

Partner Notification of Sexually Transmitted Diseases: Practices and Preferences

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Background: Timely notification and treatment of sex partners exposed to a sexually transmitted disease (STD) is essential to reduce reinfection and transmission. Our objectives were to determine factors associated with patient-initiated notification of sex partners and preferences regarding standard partner referral versus expedited partner therapy (EPT).

Methods: Participants diagnosed with gonorrhea, chlamydia, trichomoniasis, or nongonococcal urethritis within the previous year were administered a baseline survey asking about demographics, sexual history, and partner treatment preferences (standard partner referral vs. EPT). They identified up to 4 sex partners within the past 2 months, and answered questions on relationship characteristics, quality, and notification self-efficacy. At follow-up, participants with a current STD were asked whether they notified their partners. Generalized estimating equations were used to evaluate the associations between predictor variables and partner notification.

Results: Of the 201 subjects enrolled, 157 had a current STD diagnosis, and 289 sex partners were identified. The rate of successful partner notification was 77.3% (157/203 sex partners). Partner notification was increased if the subject had a long-term relationship with a sex partner (odds ratio: 3.07; 95% confidence interval: 1.43, 6.58), considered the partner to be a main partner (odds ratio: 2.53; 95% confidence interval: 1.43, 6.58), or had increased notification self-efficacy. Overall, participants did not prefer EPT over standard referral; however, females, those with higher education levels, and those with a prior STD preferred EPT.

Conclusions: Patient-initiated partner referral is more successful in patients with increased self-efficacy who have stronger interpersonal relationships with their sex partners.

Partner notification is an important component of public health efforts to reduce the spread of sexually transmitted diseases (STDs). It has been estimated that less than 20% of patients with gonorrhea or chlamydia, the 2 most commonly reported STDs in the United States, receive public health department partner notification services.^{1,2} Thus, the public health system relies on patients to notify their sex partners about a diagnosis of gonorrhea or chlamydia and to refer them for treatment. However, interviews of patients diagnosed with these 2 infections showed that they were more likely to inform main partners than partners perceived as transmitters, 1-time partners, and partners before the onset of symptoms, leaving many such partners unknowing and untreated.^{3,4}

Investigators have examined alternate methods of partner notification to improve the rate of successful partner treatment, such as patient-delivered, expedited partner therapy (EPT). In addition to encouraging patients to refer their sex partners to a provider for a clinical examination, they are given additional antibiotics or a prescription to give to their partners. Expedited treatment of sex partners has been shown to significantly reduce the rate of persistent or recurrent gonorrhea, whereas its effect on the rate of chlamydia reinfection has been more modest. Programmatic implementation of EPT in a San Francisco STD clinic did not show a reduction in rates of chlamydial or gonococcal reinfection within 1 year, indicating that the impact of EPT in a community-setting is still largely unknown.⁵ Furthermore, studies examining the notification and treatment of sex partners are limited, and little is known about patient preferences regarding EPT.⁶⁻¹¹ The objectives of this study were to identify factors associated with partner notification and to assess patient opinions regarding EPT versus standard referral of partners for treatment.

MATERIALS AND METHODS

Participants were male and female patients seeking care at the Allegheny County Health Department STD Clinic between November 2008 and June 2009. The STD Clinic is the only STD clinic in Pittsburgh, and patients diagnosed with STDs are advised by clinic staff to notify all sex partners to seek evaluation and treatment. EPT is not offered at the clinic. Patients aged 18 years and older were eligible if they tested positive for *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Trichomonas vaginalis*, or nongonococcal urethritis, or were diagnosed with 1 of these infections within the past year per chart review. Patients diagnosed with syphilis or human immunodeficiency virus, and those who did not speak English, were excluded. The institutional review board at the University of Pittsburgh granted human subject approval.

All participants were administered a baseline interview on enrollment comprised of questions on demographics, STD history, and partner notification preferences regarding standard referral versus EPT. The baseline interview was taken during the same clinic visit in which patients received a positive STD

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diagnosis or after initial STD testing was completed (but pending), if they had a diagnosis within the past year. Participants were asked to identify their 4 most recent sex partners during the previous 2 months and to answer questions pertaining to relationship characteristics and sex behaviors with each partner. Scales assessing relationship quality, notification self-efficacy, and anticipated consequences of notification were completed for each partner.⁴ Relationship quality included items on emotional and supportive characteristics of the patient-partner relationship. Notification self-efficacy, which reflects a person's belief about his or her capacity to notify partners about an STD, included items regarding patient's ease with discussing an STD diagnosis, treatment, and whether a sex partner has been treated, whereas anticipated consequences assessed the likelihood of a sex partner physically abusing or breaking up with the patient. The survey also included validated measures of depression, self-esteem, and STD-related stigma (negative societal attitudes toward STD infection) and shame (negative personal feelings and embarrassment).¹²⁻¹⁵ All scales were scored according to published methods. For scales assessing relationship quality, notification self-efficacy, and anticipated consequences, the scores were left as continuous data for analyses. If cutoff points were published, patients were dichotomized based on total score. For example, on the CESD-10 (range, 0-30), a validated screening tool for depression, a score greater than 10 indicated depressive symptomatology. A score less than 15 on the Rosenberg self-esteem scale (range, 0-30) indicated low self-esteem. For STD-related stigma and shame, we set the cutoff at the 75th percentile; in prior work, scores above the 75th percentile were classified as "high" levels of stigma or shame.¹⁴

Participants with a current STD diagnosis confirmed by laboratory testing underwent a follow-up interview, which was conducted through telephone approximately 1 month after enrollment. Having a current STD was defined as finding out about an STD diagnosis at the same visit as the baseline interview or undergoing the baseline interview on the day of treatment for a recently made STD diagnosis. The participants were asked whether each sex partner was notified of the STD diagnosis, how many days it took them to notify each partner after they found out about the diagnosis, and how certain they were that partners received treatment for the STD. Participants who could not be contacted within 2 months were considered lost to follow-up.

Measures

The primary outcome was self-reported partner notification of an STD diagnosis. The question, "Did you tell Partner X about your STD diagnosis?" was repeated for each partner identified at baseline. Partner notification was dichotomized in 2 ways. First, patients who notified at least one of their sex partners were compared with patients who did not notify any partners (Table 1). This method was used for characteristics relating to the patient, such as demographics, STD history, self-esteem, and STD-related stigma and shame. Second, patients in dyads where sex partners were notified were compared with patients in dyads where partners were not notified (Tables 2, 3). Variables pertaining to relationship characteristics and behaviors for each patient-partner dyad were assessed according to the second method of dichotomization, as patients were able to provide information on up to 4 recent sex partners.

A secondary outcome measure of the study was patient preference regarding standard referral versus EPT. Patients were asked which 1 of the following 4 options they preferred for treatment of any sex partner and was not partner specific:

(a) taking medication to deliver to his or her partner, (b) taking a prescription for medication to deliver to his or her partner, (c) having partners pick up medication at a local pharmacy to treat themselves, or (d) referring partners to an STD clinic or doctor's office for an examination and treatment. Selection of any of the first 3 choices was coded as EPT, whereas the fourth was coded as standard partner referral. Predictor variables for the secondary outcome included demographic characteristics and previous STD history, excluding the current STD diagnosis.

Statistical Analysis

For this study, data were analyzed with STATA statistical software, release 10 (StataCorp LP, College Station, TX). Statistical significance was determined using 2-sided *P* values of 0.05. The distributions of demographic, prior STD history, and psychosocial characteristics of participants by 2 groups (participants who notified at least one sex partner vs. participants who did not) were summarized with frequencies. The associations between notification of sex partners and predictor variables (sex, race, STD history, etc.) were examined by logistic regression.

As participants were able to provide data on up to 4 sex partners, the bivariate relationship between notification status of sex partners in dyads and the characteristics of patient-partner dyads were assessed by generalized estimation equations (GEE) to account for the fact that observations within the same patient were correlated. Multivariable generalized estimating equations were then used to estimate the adjusted odds ratios (ORs) and 95% confidence intervals (CIs) after controlling for other covariables.

A similar set of analyses was conducted for the secondary outcome. Specifically, the distributions of demographic and prior STD history characteristics of participants by partner treatment preference were presented with counts. Univariable and multivariable logistic regressions were used to calculate the ORs and their respective 95% CIs using all candidate variables; a reduced, backward selection model was then constructed including predictors with a *P* value less than 0.20.

RESULTS

We enrolled 201 patients with a current or previous STD diagnosis. The mean age of the cohort was 24.4 years (range, 18-50 years). The majority of the participants was heterosexual (90%), male (66.7%), black (66.1%), and single (86.1%). Almost half had an education level of high school or less. Most (71.6%) reported having at least one STD previously, and 41.2% had an STD diagnosis within the past year.

Of the 201 patients, 157 (78.1%) had a current STD diagnosis and 289 sex partners of these patients were reported. Partner notification was examined for these 157 patients only. The follow-up rate among patients with a current STD diagnosis was 73.2%, and the capture rate (the number of sex partners described by participants on enrollment whose information was collected on follow-up) was 70.6% (Fig. 1). Overall, 77.3% of identified sex partners captured were reported to have been successfully notified. A total of 71% of sex partners were notified within 1 week of the day the patient knew about his or her diagnosis, and approximately one-half of partners (53.2%) had received treatment according to the patient testimony at 1 month.

There were 114 patients who completed follow-up (after excluding 1 patient who did not have any recent sex partners to notify). There was no difference in demographic profiles between the 114 patients who completed follow-up and the 46

TABLE 1. Demographic, Prior STD History, and Psychosocial Characteristics of Participants by Notification of Sexual Partners (With Column Percentages and *P* Values)

Characteristics	Patients Who Notified at Least 1 Sexual Partner n = 102 (%)	Patients Who Did Not Notify Any Sexual Partner n = 12 (%)	<i>P</i> (Fisher Exact Test)	OR of Notification* n = 114
Sex				
Male	68 (67)	10 (83)	0.33	Reference
Female	34 (33)	2 (17)		2.50 (0.52, 12.05)
Race				
White, Asian, Hispanic	35 (66)	5 (58)	0.75	Reference
African American	67 (34)	7 (42)		1.37 (0.40, 4.62)
Age				
<21	30 (29)	5 (42)	0.51	0.58 (0.17, 1.98)
≥21	72 (71)	7 (58)		Reference
Marital status				
Single	86 (84)	11 (92)	0.69	Reference
Married, divorced, widowed	16 (16)	1 (8)		2.05 (0.25, 16.97)
Education				
HS or less	49 (48)	6 (50)	1.00	0.92 (0.28, 3.06)
Beyond HS	53 (52)	6 (50)		Reference
STD history				
No	34 (33)	4 (33)	1.00	Reference
Yes	68 (67)	8 (67)		1.00 (0.28, 3.56)
History of sexual abuse				
No	76 (75)	10 (83)	0.76	Reference
Yes	25 (25)	2 (17)		1.64 (0.34, 8.02)
No. sex partners in last 2 mo				
1	49 (48)	3 (25)	0.22	Reference
>1	53 (52)	9 (75)		0.36 (0.09, 1.41)
Self-esteem				
Normal	99 (97)	12 (100)	0.71	—
Low self-esteem	3 (3)	0		—†
STD-related stigma				
No	78 (76)	9 (75)	0.58	Reference
Yes	24 (24)	3 (25)		0.92 (0.23, 3.69)
STD-related shame				
No	85 (83)	10 (83)	0.63	Reference
Yes	17 (17)	2 (17)		1.00 (0.20, 4.98)

*OR of notification are estimated by logistic regression.

†OR of self-esteem is not estimable because of zero cell.

STD indicates sexually transmitted disease; OR, odds ratios; HS, high school.

patients who did not. Age, sex, and race of a patient were not significantly associated with partner notification (Table 1). There was no significant difference in notification practices between single and married patients, or between patients with higher and lower levels of education. Similarly, prior STD history was not related to partner notification.

We assessed how psychosocial characteristics affect partner notification (Table 1). Patient perceptions of STD-related stigma and shame were not associated with disease disclosure. Low levels of self-esteem were infrequent in our cohort ($n = 3$). There was no difference in partner notification between patients with and without a history of sexual abuse.

The impact of relationship characteristics on partner notification rates was examined for each patient-partner dyad (Table 2). Having a relationship lasting more than 4 months was significantly associated with partner notification (OR: 3.66; 95% CI: 1.84, 7.27). Sex partners who were considered to be main partners were over 4 times as likely to be notified about an STD diagnosis (OR: 4.33; 95% CI: 2.32, 8.10). Accordingly, 1-time partners were less likely to be told about an infection. All 21 partners who had children with a patient were notified.

Sexual behavioral characteristics with a specific partner were associated with successful partner notification (Table 2).

Patients were more likely to notify sex partners with whom they had sexual intercourse within the last week compared with partners from more than 1 week ago (OR: 2.88; 95% CI: 1.35, 6.14). They were almost 5 times as likely to disclose an STD diagnosis when they anticipated having sexual activity with a partner again (OR: 4.82; 95% CI: 2.14, 10.84). Finally, patients who reported using condoms during their most recent coital episode with a sex partner had lower rates of partner notification than those who did not use condoms (OR: 0.42; 95% CI: 0.22, 0.79).

After adjusting for relationship characteristics, duration of relationship and being a main sex partner remained significantly associated with successful partner notification (Table 2). Although the anticipation of future sexual activity with a partner was associated with partner notification on univariate analysis, it was no longer independent in the final adjusted model. Of the 3 scales assessing relationship quality, notification self-efficacy, and anticipated consequences of notification for each sex partner named at enrollment, both relationship quality and notification self-efficacy were highly associated with successful patient-initiated partner notification (Table 3). For every point increase in score on the notification self-efficacy and relationship strength scales, there was a 1.47 (95% CI: 1.27, 1.71) and

TABLE 2. Relationship Characteristics of Patient-Partner Dyad, by Notification Status of Sexual Partners

Characteristics	Partners Notified n = 157 (%)	Partners Not Notified n = 46 (%)	OR of Notification* n = 203	Adjusted OR of Notification† n = 203
Duration of relationship				
<4 mo	30 (81)	24 (52)	Reference	Reference
>4 mo	127 (19)	22 (48)	3.66 (1.84, 7.27)‡	3.07 (1.43, 6.58)‡
Main partner				
No	62 (40)	35 (76)	Reference	Reference
Yes	95 (60)	11 (24)	4.33 (2.32, 8.10)‡	2.53 (1.43, 6.58)‡
One-time partner				
No	133 (85)	24 (52)	Reference	
Yes	23 (15)	22 (48)	0.29 (0.15, 0.55)‡	
Last sex with partner				
<1 wk	57 (36)	8 (17)	2.88 (1.35, 6.14)‡	2.18 (0.89, 5.33)
>1 wk	100 (64)	38 (83)	Reference	Reference
Condom use at last intercourse				
No	111 (71)	26 (57)	Reference	Reference
Yes	46 (29)	20 (43)	0.42 (0.22, 0.79)‡	0.49 (0.24, 1.02)
Anticipated sexual activity				
No/unsure	86 (55)	38 (83)	Reference	Reference
Yes	70 (45)	7 (15)	4.82 (2.14, 10.84)‡	2.35 (0.95, 5.81)
Children with partner				
No	136 (87)	46 (100)	Reference	
Yes	21 (13)	0	101.89 (0.08, ∞)	

*OR of notification are estimated by generalized estimating equations model.

†Adjusted OR of notification are estimated by multivariable generalized estimating equations model after controlling for all covariables except "children with partner."

‡ $\alpha < 0.01$.

OR indicates odds ratios.

1.23 (95% CI: 1.15, 1.34) times greater likelihood of partner notification, respectively.

1.16, 4.31). There was no association between race, age, or marital status and method of partner therapy.

Patient Preferences for Partner Therapy

Patient preferences regarding standard partner referral versus EPT were determined using the entire cohort of patients. Overall, 109 of 200 (54.5%) patients preferred to refer their sex partners to a physician or clinic for STD testing and treatment rather than deliver treatment themselves. Of the 91 patients who preferred one of the methods of EPT, 79% would deliver medication to their partner, 13% would deliver a prescription, and 8% would tell their partner to pick up medication at a local pharmacy. On multivariable logistic regression analysis, female sex and higher educational levels were associated with choice of EPT (Table 4). STD history was also significantly associated with patient preference of partner treatment, as patients with prior STDs more frequently opted for EPT (OR: 2.23; 95% CI:

DISCUSSION

This study demonstrates that the majority of patients notified their sex partners of an STD within 1 week of diagnosis, and notification rates were higher in relationships of longer duration and between main partners. Patients with positive interpersonal relationships were more likely to notify partners than patients with 1-time or casual partners. Increased patient self-efficacy in discussing an STD diagnosis and treatment was also associated with successful disclosure.

Previous studies have identified several predictors associated with successful partner notification. Rogstad et al. found that among individuals with gonorrhea, white females were more likely to have successfully notified sex partners than

TABLE 3. Relationship Quality, Notification Self-Efficacy, and Anticipated Consequences, by Notification Status of Sexual Partners

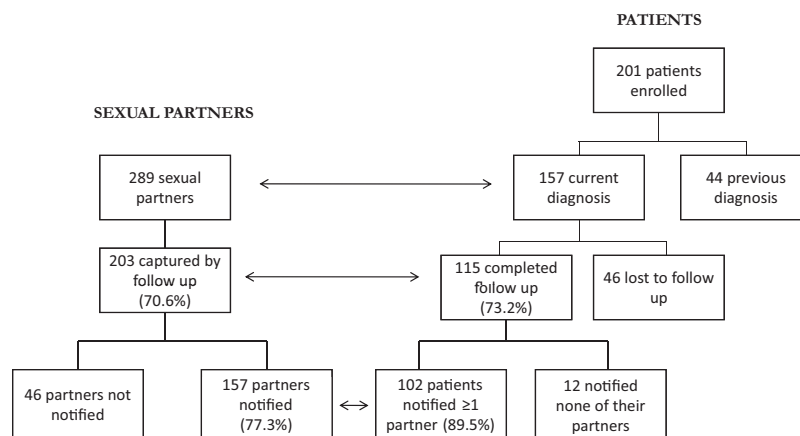
Characteristics	Partners Notified Mean \pm SD, (Minimum, Maximum) (n = 157)	Partners Not Notified Mean \pm SD, (Minimum, Maximum) (n = 46)	OR of Notification* (n = 203)
Relationship quality	16.6 \pm 4.0, (6, 24)	12.8 \pm 3.9, (6, 21)	1.23 (1.15, 1.34)†
Notification self-efficacy	9.1 \pm 1.9, (3, 12)	7.6 \pm 2.1, (4, 12)	1.47 (1.27, 1.71)†
Anticipated consequences	6.5 \pm 1.3, (3, 11)	6.5 \pm 1.4, (4, 11)	1.08 (0.85, 1.36)

*OR of notification are estimated by generalized estimating equations of all partner data.

† $\alpha < 0.01$.

SD indicates standard deviation; OR, odds ratios.

Figure 1. Study enrollment: patients and their reported sexual partners. *Percent calculated by using denominator of 114 patients. One of the 115 patients completing follow-up was excluded for not having any recent sexual partners to notify.



Afro-Caribbean or male patients.¹⁶ Similarly, women with gonorrhea or chlamydia in Amsterdam referred more sex partners than men.¹⁷ Although demographic factors such as sex, race, and age were significant in a few specific populations, the results of our study are consistent with other studies demonstrating that relationship quality and characteristics may be more influential than patient demographics in patient-initiated disclosure of an STD diagnosis.^{3,4,17–21}

Gorbach et al. found that infected individuals were most likely to notify main sex partners about an STD diagnosis, and were least likely to notify partners perceived as transmitters or contacts before symptoms.³ Likewise, partner notification is increased among adolescent patients with

stronger emotional ties to their sex partner, regardless of patient race or sex.⁴ Finally, patients in relationships of longer duration, where sexual contact was recent and frequent, had higher rates of partner notification.^{16,18,20} Our findings provide further evidence supporting an association between partner notification and partnership characteristics, particularly strength and duration of relationship and being a main partner. Predictors such as anticipated sexual activity and lack of condom use may reflect the comfort and trust that grows between sex partners over time, thereby impacting the decision to inform partners of an STD diagnosis. In addition, patients who had children with their sex partners exhibited a high degree of notification. The mother/father

TABLE 4. Demographic and Prior STD History Characteristics of Participants, by Partner Treatment Preference (With Column Percentages)

Characteristics	Patients Preferring EPT n = 91 (%)	Patients Preferring Standard Referral* n = 109 (%)	Unadjusted OR of EPT Preference [†] n = 200	Adjusted OR of EPT Preference [†] n = 200
Sex				
Male	55 (60)	80 (73)	Reference	Reference
Female	36 (40)	29 (27)	1.81 (0.99, 3.28)	1.87 (1.01, 3.46) [‡]
Race				
White, Asian, Hispanic	31 (34)	37 (34)	Reference	
African American	60 (66)	72 (66)	0.99 (0.55, 1.79)	
Age				
<21	25 (27)	28 (26)	1.10 (0.58, 2.06)	
≥21	66 (73)	81 (74)	Reference	
Marital status				
Single	75 (82)	97 (89)	Reference	
Married, divorced, widowed	16 (18)	12 (11)	1.72 (0.77, 3.86)	
Education				
HS or less	35 (39)	56 (51)	0.59 (0.34, 1.04)	0.54 (0.30, 0.97) [‡]
Beyond HS	56 (61)	53 (49)	Reference	Reference
STD history				
No	19 (21)	39 (36)	Reference	Reference
Yes	72 (79)	70 (64)	2.11 (1.11, 4.00) [‡]	2.23 (1.16, 4.31) [‡]
Current STD				
No	24 (26)	20 (18)	Reference	
Yes	67 (74)	89 (82)	0.63 (0.32, 1.23)	

*Standard referral is defined as referring partners to an STD clinic or doctor's office for evaluation and treatment.

[†]OR of notification are estimated by logistic regression. Adjusted OR are estimated using a reduced, backward selection model containing predictors with $P < 0.20$.

[‡] $\alpha < 0.05$.

STD indicates sexually transmitted disease; OR, odds ratios; HS, high school.

status of sex partners seems to remain important, even if they are no longer the main partners.

Notification self-efficacy may be considered an indicator of psychosocial factors influencing patient-initiated partner notification. Discussion of an STD diagnosis requires individuals to have confidence in themselves and in their relationship with their partners. Self-efficacy has been shown to play a role in successful partner notification in adolescents; our findings broaden the validity of this association to the adult population, lending further support to the strategy of assessing individual patient beliefs, behaviors, and partnerships.⁴ Clinical interventions that focus on improving patient-initiated partner referral, such as motivational counseling and education of patients to develop their interrelationship and communication skills, are important to increase the notification of sex partners.^{22,23}

EPT has been shown to reduce reinfection rates of gonorrhea and chlamydia.⁷⁻⁹ An earlier study examining the expansion of EPT to the private sector through a partnership with commercial pharmacies reported that three-fourths of patients randomly selected for the expedited arm of the study agreed to deliver treatment to their partners, and most chose to obtain medication at a pharmacy.¹⁹ The success rate of medication delivery was 84%, suggesting that in practice, patients were open to the option of EPT. Despite improvements in reinfection rates or medication delivery rates, it is important to ascertain patient preferences, especially when considering the application of such services to patient populations in different sectors (private vs. public) and regions.²⁴⁻²⁶ Our finding that more patients in our cohort, especially females, those with higher education levels, or those with an STD history, preferred EPT to standard partner referral, indicates the need for options in partner referral services for individual patients. Unlike males, females in our cohort preferred EPT to standard referral. One may speculate that this difference, coupled with the results of a recent randomized control trial of EPT, in which recurrent chlamydia and gonorrhea infection rates trended lower in males compared with females, may reflect a more successful style of communication that females have in discussing STDs with their partners, or that females make better use of available options to communicate an STD exposure.²⁷ Education level may affect patient comfort with and understanding of notification services and options. Patients with a prior STD diagnosis may have different perspectives on partner treatment from those who have never had one. Given these dissimilarities, offering multiple methods of partner notification is better than offering only one.

A limitation of our study was that the main outcome of partner notification was based on self-report by participants and was not confirmed, and therefore we cannot precisely determine notification success rate. Although confirmation of partner treatment (by record review) would be a better outcome than self-report, such a study design would be difficult to conduct. Perhaps those health systems that are able to link sex contacts and track healthcare outcomes from different providers (e.g., electronic health records in national health systems) and handle the data confidentially would be able to overcome the challenges posted in partner studies. Another limitation is that one investigator administered the survey to participants, which may have inadvertently introduced bias as compared with a self-administered survey. Also, we included participants whose partners already knew about their diagnosis at the time of enrollment in the positive notification category, which increased the partner notification rate measured at 1-month follow-up. Given that the overall goal of patient-initiated partner notification is the communication of information that will

improve the likelihood of sex partners receiving STD testing and treatment after exposure, we did not feel that including these patients adversely affected study findings; in fact, the observed rate of partner notification in our cohort is consistent with other reports.^{4,7,28} Finally, our study may have been underpowered to detect associations between participant characteristics and partner notification. Although all of the patients enrolled were from 1 public STD clinic, which may limit the generalizability, the findings may be applicable to other large, busy, urban STD clinics. These data may help to explain local STD transmission rates by revealing why sex partners exposed to an STD are (or are not) being treated. The strength of this study is that it is one of the first to survey patients regarding their preferences of partner notification. Our data on patient perspectives regarding standard partner referral versus EPT should be considered by STD prevention programs contemplating the addition of EPT to their existing partner management practices.

In conclusion, our study provides important information on partner notification practices among patients diagnosed with an STD. Patient-initiated partner referral methods are more successful among patients with increased self-efficacy and for partners with whom patients have stronger relationships. Improved strategies are needed to target casual and 1-time partners at high risk for STDs. Although EPT has become one such method to increase successful partner treatment, it is important to recognize that not all patients prefer to take their sex partner's treatment themselves because they want them to undergo STD testing to confirm the diagnosis first. Thus, additional studies are needed to determine how public health and provider services can better facilitate patient-initiated partner notification and partner treatment in ways that are amenable to patients, as well as to educate patients regarding the important role of partner notification in decreasing STD transmission.

REFERENCES

1. Golden MR, Hogben M, Handsfield HH, et al. Partner notification for HIV and STD in the United States: Low coverage for gonorrhea, chlamydial infection, and HIV. *Sex Transm Dis* 2003; 30:490-496.
2. Macke BA, Keenan HA, Kassler WJ. Partner notification strategies for sexually transmitted diseases. *Sex Transm Dis* 1998; 25:329-330.
3. Gorbach PM, Aral SO, Celum C, et al. To notify or not to notify: STD patients' perspectives of partner notification in Seattle. *Sex Transm Dis* 2000; 27:193-200.
4. Fortenberry JD, Brizendine EJ, Katz BP, et al. The role of self-efficacy and relationship quality in partner notification by adolescents with sexually transmitted infections. *Arch Pediatr Adolesc Med* 2002; 156:1133-1137.
5. Stephens SC, Bernstein KT, Katz MH, et al. The effectiveness of patient-delivered partner therapy and chlamydial and gonococcal reinfection in San Francisco. *Sex Transm Dis* 2010; 37:525-529.
6. Golden MR, Whittington WL, Gorbach PM, et al. Partner notification for chlamydial infections among private sector clinicians in Seattle-King County: A clinician and patient survey. *Sex Transm Dis* 1999; 26:543-547.
7. Golden MR, Whittington WL, Handsfield HH, et al. Effect of expedited treatment of sex partners on recurrent or persistent gonorrhea or chlamydial infection. *N Engl J Med* 2005; 352:676-685.
8. Kissinger P, Mohammed H, Richardson-Alston G, et al. Patient delivered partner treatment for male urethritis: A randomized controlled trial. *Clin Infect Dis* 2005; 41:623-629.
9. Trelle S, Shang A, Nartey L, et al. Improved effectiveness of partner notification for patients with sexually transmitted infec-

- tions: Systematic review. *BMJ* 2007; 334:354–357. doi: 10.1136/bmj.39079.460741.7C.
10. Goldsworthy RE, Fortenberry JD. Patterns and determinants of patient-delivered partner therapy uptake among healthcare consumers. *Sex Transm Dis* 2009; 36:25–32.
 11. McBride KR, Goldsworthy RE, Fortenberry JD. Formative design and evaluation of patient-delivered partner therapy informational materials and packaging among public health clinic patients. *Sex Transm Infect* 2009; 85:150–155.
 12. Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Appl Psychol Meas* 1977; 1:385–401.
 13. Rosenberg M. *Conceiving the Self*. New York, NY: Basic Books, 1979.
 14. Fortenberry JD, McFarlane M, Bleakley A, et al. Relationships of stigma and shame to gonorrhea and HIV screening. *Am J Public Health* 2002; 92:378–381.
 15. Sales JM, DiClemente RJ, Rose ES, et al. Relationship of STD-related shame and stigma to female adolescents' condom-protected intercourse. *J Adolesc Health* 2007; 40:573.e1–573.e6.
 16. Rogstad KE, Clementson C, Ahmed-Jushuf IH. Success of partner notification in heterosexuals with gonorrhea: Effects of sex and ethnicity. *Sex Transm Infect* 1998; 74:379.
 17. van de Laar MJ, Termorshuizen F, van de Hoek A. Partner referral by patients with gonorrhea and chlamydial infection: Case-finding observations. *Sex Transm Dis* 1997; 24:334–342.
 18. Brewer DD. Case-finding effectiveness of partner notification and cluster investigation for sexually transmitted diseases/HIV. *Sex Transm Dis* 2005; 32:78–83.
 19. Golden MR, Whittington WL, Handsfield HH, et al. Partner management for gonococcal and chlamydial infection: Expansion of public health services to the private sector and expedited sex partner treatment through a partnership with commercial pharmacies. *Sex Transm Dis* 2001; 28:658–665.
 20. Thurman AR, Shain RN, Holden AE, et al. Partner notification of sexually transmitted infections: A large cohort of Mexican American and African American women. *Sex Transm Dis* 2008; 35:136–140.
 21. van Duynhoven YT, Schop WA, van der Meijden WI, et al. Patient referral outcome in gonorrhea and chlamydial infections. *Sex Transm Infect* 1998; 74:323–330.
 22. Hogben M, Nicolai LM. Innovations in sexually transmitted disease partner services. *Curr Infect Dis Rep* 2009; 11:148–154.
 23. Schillinger JA, Hogben M. Partner notification for gonorrhea—time for new ideas. *Sex Transm Dis* 2007; 34:195–196.
 24. Sutcliffe LJ, Brook MG, Chapman JL, et al. Is accelerated partner therapy a feasible and acceptable strategy for rapid partner notification in the UK? A qualitative study of genitourinary medicine clinic attenders. *Int J STD AIDS* 2009; 20:603–606.
 25. Estcourt CS, Sutcliffe LJ, Shackleton T. Achieving successful partner notification: Putting together the pieces of the puzzle. *Int J STD AIDS* 2009; 20:601–602.
 26. Young T, de Kock A, Jones H, et al. A comparison of two methods of partner notification for sexually transmitted infections in South Africa: Patient-delivered partner medication and patient-based partner referral. *Int J STD AIDS* 2007; 18:338–340.
 27. Shiely F, Hayes K, Thomas KK, et al. Expedited partner therapy: A robust intervention. *Sex Transm Dis* 2010; 37:602–607.
 28. Hogben M, Kissinger P. A review of partner notification for sex partners of men infected with chlamydia. *Sex Transm Dis* 2008; 35:S34–S39.