Changes in Sexual Behavior Over the COVID-19 Pandemic Among a Community-Based Cohort of Men Who Have Sex With Men in Columbus, Ohio

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Background: The purpose was to assess COVID-19 beliefs and attitudes and examine COVID-19–related changes in sexual behavior of men who have sex with men during 3 time periods: April–July 2020 (T1), August–December 2020 (T2), January–May 2021 (T3).

Methods: Data were analyzed from 157 men who have sex with men in Ohio recruited to participate in a longitudinal multisite network study of syphilis epidemiology in 3 US cities: Columbus, Ohio; Baltimore, Maryland; and Chicago, Illinois. In April 2020, a COVID-19 module was appended to existing baseline and follow-up surveys to assess beliefs, attitudes, and changes in sexual behavior. Sample characteristics were summarized. Correlations between demographic variables (age, racial identity) and COVID-19 outcomes were examined.

Results: In response to COVID-19 social distancing restrictions and self-reported anxiety, some men limited sexual activity at T1, but the majority (n = 105 [67%]) continued to engage in sex. The number of men engaging in sex increased over time (T2: n = 124 [79%]; T3: n = 121 [77%]). At T1, men not in a relationship more frequently reported having less sex compared with prepandemic (n = 39 [57%]). By T3, men in a relationship more frequently reported less sex (n = 32 [54%]). Increased anxiety about sex and condom use was positively correlated with identifying as a man of color (P < 0.001). Most of the sample reported either starting or increasing online sexual activity during each time period.

Conclusions: Future efforts to target sexual health during a pandemic or other health emergencies should prioritize men of color and address the unique perspective of both single and partnered men.

More than 2 years after the first confirmed infection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; the virus that causes COVID-19) in the United States, more than 69,000,000 infections and 850,000 deaths have been reported in the United States. To protect the nation, a series of local and statewide social distancing restrictions and stay-at-home orders were enacted, starting in March 2020. The extent to which these influenced human behavior and person-to-person interaction in the short and long terms is still not fully understood.

Sexual behavior and attitudes have also been affected by the COVID-19 pandemic. Globally and in the United States, people have reported less sexual desire and reduced sexual activity.2,3 These changes are unsurprising considering both the widespread fear of contracting COVID-19 that swept the general population and the restrictions imposed on in-person contact. Whether sexual activity will again resemble that of the prepandemic era, particularly as social distancing restrictions are rolled back, COVID vaccination rates level off, and COVID-19 cases continue to fluctuate in many areas of the country, is not yet known. By examining sexual behavior reported during this pandemic, we can begin to identify patterns in behavior that can both inform current public health risk management efforts and bolster preparedness for future pandemics.

Men who have sex with men (MSM) in the United States reported a decrease in number of sex partners early in the pandemic; however, little is known about how sexual behavior and attitudes of MSM changed through the course of 2020 and early 2021. The present study looks at changes in sexual behavior of MSM living in Columbus, Ohio, during the COVID-19 pandemic. Ohio saw its first case of COVID-19 in early March 2020, and shortly after, strict stay-at-home orders were put in place.6,7 Even into 2021, curfew restrictions remained in place to control the spread of COVID-19. The present analysis characterizes changes in sexual behavior and attitudes over the course of the pandemic from April 2020 to May 2021 for a community-based sample of MSM.

METHODS

The multisite Network Epidemiology of Syphilis Transmission study is a longitudinal, network study of syphilis transmission among MSM in 2 midwestern and 1 mid-Atlantic city, including Columbus, Ohio. This analysis uses data collected specifically in response to COVID-19, only at the Columbus site. Participants were recruited using a multipronged approach (clinic-based in clinical sites which serve MSM; community-based at community organizations serving MSM and LGBTQ+ events, bars, and clubs; online-based via social media sites, dating apps, ResearchMatch, and StudySearch; referrals from study participants). Eligibility criteria included being at least 18 years old; male sex assigned at birth; identifying as male; living, working, and/or receiving care in the study area; and having had oral or anal sex with a man in the past 6 months. At baseline and quarterly follow-up visits, participants completed surveys to assess behavioral, healthcare-seeking measures and sexual network attributes. In April 2020, we added a module to the existing survey to assess COVID-19–related sexual behavior changes. The current analysis compares responses of 157
men (65% of men enrolled at the Columbus site) who completed the COVID-19 survey during all 3 assessment periods: April–July 2020 (T1), August–December 2020 (T2), and January–May 2021 (T3). Study procedures were approved by the Ohio State University Institutional Review Board.

Measures

COVID-19 Diagnosis/Beliefs/Anxiety

Participants were asked to report any recent COVID-19 symptoms and positive diagnoses (confirmed with a test or not). Perceived likelihood of COVID-19 infection was measured using a 5-point Likert scale ranging from “very unlikely” to “very likely.” Perceived severity of infection was measured using a 5-point Likert scale ranging from “not severe” to “very severe.” Perceived self-efficacy to protect against infection was assessed using a 5-point Likert scale ranging from “not at all” to “very much so.”

Sexual Behavior

For each item, we asked participants to report (a) if the likelihood of engaging in each behavior increased, decreased, or remained unchanged recently because of COVID-19, and (b) if they started or increased a behavior recently because of COVID-19.

Analysis

For this analysis, we only included data from participants who completed the COVID-19 survey at all 3 time points. Using descriptive statistics, we analyzed the frequency and trends of sexual behavior and summarized the characteristics of this sample, including COVID-19 beliefs, which were only collected during the first time period. We compared differences in COVID-19 beliefs, attitudes, and sexual risk behaviors by age and racial identity, using Pearson χ² tests for binary and categorical variables, and t tests for continuous variables.

RESULTS

Participant Characteristics

At baseline, participants primarily identified as gay (n = 128 [82%]), had at least some college-level education (n = 85 [54%]), were employed full-time (n = 91 [58%]), and were predominantly White (n = 117 [75%]), with men of color mostly identifying as Black or African American (n = 34 [21%] of men of color); Table 1). The mean (SD) age was 34.2 (13.05) years (range, 18–77 years), and 23% of the sample were aged 18 to 24 years. Most men identified as single (not married, in a civil union/domestic partnership, divorced, or widowed; n = 126 [80%]). Participants were also asked their relationship status with options of closed/open and monogamous/polyamorous for those identifying as being in a relationship; most men were not in a relationship (n = 87 [55%]). Of those in a relationship, half (n = 34 [51%]) had only 1 current sex partner. Over the course of the assessment period (April 2020–May 2021), 15 men (9.6%) self-reported ever having tested positive for COVID-19 (n = 1 at T1, n = 4 at T2, n = 10 at T3).

COVID-19 Beliefs

Considering baseline COVID-19 beliefs, at T1 (April–July 2020), 40% of participants thought it was very unlikely or unlikely that they would contract COVID-19 (n = 65), one-third (n = 51 [33%]) were unsure of their susceptibility. If infected, almost half (47%) thought their case would either not be severe or be only

| TABLE 1. Baseline Characteristics of 157 Men Who Have Sex With Men Who Completed a COVID-19 Survey During 3 Periods, April 2020–May 2021 |
| --- |
| **n (%)** |
| Age, mean (SD), y | 34.2 (13.05) |
| Highest level of education |  |
| Less than high school diploma | 2 (1.3) |
| High school diploma or GED | 16 (10.2) |
| Some college, associate’s degree, or technical degree | 54 (34.4) |
| Bachelor’s degree | 48 (30.6) |
| Any postgraduate studies | 37 (23.6) |
| Mother’s highest education |  |
| Grades 1–8 | 4 (2.5) |
| Some high school | 9 (5.7) |
| High school diploma or GED | 48 (30.6) |
| Some college, associate’s degree, or technical degree | 45 (28.7) |
| Bachelor’s degree | 22 (14.0) |
| Any postgraduate studies | 25 (15.9) |
| Employment status |  |
| Full-time | 91 (58.0) |
| Part-time | 26 (16.6) |
| Self-employed | 14 (8.9) |
| Retired | 9 (5.7) |
| Unemployed | 12 (7.6) |
| Sexual identity |  |
| Gay | 128 (81.5) |
| Straight | 2 (1.3) |
| Bisexual | 24 (15.3) |
| Pansexual | 1 (0.6) |
| Queer | 1 (0.6) |
| Race identity/ethnicity |  |
| American Indian, Alaska Native | 1 (0.6) |
| Asian | 2 (1.3) |
| Black, African American | 34 (21.7) |
| White | 117 (74.5) |
| ≥2 races | 3 (1.9) |
| Hispanic | 12 (7.6) |
| Marital status |  |
| Single, never married | 126 (80.3) |
| Married, civil union, or domestic partnership | 19 (12.1) |
| Separated | 1 (0.6) |
| Divorced | 8 (5.1) |
| Widowed | 3 (1.9) |
| Relationship status |  |
| In a monogamous relationship with 1 partner | 34 (21.7) |
| In an open relationship with 1 partner | 28 (17.8) |
| In a closed polyamorous relationship with ≥2 partners | 1 (0.6) |
| In an open polyamorous relationship with ≥2 partners | 4 (2.5) |
| Not currently in a relationship | 87 (55.4) |
| Perceived likelihood of contracting COVID-19 |  |
| Very unlikely | 24 (15.3) |
| Unlikely | 39 (24.8) |
| Neutral | 51 (32.5) |
| Likely | 21 (13.4) |
| Unsure | 22 (14.0) |
| Perceived severity of a COVID-19 infection |  |
| Not severe | 28 (17.8) |
| Slightly—somewhat severe | 46 (29.3) |
| Moderately severe | 27 (17.2) |
| Very severe | 27 (17.2) |
| Unsure | 29 (18.5) |
| Perceived self-efficacy to protect against COVID-19 |  |
| Not at all | 1 (0.6) |
| Slightly—somewhat so | 5 (3.1) |
| Moderately so | 44 (28.0) |
| Very much so | 106 (67.5) |
| Unsure | 1 (0.6) |

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slightly severe. Twenty-seven participants (19%) were unsure about the proposed severity. Perceived self-efficacy to protect oneself from a COVID-19 infection was high. Nearly all participants (n = 150 [96%]) reported that they knew how to protect themselves, compared with just 4.3% (n = 7) who were either not confident in or unsure of their ability. We observed no significant correlations between racial identity and participants’ beliefs about COVID-19 susceptibility, severity, and self-efficacy. Similarly, self-reported COVID diagnosis was not significantly correlated with susceptibility, severity, or self-efficacy. Younger age was positively correlated with lower anticipated severity of a COVID-19 infection (P < 0.001). Age was not correlated with perceived susceptibility or self-efficacy to protect oneself against infection.

Anxiety
Despite high self-efficacy to protect themselves against COVID-19 and nearly all reporting that they were social distancing either all of the time (n = 73 [47%]) or some of the time (n = 79 [50%]), more than half of the sample expressed increased anxiety about sexual activity in response to the question, “Has social distancing had any effect on how you feel about sex?” (n = 85 [54%]) at T1). By T3, anxiety had decreased but was still reported by more than one-third of men (n = 61 [38%]). Age was not associated with anxiety (P = 0.87), but racial identity was significantly correlated with anxiety, with men of color reporting increased anxiety more frequently compared with White men (P < 0.001).

Sexual Behavior
Sex frequency changed during the 3 time periods (Table 2, Fig. 1). At T1, nearly one-third of men (n = 46 [29%]) reported not having sex because of COVID. Most (n = 36 [78%]) of those abstaining from sex were not in a relationship. At T2, 17% (n = 27) of men reported not having sex, and again, most (n = 20 [74%]) were not in a relationship. By T3, however, this pattern was inverted. Of the 21% (n = 33) of men abstaining from sex, most (n = 22) were in a relationship.

Of those engaging in sex at T1, 62% (n = 69) reported having sex less often compared with prepandemic behavior. Most (n = 39 [57%]) of those reporting less frequent sex were not in a relationship. At T2 and T3, about 40% of men reported less frequent sex (T2: n = 61 [39%]; T3: n = 59 [38%]), and most (T2: n = 38 [62%]; T3: n = 32 [54%]) were in a relationship. Age was not associated with sex frequency (P = 0.57), but increased sex frequency and identifying as a man of color were associated (P < 0.001).

When asked, “How likely are you to have a new sex partner, compared with the time before the coronavirus pandemic?” at T1, most participants (n = 114 [73%]) reported that this was “less likely” (Fig. 2). In contrast, this figure decreased to 54% (n = 85) at T2, with no further change at T3 (54%; Table 2, Fig. 2).

At T1, more than half of the sample (54%) reported that they had not changed how often they used condoms during sex since the start of the pandemic (Table 2, Fig. 3). At T2 and T3, two-thirds of participants reported condom use similar to prepandemic behavior. At each time point, men in a relationship more often than single men reported that their condom use was unchanged compared with prepandemic behavior. A small number of men (5.1% at T1, 6.4% at T2, 5.1% at T3) reported increasing their condom use, with little to no difference by relationship status. Men of color were more likely than White men to report current condom use compared with prepandemic behavior (P = 0.04); there was no correlation with age (P = 0.98).

Several men engaged in virtual sexual interactions, by either starting or increasing online sexual activity (Table 2, Fig. 4). During the first 2 time periods, starting or increasing the practice of chatting on a hookup app or Web site did not change (31% at T1, 31% at T2), but at T3, a moderate decline (24%) was observed. Greater differences were observed between time periods for starting or increasing sexting (i.e., sending, receiving, or forwarding sexually explicit images or videos of oneself to others; 28% at T1, 24% at T3) and video chatting (i.e., using an online app with video feature, such as FaceTime and others, to engage in mutual masturbation or other form of mutual arousing sexual activity with another person; 15% at T1, 1% at T3). A start or increase in meeting new sex partners online was rare (5% at T1) and further decreased over the course of the pandemic (0.6% at T3). Half of participants (52%) started or increased online pornography consumption at T1. This decreased to 37% and 39% in the second and third time periods. Few reported starting or increasing camming (i.e., producing and posting sexually explicit images or videos of oneself for money) or online sex work (5.3%) at T1, and this decreased to 3.8% at T3.

During T1, all online behaviors were reported more frequently by men not in a relationship compared with men with at least 1 romantic partner. Over the course of the next 2 time periods, compared with single men, men in a relationship more frequently started or increased consumption of online pornography, met sex partners online (T2, T3), chatted on hookup apps and Web sites, and sexted (T3 only). At all time points, we observed no significant differences in starting or increasing these online behaviors by age or race.

**DISCUSSION**
In response to COVID-19 social distancing requirements, fear of infection, and limits on physically meeting with others, men in this study made a variety of adjustments to sexual behavior and their attitudes about sex, with some dissonance between the 2.

By May 2021, almost 10% of MSM in this sample self-reported a COVID-19 diagnosis, compared with 10% of the Franklin County (Columbus) general population. During the first few months of the pandemic, several men felt a perceived threat of COVID-19 susceptibility and severity as well as increased anxiety about having sex. By the third time period (January–May 2021), about 40% of men were still reporting this anxiety. Experiences of anxiety were more likely to be reported by men of color, which may be reflective of intersectional vulnerabilities highlighted in both general and pandemic-specific studies. Despite this, no differences in self-reported COVID-19 susceptibility or severity and increased anxiety among Black men compared with their White gay and heterosexual counterparts. This finding underscores the need for more robust strategies to support not only the sexual health but also the mental health of these men.

Anxiety levels were lowest during the third time period, a potential effect of the COVID-19 vaccine. In Ohio, vaccine distribution began in December 2020, prioritizing healthcare workers. All participants would have become eligible for the vaccine at the end of March 2021 (2 months before the end of T3).
TABLE 2. Sexual Health and Behavior COVID-19 Impacts of 157 Men Who Have Sex With Men, April 2020–May 2021

| Time Period 1 (April–July 2020; n = 157) | Time Period 2 (August–December 2020; n = 157) | Time Period 3 (January 2021–May 2021; n = 157) |
|-----------------------------------------|---------------------------------------------|------------------------------------------|
| Enacted/expired COVID-19 restrictions   | Franklin County Public Health State at Home Advisory Enacted (November 18, 2020) | Franklin County Public Health State at Home Advisory Expired (February 6, 2021) |
| Ohio Department of Health Stay at Home Order Enacted (March 22, 2020)* | Ohio Department of Health Stay at Home Order Expired (May 29, 2020) | Ohio Department of Health Updated Order for Social Distancing Enacted (May 29, 2020) |
| Ohio Department of Health Stay at Home Order Expired (May 29, 2020) | Ohio Department of Health Stay at Home Advisory Expired (May 29, 2020) | Franklin County Board of Health Facial Coverings Order Enacted (July 14, 2020) |

Self-reported COVID-19 infections, n (%)

|                   | Total     | Single    | In a Relationship | Total     | Single    | In a Relationship | Total     | Single    | In a Relationship |
|-------------------|-----------|-----------|-------------------|-----------|-----------|-------------------|-----------|-----------|-------------------|
| Not having sex    | 46 (29.3) | 36 (22.9) | 10 (6.4)          | 27 (17.2) | 20 (12.7) | 7 (4.5)           | 33 (21.0) | 11 (7.0) | 22 (14.0)         |
| Having less sex   | 69 (43.9) | 39 (24.8) | 30 (19.1)         | 51 (32.5) | 21 (13.4) | 30 (19.1)         | 50 (31.8) | 21 (13.4) | 29 (18.5)         |
| Having same amount of sex | 30 (19.1) | 10 (6.4) | 20 (12.7)         | 12 (7.6) | 6 (3.8) | 6 (3.8)           | 12 (7.6) | 7 (4.5) | 5 (3.2)           |
| Having more sex   | 6 (3.8)   | 3 (1.9)   | 3 (1.9)           | 12 (7.6) | 6 (3.8) | 6 (3.8)           | 12 (7.6) | 7 (4.5) | 5 (3.2)           |
| More anxious about sex due to social distancing | 85 (54.1) | 36 (22.9) | 49 (31.2)         | 83 (52.9) | 32 (20.4) | 51 (32.5)         | 61 (38.9) | 23 (16.6) | 38 (24.2)         |

Condom use since start of the pandemic

|                   | n (%)     | n (%)     | n (%)     |
|-------------------|-----------|-----------|-----------|
| Less often        | 4 (2.5)   | 2 (1.3)   | 2 (1.3)   |
| Same              | 84 (53.5) | 39 (24.8) | 45 (31.2) |
| More often        | 8 (5.10)  | 3 (1.9)   | 5 (3.2)   |

Current likelihood of sex with new partner compared with prepandemic

|                   | n (%)     | n (%)     | n (%)     |
|-------------------|-----------|-----------|-----------|
| Less              | 112 (71.3) | 67 (42.4) | 45 (31.2) |
| Same              | 29 (18.5) | 16 (10.2) | 13 (8.3)  |
| More              | 4 (2.5)   | 2 (1.3)   | 2 (1.3)   |

Started or increased in the past 3 mo

|                   | n (%)     | n (%)     | n (%)     |
|-------------------|-----------|-----------|-----------|
| Chatting on hookup app, Web site | 47 (29.9) | 34 (21.7) | 13 (8.3)  |
| Video chatting    | 23 (14.6) | 15 (9.6)  | 8 (5.1)   |
| Sexting           | 44 (28.4) | 27 (17.2) | 17 (10.8) |
| Camming, online sex work | 8 (5.1)   | 6 (3.8)   | 2 (1.3)   |
| Watching porn     | 80 (51.0) | 45 (29.9) | 35 (22.3) |
| Meeting sex partner | 7 (4.5)   | 6 (3.8)   | 1 (0.6)   |

*Order enacted 1 month before study period.

Vaccination data were not collected as a part of this study; thus, we are unable to predict any relationship between vaccination uptake and attitudes, anxiety, and other variables of interest. Evidence suggests, however, that sexual and gender minority (SGM) men have higher levels of vaccination uptake compared with non-SGM men. Among the unvaccinated, SGM men have higher levels of vaccination uptake compared with non-SGM men. Although COVID-19 vaccine hesitancy has been observed in subgroups of MSM (e.g., socioeconomically vulnerable, HIV seropositive, racially minoritized), for some, availability may have alleviated fear of being infected by or infecting others. In addition, participants at each study visit may have had less anxiety than participants who chose not to attend study visits. Extending our assessment period to more fully explore immunization behavior and attitudes and the maturation of the epidemic could have allowed for a deeper exploration and may have been informative for future pandemics.

Interestingly, although some men limited sexual activity, most men in the sample continued to engage in sex, despite their anxiety. Across the sample, we observed a pattern in which there was an initial decline in in-person sexual behavior at the start of the pandemic, followed by an increase in sexual activity during the second time period that was maintained in the third time period. The increase in activity at T2 was perhaps motivated by "pandemic fatigue." Male participants who have sex with men in other studies described this fatigue as boredom, loneliness, and physical needs for sex that motivated reengagement in sexual behavior after their earlier withdrawal because of COVID-19–related concerns. Relaxed distancing behavior among this sample may have contributed to the increase of self-reported positive COVID-19 cases observed over time (n = 1 at T1, n = 10 at T2), a number that itself may not truly reflect the impact of behavior change because men may have underreported infections or may not have been tested during the data collection period.
Patterns across several behaviors emerged by relationship status and racial identity. For example, at the start of the pandemic, men who were not in a relationship were more likely to report having less sex compared with their prepandemic behavior. By the second and third time periods, trends had flipped; men in a relationship were more likely to report less sex. Higher frequency of sex was positively correlated with identifying as a man of color.

Among those who were engaging in sex, COVID-19 did not seem to lead to increases in condom use. Very few men reported an increase in condom use during any period compared with prepandemic behavior, regardless of relationship status. The minimal change in condom use may reflect consistent public health messaging that has focused on the respiratory transmission of SARS-CoV-2. Although close contact during sex may put one at risk of a partner's exhalation of respiratory droplets, there is currently no evidence of additional transmission risk through vaginal fluid or semen,\textsuperscript{19-21} thus making condom use an ineffective guard against SARS-CoV-2 transmission. Engaging in social distancing (reduced frequency of in-person sex and decreased numbers of new sex partners) may have lowered the perceived threat of sexually transmitted infection and led most men in the sample to maintain condom use behavior similar to prepanademic behavior.

Because social distancing initially slowed the frequency of in-person sexual activity, many men in the sample pivoted to online sexual activity, possibly to engage sexually while adhering to physical distancing recommendations circumventing distancing recommendations.\textsuperscript{22} The reported initiation or increase in chatting on hookup apps and Web sites at the start of the pandemic decreased only slightly by the second and third time points. Targeting these sites to diffuse safer sex messaging may be an effective intervention approach. Very few of those interacting with others sexually online went on to meet those partners in person. The most common online behavior was viewing pornography, perhaps explained by increases in spare time, lack of intimacy with other people, and the stress generated by the pandemic.\textsuperscript{23} By mid-2021, starting or increasing pornography use had decreased to about 40% (down from 53% in the first 3 months of data collection), which was still much higher than all other online sexual activity assessed during this period. Although camming and online sex work remained relatively rare, these behaviors increased with the start of the pandemic before stopping almost completely. The initial uptake may be reflective of the economic impacts of the pandemic,\textsuperscript{24} tapering off as personal conditions stabilized and financial necessity diminished. Differences by relationship status were observed for several online activities, but few patterns emerged. At T1, men who were not in a relationship were more frequently reported starting or increasing all online activities, which one might expect given that they were also more likely to report having less or no sex.

![Figure 1. Sex frequency by relationship status past 3 months compared with pre-COVID pandemic behavior.](image1)

![Figure 2. Likelihood of sex with new partner by relationship status past 3 months compared with pre-COVID pandemic behavior.](image2)
As the pandemic continued, men in a relationship more frequently reported they were having less frequent sex, but their engagement in online sexual activities was as high and, in a few instances, slightly higher than that of men not in a relationship.

This report of the effects of COVID-19 on the sexual and mental health of a community-based sample of MSM complements existing work reflecting the experiences of clinic-based samples. However, the generalizability of this convenience sample of men enrolled in a network study of syphilis epidemiology is limited. The sample was not highly diverse by race or age, and the sample size limited the ability to examine disparities that may have been experienced by subgroups such as Black men or young men.

This analysis highlights how men in this community sample changed sexual behavior in response to social network disruptions caused by COVID-19–related public health guidance such as social distancing. The initial increase in safer sex and social distancing was not maintained, even as the pandemic itself continued, perhaps contributing to an increase in self-reported COVID-19 infections in later time periods. Experiences differed by race, emphasizing the need for rapid and ongoing intervention that prioritizes men of color both now and in future sexual health efforts. Efforts should also address the unique perspective of both single and partnered men, given shifts in protective behavior over time by relationship type.

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