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To cite this article: Mance E. Buttram, Maria E. Pagano & Steven P. Kurtz (2017): Frequency of Group Sex Participation and Risk for HIV/STI Among Young Adult Nightclub Scene Participants, International Journal of Sexual Health, DOI: [10.1080/19317611.2017.1385561](https://doi.org/10.1080/19317611.2017.1385561)

To link to this article: <https://doi.org/10.1080/19317611.2017.1385561>



Accepted author version posted online: 28 Sep 2017.
Published online: 26 Oct 2017.



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Frequency of Group Sex Participation and Risk for HIV/STI Among Young Adult Nightclub Scene Participants

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ABSTRACT

Objectives: This study examines frequency of group sex participation and associated characteristics and behaviors among a sample of heterosexual young adult participants in Miami's nightclub scene ($n = 498$). *Methods:* Baseline survey assessments were analyzed using zero-inflated binomial regression. *Results:* Forty-one percent of the sample reported group sex participation history. Greater frequency of group sex is associated with buying sex, sex with an injection drug user, being high during sex, condomless vaginal sex, victimization history, and sexually transmitted infection incidence ($p < .02$). *Conclusions:* Sexually transmitted infection prevention and intervention efforts should address risks associated with group sex participation.

ARTICLE HISTORY

Received 3 February 2017
Revised 19 September 2017
Accepted 24 September 2017

KEYWORDS

Group sex; heterosexual; STI; HIV; substance use

Introduction

Group sex events, in which people have sex with more than one partner in a single sexual encounter, have the potential to facilitate the transmission of sexually transmitted infections (STIs), including HIV, and may be an important influence on a community's infection rates (Friedman et al., 2008; Friedman et al., 2011). This is because group sex events, by their nature, are occasions in which people have sex with multiple partners. In addition, the rapid rate of partner change during group sex may further increase STI transmission risk (Friedman et al., 2008; Friedman et al., 2011). During these events, sex with more than one partner may include condomless vaginal and/or anal sex, using the same condom to have vaginal and/or anal sex with multiple partners, and using hands and/or sex toys with multiple partners in succession. Such actions during group sex events may pass bodily fluids between multiple partners over a short amount of time, leading to the potential for indirect STI transmission (Friedman et al., 2011).

Group sex events often include participants from multiple populations, including substance users, injection drug users (IDUs), nonsubstance users, men who have sex with men (MSM), women who have sex with

men and women, sex buyers or exchangers, and other men and women (Buttram & Kurtz, 2015; Friedman et al., 2008; Friedman et al., 2011). The limited data available indicate that members of these disparate populations often attend the same group sex events and engage in unprotected sex (Friedman et al., 2008). Thus, group sex events often create scenarios in which HIV/STI can pass across group boundaries (Friedman et al., 2008; Friedman et al., 2011).

Investigations of group sex have largely been conducted among MSM. Research demonstrates that MSM group sex participants engage in multiple sexual and drug use behaviors, during group sex events and elsewhere, that place them at higher risk for HIV/STI infection (Phillips II, Grov, & Mustanski, 2015). Published findings indicate that MSM group sex participants were more likely to report drug use, condomless anal intercourse, psychosocial problems (e.g., depression), and gonorrhea infection compared to nonparticipants (Crosby, DiClemente, & Metty, 2003; Grov et al., 2014; Hirshfield et al., 2015; Phillips, Gove, et al., 2015; Phillips, Magnus, et al., 2015; Rice et al., 2016).

Group sex among non-MSM populations remains less studied (Friedman et al. 2011). A social network

analysis of group sex events among young adults found that STI discordance among group sex participants was high and that many of these participants also engaged in condomless sex (Friedman et al., 2008). Among incarcerated heterosexual African American men, group sex participation prior to incarceration was associated with current STI (Scheidell, Friedman, Golin, Wohl, & Khan, 2017). Although not specifically investigating group sex, a small number of studies have documented group sex participation among heterosexual (or primarily heterosexual) samples. Investigations of syphilis and gonorrhea outbreaks led to the first apparent reports of group sex among teenagers and young adults (Rothenberg et al., 1998; Welych et al., 1998). Subsequent studies found reports of group sex participation among adolescent women (Krauss et al., 2006), African American teenagers and young adults with a history of gang involvement (Sanders, Lankenau, & Jackson-Bloom, 2009; Voisin et al., 2004), rural stimulant drug users at risk for HIV (Zule et al., 2007), ethnic minority adolescent women with histories of abuse (Champion, 2011), and African American women who have sex with women and men (Muzny, Austin, Harbison, & Hood, 2014). Most recently, examinations of HIV transmission risk behaviors among nonmedical prescription opioid misusers have documented the prevalence of group sex participation among this population (Friedman, Mateu-Gelabert, & Sandoval, 2017; Mateu-Gelabert, Guarino, Jessell, & Teper, 2015).

The current research is situated in this context, in which multiple studies have documented group sex behaviors, but explicit examinations of group sex among heterosexual populations remains scarce. Literature describes the potential epidemiologic significance of group sex events on HIV/STI transmission (Friedman et al., 2011), and the potential risks involved in having multiple sex partners (Centers for Disease Control [CDC], 2015a). Thus, individuals frequently engaging in group sex would likely be placing themselves at higher risk for STI transmission and infection. With a sample of heterosexual young adults, the present study examines demographic characteristics, STI risk behaviors, substance use, and health and social problems associated with greater frequency of group sex participation. We hypothesized that participants who more frequently engage in group sex will be more likely to report engaging in STI risk behaviors and to endorse health and social problems than other study enrollees.

Methods

Site

Miami-Dade County, Florida, is a diverse community of more than 2.6 million people, of whom 66.2% are Hispanic, 18.9% Black, and 14.8% White (U.S. Census Bureau, 2015). The Miami metropolitan area reports the highest HIV prevalence rates in the United States (CDC, 2015b). At the same time, Miami has become a national and international destination for partying, sexual tourism, and club drug use. It has been noted that South Beach has also become an East Coast center for club culture, setting trends that are emulated and replicated elsewhere in the United States (Kurtz, Surratt, Buttram, Levi-Minzi, & Chen, 2013).

Sample and procedure

Data are drawn from baseline assessments ($n = 498$) conducted between September 2011 and November 2015 as part of a behavioral intervention trial designed for young adult participants in Miami's electronic dance music (EDM) nightclub club scene. Inclusion criteria included (1) ages 18–39; (2) heterosexual vaginal and/or anal sex in the past 90 days; (3) use of club drug(s), defined as powder cocaine, MDMA (also known as ecstasy), LSD, methamphetamine, GHB and/or ketamine, at least three times in the past 90 days; (4) nonmedical use of a psychoactive prescription medication in the past 90 days; and (5) attendance at large local EDM nightclubs at least once per month.

Participants were recruited through respondent-driven sampling (Heckathorn, 1997). Initial respondents (seeds) were chosen for diversity in gender, ethnicity, and age, and recruited through outreach at nightclubs and existing contacts in the EDM culture. Each seed and subsequent study participant was provided with up to five recruitment coupons to give to other club drug users in their social network, with the understanding that they would earn \$50 for the recruitment of each additional eligible enrolled respondent. Although participants were not recruited at nightclubs, the clubs they reported patronizing most often were large venues focused on the EDM experience.

All individual interviews were conducted in private offices and lasted about 90 min. After providing informed consent, participants completed the baseline assessment and received a \$50 stipend for their time and travel expenses following the interview. Human

subject protocols were approved by the university's Institutional Review Board.

Measures

Demographic and background measures included age, gender, race/ethnicity, and education. Race/ethnicity was assessed by asking participants if they were Hispanic or Latino, followed by asking them what race/ethnicity they consider themselves to be. Education was assessed based on high school completion or not. The remainder of the standardized baseline assessments were primarily composed of the Global Appraisal of Individual Needs (GAIN, v. 5.4; Dennis, 2006). This instrument has several core sections (e.g., background, substance use, sexual risk behaviors, mental health, and victimization), with each containing questions on the recency of problems, breadth of symptoms, and recent (past 90 days) and lifetime frequencies in days or times.

Sexual behavior questions from the GAIN included counts of past 90-day condomless vaginal and anal intercourse outside of a monogamous relationship. Participants with a primary partner in a relationship of 3 months or longer and who reported no more than one sexual partner in the past 90 days were considered to be in a monogamous relationship. Group sex participation was assessed by asking participants if they had ever participated in group sex (defined as three or more people, including the participant). Participants endorsing group sex participation were asked how many times in their lifetime they had participated in group sex, age of first group sex participation, lifetime count of group sex participation, the largest number of attendees at a group sex event attended by the participant, and if they have ever participated in condomless group sex.

Additional questions asked, if during the past 12 months, a participant had bought sex (i.e., "use money or drugs to purchase or get sex"), traded sex (i.e., "have sex to get drugs, gifts, or money"), or had sex with an IDU. Finally, being high for sex was assessed with the question, "How often in the past 90 days were you 'high' on either alcohol or drugs when you were having sex with another person?" Responses were based on a 5-point scale ranging from 1 (*never*) to 5 (*almost all the time*). Intracorrelations between sexual behavior items nonspecific to group sex were small ($r = 0.14\text{--}.19$, $p < 0.01$) except for moderate

correlations between buying and trading sex ($r = 0.31$, $p < 0.0001$), and condomless vaginal and anal sex incidences ($r = 0.28$, $p < 0.0001$).

During the assessments, participants were asked whether they had injected drugs during the past 90 days. Also included in the GAIN are several measures of health and social problems. Victimization history was assessed by affirmative responses to one or more of the following events: being attacked with a weapon or being beaten to as to cause bruises, cuts, or broken bones (physical abuse); being forced to participate in sexual acts against one's will (sexual abuse); or being made to feel very bad about oneself or one's life (emotional abuse). Substance dependence was assessed by the endorsement of three or more of seven *Diagnostic and Statistical manual of Mental Disorders*, 4th edition (*DSM-IV*) symptoms during the past 90 days (e.g., needing more drug to get the same effect; experience withdrawal symptoms; being unable to quit or cut down). Although the *DSM-5* was released during data collection, it measures a single continuum of substance use disorders, whereas the *DSM-IV* contained distinct criteria for substance abuse and dependence. Consequently, we opted not to modify the baseline assessments and used the *DSM-IV* measure in all baseline assessments. The GAIN also includes the General Mental Distress Scale, which includes past year symptoms of somatization (four items; e.g., sleep trouble; shortness of breath or lump in the throat), depression (nine items; e.g., feeling sad, lonely or hopeless; feeling tired or having no energy), and anxiety (12 items; e.g., feeling nervous anxious or tense; unable to control worries). Alpha reliability coefficients for the somatization, depression, and anxiety subscales in this study were .882, .887, and .801, respectively. Participants were also asked to report lifetime diagnosis of any STI, including herpes, chlamydia, syphilis, gonorrhea, hepatitis B, and human papilloma virus; total counts are reported at STI incidences. Intra-correlations between health and social problem variables were low ($r = .13\text{--}.22$, $p < .01$).

Data analyses

Statistical analyses were performed with SAS Version 9.2 (SAS Institute Inc., Cary, NC) using the procedures PROC FREQ, CORR, and GENMOD. Depending on the type of variables (interval or discrete), Fisher's exact test for binary variables or the Kruskal-Wallis chi-

square test for continuous variables were performed to evaluate differences between subjects. Correlational analyses were performed using Pearson correlations (rp) between interval variables and the biserial correlation coefficient (rb) between interval and discrete variables.

To examine the association between explanatory variables and frequency of group sex participation, a zero-inflated negative binomial regression was specified with a logit link function, offset by age of first consensual sex, and a Pearson correction for dispersion (Allison, 2005). To adjust for the RDS design, weighted least squares estimation as a function of the correlations among seed clusters was invoked with the REPEATED statement as recommended for clustered data (Allison, 2012). Three explanatory variable sets (background, sexual behaviors, and health and social problems) were selected based on characteristics associated with infectious disease or risky sexual behaviors in prior work (Cheng et al., 2010; Pagano, Maietti, & Levine, 2015). To preserve a recommended predictor/subject ratio (1:10–20), substance use variables associated with HIV-risk related sex behaviors in prior work were also included (i.e., injection drug use; Cheng et al., 2010). Preliminary analyses suggested that linear modeling was adequate, and the logit model showed a good fit, $\chi^2(478) = 293.74$, $p = .62$. Examination of

the correlation matrix for explanatory variables found no correlation to exceed $r = .2$, and collinearity diagnostics indicated no problems. All two-tailed tests with significant values greater than 95% ($p < .05$) are reported.

Results

As shown in Table 1, the study includes 498 young adult EDM nightclub scene participants. The sample was racially/ethnically diverse, with Hispanic participants being less likely to report group sex participation ($p < .006$) and White participants more likely to report group sex participation ($p < .035$) than other races/ethnicities. Females were also less likely than males to report group sex participation ($p < .004$). Group sex participants had a mean age approximately 1.5 years higher than non-participants ($p < .001$). The endorsement of sexual risk behaviors, including buying sex, trading or selling sex, having sex with an IDU, and being high for sex, condomless anal intercourse, and injection drug use, were also more likely among group sex participants compared to non-participants ($p < .002$). Finally, group sex participants were more likely to report histories of victimization and STI incidence, and more mental distress symptoms than their peers ($p < .046$).

Table 1. Baseline Characteristics of Group Sex Participants and Non participants ($N = 498$).

Demographics	Group sex participants ($n = 203$)		Nonparticipants ($n = 295$)		t/χ^2	p
	n	%	N	%		
Hispanic	116	57.1%	204	69.2%	7.552	0.006
African American/Black	47	23.2%	57	19.3%	1.068	0.301
White	32	15.8%	28	9.5%	4.464	0.035
Other race/ethnicity	8	3.9%	6	2.0%	0.416	0.519
Female	75	36.9%	147	49.8%	8.08	0.004
High school graduate	174	85.7%	248	84.1%	0.252	0.616
Age (M ; SD)	26.23	(5.570)	24.60	(5.209)	11.101	0.001
STI risk behaviors						
Buy sex ^a	40	19.7%	17	5.8%	23.060	0.000
Trade or sell sex ^a	44	21.7%	23	7.8%	19.891	0.000
Sex with an IDU ^a	35	17.2%	22	7.5%	11.357	0.001
High during sex ^b	177	87.2%	211	71.5%	17.151	0.000
Condomless vaginal sex ^b	183	90.1%	267	90.5%	0.018	0.893
Condomless anal sex ^b	98	48.3%	101	34.2%	9.878	0.002
Substance use						
Injection drug use ^b	41	20.2%	27	9.2%	12.441	0.000
Health and social problems						
Victimization ^c	163	80.3%	97	32.9%	10.47	0.001
Substance dependence ^b	127	62.6%	159	53.9%	3.692	0.055
STI incidences ^c	48	23.6%	45	15.3%	5.575	0.018
Mental distress symptoms ^a (mean; SD)	9.33	(7.654)	7.53	(7.119)	7.266	0.007

Note. STI = sexually transmitted infection; IDU = injection drug users.

^aPast year.

^bPast 90 days.

^cLifetime.

Forty-one percent ($n = 203$) of the sample had a history of group sex that first occurred at an average age of 19.37 years ($SD = 4.28$, range = 6–34). Thirty-six percent ($n = 73$) were minors at the time of their first participation in a group sex event; 48% ($n = 95$) had a history of unprotected group sex. The largest number of individuals with whom participants had group sex was 4.82 on average ($SD = 5.15$, range = 3–50). Participants with a history of group sex reported having group sex an average of 12.84 times ($SD = 42.45$, range = 1–400). The frequency of group sex incidences was similar between those who had protected ($M = 12.71$, $SD = 40.0$) and unprotected ($M = 13.01$, $SD = 44.61$) group sex. However, adjusting for length of time of being sexually active (i.e., current age minus age of first consensual sex), participants who had group sex as a minor had group sex twice as many times ($M = 19.11$ vs 9.32, $F = 7.13$, $p = .008$) and with larger numbers ($M = 6.00$ vs 4.18, $F = 3.27$, $p = .05$) than those who started having group sex as an adult.

Table 2 shows the results of the zero-inflated negative binomial regression of the characteristics associated with frequency of group sex, adjusted for length of time of being at risk of the event (i.e. length of time since starting to be sexually active). As shown in Table 2, victimization history and five sexual-risk related characteristics were associated with greater

Table 2. Characteristics Associated with Frequency of Group Sex Participation (N = 498).

Demographics and background	β	SE	95% CI	χ^2	p
Race/ethnicity (ref = Black)					
Hispanic	0.60	0.37	-0.12, 1.32	1.64	0.141
White	0.70	0.40	0.11, 1.29	1.32	0.220
Other	0.33	0.33	-0.33, 0.98	0.98	0.332
Gender (ref = female)					
Age	0.55	0.36	-0.24, 0.86	1.50	0.192
High school graduate	0.08	0.02	0.05, 0.12	5.11	0.000
STI risk behaviors					
Buy sex ^a	-0.19	0.28	-0.75, 0.36	-0.68	0.497
Trade or sell sex ^a	0.60	0.30	0.01, 1.20	1.99	0.042
Sex with an IDU ^a	0.05	0.32	-0.38, 0.58	0.15	0.884
High during sex ^b	0.62	0.30	0.04, 1.20	2.11	0.035
Condomless vaginal sex ^b	0.29	0.08	0.14, 0.44	3.83	0.000
Condomless anal sex ^b	0.01	0.00	0.00, 0.01	4.40	0.000
Substance use	0.00	0.01	-0.01, 0.01	-0.10	0.924
Injection drug use ^b	0.29	0.48	-0.65, 1.24	0.61	0.543
Health and social problems					
Victimization ^c	0.82	0.19	0.13, 0.86	2.65	0.008
Substance dependence ^b	0.82	0.54	0.23, 1.88	1.53	0.125
STI incidences ^c	0.32	0.11	0.10, 0.55	2.88	0.004
Mental distress symptoms ^a	0.01	0.02	0.04, 0.02	0.63	0.528

Note. STI = sexually transmitted infection; IDU = injection drug users.

^aPast year.

^bPast 90 days.

^cLifetime.

frequency of group sex participation. Specifically, buying sex was associated with a 1.82-fold increase ($\exp[.60] = 1.82$) in the frequency of group sex participation. Sex with an IDU was associated with a 1.86 fold-increase ($\exp[.62] = 1.86$) in the frequency of group sex participation. Each one-unit increase in rating of how often a participant was high during sex was associated with a 33.6% increase in group sex frequency; that is, $100 * (\exp [.29] - 1 = 33.6\%$. Each additional HIV/STI incidence was associated with a 37.7% increase in group sex frequency; that is, $100 * (\exp [.32] - 1 = 37.7\%)$. Background characteristics were not associated with frequency of group sex with exception to older age ($p < .0001$).

Discussion

This is one of the first apparent studies to examine demographics, STI risk behaviors, substance use, and health and social problems among a sample of heterosexual group sex participants. Of the 498 participants who completed baseline assessments, 59% of the sample did not participate in group sex. However, 41% reported histories of group sex, and these participants engaged in group sex an average of 13 times with a mean of five participants in the largest group sex event. Of participants who had participated in group sex, nearly half (48%) reported condomless sex during the event. The data suggest that this behavior is a widespread phenomenon among this sample of heterosexual young adults.

Perhaps the most striking of the findings are the results related to STI transmission risk behaviors. Increased frequency of group sex participation was associated with several additional sexual risk behaviors including buying sex, having sex with an IDU, and being high during sex. Although group sex participation may be of public health concern in general, the fact that greater frequency of group sex participation is associated with numerous STI risk behaviors is especially worrisome, especially if participants engage in condomless group sex. The finding that STI incidence is associated with more frequent group sex participation supports the interpretation that more greater frequency of group sex participation may be especially risky because of the rapid rate in which group sex participants engage in sex with a new partner (Friedman et al., 2008; Friedman et al., 2011). The study findings also show an association between increased frequency

of group sex participation and condomless vaginal intercourse, which can exacerbate such STI transmission risks.

In addition, more than one third (36%) of participants with a history of group sex reported that their first group sex event occurred prior to age 18; these participants reported having group sex twice as many times and with larger numbers of people at the group sex event than other group sex participants in the sample. Research indicates that adolescents and young adults ages 15–24 acquire half of all new STIs (Satterwhite et al., 2013) and that individuals reporting an STI during adolescence are at increased risk for HIV infection later in life (Newbern et al., 2013). Initiating group sex during adolescence likely exposes young people to increased STI risk, compared to others.

Substance dependence and injection drug use were not associated with greater frequency of group sex participation. This is likely because of study eligibility criteria and generally high levels of substance use among this sample. However, group sex participation, especially when it includes individuals engaging in other risky behaviors, such as injection drug, has the potential to simultaneously transmit numerous STIs, HIV, and Hepatitis C to multiple individuals and across several populations during a single sexual event (Friedman et al., 2011). Thus, substance using group sex participants who may be at higher risk for HIV/STI infection may also increase transmission risk for others at group sex events.

The present findings suggest that more attention must be given to group sex behaviors and potential risk for STI transmission. Perhaps the most feasible means of doing so is to include group sex-specific information in existing intervention approaches. For example, computer-based and mobile health interventions have already shown promise in reducing sexual risk behaviors among young adults; these approaches are acceptable to the population, scalable, and can be delivered at relatively low cost (Billings et al., 2015; Chen, Lightfoot, Szalacha, & Lindenberg, 2017; Kurtz, Buttram, Pagano, & Surratt, 2017; Peskin et al., 2015; Shafii et al., 2014). Thus, including components in these interventions that address group sex in an engaging, age appropriate, and culturally informed way, would likely further reduce STI risk behaviors related to group sex participation. Given that so many in the sample initiated group sex as a minor, education, prevention, and intervention programs targeted

to adolescents may be especially warranted. Similarly, HIV/STI interventions that target specific populations most at risk, including criminal justice involved youth, African American youth, and STI clinic patients (Carey et al., 2015; Dave et al., 2016; Elkington et al., 2015; Harper, Dolcini, Benhorin, Watson, & Boyer, 2014) could also be adapted to include group sex modules. Furthermore, substance users may also benefit from group sex risk education, prevention and intervention programs.

In view of the findings, the study highlights the need for additional research. The current literature on group sex behaviors among non-MSM populations is scant. Qualitative research which examines group sex behaviors would constitute valuable formative research for developing intervention approaches targeted specifically to non-MSM group sex participants. Such research may include probes related to safer sex behaviors (e.g., condom use, pre-exposure prophylaxis), types of sex (e.g., vaginal, anal, oral sex), actions related to indirect STI transmission (e.g., use of one condom during sex with multiple partners), substance use during group sex, and various group sex participant characteristics (e.g., adolescents, older adults, IDUs, men who have sex with men and women).

As with all research, this study has some limitations worth noting. Although recruitment procedures resulted in a sample broadly inclusive of the racial/ethnic makeup of Miami-Dade County, the ability to generalize the findings to other young adult club drug users and/or group sex participants is limited by the study eligibility requirements. We also note that all data are based on self-report, potentially leading to underreporting of socially undesirable behaviors. Given the levels of substance use and sexual risk behaviors we found, however, underreporting of these and other stigmatized behaviors would appear to be uncommon.

This study has examined frequency of group sex participation among a sample of young adults in Miami's trend-setting EDM nightclub scene. Widespread sexual risk behaviors suggest that participants who more frequently participate in group sex participants may be at increased risk for acquiring and/or transmitting HIV/STI to multiple partners in rapid succession. Public health concern is especially high given the literature that suggests group sex events function as spaces where many risk behaviors occur across multiple populations (Friedman et al., 2011).

Though HIV has historically been confined to specific populations thought to be at increased risk (e.g., men who have sex with men; IDUs), the mixing of populations and sexual risk behaviors during group sex has the potential to introduce the HIV epidemic to groups with lower HIV prevalence. Given the limited literature on group sex among heterosexual populations, more research is needed to identify specific intervention targets. However, the data indicate that discussions of group sex participation during HIV/STI educational and behavioral programs and interventions for young adults are urgently needed.

Funding and acknowledgments

This research was supported by DHHS Grant Number 5 R01 DA019048 from the National Institute on Drug Abuse. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Drug Abuse or the National Institutes of Health.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Human subjects

All procedures followed were in accordance with the ethical standards of the responsible committee on Human Experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5). Informed consent was obtained from all participants for being included in the study.

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