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# Assessing Sexually Transmitted Infections and HIV Risk Among Transgender Women in Lima, Peru: Beyond Behavior

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## Abstract

**Purpose:** The purpose of this study was to explore risk factors for HIV and sexually transmitted infections (STIs) among transgender women (TW) in Lima, Peru.

**Methods:** HIV-negative or serostatus unknown TW reporting recent condomless receptive anal intercourse underwent testing for STIs and HIV and completed a sociobehavioral survey.

**Results:** Among 120 TW, 29.6% had rectal *Neisseria gonorrhoeae* (GC) or *Chlamydia trachomatis* (CT) and 12.6% had HIV. Age and migrant status were associated with rectal GC/CT, and rectal GC/CT predicted HIV infection.

**Conclusions:** Further study is needed to understand individual and social factors that contribute to HIV/STI vulnerability among TW.

**Keywords:** Global health, HIV/AIDS, sexually transmitted infections, transgender

## Introduction

OVER THE COURSE of the HIV epidemic, many studies have found associations between rectal *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) and incident HIV infection, with the presence of either infection conferring between 1.6 and 8.8 times the risk for HIV infection.<sup>1–5</sup> Transgender women (TW) have some of the highest prevalence rates of rectal GC (2.1%–20.2%), CT (3.2%–20.2%), HIV (17.4%–20.7%), and syphilis (1.4%–26.8%) worldwide.<sup>6–11</sup> Previous research shows that individual-level sexual risk behaviors such as condomless receptive anal intercourse (CRAI) and number of sexual partners do not adequately explain the exceptionally high prevalence of HIV or rectal sexually transmitted infections (STIs) among TW.<sup>12–14</sup> Instead, multiple levels of biological, behavioral, and social characteristics have been found to influence risk for HIV and STI acquisition among TW, such as race/ethnicity, involvement in sex work, and experiencing gender-based discrimination.<sup>10,14</sup>

Apart from sex work, however, social and community-level characteristics that may contribute to high STI risk among TW are not well understood and likely vary according to cultural and geographic settings.<sup>15</sup> Social network characteristics are linked to HIV/STI infection risk in men who have sex with men (MSM), but little is understood about how these characteristics protect or place at risk TW.<sup>16</sup> More research is needed to determine which other sociobehavioral factors place TW at risk for rectal STIs and HIV infection to better link them to preventive and treatment services, such as HIV pre-exposure prophylaxis (PrEP) and individual and partner counseling.

To better understand the combination of factors that increase vulnerability of TW to STIs and HIV infection, in the present study we describe both individual behaviors and group-level characteristics associated with HIV, rectal GC/CT, and syphilis in a cross-sectional sample of TW in Lima, Peru. We first assessed individual characteristics such as age, CRAI, number of partners, and substance use. We hypothesized that community-level characteristics such

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as involvement in sex work, rural-to-urban migration, and involvement in the transgender community would place TW at greater risk for STIs and HIV.

## Methods

### Study participants

We used data from a larger cohort of MSM and TW who were screened to determine eligibility for a study on rectal STI screening and combination HIV prevention (clinicaltrials.gov Identifier NCT03010020). From June to December 2017, HIV-negative or unknown serostatus MSM and TW were recruited by peer recruiters from *Vía Libre*, a nongovernmental organization dedicated to HIV education, testing, and treatment in Lima, Peru. Eligible participants for that study were (1) 18 years old or older, (2) assigned male sex at birth, and (3) reported CRAI in the past 6 months with at least one HIV-negative or unknown serostatus partner. HIV-negative or unknown serostatus was assessed by self-report.

We used data only from TW who participated in the larger study. Six hundred and fourteen potential participants (MSM and TW) from the larger study were screened, of whom 120 TW were eligible for the analysis presented in this article. All participants were asked which sex they were assigned at birth. Gender identity was assessed with the question: “Which of the following words describes how you identify yourself currently?” with options of male (*varon, masculino, and hombre*), female (*femenina and mujer*), trans (*travesti, transgénero, trans, transformista, and transsexual*), androgynous, not sure, and other, with a free-text option to explain an “other” choice. With culturally specific understanding of gender identity and sexual orientation in mind, we assessed sexual orientation with the question: “Which of the following words describes your sexual orientation?” with options of heterosexual, bisexual, homosexual, transgender, and unknown or other with a free-text option. To understand health behaviors of TW specifically, we restricted our analysis to study participants who identified as trans (*travesti, transgénero, trans, transformista, and transsexual*) or female (*femenina and mujer*) in the question about gender identity or who identified their sexual orientation as transgender. This is consistent with previous research, which found that Peruvian MSM and TW often conflate gender identity and sexual orientation and that TW can identify as trans either in gender or in sexual orientation, or both, using a number of terms included in our survey.<sup>17–19</sup>

### Study procedures

Participants underwent a physical examination by a study physician and testing for rectal CT and GC using a transcription-mediated assay (TMA) (Gen-Probe Aptima<sup>®</sup>; Hologic, Inc., San Diego, CA). HIV infection was diagnosed using a fourth-generation rapid HIV-1/2 assay (Alere Determine<sup>™</sup>; Alere, Waltham, MA)\* with positive results confirmed by indirect immunofluorescence (Ministry of Health, Lima, Peru). Untreated syphilis was defined as a rapid plasma reagin (RPR)  $\geq 1:16$  (RPRnosticon; bioMérieux, Marcy l'Étoile, France), with positive results confirmed by the *Treponema pallidum* particle agglutination (TP-PA) test (Serodia<sup>®</sup>

TP-PA; Fujirebio, Tokyo, Japan). Treated syphilis was defined as a positive RPR at any titer with positive TP-PA confirmation, as per parent study protocol. Each participant underwent pre- and post-test counseling using the Centers for Disease Control and Prevention's RESPECT-2 model.<sup>20</sup>

Cases of laboratory-diagnosed GC/CT and symptomatic proctitis were treated with ceftriaxone 250 mg—intramuscular (IM) injection—and azithromycin 1 g—oral. Syphilis was treated with three weekly IM doses of penicillin G, 2.4 million IU. Participants found to have previously undiagnosed HIV infection were referred to the Peruvian National Treatment Program for initiation of antiretroviral therapy.

### Measures

Participants answered demographic and behavioral questions using a computer-assisted self-interview (CASI). Demographic questions inquired about age, highest education level attained, region of birth, household income, and sexual role identity, including insertive (*activa*), receptive (*pasiva*), or versatile (*moderna*) roles. First, survey questions asked about participants' sexual practices during the previous 30 days, including number of partners, sex partner types (client, casual, anonymous, or stable), and number of sex partners with whom the participant had CRAI. Then, specific questions probed for sex acts with each of the participant's last three sexual contacts, including whether intercourse was anal or vaginal, the participant's role (insertive or receptive), and condom use during each act of intercourse. We also asked about drug and alcohol use by the participant and the partner before sexual intercourse. For this measure, participants were specifically asked to indicate yes or no if they used alcohol, marijuana, cocaine, heroin, amyl nitrates (poppers), or methamphetamines. They were also given an “other” option where they could write in what other substance they used.

To assess for geographic migration, only participants who were current residents of Lima province were included. For the purpose of our analyses, participants were classified as migrants if they were born in a province outside Lima or Callao. Participants were also asked about demographic characteristics (age, gender, sexual orientation, and relationship to participant) of their three closest social contacts. Problem alcohol use was identified by a score of 8 or greater on the Alcohol Use Disorders Identification Test (AUDIT), a 10-item alcohol screening questionnaire developed by the World Health Organization as a tool to identify alcohol misuse.<sup>21</sup> The AUDIT probes drinking frequency (How often do you have a drink containing alcohol?), quantity (How many drinks containing alcohol do you have on a typical day when you are drinking?), and consequences of drinking (How often during the last year have you failed to do what was normally expected of you because of drinking?). All of these data were collected by CASI.

### Ethics statement

Written informed consent was obtained from each participant before any data collection. The University of California, Los Angeles, Institutional Review Board and the Ethics Committee at Asociación Civil *Vía Libre* approved all study procedures before their implementation.

\*Alere was acquired by Abbott Laboratories in October 2017.

TABLE 1. PARTICIPANT-LEVEL CHARACTERISTICS (N=120)

Characteristics of the study participants	Total study participants
Age, (years)	
Median (IQR)	29.5 (24.0–37.5)
Range	18–60
Education (years)	
0–6	4 (3.3)
7–11	87 (72.5)
>11	29 (24.2)
Region of birth	
Lima	73 (60.8)
Mountain or coastal provinces	27 (22.5)
Amazon provinces	20 (16.7)
Monthly household income	
USD 150 or less	49 (40.8)
More than USD 150	44 (36.7)
Not reported	27 (22.5)
Sexual role	
Insertive	2 (1.7)
Receptive	102 (85.0)
Versatile	16 (13.3)
HIV infection (n=119)	
HIV/GC/CT	5 (4.2)
HIV (any)	15 (12.6)
Rectal STI	
Chlamydia positive	32 (26.7)
Gonorrhea positive	13 (10.8)
GC/CT coinfection	10 (8.3)
Syphilis (n=119)	
Positive RPR and TP-PA, any dilution	31 (26.1)
Positive RPR and TP-PA, dilutions ≥1:16	7 (5.9)
No. of sex partners in the past 30 days	
Median (IQR)	10 (4–11)
Range	0–26
0–5 Partners	43 (35.8)
6–10 Partners	25 (20.8)
>10 Partners	52 (43.3)
Total CRAI partners in the past 30 days (n=119)	
Median (IQR)	4 (2–6)
Range	0–21
0–5 Partners	84 (70.6)
6–10 Partners	14 (11.8)
>10 Partners	21 (17.7)
CRAI in the past 30 days (n=119)	
Yes	107 (89.9)
No	12 (10.1)
Alcohol abuse	
AUDIT ≥8	77 (64.2)
AUDIT <8	43 (35.8)
Substance use before intercourse <sup>a</sup> (n=110)	
Yes	66 (60.0)
No	44 (40.0)

(continued)

TABLE 1. (CONTINUED)

Characteristics of the study participants	Total study participants
Reported substance use before intercourse (n=117)	
Alcohol	50 (42.7)
Marijuana	27 (23.1)
Cocaine	14 (12.0)
Heroin	8 (6.8)
Amyl nitrites (poppers)	7 (6.0)
Methamphetamines	7 (6.0)
Types of partnerships	
Clients	76 (63.3)
Casual	87 (72.5)
Anonymous	53 (44.2)
Stable	59 (49.2)
Trans woman confidant	
One or more of three closest social contacts are trans women	44 (36.7)

<sup>a</sup>Participants were asked to report substance use during sexual activity with each of their last three partners: alcohol, marijuana, methamphetamines, cocaine, amyl nitrite (poppers), heroin, or other.

AUDIT, Alcohol Use Disorders Identification Test; CRAI, condomless receptive anal intercourse; CT, *Chlamydia trachomatis*; GC, *Neisseria gonorrhoeae*; HIV, human immunodeficiency virus; IQR, interquartile range; RPR, rapid plasma reagin; STI, sexually transmitted infection; TP-PA, *Treponema pallidum* particle agglutination test; USD, US dollars.

### Data analysis

We compared TW with and without rectal GC/CT, syphilis, or HIV using chi-squared or Fisher's exact test for categorical variables and the Wilcoxon rank-sum test for continuous variables. Due to the large number of sex partners reported in our sample, both number of sex partners and number of sex partners with whom the participant engaged in CRAI were analyzed as categorical variables (0–5, 6–10, and greater than 10 partners in the past 30 days).

Crude and adjusted (for number of CRAI partners and age) prevalence ratios (PRs) were calculated using generalized linear models with Poisson regression and robust estimation of standard errors to assess risk factors for rectal GC/CT, syphilis, and HIV. Data were analyzed using STATA Statistical Software 15.0 (StataCorp LLC, College Station, TX).

### Results

#### Sample characteristics

All participants reported being assigned male sex at birth. Median age of the sample (N=120) was 29.5 years (interquartile range [IQR] 24.0–37.5), and 24.2% completed secondary education or higher (Table 1). Sixty-four percent of participants endorsed problem alcohol use (AUDIT score of 8 or greater). Sixty-three percent of the sample reported at least one instance of transactional sex, defined by reporting a client as a sexual partner, in the past 30 days. When asked about their three closest social contacts, 36.7% reported that at least one of these close social contacts identified as a transgender woman. Thirty-nine percent of the

TABLE 2. FACTORS ASSOCIATED WITH RECTAL *NEISSERIA GONORRHOEAE/CHLAMYDIA TRACHOMATIS*, HIV, AND SYPHILIS INFECTION

	No rectal STI (n = 85)	Rectal STI (GC/CT) (n = 35)	HIV negative (n = 104)	HIV positive (n = 15)	No syphilis (n = 112)	Untreated syphilis (n = 7)
Age, (years)						
Median (IQR)	31.0 (26.0–40.0)*	26.0 (23.0–34.0)*	29.5 (24.0–37.5)	29.0 (24.0–42.0)	30.5 (24.0–38.5)*	25.0 (22.0–28.0)*
Education (years)						
0–6	4 (4.7)	0 (0.0)	3 (2.9)	1 (6.7)	4 (3.6)	0 (0.0)
7–11	59 (69.4)	28 (80.0)	74 (71.2)	12 (80.0)	80 (71.4)	6 (85.7)
>11	22 (25.9)	7 (20.0)	27 (26.0)	2 (13.3)	28 (25.0)	1 (14.3)
Monthly household income						
USD 150 or less	38 (44.7)	11 (31.4)	40 (38.5)	8 (53.3)	45 (40.2)	3 (42.9)
More than USD 150	31 (36.5)	13 (37.1)	39 (37.5)	5 (33.3)	41 (36.6)	3 (42.9)
Not reported	16 (18.8)	11 (31.4)	25 (24.0)	2 (13.3)	26 (23.2)	1 (14.3)
Substance use						
AUDIT ≥8	58 (68.2)	19 (54.2)	36 (34.6)	7 (46.7)	73 (65.2)	3 (42.9)
AUDIT <8	27 (31.8)	16 (45.7)	68 (65.4)	8 (53.3)	39 (34.8)	4 (57.1)
Substance use before intercourse (n = 110)	50 (64.1)	16 (50.0)	59 (60.8)	7 (53.9)	60 (58.3)	6 (85.7)
HIV (n = 119)						
HIV+	7 (8.3)*	8 (22.9)*	—	—	13 (11.6)	2 (28.6)
Rectal STI						
Rectal GC/CT	—	—	27 (26.0)*	8 (53.3)*	32 (28.6)	3 (42.9)
Syphilis (n = 119)						
Positive RPR and TP-PA, dilutions ≥1:16	4 (4.8)	3 (8.6)	5 (4.8)	2 (13.3)	—	—
Positive RPR and TP-PA, any dilution	20 (23.8)	11 (31.4)	24 (23.1)	7 (46.7)	—	—
No. of sex partners in the past 30 days						
Median (IQR)	10 (4–11)	10 (4–11)	10 (4–11)	5 (4–11)	4 (2–6)	4 (3–6)
Min–max	0–26	2–25	0–26	3–11	0–21	2–21
0–5 Partners	30 (35.3)	13 (37.1)	35 (33.7)	8 (53.3)	80 (71.4)	4 (57.1)
6–10 Partners	18 (21.2)	7 (20.0)	23 (22.1)	2 (13.3)	12 (10.7)	2 (28.6)
>10 Partners	37 (43.5)	15 (42.9)	46 (44.2)	5 (33.3)	20 (17.9)	1 (14.3)
CRAI partners in the past 30 days (n = 119)						
Median (IQR)	4 (2–6)	4 (3–6)	4 (2–6)	3 (2–6)	10 (4–11)	8 (4–11)
Min–max	0–21	0–21	0–21	0–11	0–26	4–12
0–5 Partners	58 (69.1)	26 (74.3)	73 (70.2)	11 (73.3)	40 (35.7)	3 (42.9)
6–10 Partners	8 (9.5)	6 (17.1)	13 (12.5)	1 (6.7)	23 (20.5)	2 (28.6)
>10 Partners	18 (21.4)	3 (8.6)	18 (17.3)	3 (20.0)	49 (43.8)	2 (28.6)
Number reporting this partner type in the past 30 days						
Clients	57 (67.1)	19 (54.3)	68 (65.4)	8 (53.3)	71 (63.4)	5 (71.4)
Casual	64 (75.3)	23 (65.7)	79 (76.0)	8 (53.3)	81 (72.3)	6 (85.7)
Anonymous	38 (44.7)	15 (42.9)	47 (45.2)	6 (40.0)	48 (42.9)	5 (71.4)
Stable	41 (48.2)	18 (51.4)	55 (52.9)	4 (26.7)	55 (49.1)	4 (57.1)
Migration						
Migrant	28 (32.9)*	19 (54.3)*	41 (39.4)	6 (40.0)	46 (41.1)	1 (14.3)
Nonmigrant	57 (67.1)	16 (45.7)	63 (60.6)	9 (60.0)	66 (58.9)	6 (85.7)
Trans woman confidant						
Yes	33 (38.8)	11 (31.4)	38 (36.5)	6 (40.0)	42 (37.5)	2 (28.6)

\*p < 0.05.

sample had migrated to Lima from another province, with approximately one-third of those who migrated coming from Amazon (jungle) provinces and two-thirds coming from coastal or Andean (mountainous) provinces.

Eighty-five percent of participants identified their sexual role as pasiva (receptive), consistent with Peruvian cultural norms surrounding gender identity and sexual role. In questions about recent sexual behavior, 89.9% reported CRAI at least once in the past 30 days and 60.0% had used substances before sexual intercourse. The most common substances used were alcohol (42.7%), marijuana (23.1%), and cocaine (12.0%). Median total number of sex partners in the past 30 days was 10 (IQR 4–11), and median number of partners with whom the participant engaged in CRAI in the past 30 days was four (IQR 2–6).

Rectal chlamydia was the most prevalent STI diagnosed in 26.7% of the sample, followed by rectal gonorrhea (10.8%) and untreated syphilis (5.9%). The prevalence of undiagnosed HIV was 12.6% and undiagnosed HIV-GC/CT coinfection was 4.2%. Participants with rectal STIs were more likely to have concurrent HIV infection (22.9% vs. 8.3% of TW without rectal STIs,  $p=0.03$ ; Table 2), to be younger (median age 26 vs. 31,  $p=0.04$ ), and to have migrated to Lima from other provinces (54.3% vs. 32.9%,  $p=0.03$ ).

#### Univariate and multivariate comparisons

In univariate analyses (Table 3), migration was significantly associated with rectal GC/CT (PR 1.84, 95% confidence interval [CI] 1.06–3.22,  $p=0.03$ ), as was HIV (PR 2.05, 95% CI 1.15–3.66,  $p=0.01$ ). Younger age was associated with untreated syphilis (PR 0.87, 95% CI 0.80–0.96,  $p=0.004$ ). In the multivariate model for rectal GC/CT infection, after adjusting for age and number of CRAI partners, only HIV status remained significantly associated with rectal GC/CT (adjusted PR [aPR] 2.17, 95% CI 1.24–3.83,  $p=0.007$ ).

#### Discussion

Our findings are consistent with previous research, which has shown that multiple risk behaviors, social conditions, and co-occurring health conditions contribute to the high prevalence of HIV and rectal STIs among TW.<sup>10,14</sup> Prevalence rates of HIV, rectal GC, and syphilis in our sample were similar to prevalence rates reported previously for TW, whereas the prevalence of rectal CT reported here was slightly higher than in other studies.<sup>6–11</sup>

Participants in this study had many individual-level factors traditionally thought to increase vulnerability to HIV and STIs, including frequent transactional sex work, CRAI,

TABLE 3. RISK FACTORS FOR ANY RECTAL *NEISSERIA GONORRHOEAE* OR *CHLAMYDIA TRACHOMATIS*, SYPHILIS, AND HIV INFECTION

<i>Outcome: any rectal GC or CT</i>				
<i>Variable</i>	<i>Crude PR (95% CI)</i>	<i>p</i>	<i>Adjusted PR (95% CI)</i>	<i>p</i>
Migration	1.84 (1.06–3.22)	0.03*	1.67 (0.96–2.91)	0.07
Age (continuous)	0.97 (0.93–1.00)	0.08	0.97 (0.94–1.01)	0.16
No. of CRAI partners in the past 30 days: 0–5 partners	Reference			
6–10 Partners	1.38 (0.70–2.75)	0.35	1.51 (0.86–3.11)	0.24
>10 Partners	0.46 (0.15–1.39)	0.17	0.46 (0.16–1.31)	0.15
HIV	2.05 (1.15–3.66)	0.01*	2.17 (1.24–3.83)	0.007*
<i>Outcome: HIV</i>				
<i>Variable</i>	<i>Crude PR (95% CI)</i>	<i>p</i>		
Migration	1.02 (0.39–2.69)	0.97		
Age (continuous)	1.00 (0.95–1.06)	0.98		
No. of CRAI partners in the past 30 days: 0–5 partners	Reference			
6–10 Partners	0.55 (0.08–3.93)	0.55		
>10 Partners	1.10 (0.33–3.58)	0.89		
Any GC/CT	2.74 (1.07–7.01)	0.04*		
<i>Outcome: syphilis</i>				
<i>Variable</i>	<i>Crude PR (95% CI)</i>	<i>p</i>		
Migration	0.25 (0.03–2.07)	0.20		
Age (continuous)	0.87 (0.80–0.96)	0.004*		
No. of CRAI partners in the past 30 days: 0–5 partners	Reference			
6–10 Partners	1.00 (0.60–14.96)	0.18		
>10 Partners	3.00 (0.12–8.56)	1.00		
HIV	2.77 (0.59–13.12)	0.20		
Any GC/CT	1.80 (0.42–7.68)	0.43		

\* $p < 0.05$ .

CI, confidence interval; PR, prevalence ratio.

high prevalence of problem alcohol use, and drug and alcohol use before sexual intercourse. Comparing TW with and without rectal GC/CT, we found that those with rectal GC/CT were younger, a finding also true for untreated syphilis. Other studies have found young TW at similar risk for STIs, and multiple partners, impulsive or inexperienced sexual decision-making, or less power in negotiating condom use have been posited as explanations for this vulnerability.<sup>7,13</sup> In univariate analyses, migrants also appeared to be at risk for rectal STIs. However, upon adjusting for age and number of CRAI partners in the multivariate analyses, this association disappeared. It may be that both younger age and migrant status represent positions of decreased decision-making power in sexual relationships or positions of less power to choose clients in the sex work hierarchy. Although previous studies have addressed migration and risk for HIV acquisition among MSM, ours is the first, to our knowledge, to describe this association among TW.<sup>22–25</sup>

We did not find that involvement in sex work was associated with rectal GC/CT, HIV, or syphilis. This lack of association may be due to the high baseline prevalence of sex work in our sample as more than half of the sample reported a client as a sexual partner in the past month; this highlights the need to explore other factors differentiating risks for HIV/STI acquisition among TW and to reexamine ideas in the medical community that sex workers may be more likely to have an STI or HIV than those not engaging in sex work. Involvement in the trans community, defined in our study as having a close social contact who identifies as trans, was also not associated with HIV, rectal GC/CT, or syphilis, contrary to other similar findings on trans community involvement in the United States.<sup>15</sup> Rectal GC/CT and new HIV diagnoses appear closely linked, consistent with a large body of literature pointing to temporal associations between rectal STIs and HIV.<sup>26</sup>

### Limitations

Because of the cross-sectional nature of this study, we were only able to describe correlations and not causation between rectal STIs, HIV, and syphilis and other demographic and behavioral characteristics. Specifically, participants were asked only whether they had participated in sex work in the past month, and this may have limited our ability to detect associations between longstanding sex work and STI risk. We also asked about the region of current residence and region of birth only, and so could not ascertain when participants migrated to Lima or how long they had lived in Lima. Last, our sample was limited to TW who reported CRAI in the past 6 months and therefore the findings are not generalizable to all TW.

### Conclusions

The factors we identified as either associated with or risk factors for rectal GC/CT, HIV, and syphilis among our sample may likely be specific to the Peruvian context; however, they may also be relevant in other countries where TW face a significantly high burden of STIs and HIV. Rectal STI diagnosis represents an important possible intervention point where young TW with rectal STIs could be linked to care, counseling, and HIV prevention strategies such as PrEP. In countries with limited public health resources, linking TW at the moment they present with an STI to counseling or

PrEP may be a cost-effective way of targeting a set of high-risk TW and reducing HIV incidence.

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### Author Disclosure Statement

No competing financial interests exist.

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