

Improving Partner Services by Embedding Disease Intervention Specialists in HIV-Clinics

Melanie M. Taylor, MD, MPH,*† Tom Mickey, BS,‡ Michelle Winscott, MD, MPH,‡
Heather James, BS,‡ Kerry Kenney, BA,*† and Bob England, MD, MPH§

Background/Objectives: Notifying partners of HIV-infected persons and referring them for testing and treatment is an effective method of disease control and identification of undiagnosed STD and/or HIV. To improve partner elicitation interviews, disease intervention specialists (DIS) were placed in 3 HIV clinics during 2008 and 2009.

Methods: We reviewed the Arizona state STD surveillance database for 2007 to identify the providers (outside of the public STD clinics) reporting the highest number of syphilis cases. DIS were placed in the clinics for half a day per week (2 clinics) or on an on-call basis (1 clinic) to deliver penicillin and interview patients. We calculated changes in the number of patients interviewed, days elapsed from specimen collection to treatment (time to treatment), days elapsed from specimen collection to initial DIS contact (time to interview), and number of reported and locatable partners from these 3 clinics before and after the clinic placement of DIS.

Results: Before the placement of clinic-based DIS, 219 syphilis cases were diagnosed at the 3 clinics (January 2006 through January 2008). After DIS placement, 115 syphilis cases were diagnosed (February 2008 through September 2009) for a total of 334 cases in this analysis. A greater percent of patients completed a partner elicitation interview during the period of DIS placement (94% after vs. 81% before, $P = 0.001$). There were increases in the average number of locatable partners (1.1 after vs. 0.6 before, $P = 0.004$) and an increase in the average number of partners exposed and brought to treatment (CDC Disposition A) or infected and brought to treatment (CDC

Disposition C) (0.6 after vs. 0.3 before, $P = 0.02$), and the time to interview decreased (18 days before vs. 9 days after, $P = 0.02$).

Conclusions/Implications: Placing DIS within community HIV clinics improved partner services. STD and/or HIV programs should consider this method to improve partner notification.

Traditional public health efforts to intervene in syphilis and HIV transmission focus primarily on partner notification, which depends on the knowledge and willingness of patients to provide information about their sexual partners. Although partner notification coverage has been reported as higher for syphilis than HIV, chlamydia, and gonorrhea,¹ partner notification for syphilis has had limited effectiveness among men who have sex with men (MSM). Specifically, locating and referring partners for treatment remains a challenge²⁻⁴. Coinfections with HIV^{5,6} and the effect of syphilis on HIV infection^{7,8} have increased the importance of partner notification in heavily affected urban areas.^{9,10} Innovative and integrated methods to improve partner notification practices are needed to improve this public health intervention.¹⁰⁻¹²

Measures of the success of partner notification include the time between diagnosis and patient interview, the number of partners brought to testing and/or treatment, and the time between patient diagnosis and partner treatment.¹³⁻¹⁵ These measures should improve with patient and medical provider cooperation. Although health department referral is accepted (and often preferred) by medical providers, patients, and partners,¹⁶⁻¹⁸ disease intervention specialists (DIS) are often challenged by a lack of awareness by patients and their providers of this STD and/or HIV intervention method, resulting in limited cooperation with partner services interviews. Concerns related to confidentiality and discomfort with the public or personal setting of DIS contact may also contribute to the reluctance of patients, partners, and their medical providers to provide information on sex partners.¹¹

Rates of syphilis among MSM in Maricopa County (Phoenix, AZ) have increased since 2002. In 2008, 50% of these MSM with syphilis were coinfecting with HIV.¹⁹ Most syphilis cases were not diagnosed in categorical STD clinics.¹³ The time between diagnosis and interview is longer for syphilis patients diagnosed in other clinics as compared with STD clinics.^{11,13} To improve syphilis intervention indices in other settings, the Maricopa County STD Program collaborated with community medical providers who reported the highest number of syphilis cases. These providers were, coincidentally, primary HIV care providers reflecting the high rates of HIV and syphilis comorbidity in Maricopa County. The collaboration included delivery of penicillin from the health department by the DIS and on-site partner solicitation interviews in the provider's office.

MATERIALS AND METHODS

DIS Placement in HIV Clinics

The Arizona state annual STD surveillance data for 2007 were reviewed to determine the providers, outside of the public

From the *Division of STD Prevention, National Center for HIV, STD and TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA; †Sexually Transmitted Disease Program, Arizona Department of Health Services, Phoenix, AZ; ‡Sexually Transmitted Disease Program, Maricopa County Department of Public Health, Phoenix, AZ; and §Maricopa County Department of Public Health, Phoenix, AZ

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Correspondence: Melanie Taylor, MD, MPH, Arizona Department of Health Services, Office of Infectious Disease Services, 150 N, 18th Avenue, Suite 140, Phoenix, AZ 85007-3237. E-mail: MDT7@cdc.gov.

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STD clinic, reporting the highest number of syphilis cases for that year. The 3 providers who reported the most syphilis in 2007 (coincidentally HIV primary care clinics) were chosen for the placement of a DIS half a day per week or on an on-call basis. Between February 2008 and September 2009, 1 DIS was placed in each of these clinics to deliver penicillin for patients and partners and to perform on-site partner elicitation interviews. Clinic A was a publically funded HIV clinic, with a patient population of approximately 1500 clients. One DIS was assigned on an on-call basis, to be notified when there was a newly diagnosed or returning syphilis patient. The DIS would go to Clinic A to interview the patient on the day of the clinic appointment. Clinics B and C were private clinics that provided care to both HIV-infected and uninfected persons. Approximately, 1200 patients at clinic B and 1400 at clinic C were HIV-infected. One DIS was assigned to each of clinics B and C half a day per week. Treatment visits for syphilis patients were scheduled on the day the DIS was in the clinic and partner elicitation interviews were performed by the DIS after the patient's visit with the provider. Opportunities for re-interview occurred for patients receiving multiple penicillin injections. The date of first interview was used for this analysis. Partners elicited and brought to treatment were included from the initial interview and re-interviews of each syphilis case. Partners of syphilis cases diagnosed in these clinics were referred to those clinics or to the public STD clinic for syphilis treatment.

Interview Record Data Abstraction

Interview records were reviewed to collect demographics, syphilis stage, sexual orientation, behavioral risk, patient treatment, partner disposition and treatment, and interview intervals. Syphilis stages were assigned according to CDC case classifications.²⁰ For each clinic, we compared changes in the number of patients interviewed, days elapsed from specimen collection to treatment (time-to-treatment), days elapsed from specimen collection to initial DIS contact (time-to-interview), days elapsed from index patient interview to partner treatment (partner time-to-treatment), and number of reported and locatable partners before and after the clinic placement of the DIS. Partner dispositions were assigned according to the CDC STD Interview Record Codes.

Data Analysis

Data analysis was performed using SPSS (v. 17, Chicago, IL). Chi-square was used to compare variables before and after DIS placement. Univariate correlates of interview completion, time to interview, and number of partners treated were entered into a multivariate analyses using linear and logistic regression.

RESULTS

Demographics of Syphilis Patients

Before the placement of clinic-based DIS, 219 syphilis cases were diagnosed at the 3 clinics (January 2006 through January 2008). After DIS placement, 115 of 334 of syphilis cases in this analysis were diagnosed (February 2008 through September 2009) (Table 1). Most cases were men (97%), 90% were MSM, and 84% were HIV-infected. More Hispanics and fewer whites were reported with syphilis after DIS placement compared with before DIS placement. During both time intervals, the majority of cases were between the ages of 35 to 54. The collection of HIV status improved significantly after DIS placement, with fewer cases having unknown HIV status ($P = 0.01$) (Table 1). Behavioral risk factors (including having sex with anonymous

TABLE 1. Demographic and Behavioral Characteristics of Syphilis Patients Diagnosed in 3 HIV Clinics Before and After the Placement of a Clinic-Based DIS (N = 334)

Demographic/ Behavioral Variable	Number (%)			P
	Before Placement (N = 219)	After Placement (N = 115)	Total (N = 334)	
Race				
Asian	4 (2)	4 (4)	8 (2)	0.5
Black	17 (8)	5 (4)	22 (7)	0.4
Hispanic	37 (17)	42 (37)	79 (24)	0.005
Native American	4 (2)	0 (0)	4 (1)	0.3
White	157 (71)	64 (56)	221 (66)	<0.001
Age group				
≤24 yr	9 (4)	7 (6)	16 (5)	0.4
25–34	55 (25)	31 (27)	86 (26)	0.6
35–44	103 (47)	41 (36)	144 (43)	0.05
45–54	37 (17)	31 (27)	68 (20)	0.03
≥55 yr	15 (7)	5 (4)	20 (6)	0.5
Gender				
Male	212 (97)	113 (98)	325 (97)	0.7
Female	6 (3)	2 (2)	8 (2)	0.7
Transgender	1 (0.5)	0 (0)	1 (0.3)	1.0
HIV status				
Positive	175 (80)	107 (93)	282 (84)	0.001
Negative	32 (15)	8 (7)	40 (12)	0.05
Unknown	12 (5)	0 (0)	12 (4)	0.01
Sexual orientation				
Homosexual	191 (87)	108 (94)	299 (90)	0.06
Heterosexual	12 (5)	5 (5)	17 (5)	0.8
Bisexual	14 (6)	2 (2)	16 (5)	0.1
Unknown	2 (1)	0 (0)	2 (0.6)	0.6
Anonymous sex*	158 (72)	78 (68)	236 (71)	0.3
Drug use				
More than 2 partners	56 (26)	37 (32)	93 (28)	0.2
Clinic site				
Clinic A	137 (63)	68 (69)	205 (61)	0.4
Clinic B	57 (27)	43 (37)	99 (30)	0.03
Clinic C	91 (41)	54 (47)	145 (43)	0.4
	71 (32)	19 (17)	90 (27)	0.002

*Anonymous sex, drug use, and having sex with more than 2 partners reflect behaviors reported by cases during the stage-specific interview period.
DIS indicates disease intervention specialists.

partners, drug use, and having more than 2 partners) were similar before and after DIS placement (Table 1).

Syphilis Staging and Interview Indices

Cases were less likely to be diagnosed as late latent stage after the clinic placement of a DIS, as compared with before ($P = 0.02$). After DIS placement, patients were more likely to be interviewed (94% vs. 81%, $P = <0.001$), more partners were initiated for investigation (1.1 vs. 0.6, $P = 0.04$), and the time between diagnosis and interview decreased (9 days vs. 18 days, $P = 0.03$) as compared with the time before DIS placement (Table 2). In a multivariate analysis that included HIV status, syphilis stage, Hispanic race, age, clinic, and MSM orientation, the placement of DIS in these HIV clinics remained associated with interview completion ($P = 0.007$), days to

TABLE 2. Syphilis Stage and Case Interview Outcomes Before and After Placement of Clinic-Based DIS

Syphilis Stage and Intervention Indices	No. (%) or Mean (range)			P
	Before Placement (N = 219)	After Placement (N = 115)	Total (N = 334)	
Syphilis stage				
Primary	19 (9)	16 (14)	35 (11)	0.2
Secondary	66 (30)	37 (32)	103 (31)	0.4
Early latent	66 (30)	42 (37)	108 (32)	0.3
Unknown duration	9 (4)	4 (4)	13 (4)	1.0
Late latent	56 (26)	16 (14)	72 (22)	0.02
Neurosyphilis	3 (1)	*	3 (1)	NA
Clinical care: patients				
Patients treated	218 (99)	115 (100)	331 (99)	0.6
Time to treatment (d)	18 (0–409)	12 (4–95)		0.3
Case interview				
Completed interviews	177 (81)	108 (94)	285 (85)	0.001
Time to interview (d)	18 (0–177)	9 (0–82)		0.02
Partners reported	6 (0–75)	9 (0–200)		0.3
Partners initiated for investigation	0.6 (0–5)	1.1 (0–11)		0.004
Clinical care: partners				
Partners treated per interviewed case [†]	0.3 (0–4)	0.6 (0–6)		0.02
Time to treatment of partners (d) [‡]	21 (0–205)	8 (0–106)		0.007

*Syphilis staging was changed in to reflect a symptomatic or duration of infection stage in 2008 with neurosyphilis recorded as a separate manifestation.

[†]CDC partner dispositions A (empiric treatment) or C (infected, treated).

DIS indicates disease intervention specialists.

interview ($P = 0.01$), and number of partners initiated for investigation ($P = 0.002$).

Comparison of Countywide Disease Intervention Indices

As compared with 2007, when there were no DIS in these clinics, the overall contact index (number of sexual contacts initiated for investigation/number of interviews completed) for all of Maricopa County was 0.92. In comparison, the contact index increased to 1.04 in 2008 and 1.06 in 2009, after placement of the DIS in the clinics. Removing the cases diagnosed during the period of DIS placement resulted in minimal change in the contact index; 1.01 in 2008 and 1.08 in 2009.

Clinical Care of Syphilis Cases and Partners

The percent of index cases treated and the time to treatment of index cases was not significantly different between the 2 periods. The number of partners (per index case) who were treated for syphilis exposure and/or infection increased significantly after DIS placement (0.3 before vs. 0.6 after, $P = 0.04$). The mean time to treatment of those partners decreased from 21 days to 8 days after DIS placement in the clinics ($P = 0.007$) (Table 2). In multivariate analysis that included HIV status, syphilis stage, Hispanic race, age, and MSM orientation, the placement of DIS in these clinics remained associated with a higher number of partners treated ($P = 0.01$).

DISCUSSION

DIS placement within HIV clinics with high syphilis morbidity resulted in the improvement in the number of com-

pleted patient interviews, the number of interviews yielding locatable contacts, time to interview, and the number of partners brought to treatment. Although previous reports have described community clinic placement of DIS and penicillin delivery, this is the first publication to evaluate changes in partner notification as a result of these efforts in HIV clinics.^{21–23} Secondary benefits of this effort included improved relationships with community medical providers and the public health department, provider involvement in syphilis intervention, and the use of more acceptable sites for partner interviews and treatment; all of which have been reported to improve STD and/or HIV intervention.¹⁷

Increasing interview completion and increasing the number of partners with locating information are critical steps in improving STD and/or HIV partner services efforts. The placement of county-employed DIS in these community clinics significantly improved these measurable indices. Because most of the men diagnosed with syphilis were also HIV-infected, the interviews with all partners included referral for HIV testing or (if partners were known to have HIV infection) confirmation that they were receiving primary HIV care.

The time (in days) to interview and the number of partners receiving treatment both were improved after the placement of DIS in community HIV clinics. These indices are used as national program performance measures by the Centers for Disease Control and Prevention as they have been demonstrated to be interventions that result in increased case identification and decreased syphilis transmission.¹⁵ Partners who were identified for treatment and interview were referred back into the host clinic, where appropriate. This was perceived as a

secondary benefit by providers in that these patients and their partners generated additional billing opportunities for the clinic that included intramuscular administration of health department-delivered benzathine penicillin. This penicillin delivery resulted in improvements in the time-to-treatment of partners of syphilis cases, a primary public health benefit.

There are several limitations to this study. Sample size and the non-normal distribution of continuous variables limited the power to detect statistically significant differences for some variables. Partners' names were not linked to patient electronic data and therefore demographics of partners, including HIV status, were not available for this analysis. Despite the improvements in interview completion and partner elicitation, many patients refused or were unable to provide partner locating information.

Partner notification is a productive yet labor intensive process that requires time to contact and interview patients and their partners.²⁴ This effort removed some of the barriers encountered by DIS when they attempt to interview patients and their partners in field settings. Extending the public health partner notification interviews into community providers' offices has the added benefit of reducing the time spent in patient and partner field follow-up. Cooperation with these private providers also improved patient and partner cooperation. The findings of this study should be considered by public health departments facing similar challenges of syphilis among patients seen by HIV-care providers. Interventions that focus on secondary prevention efforts, particularly among persons co-infected with syphilis and HIV, should be prioritized as they may decrease transmission of both HIV and syphilis.

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