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Advancing the prevention agenda for HIV and other sexually transmitted infections in South China: social science research to inform effective public health interventions

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Abstract

Despite widespread biomedical advances in treatment, HIV and other sexually transmitted infections (STI) continue to affect a large portion of the world's population. The profoundly social nature of behaviorally driven epidemics and disparities across socioeconomic divides in the distribution of HIV/STI and care outcomes emphasize the need for innovative, multilevel interventions. Interdisciplinary approaches to HIV/STI control are needed to combine insights from the social and biological sciences and public health fields. In this concluding essay to a Special Issue on HIV/STI in south China, we describe the evolution of China's HIV/STI epidemics and the government response; then synthesize findings from the 11 studies presented in this issues to extend seven recommendations for future HIV/STI prevention and care research in China. We discuss lessons learned from forging international collaborations between social science and public health to inform a shared research agenda to better meet the needs of those most affected by HIV and other STI.

Keywords

HIV; syphilis; China; intervention; social science; public health

Introduction

HIV and other sexually transmitted infections (STI) pose a substantial and growing burden of morbidity and mortality worldwide [1]. In 2012, 2.3 million people became newly infected with HIV, bringing the current global total infections to 35.3 million [1]. In 2008 alone, the World Health Organization estimated almost 500 million incident cases of chlamydia, gonorrhoeae, syphilis, and T. vaginalis [2]. Results of over 25 years of behavioral interventions to prevent HIV/STI have been mixed, mobilizing a call for

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programs that take a more integrated and multilevel approach to HIV/STI control [3]. The need for integrated approaches is rooted firmly in the stance that many social scientists and social justice advocates have long argued: that HIV and other STI are inherently social diseases that cannot be understood or addressed in isolation from the social, economic, and political contexts and norms that shape risk behaviors and vulnerabilities [4-7]. Moreover, disparities in the distribution of HIV/STI and care outcomes that are driven by social and economic determinants of health [8] further underscore the need for interdisciplinary collaboration to deepen our understanding of HIV/STI risk [9].

As part of an initiative by the National Institute of Child Health and Development to increase international collaborations for social science research on HIV (R24 HD056670), researchers, clinicians and public health practitioners conducted a series of interdisciplinary studies grounded in social science theoretical frameworks. The work was based in the southern city of Liuzhou, which has been heavily affected by China's HIV/STI epidemics. The research teams included social, behavioral and biomedical scientists, as well as public health practitioners from the University of North Carolina at Chapel Hill, the Institute for Sexuality and Gender Studies at Renmin (Peoples) University in Beijing, the National Center for STD Control in Nanjing, the Liuzhou City CDC, and an advisory network of Chinese and international HIV/STI experts.

In the introductory essay to this Special Issue [10], we describe themes that emerged from these projects within the broad categories of changes in norms of heterosexual behavior, the complexities of risk behaviors and venue-based risk environments, and persistent stigma faced by people living with HIV (PLHIV). In this concluding essay we provide a historical context of China's evolving HIV/STI epidemics and the government response. We then offer seven recommendations for potential new directions for HIV/STI prevention and care research based on findings from the 11 studies presented in this Special Issue. We close with a discussion of lessons learned on forging collaborations between social science and public health researchers in order to inform a shared research agenda and generate interdisciplinary research that better meets the needs of those affected by, or vulnerable to, HIV and other STI.

Evolution of China's HIV/STI epidemic and prevention agenda

The first case of HIV in China was identified in a tourist in 1985, and by 1989 indigenous cases had been reported in an outbreak among drug users in southern China [11]. China's earliest control strategy focused on quarantining infected individuals and requiring HIV testing for foreigners [12]. Concurrent with the growing HIV/AIDS epidemic, China has experienced a resurgence in reported cases of STI thought to be nearly eradicated under the socialist policies of the 1950's and 60's [13]. Between 2004 to 2011, national surveillance sites measured a more than four-fold increase in reported number of syphilis cases [14]. High rates of other bacterial (e.g., chlamydia, gonorrhoea) and viral (e.g., herpes simplex virus 2 – HSV2, human papilloma virus - HPV) STI have also been reported, especially among at-risk populations including female sex workers (FSW) and men who have sex with men (MSM) [14-17].

China's approach to disease control for HIV is strongly rooted in its epidemic surveillance system, made up of 1) a national (now web-based) case reporting system which aggregates newly diagnosed cases from designated health facilities; and 2) a national sentinel surveillance system made up of over 1900 sentinel sites that track HIV/STI rates and risk behaviors among most-at-risk populations including FSW, injecting drug users (IDU), MSM and patients attending STI clinics; and other populations of special interest (e.g., migrants, pregnant women, youth, blood donors) [18, 19]. As the HIV epidemic took hold in China in

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the early 2000's— driven primarily by injection drug use and contaminated blood products —government resources shifted to implementation of global best practices for prevention, including targeted health education, condom use promotion, targeted HIV and syphilis testing, methadone maintenance therapy and needle exchange programs, and prevention of mother to child transmission (PMTCT) [11, 20, 21].

In 2003, the Chinese government launched its first policies of a comprehensive AIDS control strategy, foremost among them the “Four Frees and One Care” policy, which provided free antiretroviral therapy (ART) for poor and uninsured AIDS patients, free voluntary counseling and testing (VCT), free drugs to HIV-infected pregnant women and HIV testing of newborns, free schooling for AIDS orphans, and care and economic assistance to households of people living with HIV/AIDS [12]. Universal free syphilis screening became available to all pregnant women in 2011 with the national PMTCT program and has been integrated into HIV screening in some VCT sites and sentinel surveillance sites for HIV risk groups [22].

From 2005 to 2011, China's estimated population prevalence of HIV remained under 0.06%. However, measured HIV rates among groups tracked through sentinel surveillance included a rising trend among MSM to 6.3% in 2011 and a falling trend among IDU to 6.4% in 2011, while FSW prevalence remained under 1% [23]. In 2011, unsafe sex overtook injection drug use for the first time as the dominant mode of HIV transmission in China (63.9% versus 28.4% of newly diagnosed infections, respectively) [23]. Government-sponsored HIV/STI programs have rolled out large scale delivery of behavioral interventions for FSW, IDU and MSM. However evidence of risk heterogeneity within these groups [24-26] suggest that portions of these populations may be less exposed to public health interventions and also more vulnerable to infection [27, 28]. One recent focus of the Chinese Ministry of Science and Technology includes the 12th 5-Year Plan Mega Project which will target these harder to reach portions of at-risk populations (12th 5-Year Plan Mega Project, 2012ZX10001-007).

Though widely acclaimed for its progressive and evidence based approach to HIV control [29], experts both within and outside the Chinese government acknowledge that effective implementation remains one of the biggest challenges in achieving policy goals, given China's massive size and striking regional variation. Unmet needs among PLHIV in some regions have been widely documented (Ministry of Health People's Republic of China, 2012), including costly incidental fees for diagnostic tests, treatment of opportunistic infections, and hospitalization [30]. Programs are also needed to address the less discussed problems facing PLHIV such as malnutrition [31], suicide [32], and poor general quality of life [33].

Future Directions

Below we synthesize findings from the body of research conducted in Liuzhou China in the context of China's evolving HIV/STI epidemics and public health response. We discuss the implications of these findings for future intervention research in China with seven recommendations:

Recommendation 1

Expand current FSW outreach efforts within venue-based settings to include clients of FSW and other female workers and patrons (male and female) at entertainment venues.

This Special Issue features research that provides an in-depth and socially contextualized picture of heterosexual HIV/STI transmission in Liuzhou City by investigating the

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dispersion and concentration of risk within and beyond traditional commercial sex settings. In China, interventions to prevent heterosexual HIV/STI transmission have largely focused on pre-defined at-risk groups – especially FSW [28, 34-37] and IDU [28, 38]. Our work, however, found high levels of self-reported risk behaviors taking place outside the context of commercial sex partnerships, including unprotected sex with non-commercial partners, multiple types of sexual partnerships, and one-time sex with casual partners [39-43]. These studies force us to rethink traditional risk profiles or behaviors and to consider the importance of sexual networks as links between individuals with “typical” high-risk behaviors and members of the general population become apparent. A more fine-tuned perception of sexual networks and stratifications of risk profiles is apparent in the study of male migrant market vendors who vary widely in terms of social goals, business interests, and economic means, all of which shape their relationships with commercial, regular and casual sex partners [43].

These studies also document the role of business and leisure activities - and the public social spaces in which they take place - in the formation of new sexual partnerships. Entertainment venues such as bars, night clubs and karaoke halls, are common places for sustaining existing relationships and forming new relationships through friends and business acquaintances. The venue-based recruitment methods used in two studies [40, 41] identified high prevalence of syphilis among respondents, particularly among those reporting ever having one-time sex (*yiyeqing*). Existing venue-based HIV/STI prevention efforts, which focus primarily on commercial sex, must therefore expand to include other types of entertainment venues such as bars, dance halls, and karaoke clubs. Traditional definitions of risk groups must also give way to a framework more inclusive of other types of risk profiles including female employees who may not self-identify as FSW, patrons of entertainment venues who are not necessarily clients of FSW, and migrant workers who do not fit the profile of traditionally targeted low socio-economic status migrants.

Recommendation 2

Design condom promotion messaging and interventions for sex work and non-sex work populations that address trust, familiarity and condom negotiation skills.

Several Special Issue studies explore perceptions of sexual relationships and the ways in which gender, trust, social and economic dynamics, and networking activities shape decisions about partner choice and condom use [43-45]. As found in past research [46-48], the studies in this Special Issue found lower condom use by men and women during sex with regular partners or partners perceived as trustworthy or familiar [43, 44, 45]. In these relationships trust is conferred through interpersonal connections as well as through indirect connections - as when new sexual partners are introduced through friends or colleagues [43, 44]. By contrast, condoms are often associated with distrust, commercial sex, uncleanliness, and emotional distance. These findings can inform condom rebranding efforts to develop socially meaningful health communication messages and campaigns.

These projects suggest ways in which exploratory research can inform intervention design, a currently underutilized strategy [49]. Indeed, many intervention efforts among FSW, youth and migrant workers have tended to focus on using a standard approach with all groups to enhance HIV knowledge and promote 100% condom use [50, 51, 52]. Formative studies can play a critical role in helping design HIV/STI interventions by identifying target populations and tailoring intervention approach, messages and services that can then be tested for effectiveness.

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Recommendation 3

Tailor intervention activities and materials for FSW that are sensitive to heterogeneity in their work venues, social norms, and individual sexual risk behaviors.

The studies reported in this Special Issue illustrate significant diversity among subgroups of FSW in terms of socio-demographic, cultural and behavioral characteristics, and subsequent risk of HIV/STI. A number of these studies consider the environments where people meet sex partners and focus on describing how the social norms, risk of violence, availability of alcohol and drugs, and other characteristics of these environments shape HIV/STI risk [40, 41, 44].

HIV/STI prevention activities for FSW in China have largely consisted of distributing condoms and information fliers, usually by outreach staff who physically go to commercial sex venues [34, 53]. This provides a unique opportunity for outreach staff to develop programs tailored to venue characteristics [54, 55]. With few exceptions [56], the diversity across commercial sex venues has been described primarily in terms of disease distribution rather than used to inform and guide interventions. Findings in this Special Issue emphasize the need for risk-reduction messages and intervention strategies that take into account venue level factors – whether venue size, business type, or social interactions of venue patrons and management. Our interdisciplinary research teams studied a variety of environments where commercial sex takes place through social frameworks which reveal important dynamics in relationships among different groups of FSW and between FSW and clients, managers, police and health outreach workers.

Studies in this Special Issue corroborate findings from previous research reporting that women working in smaller, lower-cost venues or on the streets are generally older and less-educated than their counterparts at larger, higher-cost venues [54, 55]. However, one study found that women at smaller venues are highly concerned with self-protection because they are less able to afford medical care and lost income should they contract a disease [42]. In this study, women who work at larger venues are better educated but appear less concerned about their health, perceiving their clients as financially well-off and therefore healthier. Furthermore, these two groups of women rely on different sources of health information (friends vs. Internet), a critical finding for the delivery mode of information-based HIV interventions [42]. As demonstrated in the comparison of entertainment establishments to service-based venues [40], the location of risk behaviors (literally whether sex takes place on- or off-site) and practices for finding sexual partners can be incorporated into appropriate outreach methods including thoughtful placement of condoms or wording of safe-sex messaging. Finally, as Liu and colleagues note, public health practitioners should consider the management patterns and relationship dynamics within commercial sex work venues when designing appropriate intervention materials, especially in smaller-scale sex work venues where cultural practices specific to some ethnic minorities may influence the mode of business operations [57].

Recommendation 4

Address the role of drug and alcohol use in HIV/STI risk.

Drug and alcohol use emerge as critical elements of HIV/STI risk in our studies of commercial and non-commercial sexual encounters. Risk taking enhanced by substance-use features prominently among patrons of entertainment venues who report alcohol use as a way to facilitate new sexual connections [44], market vendors who incorporate social drinking into their social and business networking [43], and subgroups of FSW who also use injection drugs [45].

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Heavy alcohol use and binge drinking are not uncommon in China [58] and are considered normative within both business and entertainment activities. High-risk sexual behaviors have been associated with alcohol use both internationally [59] and in China [60, 61]. Interdisciplinary approaches are still needed, however, to develop a more comprehensive framework for understanding the intersection of social norms, alcohol-use and sexual risk in order to inform more strategic interventions. For example, normative beliefs among FSW regarding peer alcohol use and sexual risk may play a role in FSWs' decisions about when and how much to drink [62]. This may represent heretofore unexplored intervention points by targeting FSW peer values or social dynamics among FSW, clients, and managers, all of which may have far reaching effects on HIV/STI risk in these populations. Health communication risk-messaging that portrays the connection between heavy alcohol use and sexual risk should be developed and disseminated in venues where alcohol is consumed, whether or not commercial sex is present.

Interventions to address HIV/STI risk in women who inject drugs and also sell sex represent a particularly urgent need given their heightened vulnerability and the scarcity of formal knowledge about them. Research by Gu et al. for this Special Issue provides a rare insight into differences between these women and non-drug using FSW in terms of their risk profiles, barriers to care, and risk-reduction challenges [45]. For example, these women tend to be older, single (either unmarried or divorced), and have spent more years working in commercial sex. These factors, together with elevated rates of HIV and STI infection in this group, underscore the need for interventions to address their dual sources of risk. New efforts could include programs to enhance health literacy while addressing stigma in clinics or partnerships with public security forces to find alternatives to targeting of women who are doubly vulnerable to arrest, given their commercial sex and illicit drug use activities. The analysis by Gu and colleagues in this Special Issue found that FSW who use drugs report lower condom use rates with clients and poorer STI and drug treatment service access in spite of high exposure to traditional health promotion materials (65-71%), underscoring the need for more tailored interventions [45]. This analysis demonstrates that factors at various levels are associated with consistent condom use, including number of daily injections, support of condoms by venue managers, client willingness to use condoms, and perceived social stigma. These factors suggest that a multi-level intervention could have the greatest impact among these highly marginalized women.

Recommendation 5

Address the role of intimate partner violence in HIV/STI risk.

Intimate partner violence (IPV) emerged as an unaddressed area for intervention. In this Special Issue, the study by Gu and colleagues among women who inject drugs and sell sex [45] found that 56.7% of 200 surveyed women have experienced violence from their clients, managers, or regular partners, and that experience of any of these types of violence is significantly associated with inconsistent condom use in the past 6 months. This is not the first documentation of physical or sexual violence towards FSW from police, clients, and gangs, or from regular partners [63-65]. Nonetheless, most health research and interventions for FSW do not address this aspect of their well-being. The negative impact of client violence and threats of violence on condom use among FSW underscores its importance as an HIV/STI prevention priority and further emphasizes the need to address this threat to women's well-being [63, 66].

Though research on IPV among Chinese FSW is relatively new, results from Gu's study suggest that the problem is widespread and profoundly related to HIV/STI risk [45]. As IPV research in China expands, examples of successful sex worker interventions to reduce occupational violence from other global settings may provide guidance. The Songachi

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project in India is an example of a sex worker intervention that was able to address the problem of violence against FSW through the use of existing social structures to promote community-building and collaboration, and collective action programs among FSW to fight police harassment [67]. In a second model, an intervention in South Africa [68, 69] demonstrated how a combination of microfinance programs reduced STI risk and violence among participants. Other strategies from Thailand [70] and the Dominican Republic [71, 72] have developed programs to address differential power dynamics underlying IPV and HIV risk by appending community solidarity and empowerment programs onto existing structural and political initiatives. Thus a variety of interventions methods have demonstrated effectiveness and could be adapted for testing and evaluation in Chinese settings. Based on the findings presented in this Special Issue, we support development of venue level interventions to address IPV by creating supportive, "condom-friendly" sex work environments that foster alliances between managers, gatekeepers, and clients to improve condom acceptability and reduce violence. A particular challenge that must be addressed for IPV intervention is reaching the large number of FSW who work in very small, low-end venues or freelance in parks or streets or through the internet.

Recommendation 6

Increase community-based efforts to reduce HIV stigma

In China, stigmatizing attitudes toward PLHIV have been documented in the general population [73], students [74], employers [75], migrants [76], and rural residents [77]. Within this area of research, however, insufficient attention has been devoted to specific ways in which this fear and stigma create barriers to HIV/STI testing and care and negatively impact quality of life for PLHIV [78-80]. In the city-wide survey presented in this Special Issue, nearly one-fifth of respondents agree that PLHIV should be punished for their status, while an even larger proportion (40%) believe that people with HIV should be quarantined [81]. The same study also shows that accurate knowledge of HIV transmission routes among the general population is low: only 46% of respondents know that neither sneezing nor sharing utensils can transmit HIV. Furthermore, correct HIV knowledge attenuated associations of punishment and isolation stigma [81].

A number of anti-stigma HIV interventions in China to date have targeted service providers [82-88], but our findings show the need for broader efforts at the community level as well. One example of a past successful community-level anti-stigma campaign includes a community popular opinion leader model among 4510 market workers in Fuzhou, China which found that a community level diffusion of HIV/STI disease prevention information achieved sustained reduction in HIV-related stigmatizing attitudes toward PLHIV [89]. Exposure to mass media among Chinese migrant workers has been previously associated with lower stigmatizing attitudes toward PLHIV and increased knowledge of HIV/AIDS in a dose response relationship [90]. In developing a mass media anti-stigma campaign, interdisciplinary formative research should be conducted to determine the appropriate types and modes of media messaging. These interventions also represent important opportunities to incorporate "new media" tools including mobile-phone and web-based technologies, interactive communication interventions, role-playing, and gaming [91, 92].

In addition to improving PLHIV quality of life, community-based interventions may also help normalize HIV counseling and testing. Project Accept is an example of successful model which sought to improve VCT uptake through community mobilization efforts in Thailand and sub-Saharan Africa (HPTN 043) [93, 94]. This normative shift also aimed to increase opportunities to talk about HIV risk and risk reduction [95], which resulted in significant increases in first-time testers and repeat testers in the intervention sites [93, 94]. A similar program among rural migrants in Shanghai found increases in VCT uptake as well

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as increased HIV/STI knowledge and increased positive attitudes toward PLHIV and condom use [96].

Recommendation 7

Expand support and counseling for PLHIV and their families

PLHIV in China face significant barriers to care and elevated psychosocial burdens [97-100]. Several articles in this Special Issue demonstrate an important quality of life need among PLHIV for greater support and acceptance from their families and local communities [81, 101, 102]. Internalization of HIV stigma is well documented among PLHIV in these studies who face the constant psychological and physical stress of social isolation [101]. In addition, HIV-related stigma extends to the families of PLHIV and creates additional social and emotional burdens.

In recent years, community-based organizations and university-led studies in China have begun to test antiretroviral medication (ART) adherence interventions among PLHIV [103-108]. These efforts have identified the important role that factors like social support and counseling may play not only in improving adherence outcomes but also overall quality of life for PLHIV and their families. At least three pilot programs are currently underway, two of which adapt existing U.S. interventions to increase medication adherence for implementation in China [109, 110]. The adapted programs incorporate culturally-relevant elements around family relationships, reputation, and social support as well as traditional Chinese conceptions of health and illness [104, 105, 108]. Other promising intervention models under development among PLHIV in China include focus on psychosocial support [111] and nutrition supplementation [112].

Social science and public health research: cross-fertilization for mutual benefit

The papers in this Special Issue illustrate the growing complexity of sexual risk profiles in China and their implications for HIV/STI interventions as well as persistent stigma and unmet needs among PLHIV. To date, most interventions have focused on individual-level beliefs and behaviors without sufficient consideration of social and structural risk environments. These seven recommendations for future intervention work illustrate ways in which collaborations between social science and public health can mutually inform HIV/STI-related intervention development.

Public health interventions in China can use collaborative approaches to become more attuned to the social and structural determinants of health. These include the cycles that perpetuate drug use and sex work, the role of social support networks in human health, the role of place and the local environment in influencing risk behaviors; they include the influence of stigma on uptake of health services, and the harmful effects of violence and emotional abuse on infectious disease prevention, care and treatment.

Collaborative research teams that utilize social science research methods and theoretical approaches can also address some of the challenges posed by China's current risk-group based disease monitoring system and emphasis on programmatic indicators. Policy evaluation methods in China delegate the task of disease reporting to local health departments, where indicators reflecting intervention program activity (e.g. number of condoms distributed or number of clients seen per period of time) are favored over indicators measuring program outcomes. As a result, intervention evaluations tend to quantify effort but not efficacy. As China enters a new phase of public health interventions,

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a stronger tie between health outcomes and program goals could be facilitated through increased collaboration with social science researchers.

The value of partnering with social scientists in HIV/STI prevention research is present at all stages of research design and implementation. This includes sampling and measurement frameworks, identifying research questions, data collection and analysis, and findings; and translation of results into intervention strategies. In planning future intervention projects, public health researchers can benefit from incorporation of social science frameworks to enhance the depth, detail, and nuance of their research. In turn, social scientists can work with public health practitioners to harness their research findings to the design and implementation of ongoing intervention work. China has demonstrated strong commitment to HIV/STI prevention and care and established experience with biomedical research, epidemic surveillance and behavioral interventions. This in turn has laid a solid foundation for moving in the direction of multi-component, multi-level HIV/STI prevention and care intervention activities aimed at reducing HIV/STI transmission and improving the quality of life for those at risk for and living with HIV.

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