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3 **Out of the Closet, Into the Clinic:**
4 **Opportunities for Expanding MSM-Competent Services in China**
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33 **Running head: MSM-Competent Services in China**

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35 **Key Words:** Access to care; Clinical Care; HIV/AIDS; Men Who Have Sex with Men (MSM).

36 **Word Count/Number of items:** Summary (66); Abstract (244); Text (2723); References (30);
37 Tables (3); Figures (1).

38

39 **Source of Funding:**

40 This work was supported by the National Institutes of Health [National Institute of Allergy and
41 Infectious Diseases 1R01AI114310]; UNC-South China STD Research Training Centre [Fogarty
42 International Centre 1D43TW009532]; UNC Center for AIDS Research [National Institute of
43 Allergy and Infectious Diseases 5P30AI050410]; and the Bill & Melinda Gates Foundation to
44 the MeSH Consortium (BMGF-OPP1120138).

45 The listed grant funders played no role in any step of this study. The authors declare no
46 competing interests.

47 **Short Summary**

48 A study of MSM who saw a physician in the last two years in China found that only a small
49 proportion of MSM saw an MSM-competent physician;
50 MSM who saw an MSM-competent physician were more likely to be younger, have a primary
51 care physician, and living with HIV than those who did not;
52 A high proportion of Chinese MSM had ever experienced healthcare discrimination.

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ABSTRACT

Background: Despite the high HIV burden among men who have sex with men (MSM), there is little research on health services provided to MSM in China and other low- and middle-income countries. Discrimination and inadequate services may discourage MSM from seeking healthcare services. This study examined essential services provided to MSM and healthcare discrimination among MSM in China.

Methods: A nationwide cross-sectional online survey was conducted among MSM who saw a physician in the last 24 months in China. The survey included items on sociodemographic information, HIV testing, experiences from the last physician encounter, and history of perceived healthcare discrimination. We defined MSM-competent physicians as physicians who asked their patient about having sex with other men, asked about anal sex, and either asked about or recommended HIV testing at the most recent visit.

Results: Among the 503 participants, 35.0% (176/503) saw an MSM-competent physician. In multivariate analyses, respondents who saw an MSM-competent physician were more likely to be younger (AOR, 0.87; CI, 0.81-0.94), have a primary care physician (AOR, 3.24; CI, 1.85-5.67), and be living with HIV (AOR, 2.01; CI, 1.13-3.56). 61.2% (308/503) of MSM had ever experienced healthcare discrimination.

Conclusions: Our data suggest that there is variability in the extent to which physicians are meeting the needs of MSM in China. There is an urgent need to evaluate and expand MSM-competent services in China.

75 **Introduction**

76

77 Human Immunodeficiency Virus (HIV) services, especially services for key populations, have
78 substantially decentralized in the past five years. Many men who have sex with men (MSM) can
79 receive HIV testing at a wide range of sites.(1) While some aspects of decentralization are
80 simple, configuring many diverse services to be responsive to the unique needs and preferences
81 of young MSM will likely be challenging. This situation has contributed to MSM having
82 difficulty finding local physicians who deliver MSM-competent services, defined as services
83 meeting evidence-based standards for serving MSM.(2) Yet all MSM need MSM-competent
84 physicians who can sensitively elicit sexual histories, tactfully safeguard dignity, and provide
85 evidence-based care.(1, 2) MSM-competent services have been associated with sexual
86 orientation disclosure, greater HIV testing, and antiretroviral adherence and retention within the
87 HIV care continuum.(3, 4) The difficulty that MSM face in finding local physicians likely
88 contributes to the substantial MSM disparities in HIV outcomes and overall mortality.(5, 6)

89

90 MSM in China have a high burden of HIV. HIV prevalence among MSM in China has increased
91 from 6.0% in 2010 to 8.0% in 2015.(7) HIV incidence among Chinese MSM was 8.9/100
92 person-years in a recent study.(8) Although free HIV testing is provided in many government
93 and community-based settings in China, MSM still have suboptimal HIV testing and delayed
94 antiretroviral therapy (ART) initiation.(9) Persistent discrimination against MSM make it
95 challenging to reach and engage MSM in China.(10, 11) Few MSM regularly disclosure their
96 sexual orientation to physicians (12). Expanded MSM-competent services are needed in China.

97

98 The integration of HIV and primary care services has been shown to enhance MSM-competent
99 services in high-income countries(13), but China and many low- and middle-income countries
100 (LMICs) have less well developed primary care.(14) Although the Chinese government has been
101 working since 2006 to reinstate a strong primary care system in China, the utilization of primary
102 care services by Chinese people remains poor.(15-17) The first point of contact for most people
103 with illness is still tertiary care centers that have few primary care physicians (PCPs).(15) Health
104 reform has gradually expanded the system of primary care in China over the last decade,
105 providing an opportunity for enhancing MSM-competent care.(18)

106

107 Few studies have evaluated MSM-competent services outside high-income countries.(19, 20)
108 The limited research on MSM services in low- and middle-income countries focuses on
109 physician self-report and administrative data.(21) Moreover, qualitative research among MSM
110 suggests that many physicians discriminate against MSM and perceived discrimination can deter
111 MSM from seeking or continuing care.(22) The purpose of this study was to evaluate MSM-
112 competent services and determine the frequency of healthcare discrimination among a
113 nationwide online sample of young MSM in China.

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115

116 **Materials and Methods**

117

118 ***Study design and sampling methods***

119 We conducted a national, cross-sectional online survey from May 27 through May 30, 2017. The
120 survey was closed when the necessary sample size was reached. We recruited men using two
121 large gay websites and an HIV organization's WeChat account. WeChat, a free multi-functional
122 social media platform based in China, reported 938 million monthly active users as of May 2017

123 (16). The entire survey instrument was field tested among 20 MSM, and feedback was
124 incorporated into the finalized survey instrument. The link to the survey was first listed at the
125 end of an HIV-related article posted on Blued's WeChat platform. Blued is the world's largest
126 sex-seeking gay app. As of 2016, 27 million MSM have used Blued. Next, a short advertisement
127 about the online survey was posted on the HIV organization's official WeChat account and then
128 shared on the official WeChat account of an MSM organization headquartered in Qingdao, a city
129 in China's eastern Shandong Province. This MSM organization provides health counseling,
130 outreach, education, and online support for MSM and people living with HIV. This organization
131 typically posts online articles about MSM in order to attract readers. We chose an HIV-related
132 article because we wanted to recruit MSM at risk for and living with HIV. Recruitment was
133 tracked using Sojump, an online questionnaire management software, and stopped on May 30th
134 after the pre-specified sample of 500 was reached. Assuming 60% of MSM who saw an MSM-
135 competent doctor have a PCP and 40% of MSM who saw an MSM-competent doctor do not
136 have a PCP, a sample size of 500 allows for detection of a statistically significant difference
137 between these two groups with 95% confidence. The values of 60% and 40% were chosen based
138 on data from field testing.

139

140 Eligible participants were born biologically male, 16-30 years old, had ever engaged in anal or
141 oral sex with another man, and had seen a physician in the last 24 months. Participants read a
142 consent form and selected 'agree' to acknowledge understanding and willingness to participate in
143 the survey. Eligible participants received a small (~\$7.50 USD) phone credit for participating.

144

145 *Measures*

146 The online survey was anonymous and measured sociodemographic information, HIV testing,
147 recent experiences seeing a physician, and lifetime experiences of healthcare discrimination.
148 Most survey items were from a population-based survey of sexual behaviors in China (23).
149 Sociodemographic information included age (as a continuous variable), geographical location
150 (city and province), residence (urban or rural), migrant status (migrant or local resident),
151 occupation, marital status, education level (high school or below, some college, college and
152 above), annual income (less than or equal to 5400 USD, 5401-9000 USD, greater than 9000
153 USD), and ethnic affiliation. For reference, the average household net income in 2012 in China
154 was approximately 7000 USD.(24) Participants' province of origin was categorized based on
155 eight geographical regions in China: eastern, southern, central, northern, northwestern,
156 northeastern, southwestern, and other (Taiwan, Hong Kong, and Macau). Participants were asked
157 whether they currently have a PCP. We defined a PCP as a community level, non-specialist
158 physician who men trusted and saw on a regular basis.(25) Participants were asked to report their
159 self-identified sexual orientation (gay, bisexual, heterosexual, or unsure/other) and their current
160 self-identified gender (man, woman, transgender, or unsure/other). For self-identified gender, we
161 combined the categories of women and male-to-female transgender.(12) Participants were asked
162 if they had ever tested for HIV. Among those who tested for HIV infection, participants were
163 asked their most recent HIV test result. The full survey instrument is included as supplemental
164 material.

165

166 More detailed information was collected on the last physician visit. Men were asked about
167 whether the physician asked about the following: having sex with other men (yes or no), anal sex
168 (yes or no), condom use (yes or no), HIV testing (yes or no), and recommended HIV testing (yes

169 or no). MSM-competent physicians were defined as physicians who asked about having sex with
170 other men, asked about anal sex, and either asked about or recommended HIV testing. This
171 operational definition was based on MSM evidence-based guidelines from the US CDC,(26) the
172 WHO,(1) and the Fenway Institute.(2)

173
174 Physician discrimination against MSM was examined using nine survey items (Table 2) that
175 were adapted from existing survey instruments.(18, 27, 28) These survey items were used among
176 young MSM in other settings (27, 28) and young sexual minorities.(18) Men responded to each
177 of the nine items and then we dichotomized the variable to denote whether the man had
178 experienced any healthcare discrimination in their lifetime.

179

180

181 *Statistical analysis*

182 For the descriptive analyses, we stratified the sociodemographic and health seeking behaviors by
183 whether man reported last seeing an MSM-competent physician. We also performed T-tests (for
184 means) and Chi-square tests to evaluate whether the two groups were different. We further
185 evaluated the factors associated with seeing an MSM-competent physician by conducting a
186 bivariate logistic regression analysis (odds ratio, 95% confidence intervals). Finally, we
187 performed multivariable analyses to obtain the adjusted association between different variables
188 and seeing an MSM-competent physician. Variables with P values of less than 0.2 in the
189 bivariate models were included in the final multivariate analysis.(29) All data analyses were
190 completed using IBM SPSS Statistics 19 (IBM, Armonk, NY, USA). We used similar methods
191 to evaluate factors correlated with reported lifetime experiences of healthcare discrimination.
192 Specifically, we conducted bivariate logistic regressions and multivariable logistic regressions,

193 and variables with P values of less than 0.2 in the bivariate models were included in the
194 multivariate regression models.

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197 ***Ethical statement***

198 Ethical approval was obtained from the ethics review committees at the Guangdong Provincial
199 Center for Skin Diseases and STI Control (Guangzhou, China) and the University of North
200 Carolina at Chapel Hill (North Carolina, USA).

201
202

203 **Results**

204

205 Of 1689 people who clicked on the survey link, 1084 were determined ineligible. Approximately
206 half of those ineligible were excluded because they had not seen a physician in the last 24
207 months. Of the 605 eligible respondents, 503 completed the survey, yielding a completion rate of
208 83.1%.

209

210 ***Demographic characteristics of total MSM participants***

211 Table 1 shows the demographic characteristics of the sample. Overall, the average age of
212 participants was 23.9 ±3.5 years old. 93.2% (n=469) identified as men, 5.4% (n=27) identified as
213 male-to-female transgender, and 1.4% (n=7) identified as unsure/other. In terms of sexual
214 orientation, 83.5% (n=420) self-identified as gay, 11.9% (60) self-identified as bisexual and
215 4.6% (n=23) self-identified as either heterosexual or unsure/other. Most respondents had never
216 been married (94.4%, n=475). Most participants were Han Chinese (94.2%, n=474), and the
217 survey included men from every province in China except Tibet. Participants were from, in
218 descending order of frequency: eastern China (33.2%, n=167), southern China (19.1%, n=96),
219 northern China (14.9%, n=75), southwestern China (12.1%, n=61), central China (10.5%, n=53),

220 northeastern China (6.2%, n=31), northwestern China (3.6%, n=18), and other (0.4%, n=2). Most
221 respondents lived in urban areas (85.9%, n=432), and about half (50.1%, n=252) were migrants.
222 Most participants were employed (57.1%, n=287), and about one-third (34.4%, n=173) were
223 students. Annual income distribution among participants was 45.1% (n=227), 34.4% (n=173),
224 and 20.5% (n=103) earning \leq 5400 USD, 5401-9000 USD, >9000 USD, respectively. Overall,
225 14.3% (n=72) of participants had never been tested for HIV. Among those tested, HIV
226 prevalence was approximately 14.5% (n=73). 14.7% (n=74) of participants had an established
227 PCP.

228

229 ***Comparison of sociodemographics between MSM who saw an MSM-competent physician and***
230 ***MSM who did not***

231 The average age of MSM who saw an MSM-competent physician at their last visit was 23.2
232 (\pm 3.4) versus 24.3 (\pm 3.6) for MSM who did not see an MSM-competent physician (P <0.001,
233 table 2). Southwestern China had the highest proportion of respondents who saw an MSM-
234 competent physician (52.5%, n=32), followed by northwestern China (38.9%, n=7), southern
235 China (38.5%, n=37), northern China (34.7%, n=26), eastern China (31.7%, n=53), central China
236 (28.3%, n=15), and northeastern China (19.4%, n=6) (P for group difference=0.034). In terms of
237 HIV status, 54.8% (n=40) of participants living with HIV saw an MSM-competent physician at
238 their last visit while 66% (n=231) of participants with HIV did not see an MSM-competent
239 physician at their last visit (P <0.001). Regarding primary care, 59.5% (n=44) of participants who
240 reported having a PCP saw an MSM-competent physician at their last visit while 30.8% (n=132)
241 of participants without a PCP saw an MSM-competent physician at their last visit (P <0.001).

242

243 ***Factors associated with seeing an MSM-competent physician***

244 Correlates of seeing an MSM-competent physician are presented in Table 3. Overall, 35.0%
245 (n=176) of men saw an MSM-competent physician at their last visit. MSM who saw an MSM-
246 competent physician at their last visit were more likely to be younger (adjusted odds ratio
247 [AOR], 0.87; 95% confidence interval [CI], 0.81-0.94) and have a PCP (AOR, 3.24; 95% CI,
248 1.85-5.67). Those who were living with HIV were more likely than others to report seeing an
249 MSM-competent physician at their last visit (AOR, 2.01; 95% CI, 1.13-3.56). In the crude
250 model, people living in southwestern China had an increased odds of seeing an MSM-competent
251 physician at their last visit compared to other regions (crude odds ratio [OR], 2.37; 95% CI, 1.30-
252 4.32). No association was detected between self-identified gender, sexual orientation, residency,
253 migrant status, occupation, marital status, education, annual income, or ethnic affiliation.

254
255 ***Factors associated with healthcare discrimination***

256 Table 4 displays frequencies of experiences of perceived discrimination by physicians among the
257 entire survey population. 61.2% (n=308) of participants reported ever experiencing perceived
258 discrimination by a physician. Overall, 40% (n=199) of participants reported having ever
259 refrained from a necessary examination or treatment because they were afraid of being
260 discriminated against because of their sexual orientation. 37.2% (n=187) of participants reported
261 having felt that their physician should know about their sexual orientation prior to an
262 examination or treatment, but did not disclose it for fear of negative consequences. 30% (n=151)
263 of respondents had perceived that their physician was uncomfortable discussing sexuality or
264 sexual history. Another 20.7% (n=104) of respondents reported having felt discriminated against
265 by physicians because of their sexual orientation. We analyzed correlates of healthcare

266 discrimination in a multivariate analysis and found that no correlates were associated
267 (Supplemental Table 1).

268
269 **Discussion**

270
271 In this study, we evaluated several elements of MSM-competent services among an online,
272 cross-sectional sample of MSM in China. We found that approximately one-third of men saw an
273 MSM-competent physician at their last physician visit. Men with a PCP were more likely to
274 report seeing an MSM-competent physician. This study expands the literature by asking about
275 three important aspects of MSM-competent services, evaluating MSM-competent services in a
276 middle-income context, and reporting frequencies of MSM experiences of healthcare
277 discrimination in China.

278
279 We found only one-half of respondents reported being recommended HIV testing at their last
280 physician visit. This level of HIV test offer likely represents an improvement from a 2012 study
281 among patients seen by STI providers in China.(21) Among men who are not living with HIV in
282 our study, over one-third were recommended HIV testing at their last physician visit. This
283 proportion of HIV test offer is higher than reported in a 2009 study among non-HIV infected
284 MSM in the United States.(13)

285
286 We found that men with PCPs were more likely to receive MSM-competent care. This is
287 consistent with data from Australia and United States.(13, 30) We were not able to identify
288 similar data on the frequency of MSM-competent services in China. PCPs may be more
289 competent in managing MSM health themselves or could facilitate referral to HIV or sexually

290 transmitted infection (STI) specialists. Although there has been a growing primary care
291 movement in China in the last decade, most people see specialists first and primary care services
292 are underutilized.(16, 17) All physicians need to have the skills, knowledge, and experience to
293 serve MSM in the clinic, but this need is particularly prominent in infectious diseases and
294 primary care settings there MSM represent a larger portion of patients seen.

295

296 We found substantial discrimination experienced by MSM in healthcare settings. Nearly two-
297 thirds of participants experienced some form of lifetime healthcare discrimination. Men in our
298 sample reported being ignored, mistreated, and refused healthcare by physicians at rates similar
299 to two studies in the United States.(27, 28) Rates of refraining from an examination or treatment
300 or disclosure of sexual orientation for fear of discrimination were higher than among sexual
301 minorities in Germany.(18) Homophobic attitudes among physicians are common and may
302 prevent MSM from seeking the health services.(31, 32) Training and related interventions for
303 physicians may help to decrease MSM healthcare discrimination.(33)

304

305 Our data have implications for research and policy. From a research perspective, additional
306 studies are needed to evaluate the extent to which physicians provide MSM-competent services.
307 Earlier research has used administrative data to understand the quality of physician sexual health
308 services in China.(21) MSM-focused evaluation of physician services through online platforms
309 may be another option, given the high rates of internet use among MSM in China.(34) From a
310 policy perspective, more detailed guidelines for serving MSM in China may be useful for
311 clinicians. Although global WHO guidelines exist,(1, 35) these have not been adapted or widely
312 implemented in China.

313

314 Our study has several limitations. First, our definition of MSM competence was relatively
315 narrow and did not incorporate all of the needs of MSM. Second, this is a cross-sectional study
316 and no causal relationships can be inferred. We recruited a young, online sample of mostly urban
317 MSM who may be different from the general MSM population.(36) Third, we only asked about
318 MSM-competent services at the last physician visit. Fourth, our measures of healthcare
319 discrimination evaluated lifetime experiences, introducing the possibility of recall bias.
320 However, similar measures have been used in other contexts.(37) Fifth, discrimination survey
321 items and a few other items were not validated in China. At the same time, we did adapt them
322 based on field testing and this preliminary data is important for subsequent behavioral research
323 on this topic.

324

325 Despite these limitations, this study provides important information for further research and
326 suggests that there is an urgent need to continue to evaluate and expand MSM-competent
327 services in China. Our data suggest that there are already a subset of MSM-competent
328 physicians, laying the foundation for subsequent MSM service improvements.

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335 **Acknowledgments:**

336 We thank all the study participants and staff members at SESH Global, Danlan, and Shenzhen
337 Nanshan Center for Chronic Disease Control who contributed.

338

339 **Author Disclosure Statement:** No competing financial interests exist.

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342 **References**

343

344 1. WHO Guidelines Approved by the Guidelines Review Committee. Consolidated Guidelines on
345 HIV Prevention, Diagnosis, Treatment and Care for Key Populations - 2016 Update. Geneva:
346 World Health Organization, Copyright (c) World Health Organization 2016.; 2016.

347 2. Fenway Guide to Lesbian, Gay, Bisexual, and Transgender Health. Second ed. Philadelphia:
348 American College of Physicians; 2015.

349 3. Micheni M, Secor A, van der Elst E, et al. Facilitators and challenges to ART adherence among
350 men who have sex with men (MSM) in Coastal Kenya. *AIDS Res Hum Retroviruses*.
351 2014;30(Suppl 1):A136.

352 4. Beckerman A, Fontana L. Medical treatment for men who have sex with men and are living with
353 HIV/AIDS. *Am J Mens Health*. 2009;3(4):319-29.

354 5. Yan H, Yang H, Li J, et al. Emerging disparity in HIV/AIDS disease progression and mortality for
355 men who have sex with men, Jiangsu Province, China. *AIDS Behav*. 2014;18 Suppl 1:S5-10.

356 6. Cochran SD, Mays VM. Sexual orientation and mortality among US men aged 17 to 59 years:
357 results from the National Health and Nutrition Examination Survey III. *Am J Public Health*.
358 2011;101(6):1133-8.

359 7. Tang S, Tang W, Meyers K, Chan P, Chen Z, Tucker JD. HIV epidemiology and responses among
360 men who have sex with men and transgender individuals in China: a scoping review. *BMC Infect*
361 *Dis*. 2016;16(1):588.

362 8. Xu JJ, Tang WM, Zou HC, et al. High HIV incidence epidemic among men who have sex with men
363 in china: results from a multi-site cross-sectional study. *Infect Dis Poverty*. 2016;5(1):82.

364 9. Liu Y, Ruan Y, Vermund SH, et al. Predictors of antiretroviral therapy initiation: a cross-sectional
365 study among Chinese HIV-infected men who have sex with men. *BMC Infect Dis*. 2015;15:570.

366 10. Wei C, Yan H, Yang C, et al. Accessing HIV testing and treatment among men who have sex with
367 men in China: a qualitative study. *AIDS care*. 2014;26(3):372-8.

368 11. Feng Y, Wu Z, Detels R. Evolution of MSM community and experienced stigma among MSM in
369 Chengdu, China. *Journal of acquired immune deficiency syndromes (1999)*. 2010;53(Suppl
370 1):S98.

371 12. Tang W, Mao J, Tang S, et al. Disclosure of sexual orientation to health professionals in China:
372 results from an online cross-sectional study. *J Int AIDS Soc*. 2017;20(1):1-9.

373 13. Johnson CV, Mimiaga MJ, Reisner SL, et al. Health care access and sexually transmitted infection
374 screening frequency among at-risk Massachusetts men who have sex with men. *American*
375 *journal of public health*. 2009;99(S1):S187-S92.

376 14. Wong WC, Kidd MR, Tucker JD. Republished: Mainstreaming HIV services for men who have sex
377 with men: the role of general practitioners. *The Fellowship of Postgraduate Medicine*; 2013.

378 15. Wu D, Lam TP, Lam KF, Zhou XD, Sun KS. Health reforms in china: the public's choices for first-
379 contact care in urban areas. *Family Practice*. 2017;34(2):194-200.

380 16. Wu D, Lam TP. At a Crossroads: Family Medicine Education in China. *Acad Med*. 2017;92(2):185-
381 91.

382 17. Wu D, Lam TP. Underuse of Primary Care in China: The Scale, Causes, and Solutions. *J Am Board*
383 *Fam Med*. 2016;29(2):240-7.

384 18. Hirsch O, Loltgen K, Becker A. Lesbian womens' access to healthcare, experiences with and
385 expectations towards GPs in German primary care. *BMC Fam Pract*. 2016;17(1):162.

386 19. Holtgrave DR, Kim JJ, Adkins C, et al. Unmet HIV service needs among Black men who have sex
387 with men in the United States. *AIDS Behav*. 2014;18(1):36-40.

388 20. Tao G, Hoover KW. Differences in access to healthcare and utilisation of HIV and sexually
389 transmissible infection services between men who have sex with men and men who have sex

- 390 only with women: results of the 2006-10 National Survey of Family Growth in the United States.
 391 Sex Health. 2013;10(4):363-8.
- 392 21. Tucker JD, Walensky RP, Yang LG, et al. Expanding provider-initiated HIV testing at STI clinics in
 393 China. AIDS Care. 2012;24(10):1316-9.
- 394 22. Liao M, Wang M, Shen X, et al. Bisexual Behaviors, HIV Knowledge, and
 395 Stigmatizing/Discriminatory Attitudes among Men Who Have Sex with Men. PLoS One.
 396 2015;10(6):e0130866.
- 397 23. Parish WL, Laumann EO, Cohen MS, et al. Population-based study of chlamydial infection in
 398 China: a hidden epidemic. Jama. 2003;289(10):1265-73.
- 399 24. Xie Y, Jin Y. Household wealth in China. Chinese sociological review. 2015;47(3):203-29.
- 400 25. Schoen C, Osborn R, Doty MM, Squires D, Peugh J, Applebaum S. A survey of primary care
 401 physicians in eleven countries, 2009: perspectives on care, costs, and experiences. Health
 402 Affairs. 2009;28(6):w1171-w83.
- 403 26. Workowski KA, Bolan GA. Sexually transmitted diseases treatment guidelines, 2015. MMWR
 404 Recomm Rep. 2015;64(Rr-03):1-137.
- 405 27. Eaton LA, Driffin DD, Kegler C, et al. The role of stigma and medical mistrust in the routine health
 406 care engagement of black men who have sex with men. Am J Public Health. 2015;105(2):e75-82.
- 407 28. Kinsler JJ, Wong MD, Sayles JN, Davis C, Cunningham WE. The effect of perceived stigma from a
 408 health care provider on access to care among a low-income HIV-positive population. AIDS
 409 Patient Care STDS. 2007;21(8):584-92.
- 410 29. Tang W, Huan X, Mahapatra T, et al. Factors associated with unprotected anal intercourse
 411 among men who have sex with men: results from a respondent driven sampling survey in
 412 Nanjing, China, 2008. AIDS and Behavior. 2013;17(4):1415-22.
- 413 30. Chu C, Selwyn PA. An epidemic in evolution: the need for new models of HIV care in the chronic
 414 disease era. J Urban Health. 2011;88(3):556-66.
- 415 31. Vu L, Tun W, Sheehy M, Nel D. Levels and correlates of internalized homophobia among men
 416 who have sex with men in Pretoria, South Africa. AIDS and Behavior. 2012;16(3):717-23.
- 417 32. Wei C, Cheung DH, Yan H, Li J, Shi L, Raymond HF. The Impact of Homophobia and HIV Stigma on
 418 HIV Testing Uptake Among Chinese Men Who Have Sex With Men: a Mediation Analysis. Journal
 419 of acquired immune deficiency syndromes (1999). 2016;71(1):87-93.
- 420 33. Tucker JD, Fenton KA, Peckham R, Peeling RW. Social entrepreneurship for sexual health (SESH):
 421 a new approach for enabling delivery of sexual health services among most-at-risk populations.
 422 PLoS Med. 2012;9(7):e1001266.
- 423 34. Cao B, Liu C, Stein G, et al. Faster and Riskier? Online Context of Sex Seeking Among Men Who
 424 Have Sex With Men in China. Sex Transm Dis. 2017;44(4):239-44.
- 425 35. United Nations Population Fund GFoMH, United Nations Development Programme, World
 426 Health Organization, United States Agency for International Development, World Bank.
 427 Implementing comprehensive HIV and STI programmes with men who have sex with men:
 428 Practical guidance for collaborative interventions. New York (NY); 2015.
- 429 36. Wang C, Mollan KR, Hudgens MG, et al. Generalisability of an online randomised controlled trial:
 430 an empirical analysis. J Epidemiol Community Health. 2017.
- 431 37. Li X, Lu H, Ma X, et al. HIV/AIDS-related stigmatizing and discriminatory attitudes and recent HIV
 432 testing among men who have sex with men in Beijing. AIDS and Behavior. 2012;16(3):499-507.

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435 **Tables**

436

437 **Table 1. Demographic Characteristics of the Survey Participants in China, 2017 (N = 503)**

Characteristics	n	Percent
Age, y		
16-20	102	20.3
21-25	223	44.3
26-30	178	35.4
Education		
High school and below	134	26.6
Some college	141	28
College and above	228	45.3
Marital status		
Never married	475	94.4
Engaged or ever married	28	5.6
Residency		
Rural	71	14.1
Urban	432	85.9
Annual income (USD)		
≤5,400	227	45.1
5,401-9,000	173	34.4
>9,000	103	20.5
Sexual orientation		
Gay	420	83.5
Bisexual	60	11.9
Heterosexual and Others*	23	4.6
Currently has a primary care doctor		
Yes	74	14.7
No	429	85.3
Currently interested in establishing a PCP		
Yes	323	64.2
No	106	21.1
HIV positive		
Yes	73	14.5
No	350	69.6
Never got test results	8	1.6
Never been tested	72	14.3

438 * This includes individuals who identify as heterosexual and those unsure of their sexual orientation.

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440 **Table 2. Comparison of Sociodemographics Between MSM Who Saw an MSM-Competent**
 441 **Doctor and MSM Who Did Not in China, 2017 (N=503)**

	Overall (n=503), n(%)	Saw an MSM- competent doctor (n=176), n(%)	Did not see an MSM competent doctor (n=327), n(%)	<i>P</i>
Sociodemographics				
Age (mean, SD)	23.92, 3.54	23.22, 3.39	24.29, 3.56	0.001
Self-identified gender				0.28
Man	469 (93.2)	167 (35.6)	302 (64.4)	
Trans/Woman	27 (5.4)	6 (22.2)	21 (77.8)	
Unsure/other	7 (1.4)	3 (42.9)	4 (57.1)	
Sexual orientation ¹				0.51
Gay	420 (83.5)	151 (36)	269 (64)	
Bisexual	60 (11.9)	17 (28.3)	43 (71.7)	
Heterosexual or others ¹	23 (4.6)	8 (34.8)	15 (65.2)	
Location by Chinese region				0.034
Eastern	167 (33.2)	53 (31.7)	114 (68.3)	
Southern	96 (19.1)	37 (38.5)	59 (61.5)	
Central	53 (10.5)	15 (28.3)	38 (71.7)	
Northern	75 (14.9)	26 (34.7)	49 (65.3)	
Northwestern	18 (3.6)	7 (38.9)	11 (61.1)	
Southwestern	61 (12.1)	32 (52.5)	29 (47.5)	
Northeastern	31 (6.2)	6 (19.4)	25 (80.6)	
Taiwan, Hong Kong, Macau	2 (0.4)	0 (0)	2 (100)	
Residency				0.88
Urban	432 (85.9)	150 (34.7)	282 (65.3)	
Rural	71 (14.1)	26 (36.6)	45 (63.4)	
Migrant status				0.74
Local	251 (49.9)	87 (34.7)	164 (65.3)	
Migrant	252 (50.1)	89 (35.3)	163 (64.7)	
Occupation				0.14
Student	173 (34.4)	62 (35.8)	111 (64.2)	
Employed	287 (57.1)	103 (35.9)	184 (64.1)	
Sex worker	2 (0.4)	2 (100)	0 (0)	
Unemployed	12 (2.4)	3 (25)	9 (75)	
Other	29 (5.8)	6 (20.7)	23 (79.3)	
Marital status				0.46
Never married	475 (94.4)	168 (35.4)	307 (64.6)	
Engaged or ever married	28 (5.6)	8 (28.6)	20 (71.4)	
Education				0.35
High school or below	134 (26.6)	53 (39.6)	81 (60.4)	
Some college	141 (28)	50 (35.5)	91 (64.5)	
College and above	228 (45.3)	73 (32)	155 (68)	

Annual Income (USD)				0.23
≤5,400	227 (45.1)	86 (37.9)	141 (62.1)	
5,401-9,000	173 (34.4)	61 (35.3)	112 (64.7)	
>9,000	103 (20.5)	29 (28.2)	74 (71.8)	
Ethnic affiliation				0.95
Han	474 (94.2)	166 (35)	308 (65)	
Non-Han	29 (5.8)	10 (34.5)	19 (65.5)	
HIV status ²				<0.001
HIV positive	73 (14.5)	40 (54.8)	33 (45.2)	
HIV negative	350 (69.6)	119 (34.0)	231 (66)	
Never got test results	8 (1.6)	5 (62.5)	3 (37.5)	
Never been tested	72 (14.3)	12 (16.7)	60 (83.3)	
Health Seeking Behaviors				
Have a primary care physician				<0.001
Yes	74 (14.7)	44 (59.5)	30 (40.5)	
No	429 (85.3)	132 (30.8)	297 (69.2)	

¹This includes individuals who identify as heterosexual and those unsure of their sexual orientation.

²Satisfying the MSM-competent doctor requirement of asking about or recommending HIV testing has a different meaning for PLWHA versus non-PLWHA: an MSM-competent doctor would still recommend HIV testing to PLWHA, but the test would likely be either a viral load measurement or CD4 count. The type of testing recommended by an MSM-competent doctor seeing non-PLWHA would likely be an ELISA test.

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444 **Table 3. Factors Associated with MSM Who Saw an MSM-Competent Doctor in China,**
 445 **2017 (N=503)**
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	Crude OR (95% CI)	AOR (95% CI)
Sociodemographics		
Age (mean, SD)	0.92 (0.87-0.97)	0.87 (0.81-0.94)
Self-identified gender		
Man	1	
Trans/Woman	0.52 (0.21-1.31)	
Unsure/other	1.36 (0.30-6.12)	
Sexual orientation		
Gay	1	
Bisexual	1.05 (0.44-2.54)	
Heterosexual and others*	0.74 (0.27-2.07)	
Location by Chinese region		
Eastern	1	1
Southern	1.35 (0.80-2.28)	1.25 (0.71-2.21)
Central	0.85 (0.43-1.68)	0.59 (0.29-1.23)
Northern	1.14 (0.64-2.03)	1.21 (0.66-2.24)
Northwestern	1.37 (0.50-3.73)	1.09 (0.38-3.16)
Southwestern	2.37 (1.30-4.32)	1.79 (0.92-3.45)
Northeastern	0.52 (0.20-1.33)	0.5 (0.19-1.36)
Taiwan, Hong Kong, Macau	0 (0)	0 (0)
Residency		
Urban	1	
Rural	1.09 (0.65-1.83)	
Migrant status		
Local	1	
Migrant	1.03 (0.71-1.49)	
Occupation		
Student	1	1
Employed	1 (0.67-1.49)	1.43 (0.84-2.44)
Sex worker	0 (0)	3292724560 (0)
Unemployed	0.6 (0.16-2.29)	0.55 (0.13-2.36)
Other	0.47 (0.18-1.21)	0.63 (0.23-1.76)
Marital status		
Never married	1	
Engaged or ever married	0.73 (0.32-1.70)	
Education		
High school or below	1	
Some college	0.84 (0.52-1.37)	
College and above	0.72 (0.46-1.12)	
Annual Income (USD)		
≤5,400	1	

5,401-9,000	0.89 (0.59-1.35)	
>9,000	0.64 (0.39-1.07)	
Ethnic affiliation		
Han	1	
Non-Han	0.98 (0.44-2.15)	
HIV status		
HIV positive	2.35 (1.41-3.92)	2.01 (1.13-3.56)
HIV negative	1	1
Never got test results	3.24 (0.76-13.77)	1.37 (0.29-6.37)
Never been tested	0.39 (0.20-0.75)	0.4 (0.20-0.79)
Health Seeking Behaviors		
Have a primary care physician		
Yes	3.3 (1.99-5.48)	3.24 (1.85-5.67)
No	1	1

447 *This includes individuals who identify as heterosexual and those unsure of their sexual orientation.

448 **Table 3. Experiences of Discrimination by Physicians Among Young MSM in China, 2017**
 449 **(N = 503)**
 450

	Yes N (%)	No N (%)	Not sure N (%)
Statement*			
I have been mistreated by doctors because of my sexual orientation.	65 (12.9)	438 (87.1)	-
I have been ignored by doctors because of my sexual orientation.	64 (12.7)	439 (87.3)	-
Question			
Have you ever perceived that your doctor was uncomfortable discussing your sexuality or sexual history?	151 (30)	218 (43.3)	134 (26.6)
Has a doctor ever refused to provide healthcare to you because of your sexual behaviors?	33 (6.6)	360 (71.6)	110 (21.9)
Have you ever refrained from a necessary examination or treatment because you were afraid of being discriminated against because of your sexual orientation?	199 (40)	247 (49.1)	57 (11.3)
Have you ever felt discriminated against by physicians, in hospitals or in other areas of the healthcare system because of your sexual orientation?	104 (20.7)	268 (53.3)	131 (26)
Have you ever been refused an examination or treatment because of your sexual orientation?	37 (7.4)	397 (78.9)	69 (13.7)
Have you ever felt that your doctor should know about your sexual orientation prior to an examination or treatment, but you did not disclose it for fear of negative consequences?	187 (37.2)	221 (43.9)	95 (18.9)
Did you ever feel the need to talk about your sexual orientation with your doctor but he/she dismissed/ignored it?	53 (10.5)	339 (67.4)	111 (22.1)

*Respondents were not given a 'Not sure' option for these statements

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468 **Supplement Legend**

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470 **Supplemental Table 1. Comparison of Sociodemographics Between MSM Who Have**
471 **Experienced Healthcare Discrimination and MSM Who Have Not in China, 2017 (N = 503)**

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