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Elevated Risk for Tobacco Use Among Men Who Have Sex With Men Is Mediated by Demographic and Psychosocial Variables

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Men who have sex with men (MSM) may be more likely to smoke than general population men. Such population comparisons typically do not control for demographic differences and have not tested reasons for MSMs' greater tobacco use. We compared MSM with general population men in data that allowed us to control demographic differences, and hypothesized that MSM would report more tobacco use, due to elevated levels of three psychosocial variables that generally predict tobacco use: depression symptoms, alcohol use, and limited health access. Data were from a 2001 survey of MSM in Chicago ($n = 817$) and from the 2001 National Health Interview Study ($n = 7{,}783$). Significantly more MSM used tobacco, particularly younger MSM. Depression symptoms, alcohol use, and limited health access were more common among MSM and partially accounted for their elevated smoking risk. The lower health access and greater vulnerability of MSM to depression and alcohol use contributed to their higher smoking rate and must be considered in further smoking research and prevention. Younger MSM show very high rates of smoking and are a particular intervention target. Limitations of this cross-sectional study are noted.

Keywords culture and depression; gay versus heterosexual population differences; psychosocial predictors; smoking rates; vulnerability

Introduction

Some 40% of men who have sex with men (MSM) may be current smokers (Skinner and Otis, 1996; Stall et al., 1999), substantially more than the 25% found in the general U.S. male population (CDC, 2003a, 2003b). Studies of MSM smoking rarely control for sample differences in age, ethnicity, education, or other variables known to predict tobacco use. The first goal of this study was to directly compare MSM to general population smoking rates while controlling for demographic differences between groups.

Our second goal was to go beyond simple descriptive analyses of MSM smoking to examine cultural or psychosocial variables that may underlie population differences.

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We hypothesized that psychosocial variables that generally confer vulnerability to smoking—depression, alcohol use, and access to health care—may be more common among MSM and may help explain their elevated smoking rate. MSM may be at risk for depression due to stigma, discrimination, or conflicts over sexual identification (Cochran and Mays, 2000; Mills et al., 2004). MSM also report elevated rates of alcohol and drug use (McKirnan and Peterson, 1989; Woody et al., 2001), possibly stemming from depression, culturally specific stressors, or alcohol use–related social venues (McKirnan and Peterson, 1992). Smoking is itself associated with both depression (Breslau et al., 1991; Kassel et al., 2003; but see Hitsman et al., 2003) and alcohol or drug use (Kenford et al., 2002; Soeken and Bausell, 1989; Wetzels et al., 2003). We predicted that both depression and "heavier" alcohol use would be more common among MSM, and would underlie their higher smoking rates.

Health care is a contact point for information about the hazards of smoking and for cessation programs (Fiore, 2000). MSM may have lessened health access due to perceived discrimination or avoidance of sexual disclosure (Council on Scientific Affairs, 1996; Harrison, 1996). We predicted that limited health access would be associated with smoking, would be more common among MSM, and would help account for their elevated tobacco use.

We compared MSM with the general population in lifetime and current smoking status, using data that allowed us to statistically control for differences in ethnicity, age, education, city size, and geographical region. We expected younger MSM to be at particular risk for tobacco use, given the importance of settings such as bars and clubs to this group (McKirnan and Peterson, 1989, 1992; Stall et al., 1999). We hypothesized that MSM would report more depression, alcohol use, and poor health care access, and that these variables would help explain their elevated rate of smoking. Support for these hypotheses would provide a theoretical grounding to the finding of simple population differences and may point the way to culturally specific interventions.

Methods

Data Sources

MSM data are from 15-minute anonymous surveys administered at 11 diverse gay/bisexual venues of Chicago during 2001. All participants reported sex with another man in the previous 6 months or were self-identified as MSM (n = 817). We used a targeted multiframe sampling approach developed over successive community surveys to avoid bias stemming from high-risk settings. Venues ranged from large "pride" and festival events to a small poetry reading. We recruited half the sample at diverse "black gay pride" events, 33% at an MSM street fair and related venues, and 14% from Latino clubs or organizations. The unweighted sample was 53% African American (n = 418), 17% Latino (n = 132), 23% White (n = 183), and 10.1% Asian/Pacific Islanders, other, or missing (n = 82).

General population data are from the 2001 National Health Interview Survey (NHIS) (Botman et al., 2000; National Center for Health Statistics [NCHS], 2002) public domain adult male sample, downloaded 6/11/03 from //ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/NHIS/2001 (initial n = 14,490). The NHIS is a multistage, national probability sample of noninstitutionalized civilians, collected under contract with the U.S. Census Bureau.

Procedures

For MSM data, trained outreach workers from the MSM community randomly approached potential respondents and requested that they complete an anonymous self-administered

survey of health-related attitudes and behaviors in exchange for $5. We took the decision to complete the survey as informed consent. Over 50% of eligible men agreed to participate. Participants were allowed to complete the survey only once. The institutional review boards of Howard Brown Health Center and The University of Illinois at Chicago approved the survey and procedures. African American and Latino participants were over-represented; to compensate we used the SPSS (2001) case weighting procedure to lessen African American representation (case weight = .5), and increase Latino (weight = 1.1) and White representation (weight = 2.5). Results are given for weighted data but were similar using raw data.

NHIS data are from computer-assisted face-to-face interviews conducted in participants' households (Botman et al., 2000; NCHS, 2002). Response scales were the same as those used in the MSM survey. The response rate was 74%. Respondents over age 45 were over-represented. To compensate, we randomly selected NHIS respondents to approximate the age distribution of the MSM sample. We used 100% of the NHIS data aged 18 to 34, 73% of NHIS participants aged 35 to 44, and 15% of those aged 45 to 78. The resultant sample used 56% of NHIS participants (n = 7,783). In both the MSM and NHIS final samples, 19% of participants were aged 18 to 24, 37% aged 25 to 34, 29% aged 35 to 44, and 14% aged 45 to 78. The NHIS did not assess sexual orientation, although we know from other studies that only 2–3% of general population men are MSM (Smith, 1998). The degree of inadvertent overlap in these samples was therefore minimal.

Measures

We constructed variables common to the two data sets, using the MSM sample as the "index" case: NHIS variables that used slightly different scales were recoded to reflect MSM categories. All data transformations and analyses are the complete responsibility of the investigators rather than NCHS. All measures used simple checklists or rating scales that are standard in survey research within diverse populations.

For demographics, age was coded into the three groups used in NHIS population reports: 18–24 years, 25–44 years, and 45–64 years. Race/ethnicity was coded as White, African American, Latino, and Asian/Pacific Islander or other. Education was coded as six categories: "did not complete high school" (1) to "graduate degree" (6). The NHIS assessed geographic region (Northeast, Midwest, South, West) and Metropolitan Statistical Area size (MSA). All MSM participants were coded as "Midwest" and MSA of 2.5 M to 5 M.

Tobacco use was measured as lifetime and current status and smoking quantity. We assessed smoking quantity as cigarettes per day, week, or month, as appropriate, transformed into an index of packs per week. The samples differed in whether an interviewer would hear the participant's response, raising the prospect of differences in social desirability responding. Comparisons of interview, questionnaire, and physiological smoking assessments show high accuracy and mixed or no differences by format (Kaplan et al., 2001; Richman et al., 1999; Velicer et al., 1992). Thus, these self-reports are likely accurate, and any group differences are not plausibly due to differing response formats.

Depression symptoms were assessed via five items (e.g., "I felt sad," alpha = .78), similar to the Center for Epidemiological Studies-Depression (CES-D; Radloff, 1977). Participants rated the number of days they experienced each symptom over the past 30 days (NHIS) or week (MSM) on a scale ranging from "rarely or none"(0) to "most or all of the time" (3). Symptoms reported twice a week or more were coded as "present" (Santor and Coyne, 1997); we contrasted participants with two or more symptoms versus those with zero or one symptom.

"Heavy" alcohol use was assessed as the frequency of consuming five or more drinks or intoxication. Our binary coding was an average of more than once per month versus

monthly or less. The NHIS assessed average use for the previous year, versus 6 months in the MSM survey. The time frame differences for both depression and alcohol use likely have little bearing on reported averages (Schroder et al., 2003). Insofar as they may lead to under-reporting in the MSM sample, they make tests of our hypothesis more conservative.

Health access indicators were any medical visit in the previous 2 years and current health insurance. We constructed a health access index corresponding to "complete" access (any visit in the previous 2 years plus insurance) versus any combination of no insurance or no medical visit.

Method of Analysis

There were three levels of analysis: (1) sample differences in tobacco use, controlling for demographics; (2) moderating analyses of whether demographic effects on smoking were similar across sample; and (3) mediating analyses of whether depression, alcohol use, and health access accounted for sample differences in smoking. All logistic regressions entered geographic region, MSA size, age, education, and race/ethnicity on an initial step, followed by a variable to indicate sample.[1] All odds ratios were adjusted for demographic covariates (aOR). Regressions testing moderating effects entered the interaction term (e.g., sample by age) after the demographics and main effects. We tested mediation by comparing the direct effect of sample to the indirect sample effect after each psychosocial variable had been entered in the model. A significant decrease in χ^2 for the second model would indicate that sample differences were partially mediated by the psychosocial measure(s) (Baron and Kenny, 1986).

Results

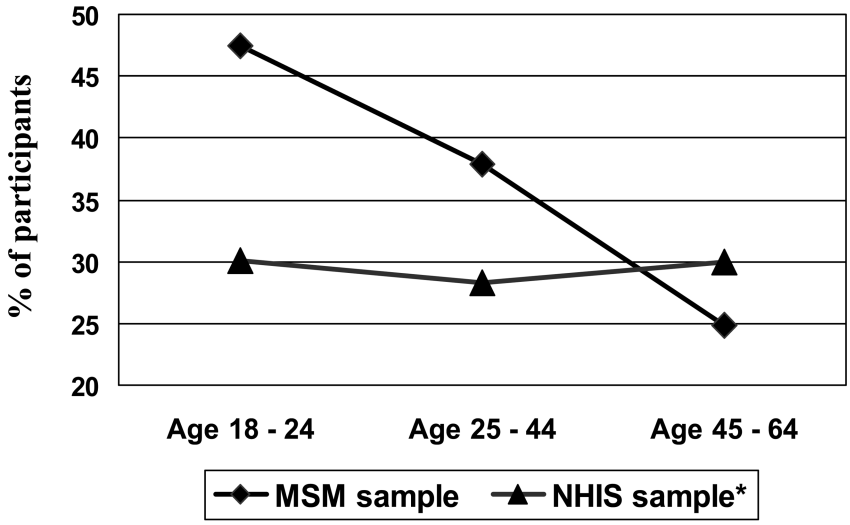
Overall Smoking Rates

MSM were more likely to have ever used tobacco than were men from the NHIS general population sample (56% vs. 45%, aOR = 2.37 [95% confidence interval (CI) = 1.97–2.86], χ^2 [1, n = 8,480] = 80, $p < .001$). MSM were also more likely to be current smokers (37.2% vs. 28.4%, aOR = 2.42 [95% CI = 1.98–2.92], χ^2 [1, n = 8,478] = 76.5, $p < .001$). MSM smokers consumed an average of 6.7 packs per week (standard error = .25, median and mode = 7), in contrast to an average of 5.4 packs in the NHIS sample (standard error = .1, median = 5.3, mode = 7; F (1,2535) = 17.8, $p < .001$).

Moderating Analyses: Demographic Effects Across Sample

The effect of age on current smoking differed considerably between samples, controlling for region, MSA size, race/ethnicity, and education. In the general population, current smoking status did not vary by age (χ^2 [2, n = 7,453] = 2.3, not significant). In marked contrast, younger MSM were significantly more likely to currently smoke than were older MSM, whose smoking rate was similar to general population men (χ^2 [2, n = 848] = 15.5, $p < .001$ sample by age χ^2 [2, n = 8,226] = 9.19, $p < .01$). Among 18–24 year olds 48% of MSM smoked, versus 30% of general population men (aOR = 3.88, 95% CI = 2.4–6.2), reflecting a strong vulnerability to tobacco use among younger MSM (Figure 1).

[1]We conducted all analyses with the complete NHIS sample using region and MSA size as covariates and with a subsample selecting only for Midwest region and large MSAs. All results were similar with the two approaches. We report results from the complete sample to enhance statistical power and generalizability.



* Data source: National Center for Health Statistics, 2002

Analyses control for region, MSA size, race/ethnicity, age and education. Sample by age interaction X^2 (1, N = 8486) = 14.3, $p < .001$.

Figure 1. Men reporting current smoking, by age group and sample.

Other demographic effects were similar across sample. In both samples Whites were more likely to have ever smoked than were African Americans or Latinos ($p < .001$), and race/ethnicity did not predict current smoking beyond the effects of age and education. In both samples more educated men were less likely to report lifetime or current smoking ($ps < .001$).

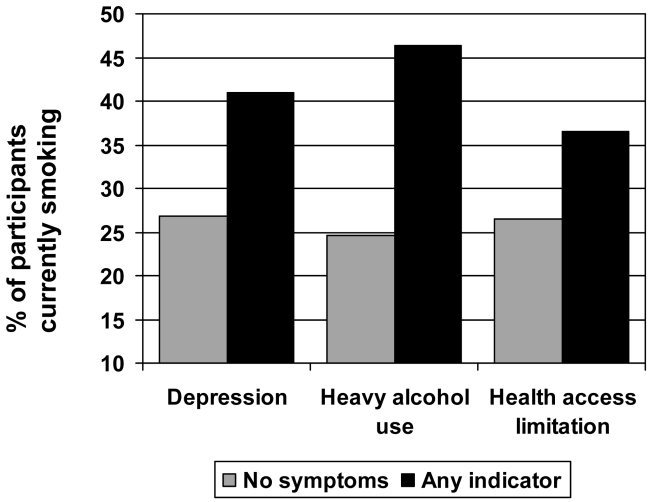
Psychosocial Mediators of Population Differences in Smoking

We tested whether MSMs' higher smoking rate could be explained by population differences in depression, alcohol use, and health access. Each mediator significantly related to lifetime and current smoking and smoking quantity in the complete (MSM plus NHIS) sample ($ps < .001$), controlling for demographics and population. Figure 2 shows current smoking: Men were more likely to smoke if they reported depression (χ^2 [1, n = 8,418] = 88, $p <$ .000; aOR = 1.7, 95% CI = 1.5–1.92), heavy alcohol use (χ^2 (1, n = 8,307) = 234, $p <$ .000; aOR = 2.49, 95% CI = 2.21–2.79), or limited health access (χ^2 [1, n = 8,354] = 47.8, $p < .000$; aOR = 1.47, 95% CI = 1.32–1.64).

The samples differed in the mediators, controlling demographics (Figure 3). MSM were significantly more likely to report depression (χ^2 [1, n = 8,380] = 54.8, $p <$.000; aOR = 2.27, 95% CI = 1.82–2.82), heavy alcohol use (χ^2 [1, n = 8,328] = 204, $p <$. 000; aOR = 4.44, 95% CI = 3.61–5.46), and limited health access (χ^2 [1, n = 8,394] = 118, $p <$. 000; aOR = 3.08, 95% CI = 2.51–3.78).

We tested the role of psychosocial variables in elevated smoking in MSM by comparing direct sample differences with models that controlled for each mediating variable by entering demographic covariates, the mediator, and then the sample term. Mediation is demonstrated by a significant decrease in log likelihood χ^2 in the mediated versus direct models.

In each of the mediated models, the χ^2 for sample differences decreased significantly relative to the direct model (Table 1, third column). Both depression and alcohol use had

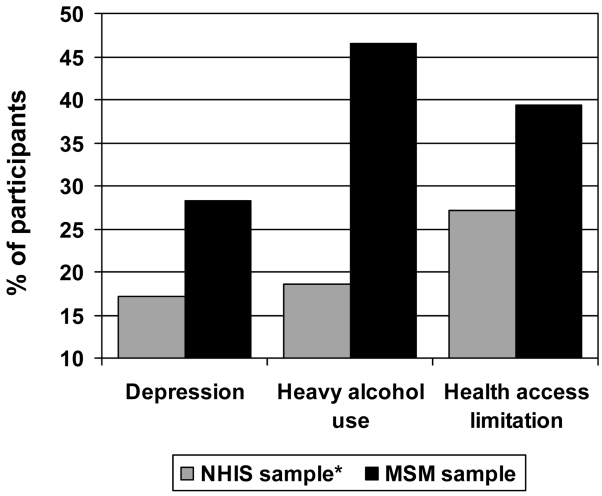


Analyses control for region, MSA size, race/ethnicity, age and education. All effects p<.001.

* Data source: National Center for Health Statistics, 2002.

Figure 2. Current smoking status by psychosocial variables; combined NHIS* and MSM data.

strong mediating effects, decreasing the sample effect χ^2 by 42% and 53%, respectively. Health access had a more modest effect. Entering the three mediators simultaneously decreased sample differences in current smoking by 76%, indicating that psychosocial variables had a substantial effect on elevated smoking rate in MSM. Results for lifetime



Analyses control for region, MSA size, race/ethnicity, age and education. All effects p<.001.

* Data source: National Center for Health Statistics, 2002.

Figure 3. Psychosocial variables by sample (NHIS vs. MSM).

Table 1
Direct and mediated effects of sample (MSM vs. NHIS) on current smoking status

Mediator	Sample effect χ^2	χ^2 decrease
Direct effect model	74.3	
With mediator(s) in the model		
Depression	40.4	33.9, $p < .001$
Heavy alcohol use	35.2	39.1, $p < .001$
Health access	59.9	14.4, $p < .001$
All three	12.5	61.8, $p < .001$

All analyses control for the effects of region, MSA size, race/ethnicity, age, and education.

smoking were similar: Sample differences decreased 77% from the direct to the fully mediated model (χ^2 [1, n = 8,480] = 88.5 to 20, χ^2 $\Delta = 68.5$, $p < .001$).

Discussion

These data replicated previous reports that MSM may be a particular risk group for tobacco use (Stall et al., 1999). As with previous studies there are confounds: The NHIS was a computer-assisted interview with probability sampling, whereas the MSM data were self-administered surveys collected from a convenience sample. Thus, simple population comparisons must be interpreted with caution. However, by comparing MSM to general population data in the same analyses, we were able to statistically control for sample differences in age, race/ethnicity, education, geographic region, and population size, each of which are potential confounds in smoking data.

The moderating analyses showed younger MSM to be particularly vulnerable to smoking. Our data do not allow us to determine whether there has been a recent surge in smoking among young MSM. Tobacco companies' explicit marketing to young MSM in bar or club venues (Washington, 2002) suggests it may be. Certainly, these data indicate that young MSM are a key prevention and treatment target, even more so than in the general population.

The mediating analyses showed elevated smoking in MSM to be partially attributable to psychosocial variables. Depression, alcohol use, and limited health access were related to lifetime and current smoking in both samples, and were more common among MSM than general population men. As a block, the psychosocial measures strongly contributed to the higher rate of tobacco use in MSM. This is important in tying population differences to understandable social or psychological processes. Social or cultural processes that create vulnerability to tobacco use in any population may simply operate more strongly among MSM. Stigma or discrimination, particularly among young MSM, may create vulnerability to depression, and the importance of bar and clubs to the MSM community increases vulnerability to alcohol or drug use.

The emphasis on HIV among MSM may have overshadowed other important health issues such as alcohol or drug use, depression, and cigarette smoking. The high smoking rate among MSM, particularly among younger MSM, warrants stronger public health attention and more earmarked antismoking campaigns. Future descriptive or prevention research would benefit from exploring psychosocial variables we were not able to address here, such as social support, community norms, and health beliefs, and by longitudinal studies among young MSM. Investigating the cultural underpinnings of MSM smoking will help us tailor prevention or cessation interventions to the needs of this under-researched group of smokers.

Acknowledgments

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RÉSUMÉ

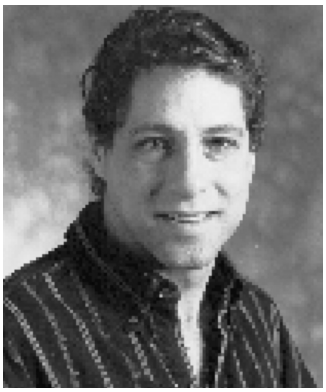
Les hommes qui ont le sexe avec les hommes (MSM) peuvent être plus probablement à la fumée que des hommes de population générale. De telles comparaisons de population typiquement ne commandez pas pour les différences démographiques, et le démuni examiné raisons pour un plus grand usage du tabac de MSMs. Nous avons comparé MSM à la population générale hommes dans les données qui nous ont permises de commander des différences démographiques, et présumé que MSM rapporterait plus d'utilisation de tabac, en raison des niveaux élevés de trois variables psychosociales qui prévoient généralement l'utilisation de tabac : dépression symptômes, utilisation d'alcool, et accès limité de santé. Les données étaient d'un aperçu 2001 de MSM Chicago (n = 817), et de l'étude d'entrevue de santé du national 2001 (n = 7,783). Sensiblement plus de MSM tabac utilisé, en particulier la jeune generation de MSM. Les symptômes de dé pression, l'utilisation d'alcool, et l'accès limité de santé étaient plus commun parmi MSM, et partiellement expliqué leur tabagisme élevé risque. Accès de la santé de MSMs et plus grand inférieurs la vulnérabilité à la dépression et l'utilisation d'alcool contribuent à leur tabagisme plus élevé évaluez, et devez être considéré dans davantage de recherche et d'empêchement de tabagisme. De plus jeunes taux très élevés d'exposition de MSM de tabagisme, et sont une intervention particuliè re cible. Des limitations de cette étude transversale sont notées.

RESUMEN

Los hombres que tienen sexo con los hombres (MSM) tienen más probabilidades de fumar que hombres de la población en general. Tales comparaciones de la población no controle típicamente para las diferencias demográficas y no han probado razones del mayor uso del tabaco de MSMs. Comparamos MSMs con la población de hombres en general los datos que nos permitieron controlár las diferencias demográficas y llegamos al hipótesis que MSM reportaría más uso del tabaco, debido a los niveles elevados de tres variables sicosociales que generalmente predicen uso del tabaco: síntomas de depresión, uso del alcohol, y acceso limitado a tratamientos de salud. Los datos eran de un examen del año 2001 de MSM en Chicago (n = 817) y del National Health Interview Study del año 2001 (n = 7,783). Un mayor número de MSM usaron tabaco, particularmente MSMs que eran más jóvenes. Los síntomas de la depresión, el uso del alcohol, y el acceso limitado a tratamiento de salud eran más común entre MSM y en parte responsible por el riesgo del adquirir el hábito de fumar. El acceso mas bajo de tratamiento de salud de MSMs, más vulnerabilidad a la depresión y el uso del alcohol contribuyen a sus niveles elevados de fumar y debe ser considerado en la investigación y la prevención adicionales de fumar. MSMs más jóvenes demuestran altos niveles de fumar y son una

población particular para intervención. Las limitaciones de este estudio transversal estan demostrado.

THE AUTHORS



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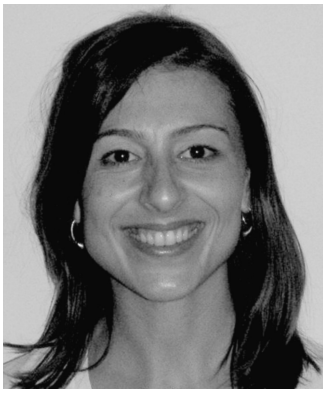

Marina Tolou-Shams received her Ph.D. from The University of Illinois at Chicago. She is currently a postdoctoral fellow in Pediatric Psychology at Brown University Medical School. Her primary area of research is adolescent HIV prevention, but she has also conducted extensive HIV/STD and general health psychology research within the GLBT community. She is currently working on developing a family-based affect management HIV prevention program for substance-using juvenile offenders.

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for young children. Dr. Turner's work focuses on risk factors that affect children and their families, with the goal of establishing lifelong healthy behaviors during the early formative years.

Kellie Dyslin received her MSW from the University of Illinois at Chicago. Ms. Dyslin has served as Project Coordinator for several major HIV prevention studies at Howard Brown Health Center. She has an extensive background in HIV prevention and health research with the gay, lesbian, bisexual and transgender population. Her research and practice interests include health disparities among ethnic and sexual minorities, intimate partner violence, and the impact of social inequality on well-being.

Brent Hope received his MSW from Loyola University Chicago in 1991 with a focus in adult treatment. Mr. Hope served as director of Research at Howard Brown Health Center during this study, overseeing biomedical clinical trials, behavioral interventions, community surveys and basic science projects. With Dr. McKirnan he developed clinical protocols for a number of HIV prevention studies. He currently provides psychotherapy to LGBT and HIV-impacted individuals, and conducts clinical evaluation and management of psychiatric disability claims for an insurance company.

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