. *AIDS & Behavior* 2000;4:103–10.
- Xinhua News Agency. China to expand, improve TV service in rural areas. 2006a. Retrieved March 3, 2008, from <http://www.china.org.cn/english/null/162776.htm>
- Xinhua News Agency. Yao Ming, Magic Johnson TV ad launched to fight discrimination against HIV/AIDS patients. 2006b. Retrieved March 30, 2008, from [http://english.peopledaily.com.cn/200603/05/eng20060305\\_247944.html](http://english.peopledaily.com.cn/200603/05/eng20060305_247944.html)
- Zhao G, Detels R, Gu F, Li D, Li X, Li Y, et al. The distribution of people seeking STD services in the various types of health care facilities in Chao Yang District, Beijing, China. *Sexually Transmitted Diseases* 2008;35(1):65–7. [PubMed: 18157066]

**TABLE 1**

Description of study sample (n=3,716)

	#	%
<b>Gender</b>		
Male	1652	44.5
Female	2064	55.5
<b>Age</b>		
25 or younger	416	11.2
26–30	463	12.5
31–35	708	19.0
36–40	711	19.1
41 or older	1418	38.2
<b>Marital status</b>		
Married/living with partner	3210	86.4
Never married/single	464	12.5
Widowed/separated/divorced	44	1.1
<b>Education</b>		
No schooling	325	8.7
Primary school	1405	37.8
Junior high	1490	40.1
Senior high	475	12.8
College and higher	21	0.6
<b>Discretionary money (Yuan) per month</b>		
< = 200	1343	36.1
201-500	1388	37.4
501-1000	743	20.0
> = 1000	242	6.5

**TABLE 2**

HIV/STD information sources, HIV transmission knowledge, and HIV/AIDS related events awareness

	Where to get HIV/STD information		Trusted information sources	
	#	%	#	%
TV programs	2876	77.4	2624	70.6
Publications (newspapers & magazines)	2037	54.8	1826	49.1
Friends or relatives	985	26.5	598	16
Radio broadcast	851	22.9	727	19.6
Service providers	788	21.2	1341	36.1
Posters	670	18.0	370	9.96
Others	389	10.5	265	7.14
Report more than one information source	2386	64.2		
Both mass media and interpersonal	1145	48		
Only mass media	1200	51.2		
Aware of Premier Minister visiting AIDS patients	1379	37.1		
Name at least one AIDS spokesperson correctly	921	24.8		
Have accurate knowledge about HIV transmission	1406	37.8		



**TABLE 3**  
Correlation coefficients and significance level among selected variables

	1	2	3	4	5	6	7	8	9
1. Female									
2. Age (year)	0.13 ***								
3. Currently married	0.19 ***	0.54 ***							
4. Education (year)	-0.23 ***	-0.31 ***	-0.22 ***						
5. Discretionary money (500 Yuan)	-0.02	-0.15 ***	-0.03 *	0.16 ***					
6. Multiple sources of HIV/STD information	-0.15 ***	-0.22 ***	-0.14 ***	0.40 ***	0.11 ***				
7. Aware of Premier visiting AIDS patients	-0.13 ***	-0.08 ***	-0.03	0.30 ***	0.07 ***	0.31 ***			
8. Name AIDS spokesperson correctly	-0.09 ***	-0.18 ***	-0.08 ***	0.35 ***	0.27 ***	0.28 ***	0.35 ***		
9. Have accurate HIV transmission knowledge	-0.07 ***	-0.06 ***	-0.02	0.19 ***	0.19 ***	0.26 ***	0.23 ***	0.32 ***	
10. HIV related stigma	0.18 ***	0.28 ***	0.18 ***	-0.35 ***	-0.30 ***	-0.35 ***	-0.34 ***	-0.39 ***	-0.45 ***

\* &lt;0.05

\*\* &lt;0.01

\*\*\* &lt;0.001

**TABLE 4**

The association between mass media exposure, HIV transmission knowledge, and HIV related stigma, controlling for potential confounders

	Have HIV transmission knowledge	Name AIDS spokesman correctly	HIV Stigma
	AOR	AOR	Beta
Female	0.91	0.93	1.50 ***
Age	1.00	0.97 ***	0.14 ***
Currently married	1.20	1.50 **	0.46
Discretionary money (500 Yuan)	1.02	1.12 **	-0.07
Education	1.09 ***	1.27 ***	-0.27 ***
Multiple sources of HIV/STD information	1.90 ***	2.83 ***	-1.83 ***
Name AIDS spokesperson correctly			-3.11 ***
Have HIV transmission knowledge			-5.47 ***

\* <0.05

\*\* <0.01

\*\*\* <0.001