AIDS Education and Prevention, 32(3), 181–195, 2020

CLIENT OUTCOMES FROM A MULTILEVEL INTERVENTION TO SUPPORT PERSONS LIVING WITH HIV AND RETURNING TO THE COMMUNITY AFTER INCARCERATION IN PUERTO RICO

Janet J. Wiersema, Jacqueline Cruzado-Quiñones, Carmen G. Cosme Pitre, and Alison O. Jordan

The twin epidemics of HIV and incarceration impact Puerto Rico, which has limited resources to address the social and structural determinants of health in incarcerated populations. A Special Programs of National Significance grant supported a Puerto Rican community-based organization to implement the evidence-informed Transitional Care Coordination intervention among incarcerated persons living with HIV, targeting changes at the individual, organization, and systems levels. After implementation (November 2015–July 2018; n = 69), 93.1% of eligible clients were linked to community-based HIV care, 86.3% remained in care for 6 months, and 78.6% remained for 12 months. A greater proportion reported consistent HIV care, ART adherence, food security, and transportation to access care. Integrating HIV case management with housing and employment services, and developing buy-in and collaboration from partners across systems of care, including after a natural disaster, led to positive client outcomes. This intervention shows promise for adaptation to other HIV care and service delivery systems.

Janet J. Wiersema, DrPH, MPH, is affiliated with NYC Health + Hospitals Correctional Health Services, New York, New York. Jacqueline Cruzado-Quiñones is affiliated with ACOJA Consulting LLC, Staten Island, New York. Carmen G. Cosme Pitre is affiliated with One Stop Career Center of Puerto Rico, Inc., Rio Piedras, Puerto Rico. Alison O. Jordan, LCSW, is affiliated with NYC Health + Hospitals Correctional Health Services, New York, New York.

Implementation and evaluation of this project was made possible by a Special Programs of National Significance (SPNS) grant from the Health Resources and Services Administration (HRSA), cooperative agreement number 4 H97HA274310302.

We would like to thank the following people and agencies for their participation and support: Health Resources and Services Administration including Special Projects of National Significance including Adan Cájina, Jessica Xavier, and John Hannay; University of California San Francisco including Wayne Steward, Stuart Gaffney, Starley Shade, Kim Koester, and Xavier Erguera; One Stop Career Center of Puerto Rico including Yomarie Cardona, Nathalia, Colon, Muriel Fernandez, Jerry Martinez, Alizenet Vargas; Carlos Rodriguez Diaz at University of Puerto Rico; Paul Teixeira; RDE team including Anusha Dayananda, Jean-Felix Lanoue, and Jesse Thomas; and NYC Health + Hospitals Correctional Health Services including Yahkayle Burney, Press Canady, Allison Dansby, Jasmine Hicks, Lily Hoffman, Monica Katyal, Ross MacDonald, and Patricia Yang.

Address correspondence to Janet J. Wiersema, DrPH, MPH, Research Scientist, NYC Health + Hospitals Correctional Health Services, 55 Water St., 18th Floor, New York, NY 10041. E-mail: jwiersema1@nychhc.org

Keywords: transitional care coordination, incarcerated and/or justice-involved, persons living with diagnosed HIV, re-entry services, continuity of care, evidence-informed

Incarcerated persons in the U.S. are more likely to be living with HIV than the non-incarcerated population. In 2015, the HIV rate among persons in prison was 1,297 per 100,000 people (Maruschak & Bronson, 2017), compared to 303.5 per 100,000 among the non-incarcerated (Centers for Disease Control and Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention [CDC], 2017). In 2016, Puerto Rico (PR) had the sixth highest rate of persons living with diagnosed HIV infection in the U.S., and the fifth highest rate of persons living with diagnosed HIV (PLWDH) ever classified as stage 3 (i.e., AIDS) (CDC, 2018a). PR also has a high incarceration rate of 313 per 100,000 (Institute for Criminal Policy Research [ICPR], 2019). Estimates of HIV in PR correctional facilities are as high as 6.9% (Rodríguez-Díaz & Andrinopoulos, 2012). A study of PLWDH in PR correctional facilities found that 56% reported inconsistent antiretroviral therapy (ART) use and 65% had never received HIV care outside of a correctional facility (Rodríguez-Díaz, Rivera-Negrón, Clatts, & Myers, 2014).

Social and structural drivers of health inequalities, including poverty and racism, contribute substantially to mass incarceration (Covin, 2012; Nkansah-Amankra, Agbanu, & Miller, 2013). Justice-involved poor Black or Latinx people living with substance use disorders and/or mental illness are particularly vulnerable. Struggles meeting priority needs before and after incarceration, such as housing, food security, and employment/income, are common (Visher & Travis, 2011). PLWDH have an added challenge of facing stigma related to their HIV status (Luther, Reichert, Holloway, Roth, & Aalsma, 2011; Varas Díaz, Rivera, & Bou, 2008).

At the time of the study, PR had one federal and 33 state-run correctional facilities that housed 10,475 persons in 2017 (ICPR, 2019). In PR, PLWDH leaving correctional settings face an environment where health care is decentralized and fragmented. A 2014 functional assessment (unpublished) found that reentry support, case management, and care coordination for PLWDH returning to the community after incarceration was limited to paper referrals. Transportation, accompaniment, and other nonmedical case management supports were identified as service needs to facilitate linkages to and retention in HIV care and services after incarceration.

To address this gap, New York City (NYC) Correctional Health Services (CHS) (then part of NYC Department of Health and Mental Hygiene; now a division of NYC Health + Hospitals) was awarded a Special Programs of National Significance (SPNS) grant (Health Resources and Services Administration, Ryan White, & Global HIV/AIDS Programs [HRSA], 2018a) from the Health Resources and Services Administration to expand and enhance organizational capacity to improve outcomes along the HIV Care Continuum in PR (HRSA, 2018b). The aim of the Pay It Forward project was to deliver technical assistance and training to a PR-based community organization to implement an evidence-informed intervention, Transitional Care Coordination (TCC) (TargetHIV, 2019). A study of the CHS TCC program in NYC jails found improvements from baseline to 6 months post-incarceration as a greater proportion of PLWDH receiving care coordination services reported taking antiretroviral therapy (ART) (92.6% vs. 55.6%) and fewer reported visiting emergency departments (0.20 vs. 0.60 visits). Clients also improved in areas related to social determinants of health, including reductions in

unstable housing (4.2% vs. 22.4%), and food insecurity (1.7% vs. 20.7%) (Jordan et al., 2013; Teixeira, Jordan, Zaller, Shah, & Venters, 2015).

Prior to project intervention, the partner organization, One Stop Career Center of Puerto Rico (OSCC-PR), had existing relationships with community-based service providers and offered housing, employment, and job training services to individuals during and after incarceration across the islands of PR. Under this grant, OSCC-PR expanded services to address the specific needs of PLWDH by integrating TCC into their organizational operations.

The study aims were to evaluate PLWDHs' improvement in areas related to health, health care access, medication adherence, housing, food security, and other factors after receiving OSCC-PR services. The integration of TCC with existing housing and employment services began in 2014, with study enrollment beginning in 2015 and follow-up continuing through July 2018. Participation was voluntary, and OSCC-PR planned to enroll 100 clients. The intervention was greatly impacted by Hurricane Maria and its aftermath, starting in September 2017.

THE PRESENT STUDY

METHODS: TCC: MULTILEVEL INTERVENTION

CHS provided training and technical assistance to OSCC-PR to implement a multilevel, multifaceted intervention to address health care access and social determinants of health (e.g., housing, employment/income, food, transportation, social support) for PLWDH: (1) at the individual level, using social work and public health concepts to integrate TCC for PLWDH with housing and employment services; (2) at the organizational level, identifying, hiring, cross-training, and obtaining needed certifications for staff; and (3) at the system level, fostering a provider network across all PR jurisdictions to collaboratively meet PLWDH needs.

Direct service staff were trained in care coordination, HIV treatment and prevention, issues of stigma, and sexually transmitted infections, as well as crisis intervention and survey administration and documentation by CHS, the PR Department of Health, the local AIDS Education & Training Center (AETC), and the University of PR. PLWDH were identified in correctional facilities via correctional health provider referral and client self-report after health education sessions. With new skills and knowledge, the direct service staff—now interventionists—worked as care coordinators, conducting comprehensive assessments with PLWDH during incarceration and developing care plans for their community return. After incarceration, interventionists often accompanied clients from correctional facilities to home, and all clients were offered community case management, transportation, accompaniment to HIV care and other services, and support in accessing mental health and substance use services as needed, and in meeting priority needs including housing, employment/income, food/groceries, clothing, and personal care (e.g., shampoo, toothbrush/toothpaste, soap). Interventionists provided follow-up services for up to one year, particularly essential since nearly half of the clients returned to the community during the aftermath or within 6 months of Hurricane Maria.

Program expansion included transportation and accompaniment to attend health care and other appointments, an assessed unmet need. OSCC-PR secured external funding for a government-surplus vehicle and driver. Other funds supported HIV prevention education outreach in correctional facilities, one avenue for TCC recruitment.

System development centered around building a PR-wide provider network to support PLWDH reentry by: (1) formalizing existing and developing additional relationships with public, private, and nonprofit organizations and securing over 60 Memoranda of Understanding with organizations such as Federally Qualified Health Centers and community-based agencies providing housing, substance use treatment, clothing, and food to facilitate care coordination and services for mutual clients; (2) launching a consortium of health, housing, and social service organizations including the Departments of Health and Correction, Ryan White, and other community health clinics, social service, and housing organizations; monthly consortium meetings helped coordinate services and facilitate access to care for PLWDH after incarceration; and (3) organizing annual stakeholder convenings, *Fortaleciendo Enlaces* (Strengthening Collaborations), attended by representatives from over 40 organizations (Tirado-Mercado, Rodríguez-Díaz, Cosme-Pitre, Cruzado-Quiñones, & Jordan, 2017).

EVALUATION

The evaluation described in this article is the client-level evaluation. Evaluations were also conducted of the consortium (unpublished) and annual stakeholder convenings (Tirado-Mercado et al., 2017), not included here.

Evaluation Design. The evaluation used a repeated measures (pre-post-post) design. Data was collected at three time points: (1) baseline measures taken during incarceration, (2) first follow-up at 6 months after incarceration, and (3) second follow-up at 12 months after incarceration.

Surveys, clinic visit information, and HIV lab values were collected at each time point and analyzed, as detailed below.

Eligibility Criteria, Recruitment, and Client Involvement. Study eligibility criteria included: incarceration in a PR correctional facility and within 6 months of projected community return, age 18 or older, and living with diagnosed HIV. Recruitment was conducted in one federal detention center and 12 PR-run correctional facilities housing people before and after sentencing. Potential clients were identified during incarceration through direct referrals from correctional health staff and by client self-referral after health education outreach sessions. Clients were recruited, enrolled, and consented for study participation in correctional facilities from November 2015 to August 2017. Client involvement included receiving care coordination services and completing surveys for up to 12 months after incarceration.

Data Sources and Outcome Measures. Data came from client surveys administered during incarceration (baseline) and at 6 and 12 months after incarceration (follow-ups), clinical information submitted by correctional and community clinics, and OSCC-PR records. The baseline survey collected demographic information, health-related characteristics including health care use, ART adherence, comorbidities, substance use, and mental health; and housing, food security, and incarceration history. The follow-up survey mirrored the baseline survey to allow for comparison from before to after the intervention. Clients received a $20 commissary deposit when completing the survey during incarceration and a $20 gift card after completing a community survey. Baseline surveys were completed via interview with interventionist or audio computer-assisted self-interview (ACASI) software. Follow-up surveys were primarily completed by ACASI.

Clinical information from correctional and community providers included HIV viral load and CD4 count lab results. Outpatient visit dates were also obtained from community providers. OSCC-PR records included client intake assessments (e.g., demographics, health) and case management notes, clinic visits, and collateral contacts. Study participation continued regardless of client location and every effort was made to obtain follow-up labs and surveys for reincarcerated clients.

Outcomes included a comparison of self-reported behaviors and experiences in the 6 months prior to incarceration to 6 (or 12) months after incarceration related to taking ART, food insecurity, homelessness, and emergency department or hospital use (all coded as yes/no). Outcome measures from clinic-submitted information included client linkage to HIV care after incarceration (yes/no, date seen), care status (e.g., attended an HIV care appointment at or around timeframe), retention in care at 6 and 12 months, viral suppression (VLS) (viral load < 200 copies/mL; CDC, 2018b) and AIDS diagnosis (e.g., CD4 count ≤ 200 cells/mm^3; Selik et al., 2014). A client was considered retained in care if he or she had at least one HIV care visit during each 6-month measurement period ("window") with a minimum of 90 days in between visits (HRSA, 2017). Since it was not feasible to obtain lab values at exactly 6 and 12 months after community return, target timeframes included a 6-month window with 3 months on either side of the target date (e.g., 6-month follow-up labs were included when performed between 3 and 9 months [≥ 90 days to < 183 days] after incarceration). We added an additional month to the 12-month window to include client measures that would have otherwise been excluded. When a person had two labs within a timeframe (e.g., two labs within the 6-month window), we recorded the first value.

We hypothesized that as a result of participation there would be an increased number of clients in care, retained in care, and taking ART, and decreased food insecurity, homelessness, emergency department use, and hospitalizations. Since PLWDH usually have higher rates of VLS during incarceration (Iroh, Mayo, & Nijhawan, 2015), we expected there to be a higher proportion of persons with VLS at baseline (during incarceration) than post-incarceration (in the community) and did not hypothesize changes in VLS or AIDS diagnoses; these analyses were exploratory in nature.

Analyses. For clients with measures across all three time points (i.e. baseline, 6 months after incarceration, and 12 months after incarceration), Cochran's Q tests were used to examine changes in dichotomous variables across the three time points, and post hoc pairwise analyses were conducted to examine differences between the time points. Friedman's Q test examined changes in CD4 count across the three time points and Wilcoxon signed ranks post hoc tests were conducted. Chi square analyses compared the proportion of clients who were virally suppressed at 6- and 12-month follow-up before and after Hurricane Maria. Significance was assessed at $p \leq .05$. SPSS version 24 was used to analyze the data.

RESULTS

CLIENT AND PROGRAM CHARACTERISTICS

Of the 69 clients enrolled in the study, three-quarters were male, and the average age was 44 years old (Table 1). Over half of the clients had not completed high school or GED (53.0%) and almost a third (32.4%) had an eighth grade or less

TABLE 1. Client Demographic, Socioeconomic, Health, and Incarceration Characteristics (***n*** = 69)

	n	**%**
Demographics, Socioeconomic, Health, and Incarceration History		
Gender		
Male	52	75.4
Female	17	24.6
Age, mean (*SD*)	43.9 (9.15)	
Education (*n* = 68)		
< High School/GED	36	53.0
High school graduate/GED	28	41.2
> High school/GED	4	5.8
Homeless in the 6 months prior to incarceration	25	36.2
Housing in 6 months prior to incarceration*		
Room, apartment or house that you rent or own	16	23.1
In a friend or family member's room, apartment, or house	42	60.9
Supportive housing, halfway house, or group home	5	7.1
Hotel or motel (without emergency voucher)	2	2.9
Emergency shelter	2	2.9
Place not meant for human habitation (street, car, park, etc.)	9	13.0
Ever had a mental health diagnosis	26	37.7
Ever used a substance (excluding alcohol or tobacco)	61	88.4
Has a place to live upon community return	40	58.0
Has transportation to get home after incarceration	25	36.2
Has employment after incarceration	8	11.6
Age of first arrest, mean (*SD*) (range 10 to 57)	24.4 (11.44)	
Lifetime number of arrests, mean (*SD*) (range 1 to 16)	5.18 (4.25)	
HIV Diagnosis, Entry Into HIV Care, and ART Use		
Age of diagnosis, mean (*SD*)	31.0 (10.75)	
Age linked to HIV care after diagnosis, mean (SD)	32.9 (10.13)	
Diagnosed in a correctional facility	39	56.5
Ever taken ART	63	91.3
Taking ART now (during incarceration)	58	89.2
Took ART before current incarceration (*n* = 67)	32	46.4
Plans to take ART after release (*n* = 66)	63	95.5
Lab Values at Baseline (During Incarceration) (*n* = 68)		
Viral load mean in copies/mL (*SD*) (range 20 to 185,674)	7,660 (31,500)	
Viral suppression, viral load ≤ 200 copies/mL	60	88.2
CD4 count mean in cells/mm^3 (*SD*) (range 123 to 1808)	538.5 (331.5)	
AIDS diagnosis (CD4 count ≤ 200 cells/mm^3)	7	10.3

*Participants were instructed to select all that apply. Therefore, percentages do not add up to 100%.

education. Twenty-five clients (36.2%) indicated homelessness in the 6 months prior to incarceration and over a third (35.5%) reported having a previous mental health diagnosis, including depression (26.1%) and/or anxiety (17.4%). Over half (56.3%) indicated wanting help for mental health issues. Most clients reported substance use with nearly three-quarters (72.5%) having used heroin or crack/cocaine, 75.4% using a needle to inject drugs, and 60.9% wanting help with substance use. Regarding potential supports for after incarceration, many clients said they had a place to live (58%); fewer had transportation to get home (36.2%), and either full- or part-time employment (11.6%). The average age of first arrest was 24 years and clients had an average of about five lifetime arrests.

The average age of clients' HIV diagnosis was 31 years and over half (56.5%) were diagnosed in a correctional facility. The majority of clients reported taking ART previously (91.3%) and during their incarceration (89.2%). However, over half (53.6%) were not taking ART prior to incarceration due to unknown HIV status (n = 12), homelessness and/or substance use (n = 11), inability to afford medication (n = 3), or a doctor's advice that ART was not needed (n = 2). The majority of clients (95.5%) reported planning to take ART after incarceration. Most clients were virally suppressed at baseline (88.2%) and 10.3% had an AIDS diagnosis. The majority of clients had a physical comorbidity (89.9%) including HCV (78.3%), asthma (23.2%), and hepatitis B (15.9%).

OUTCOMES

Social determinants of health were addressed to remove barriers and to facilitate access to HIV care for all clients returning to the community after incarceration. Of the 69 clients, 58 returned to the community and 11 did not, as eight remained incarcerated at the end of the study, 2 died in custody, and 1 relocated to the U.S. mainland immediately after community return. For the 58 clients returning to the community, OSCC-PR provided assistance in finding permanent or temporary housing (n = 22), food/groceries (n = 19), transportation (n = 30), clothing (n = 26), employment (n = 17), substance use treatment (n = 13), and mental health treatment (n = 7). After Hurricane Maria struck PR in September 2017, interventionists attempted to check in with every client who remained in PR. During these efforts, interventionists provided essentials including food or groceries (n = 29), personal care items (e.g., soap, shampoo, toothbrush, toothpaste, and undergarments) (n = 27), donated clothing (n = 17) and other items (i.e., portable stove, flashlights/lanterns, and pharmacy gift cards).

Of the 58 clients returning to the community, 54 (93.1%) were linked to HIV care after incarceration, including 43 (74.1%) linked to care within 30 days (Figure 1). Eleven of the 54 clients were linked to additional clinics during the 12-month follow-up period due to relocation or other factors (Figure 2). Of the 51 clients eligible for 6-month follow-up, 46 (90.2%) were receiving HIV care, with 44 (86.3%) retained in care. Of the 42 clients eligible for 12-month follow-up, 34 (80.9%) were receiving HIV care, with 33 (78.6%) retained in care (Figure 1).

Of the 58 clients returning to the community after incarceration, 35 (60.3%) completed surveys at all three time points (baseline, 6 and 12 months after incarceration). Those not completing surveys at all time points (n = 23) included those who were deceased after incarceration but prior to the 6- or 12-month time point (n = 4), relocated to the U.S. mainland (n = 3), were unable to access during reincarceration (n = 2), absconded (n = 1), declined participation/lost to follow-up

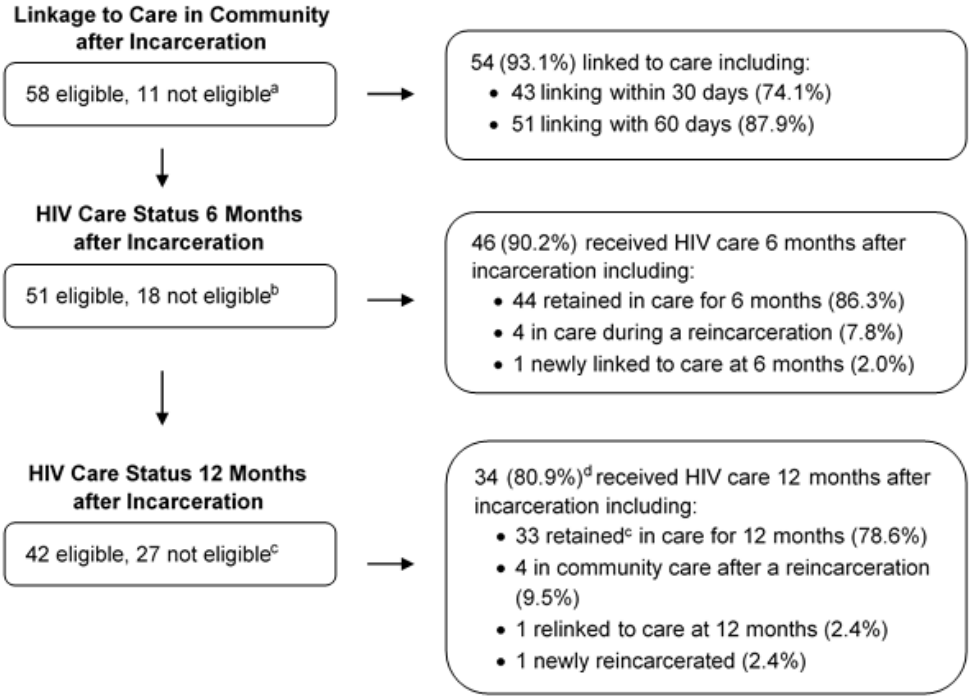

FIGURE 1. Client linkage to HIV care and HIV care status at 6 and 12 months after incarceration (n = 69). An additional 10 clients participated in a program pilot. All 10 returned to the community after incarceration and were linked to HIV care. [a]Of the 11 not eligible for linkage to care, 8 were still incarcerated at end of study, 2 deceased while in custody, and 1 relocated to U.S. mainland immediately after incarceration. [b]Of the 18 not eligible for the 6 month HIV care status assessment, 8 remained incarcerated, 5 were deceased (2 in custody, 3 after incarceration), 4 relocated to U.S. mainland, and 1 absconded/unable to engage. [c]Of the 27 not eligible, 8 remained incarcerated, 6 deceased (2 in custody, 4 after incarceration), 4 relocated to U.S. mainland, 1 absconded/unable to engage, and the study ended before 12-month follow-up period for 8 clients. [d]Of the 8 not receiving HIV care, 5 (12%) engaged in care between 5 and 8 months and then declined care but continued to participate in evaluation activities, completing the 12-month post-incarceration survey; 3 (7%) were lost to follow-up.

(n = 5), or the study ended prior to 12-month follow-up window (n = 8). Analyses were conducted to examine differences between those completing surveys at all three time points and those who did not. There were no significant differences between the two groups at $p \leq .05$ with regard to key baseline variables including gender, age, educational level, homelessness, food security, health care use, substance use, mental health, age of HIV diagnosis, ART use, CD4 and viral load levels, and incarceration history.

Outcome analyses compared self-reported behavior and experiences in the 6 months prior to incarceration (baseline) to 6 and 12 months after incarceration.

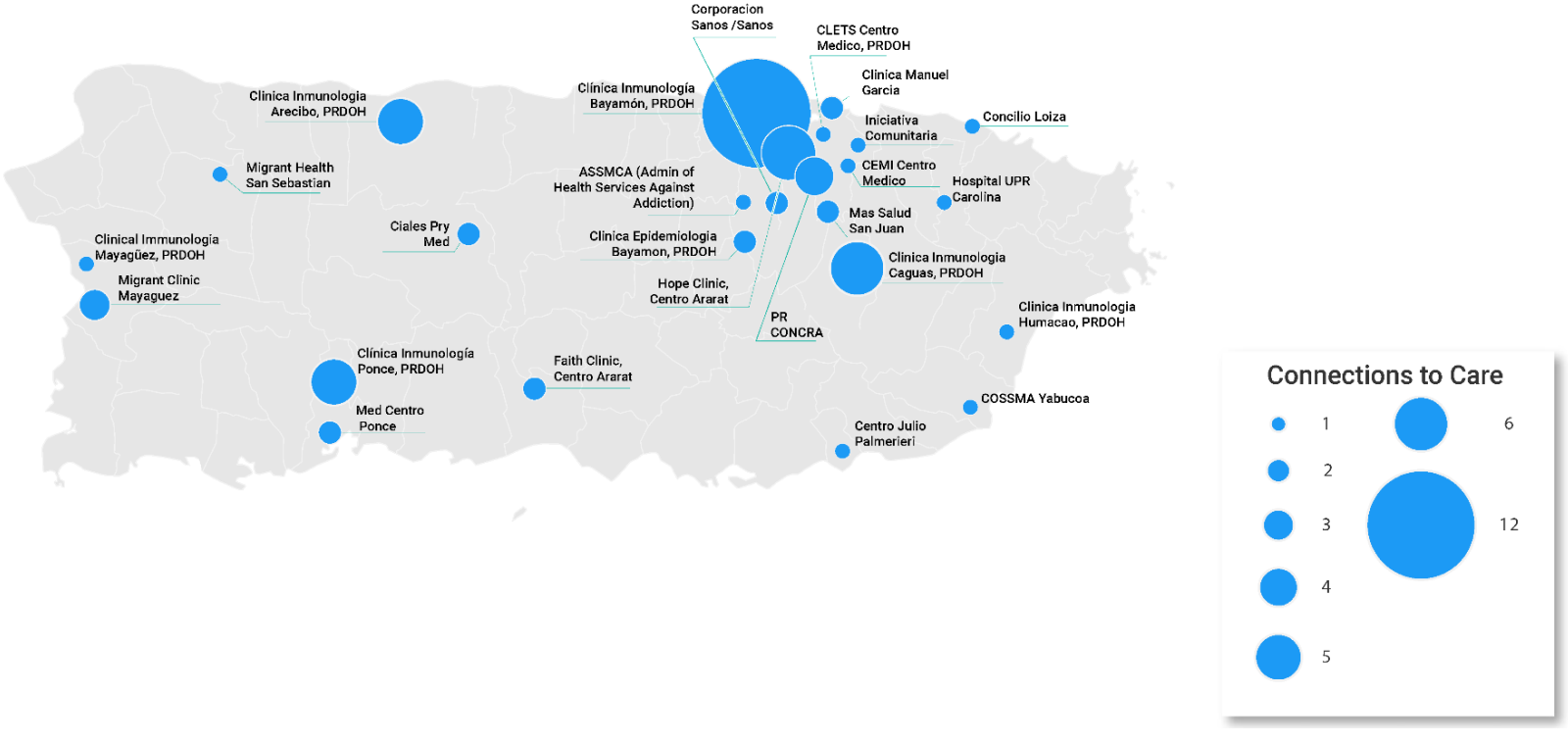

FIGURE 2. Map of Puerto Rico depicting 66 connections to HIV care for 54 clients.

TABLE 2. Health Care Utilization, Transportation, Laboratory Values, and Other Characteristics for Persons Completing the Baseline and Follow-Up Surveys at 6 and 12 Months After Incarceration (n = 35)[a]

	Baseline		6 Month follow-up		12 Month follow-up			
	n	%	*n*	%	*n*	%	Q	*p* value
Health & health care utilization (self-report)	In the 6 months prior to incarceration		In the 6 months after incarceration		In the 12 months after incarceration			
Received HIV-related care in a doctor's office or clinic	24	68.6	33	94.3	34	97.1	15.17	.001[b]
Received care in an emergency room (n = 34)	13	38.2	11	31.4	17	48.6	3.11	.211
Admitted to stay overnight in a hospital (n = 34)	9	25.7	5	14.7	8	22.9	2.00	.368
Had/has health insurance/Medicaid (n = 34)	28	80.0	33	94.3	34	97.1	6.89	.032[d]
Taking ART prior to incarceration or at follow-up interview	20	57.1	33	94.3	31	88.6	22.62	.000[b]
Needed transportation services to get HIV care	17	48.6	24	68.	29	82.9	13.63	.001[d]
Lack of transportation stopped you from getting HIV care	13	37.1	3	8.6	7	20.0	10.86	.004[c]
Other								
Homeless during timeframe (n = 34)	13	37.1	11	32.4	17	48.6	2.67	.264
Two or more days without or with barely any food to eat	15	42.9	5	14.3	11	31.4	7.60	.022[c]
Clinical visits & lab results (n = 26)[a]	During incarceration		In the 6 months after incarceration		In the 12 months after incarceration			
Viral suppression, viral load ≤ 200 copies/mL	24	92.3	21	78.9	22	84.6	2.33	.311
AIDS diagnosis (CD4 count ≤ 200 cells/mm^3)	1	3.8	4	15.4	3	11.5	4.67	.097
CD4 count in cells/mm^3, mean (*SD*)[e]	568.4	(330.6)	665.4	(380.8)	761.7	(479.2)	8.54	.014[d]

Note. [a]42 eligible — 35 completed surveys at baseline and 6-month follow-up; 26 had valid labs submitted at baseline, 6 months, and 12 months after incarceration; [b]post hoc analyses revealed a statistically significant difference between baseline and 6 month follow-up and between baseline and 12 month follow-up; no statistically significant differences were noted between 6 and 12 month follow-up; [c]post hoc analyses revealed a statistically significant difference between baseline and 6 month follow-up; [d]post hoc analyses revealed a statistically significant difference between baseline and 12 month follow-up; [e]Friedman's Q test. $X^2(2) = 8.538$ $p = .014$.

In most areas, clients showed improvements. Compared to baseline, a greater proportion of clients at 6- and 12-month follow-up reported receiving HIV care, $\chi^2(2) = 15.167$, $p < .01$, taking ART, $\chi^2(2) = 22.615$, $p < .001$, and having health insurance including Medicaid, $\chi^2(2) = 6.889$, $p < .05$ (Table 2). A smaller proportion reported food insecurity, that is, having two or more days without or with barely any food to eat, $\chi^2(2) = 7.600$, $p < .05$. While greater proportions of clients expressed a need for transportation services to access HIV care at follow-up time points, $\chi^2(2) = 13.625$, $p < .01$, there were also decreased proportions reporting that lack of transportation stopped them from getting care, $\chi^2(2) = 10.857$, $p < .01$. Areas where changes were hypothesized but not realized included homelessness/housing security and use of nonroutine health care services such as emergency department visits and hospitalizations. Additionally, there were no significant changes in the proportion of clients with VLS or AIDS diagnosis. Also, the proportion of clients who were virally suppressed at 6 and 12 months after incarceration did not differ based on whether labs were taken before or after Hurricane Maria.

DISCUSSION

OSCC-PR was well positioned to address the social determinants of health for PLWDH in addition to supporting them to connect to and remain engaged in HIV care after incarceration. Using the multilevel TCC intervention to address PLWDH priority needs (e.g., housing, food, clothing, income, substance use) led to favorable individual-level outcomes. At the individual level, OSCC-PR interventionists met with PLWDH, removing barriers and establishing supportive relationships with people returning to the community after incarceration—especially challenging after Hurricane Maria. At the program level, OSCC-PR transformed the support of PLWDH to access HIV care by integrating TCC with housing and employment services and expanded their provider network, developing linkage agreements with community providers offering a variety of services throughout Puerto Rico. At the systems level, OSCC-PR assembled a PR-wide service provider collaborative across disciplines to tackle HIV care access and continuity of care issues for justice-involved individuals.

The implementation and integration of TCC was successful as measured by connection to and retention in HIV care after incarceration, despite the impact of Hurricane Maria. Compared to other similar linkage-to-care interventions, OSCC-PR had high connection and retention rates with 74% of clients connecting to care within 30 days and 88% connecting within 60 days. For comparison, a SPNS ten-site correctional health linkages initiative on the U.S. mainland found 79% of PLWDH linked to care within 30 days after jail incarceration (Booker et al., 2013) and a systematic review of 92 studies of justice-involved PLWDH in the U.S. and Canada by Iroh et al. (2015), found 36% linked to care after leaving prison or jail. Similarly, 86% of clients in this study were retained in care at 6 months and 71% were retained at 12 months. Other studies have shown 38% being retained in care at 6 months after jail incarceration (Althoff et al., 2013), and 30% retained in care (varying timeframes) after jail or prison release (Iroh et al., 2015). Iroh and colleagues also found 29% of PLWDH taking ART after incarceration and 21% having undetectable viral load (VL < 500cc/mL) (2015). In this study, 94% and 85% of OSCC-PR's clients reported taking ART at 6 and 12 months, respectively, after incarceration. At 6 months and 12 months post-incarceration, 79% and 85% of OSCC-PR's clients also achieved VLS.

OSCC-PR's positive outcomes could be attributed to a number of aspects of their care coordination program. First, they dedicated substantial resources for community follow-up; more than is typically allocated for such interventions which likely also contributed to the low proportion of those lost to follow-up (7%). Also, OSCC-PR accomplished the TCC "warm transition" by having the same interventionists meet with clients throughout the intervention, from incarceration to follow-up in the community, often on multiple occasions. Limited public transit availability outside the San Juan metropolitan area hindered access to health care and other community supports, particularly for people returning to remote areas after incarceration. Recognizing this barrier, OSCC-PR secured funds for a vehicle and driver and transported more than half the clients to clinic visits and for other needs. In addition, since arrest histories can be a barrier to employment and housing, OSCC-PR worked with clients' lawyers to clear their arrest records to the extent possible and worked with employers and landlords that were aware of client arrest history. After Hurricane Maria, interventionists sought out every client to check on their well-being, provide food, water, and gift cards for basic supplies. OSCC-PR was already a recognized PR-wide service provider that supported justice-involved persons during and after incarceration. Building a reputation for delivering as promised in their several service areas led to substantial goodwill among clients, their families, and other community providers. With CHS training and support, OSCC-PR also demonstrated community leadership and interventionists approached their PLWDH clients with a caring nonjudgmental attitude. While not formally evaluated, OSCC-PR leadership, interventionists, and other staff appeared to experience an attitude shift and culture change that was less stigmatizing and ultimately very supportive of PLWDH, which contributed to positive relationships with clients.

There were several limitations to this study. First, there was no comparison or control group. Therefore, we cannot conclusively attribute study outcomes to the intervention and we do not know how these clients may have fared in the absence of an intervention. Second, the final participant sample was small, which limited statistical power and our ability to conduct statistical analyses to better examine intervention effects. The small sample size was largely due to recruitment challenges as correctional and Department of Health leadership changes reduced access to correctional-based electronic health records to identify potential clients. Clients were recruited by correctional health staff referral or through self-report after educational outreach sessions. As such, it is possible that the clients came from a motivated subsample of PLWDH, adversely affecting internal validity through selection bias. We did not have any information on persons who chose not to participate so we were unable to see whether these persons differed from those who received services and participated in the study. Similarly, OSCC-PR worked in one federal and 12 of 33 PR correctional facilities. Facilities were selected based on likelihood of having a greater proportion of PLWDH who would be returning to the community during the study period (e.g., facilities offering methadone maintenance therapy or larger facilities housing persons with shorter sentences); therefore, we cannot be sure that OSCC-PR clients were representative of PLWDH incarcerated in PR as a whole. Importantly, Hurricane Maria was a major disruption to clients' lives and to this study. While all clients were recruited and enrolled into the study prior to the hurricane season, follow-up was impacted as nearly half of the clients returned to the community in the aftermath or within 6 months of Hurricane Maria, during which three clients relocated to the mainland U.S. and

four died. It is unknown how the intervention or hurricane may have impacted these or other clients who declined further participation, were lost to follow-up, or had insufficient follow-up time fared.

Additional limitations include survey administration and obtaining follow-up data. Survey administration was not consistent across timeframes as baseline surveys were mostly completed by paper and follow-up surveys were mostly completed by ACASI. Surveys completed by paper were more likely to have missing responses for some variables. Also, obtaining follow-up lab results from community and correctional health clinics was challenging. Many clinics were responsive and accommodating; however, others were less responsive despite having labs conducted. Outcomes of a scaled-up effort, including enrollment, retention, and clinical outcomes, cannot be projected and the sustainability of this model is challenging without proper resources. Future studies in this area should include a larger sample size and to the extent possible, a comparison group.

Despite the limitations, client outcomes from this study are highly encouraging. In addition to this study, the TCC model serving as the basis for the OSCC-PR intervention contributed to positive outcomes for PLWDH after incarceration in 10 demonstration sites (Booker et al., 2013; Spaulding et al., 2013; Teixeira et al., 2015) and was replicated in three additional jurisdictions which are currently undergoing evaluation (HRSA 2017; TargetHIV, 2019).

CONCLUSION

Persons who are incarcerated are generally less healthy than those who are not incarcerated (Maruschak, Berzofsky, & Unangst, 2015). However, incarcerated PLWDH usually have better clinical outcomes compared to PLWDH who are not incarcerated and also to justice-involved persons after incarceration (Iroh et al., 2015). This is likely due to having housing, food, and daily access to medication. However, intensive nonmedical case management during and after incarceration, along with access to culturally appropriate HIV care and treatment, designed to address social determinants of health can lead to favorable outcomes after incarceration. Multilevel interventions, such as TCC, may be best suited to address the myriad challenges faced by vulnerable populations, requiring coordination with multiple systems (i.e., health care, housing, employment, and corrections). In this study, integrating housing and employment services with HIV care and developing buy-in and collaborations across systems of care PR-wide, including pulling together after a natural disaster, contributed to positive outcomes with a greater reach than may have been likely for any individual- or program-level intervention alone.

REFERENCES

Althoff, A. L., Zelenev, A., Meyer, J. P., Fu, J., Brown, S.-E., Vagenas, P., . . . Altice, F. L. (2013). Correlates of retention in HIV care after release from jail: Results from a multi-site study. *AIDS and Behavior*, *17*, 156–170.

Booker, C. A., Flygare, C. T., Solomon, L., Ball, S. W., Pustell, M. R., Bazerman, L. B. . . . Kling, R. N. (2013). Linkage to HIV care for jail detainees: Findings from detention to the first 30 days after release. *AIDS and Behavior*, *17*, 128–136.

Centers for Disease Control and Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. (2017). *HIV Surveillance Report: Diagnoses of HIV in-*

fection in the United States and dependent areas, 2016. Retrieved from https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2016-vol-28.pdf

Centers for Disease Control and Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. (2018a). *HIV Surveillance Report, 2017: Diagnoses of HIV infection in the United States and dependent areas, 2017*. Retrieved from https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2017-vol-29.pdf

Centers for Disease Control and Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. (2018b). *Understanding the HIV care continuum*. Atlanta, GA: Author. Retrieved from https://www.cdc.gov/hiv/pdf/library/factsheets/cdc-hiv-care-continuum.pdf

Covin, L. (2012). Homelessness, poverty, and incarceration: The criminalization of despair. *Journal of Forensic Psychology Practice*, *12*, 439–456. https://doi.org/10.1080/15228932.2012.713835

Health Resources and Services Administration, Ryan White, & Global HIV/AIDS Programs. (2017). *HIV/AIDS Bureau performance measures*. Rockville, MD: Author. Retrieved from https://hab.hrsa.gov/sites/default/files/hab/clinical-quality-management/coremeasures.pdf

Health Resources and Services Administration, Ryan White, & Global HIV/AIDS Programs. (2018a). *HRSA's Ryan White HIV/AIDS Program — Part F: Special Projects of National Significance (SPNS) Program*. Rockville, MD: Author. Retrieved from https://hab.hrsa.gov/sites/default/files/hab/Publications/factsheets/program-factsheet-part-f-spns.pdf

Health Resources and Services Administration, Ryan White, & Global HIV/AIDS Programs. (2018b). *SPNS Initiative: System-level workforce capacity building for integrating HIV primary care in community health care settings 2014–2018*. Retrieved from https://hab.hrsa.gov/about-ryan-white-hivaids-program/spns-workforce-building

Institute for Criminal Policy Research. (2019). *World Prison Brief: Puerto Rico (USA)*. Retrieved from http://www.prisonstudies.org/country/puerto-rico-usa

Iroh, P. A., Mayo, H., & Nijhawan, A. E. (2015). The HIV care cascade before, during, and after incarceration: A systematic review and data synthesis. *American Journal of Public Health*, *105*, e5–e16.

Jordan, A. O., Cohen, L. R., Harriman, G., Teixeira, P. A., Cruzado-Quinones, J., & Venters, H. (2013). Transitional care coordination in New York City jails: Facilitating linkages to care for people with HIV returning home from Rikers Island. *AIDS and Behavior*, *17*, 212–219.

Luther, J. B., Reichert, E. S., Holloway, E. D., Roth, A. M., & Aalsma, M. C. (2011). An exploration of community reentry needs and services for prisoners: A focus on care to limit return to high-risk behavior. *AIDS Patient Care and STDs*, *25*, 475–481.

Maruschak, L., & Bronson, J. (2017). *HIV in prisons, 2015 — Statistical tables*. Washington, DC: U.S. Department of Justice. Retrieved from https://www.bjs.gov/content/pub/pdf/hivp15st.pdf

Maruschak, L. M., Berzofsky, M., & Unangst, J. (2015 (Updated in 2016)). *Medical problems of state and federal prisoners and jail inmates, 2011–12*. Washington, DC: U.S. Department of Justice. Retrieved from https://www.bjs.gov/content/pub/pdf/mpsfpji1112.pdf

Nkansah-Amankra, S., Agbanu, S. K., & Miller, R. J. (2013). Disparities in health, poverty, incarceration, and social justice among racial groups in the United States: A critical review of evidence of close links with neoliberalism. *International Journal of Health Services*, *43*, 217–240.

Rodríguez-Díaz, C. E., & Andrinopoulos, K. (2012). HIV and incarceration in the Caribbean: The experiences of Puerto Rico and Jamaica. *Puerto Rico Health Sciences Journal*, *31*, 161–169.

Rodríguez-Díaz, C. E., Rivera-Negrón, R. M., Claitts, M. C., & Myers, J. J. (2014). Health care practices and associated service needs in a sample of HIV-positive incarcerated men in Puerto Rico: Implications for retention in care. *Journal of the International Association of Providers of AIDS Care*, *13*, 492–496. https://doi.org/10.1177/ 2325957414521300

Selik, R. M., Mokotoff, E. D., Branson, B., Owen, S. M., Whitmore, S., & Hall, H. I. (2014). Revised surveillance case definition for HIV infection—United States, 2014. *Morbidity and Mortality Weekly Report: Recommendations and Reports*, *63*, 1–10.

Spaulding, A. C., Messina, L. C., Kim, B. I., Chung, K.-W., Lincoln, T., Teixeira, P., . . . Flanigan, T. P. (2013). Planning for success predicts virus suppressed: Results of a non-cntrolled, observational study of factors associated with viral suppression among HIV-positive persons following jail release. *AIDS and Behavior*, *17*, S203–S211.

TargetHIV. (2019). *Dissemination of evidence-informed interventions: Transitional care coordination—From jail intake to community HIV primary care. Tools for HRSA's Ryan*

White HIV/AIDS Program/Dissemination of Evidence-Informed Interventions. Retrieved from https://nextlevel.targethiv.org/deii/jails

Teixeira, P. A., Jordan, A. O., Zaller, N., Shah, D., & Venters, H. (2015). Health outcomes for HIV-infected persons released from the New York City jail system with a transitional care-coordination plan. *American Journal of Public Health*, *105*, 351–357. https://doi.org/10.2105/ajph.2014.302234

Tirado-Mercado, V., Rodríguez-Díaz, C. E., Cosme-Pitre, C., Cruzado-Quiñones, J., & Jordan, A. O. (2017). Fortaleciendo enlaces: Strengthening collaborations to build institutional capacity for re-entry services for incarcerated people with HIV in Puerto Rico. *Puerto Rico Health Sciences Journal*, *36*, 47–49.

Varas Díaz, N., Rivera, S. M., & Bou, F. C. (2008). AIDS stigma combinations in a sample of Puerto Rican health professionals: Qualitative and quantitative evidence. *Puerto Rico Health Sciences Journal*, *27*, 147–157.

Visher, C. A., & Travis, J. (2011). Life on the outside: Returning home after incarceration. *Prison Journal*, *91*(3 Suppl), 102S–119S.