

Screening for Hepatitis C as a Prevention Enhancement (SHAPE) for HIV: An Integration Pilot Initiative in a Massachusetts County Correctional Facility

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ABSTRACT

Objectives. The Massachusetts Department of Public Health (MDPH) and the Barnstable County Sheriff's Department (BCSD) in Massachusetts initiated a pilot program in July 2009 offering education and hepatitis C virus (HCV) antibody testing to inmates and detainees, concurrent with routine HIV testing. The initiative was implemented to assess the feasibility of integrating HCV screening into an HIV screening program in a correctional setting and the efficacy of linking HCV antibody-positive inmates to clinical care upon release.

Methods. Through the Screening for Hepatitis C as a Prevention Enhancement initiative, HCV and HIV testing were offered to inmates and detainees shortly after admission, and by request at any time during incarceration. In preparation for release, referrals were made to community-based medical providers for HCV follow-up care. Data from BCSD were compared with routine surveillance data received by MDPH. Confirmatory HCV test results received by April 15, 2012, were considered indicators of appropriate post-release clinical care.

Results. From July 2009 through December 2011, 22% ($n=596$) and 25% ($n=667$) of 2,716 inmates/detainees accepted HCV and HIV testing, respectively. Of those tested for HCV antibody, 20.5% ($n=122$) were positive. Of those tested for HIV antibody, 0.8% ($n=5$) were positive. Of the inmates who tested HCV positive at BCSD and had been released, 37.8% were identified as receiving post-release medical care.

Conclusions. We determined that integration of HCV education and screening into correctional facilities is feasible and reveals high rates of HCV infection. Although this model presupposes programmatic infrastructure, elements of the service design and integration could inform a range of correctional programs. Effective linkage to care, while substantial, was not routine based on our analysis, and may require additional resources given its cost and complexity.

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Due to the historically high burden of human immunodeficiency virus (HIV) infection in correctional facilities, such settings have been identified as important targets for HIV prevention, screening, and linkage-to-care efforts.¹ Activities to address HIV prevention and screening of inmates have been evaluated, and recommendations for routine, opt-out HIV testing in correctional settings exist.²⁻⁴ The prevalence of hepatitis C virus (HCV) infection among inmates in the United States is substantially higher than that of HIV infection, ranging from 12% to 35%, and up to one-third of those with HCV infection have passed through a correctional facility; however, HCV testing is not routinely provided in correctional facilities.^{5,6}

In the U.S., it is estimated that only 25%–50% of those who have HCV infection have been diagnosed.^{6,7} Recent recommendations have emphasized the need to expand and integrate services to provide HCV screening and care through existing HIV services and other public health programs.⁶⁻⁸ Expanded HCV screening and care is imperative, as mortality associated with HCV infection recently surpassed that of HIV infection.⁹ However, more effective medications to treat HCV infection are now available.¹⁰ Increased screening for HCV is the first step to treatment and, ultimately, improved mortality.

The epidemiologic profile of HIV infection in Massachusetts has changed in recent years, with a sharp decrease in the rate of new HIV infections among individuals with histories of injection drug use. Massachusetts state correctional facilities experienced a decline in HIV prevalence among inmates by as much as 50% from 1994 to 2011, from 466 individuals in 1994 to 200 individuals in 2011 (Unpublished data, Massachusetts Department of Public Health [MDPH], HIV/AIDS Surveillance Program, 2011). At the same time, reported HCV infection diagnoses in Massachusetts have remained fairly steady, with an average of 8,900 newly diagnosed confirmed and probable cases reported to MDPH annually from 2002 to 2010 (range: 7,200–10,900). There also has been a substantial change in the age of those diagnosed with HCV infection in Massachusetts; the rate of HCV infection among those aged 15–25 years has increased from 65 per 100,000 population in 2002 to 135 per 100,000 population in 2010. (In contrast, there has been a moderate decline in HCV diagnoses among older age groups during the same time period.) Available surveillance data indicate the increase is largely due to injection of heroin.¹¹ A recent analysis of a subset of these cases suggested that a high proportion of adolescents and young adults infected with HCV may interact with the correctional system.¹²

Given recent trends in HCV infection, it is imperative to identify innovative ways to test those at risk of infection and to ensure that those infected are linked to appropriate care. The MDPH Bureau of Infectious Disease (BID) began an integrated HCV screening and education pilot project at the Barnstable County Sheriff's Department (BCSD), described in this article, which leveraged resources that were in place for HIV services. Using state and federal HIV funding, BID has provided resources to 12 county correctional facilities for nearly 20 years for a core set of interventions related to HIV prevention. For approximately 10 years, BID has also provided resources for interventions inclusive of prevention programming for HCV and other infections. Specifically, BID funds an infectious disease (ID) coordinator at each facility, who provides coordination and/or provision of HIV counseling and testing, group- and individual-level prevention education, assistance for HIV-positive inmates to access care while incarcerated, enrollment in the state HIV Drug Assistance Program, and linkage to reintegration programs upon release. The ID coordinators also provide education about viral hepatitis and sexually transmitted infections. These correctional facilities receive supplies for rapid HIV testing and ship specimens to the MDPH Hinton State Laboratory Institute (HSLI) for testing. BID also funds a regional network of providers who offer intensive short-term case-management services to HIV-positive inmates returning to the community. As part of reintegration for HIV-positive inmates, a case manager is assigned three months prior to release and continues to work with clients up to nine months post-release, ensuring linkage to care.

Outside of the correctional setting, BID has promoted disease integration initiatives since 2001, with particular focus on the alignment of HCV screening and support services in agencies serving individuals who inject drugs. BID also funds HCV medical management programs in a subset of sites that provide HIV/acquired immunodeficiency syndrome (AIDS) client health services.

This article describes the integrated HCV program developed by MDPH BID with BCSD and the results of the program with respect to case identification and linkage to care.

METHODS

Background

In July 2009, BID began an HCV screening and education pilot project at BCSD. The Screening for Hepatitis C as a Prevention Enhancement (SHAPE) initiative provided hepatitis and liver health education, HCV

antibody testing, and referral to community-based clinical providers upon release for HCV antibody-positive individuals.

Massachusetts has both county and state correctional facilities. If an individual has a sentence of >2.5 years, he/she serves the sentence at a state prison. Most sentences of ≤2.5 years are served in one of 14 county correctional facilities. BCSD operates a county facility located on Cape Cod, Massachusetts, with individuals serving sentences of <2.5 years and those awaiting court adjudication. Most of those held at BCSD are involved with the criminal justice system due to drug-related crimes, such as drug possession or trafficking. A significant proportion of the inmates and detainees go through the facility more than once. Many are at significant risk for acquiring HIV and/or HCV infection. The SHAPE initiative was integrated into the existing HIV program, as described hereafter. The initiative did not incur direct costs to BCSD. The only added costs were incurred by MDPH for supplies, specimen shipping, and HCV antibody testing. MDPH also provided BCSD with hepatitis A and B vaccines to immunize HCV antibody-positive inmates without documentation of immunity.

HIV education, screening, and linkage-to-care services have been ongoing at 12 county jails, including BCSD, for more than 15 years. A prior HIV, hepatitis, and addiction services integration process resulted in a change in the procurement process for these services in jails and substance abuse treatment facilities requiring an integrated approach to ID services, including HCV education.¹³ Both BCSD and MDPH were interested in expanding beyond HCV education to HCV screening; in July 2009, HCV screening was implemented at BCSD. The medical director and administrative leadership at BCSD supported the initiative. The ID coordinator was a champion for HCV screening in the facility, and her role as a champion was instrumental in the success of the expanded, integrated program. The ID coordinator attended an MDPH-sponsored training that included core HCV and viral hepatitis education; attendance at the training was a requirement at the time for all funded facilities.

The SHAPE initiative

SHAPE was implemented by employing the following steps. At BCSD, ID prevention and screening services were provided to those in custody during the mandatory orientation session that occurs within a few days of intake. During the mandatory group orientation (generally 10–20 individuals per session), the ID coordinator reviewed basic information on HIV and HCV infections, which includes the natural history of the infections,

disease transmission and prevention, and how to access testing within the facility. Inmates could voluntarily opt in to be tested for either or both infections after the presentation, and they were provided with pretest counseling by the coordinator soon thereafter. Inmates were also able to request testing through the regular “sick call” process at any time during incarceration if they did not opt in during orientation. There were no costs for inmates to access health services, and the full services of the ID coordinator were only provided to those who were in custody long enough to receive complete HIV and HCV testing.

A phlebotomist performed blood collection, and specimens were submitted to the HSLI for processing. HSLI performed enzyme immunoassay (EIA) testing for HCV antibody for this initiative; no supplementary tests were conducted. Specimens sent to HSLI for testing were labeled with unique barcodes with no personal identifiers. Results were returned to the facility within approximately one week, and barcode reconciliation with inmate names occurred at the facility. Posttest counseling was provided to all inmates to ensure that they received and understood the test results, including the need for further testing for those who tested antibody-positive on screening. For HIV testing, HSLI performed HIV antibody testing using a third-generation assay.

This model was limited to screening; treatment for HCV is not provided by BCSD and is only rarely provided at any county facility in the state. The ID coordinator made referrals to health care for those HCV antibody-positive inmates who were soon to be released from BCSD. BCSD primarily worked with a community health center, Duffy Health Center, and the Infectious Disease Clinical Services (IDCS) of Cape Cod Healthcare. IDCS was also funded by BID under a pilot framework to provide HCV medical management services. Once inmates left BCSD, the ID coordinator no longer had access to individuals’ care information. However, as described hereafter, the HCV surveillance system in Massachusetts provided some evidence on the outcomes related to linkage to care.

Data sources and analysis

BID employs the Massachusetts Virtual Epidemiologic Network (MAVEN), a secure, Web-based integrated disease surveillance and case-management system. For HCV surveillance, all positive laboratory test results are reportable to MDPH by name. These data are received both electronically and via paper reports for manual data entry into MAVEN. Case follow-up includes sending case report forms to ordering providers for additional patient data; for suspect acute HCV infection

cases, further investigation is conducted by local health departments. Cases of HCV infection in MAVEN may be updated as additional laboratory test results and other related data are received over time. Test types and results are documented in MAVEN.

To evaluate the linkage-to-care protocol for the SHAPE initiative, data from BCSD were compared with surveillance data received by MDPH. Because inmates at BCSD only received antibody testing by EIA, any follow-up care would ideally involve additional testing to assess antibody and infection status. BCSD did not report HCV antibody-positive cases to MDPH disease surveillance directly during the initiative; therefore, BCSD staff provided MDPH with a list of all inmates who tested positive for HCV antibody through the project and who had been released as of April 15, 2012, when the analysis was conducted. This list included inmate name, date of birth, date of test, and date of release from BCSD. A match was conducted with MDPH HCV surveillance data in MAVEN using name and date of birth, with attempts made for different spellings of each name as necessary. Laboratory test data were reviewed for each matched case to determine if that individual received HCV testing (ribonucleic acid [RNA]-based testing, genotyping, viral titer, EIA, or EIA signal-to-cutoff testing) subsequent to their release from BCSD.

RESULTS

From July 1, 2009, through December 31, 2011, BCSD offered HCV and HIV testing to 2,716 inmates and detainees, with an acceptance rate of 21.9% for HCV ($n=596$) and 24.6% for HIV ($n=667$). There were nearly 7,000 bookings at BCSD during this time. Among those tested for HCV, 20.5% were antibody-positive ($n=122$). In comparison, 0.8% of those tested for HIV were antibody-positive ($n=5$). The Table shows the characteristics of those tested and those who were antibody-positive for both infections. No coinfections were identified. Those tested for HCV and HIV were very similar with respect to sex, age, and race/ethnicity. Those tested for either infection were similar to the overall inmate population with respect to race/ethnicity and sex. (Age information was not available on the overall inmate population at the time of this analysis.) The current BCSD population is approximately 70% non-Hispanic white, 15% non-Hispanic black, 6% Hispanic, 1% Native American, and 9% identified as "other." Males comprised 84% of the inmates overall. Among the 122 inmates identified as positive for HCV antibody, 48.4% were aged 20–29 years and 82.8%

were non-Hispanic white; 91.0% reported a history of injection drug use.

The Figure shows the results of the match between HCV antibody-positive individuals at BCSD and the MDPH HCV surveillance dataset in MAVEN. Of those who tested HCV antibody-positive through this pilot and were released from BCSD during follow-up ($n=82$; excludes 22 individuals who also tested HCV-positive prior to incarceration, 15 inmates who remained incarcerated as of April 15, 2012, two inmates who had confirmatory testing during incarceration, and one inmate who died), 37.8% ($n=31$) had an HCV-related test result reported to MAVEN after release, indicating linkage to care; of these, 74.2% ($n=23$) had a positive RNA-based test (qualitative or quantitative nucleic acid amplification test or a report of genotype), confirming infection.

We also evaluated the time between release from BCSD and the earliest post-release specimen collection date for a supplementary test, as reported to MDPH. Among the 23 HCV antibody-positive inmates released from BCSD with an RNA-based confirmatory HCV test result reported to MDPH post-release, 83% ($n=19$) had a specimen collection date within one year of release, 61% ($n=14$) had a specimen collection date within six months of release, 39% ($n=9$) had a specimen collection date more than six months after release, and 17% ($n=4$) had a specimen collection date more than 12 months after release (data not shown).

DISCUSSION

The SHAPE initiative exemplifies Level 2 Core Service Integration as outlined in the National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention's program collaboration and service integration white paper⁸ and meets the stated goals of service integration:

1. To make it easier for people to access needed services by providing them with a single point of entry; and
2. To increase staff members' knowledge about available resources that are shared with other programs or agencies, and thereby minimize duplication of services while allowing each program or agency to continue specializing in its own area of expertise.

The initiative has demonstrated that integration of HCV education and screening is feasible in a county correctional setting with an existing HIV screening program, and that HCV screening is generally well accepted by inmates and detainees in the context of

Table. Characteristics of people tested for HCV and HIV at the Barnstable County Sheriff's Department, Massachusetts, July 2009–December 2011

Characteristic	Total HCV tests performed	HCV-positive	Total HIV tests performed	HIV-positive
	N (percent)	N (percent)	N (percent)	N (percent)
Total	596 (100.0)	122 (20.5)	667 (100.0)	5 (0.8)
Sex				
Male	511 (85.7)	99 (81.1)	571 (85.6)	3 (60.0)
Female	78 (13.1)	22 (18.0)	89 (13.3)	2 (40.0)
Transgender	1 (0.2)	0 (0.0)	1 (0.1)	0 (0.0)
Missing	6 (1.0)	1 (0.8)	6 (0.9)	0 (0.0)
Age (in years)				
<13	2 (0.3)	0 (0.0)	2 (0.3)	0 (0.0)
13–19	29 (4.9)	1 (0.8)	32 (4.8)	0 (0.0)
20–29	307 (51.5)	59 (48.4)	334 (50.1)	2 (40.0)
30–39	127 (21.3)	25 (20.5)	147 (22.0)	1 (20.0)
40–49	83 (13.9)	21 (17.2)	95 (14.2)	2 (40.0)
50–59	35 (5.9)	13 (10.7)	43 (6.4)	0 (0.0)
≥60	8 (1.3)	1 (0.8)	8 (1.2)	0 (0.0)
Missing	5 (0.8)	2 (1.6)	6 (0.9)	0 (0.0)
Race/ethnicity				
Non-Hispanic white	447 (75.0)	101 (82.8)	504 (75.6)	2 (40.0)
Non-Hispanic black	86 (14.4)	10 (8.2)	98 (14.7)	2 (40.0)
Hispanic	47 (7.9)	8 (6.6)	48 (7.2)	0 (0.0)
Asian	1 (0.2)	0 (0.0)	1 (0.1)	0 (0.0)
American Indian/Alaska Native	3 (0.5)	0 (0.0)	3 (0.4)	0 (0.0)
Multirace	7 (1.2)	1 (0.8)	8 (1.2)	0 (0.0)
Missing	5 (0.8)	2 (1.6)	5 (0.7)	1 (20.0)
IDU, last 12 months				
Yes	225 (37.8)	84 (68.9)	261 (39.1)	1 (20.0)
IDU, ever				
Yes	292 (49.0)	111 (91.0)	340 (51.0)	1 (20.0)

HCV = hepatitis C virus

HIV = human immunodeficiency virus

IDU = injection drug use

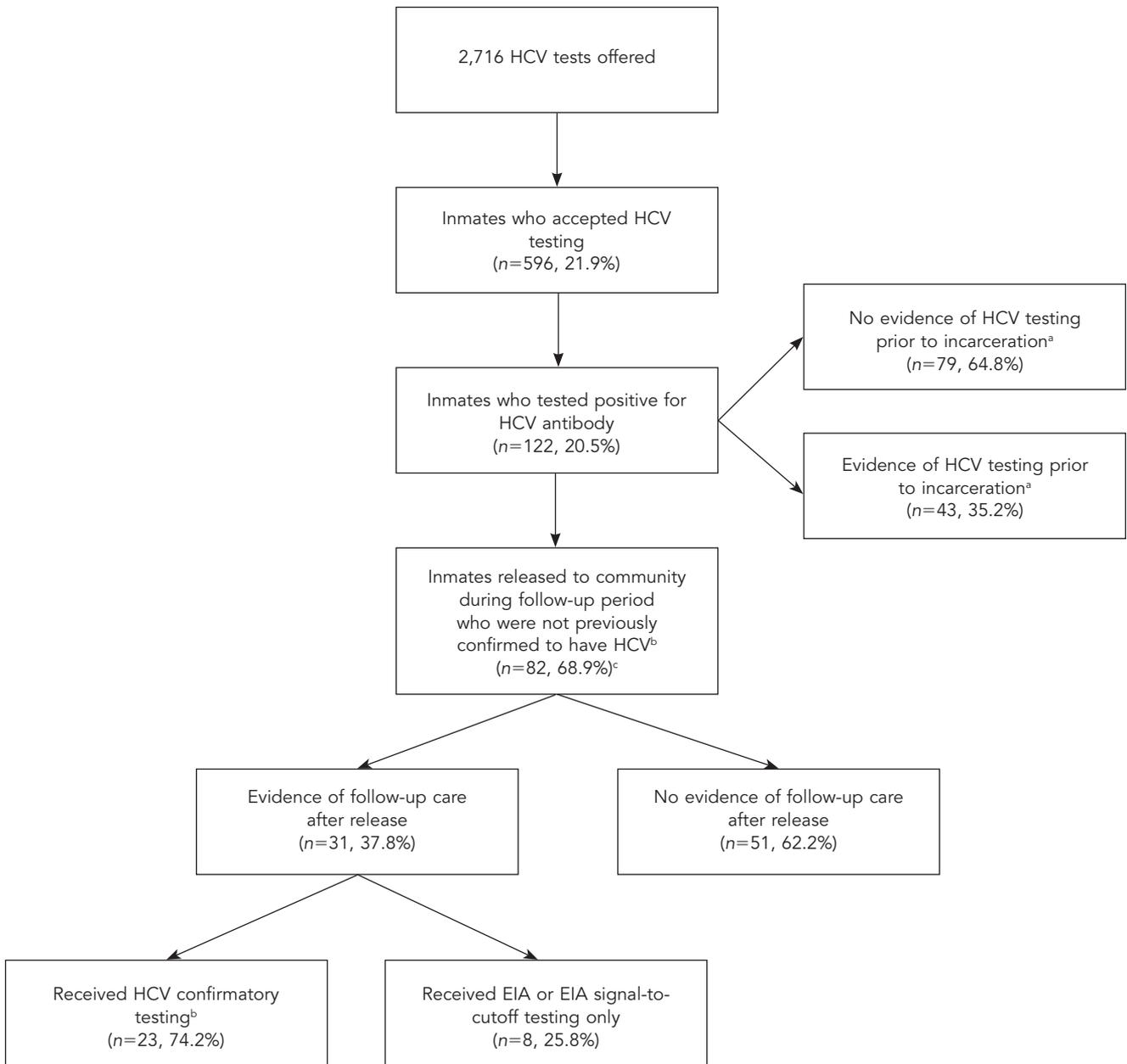
short-term incarceration and detention. It is important to highlight that the program's success was attributable to numerous factors, including strong institutional support and adequate state funding. Although these factors may vary significantly across state jurisdictions, strategies for communication, service development, and program development could be replicated.

Screening this population for HCV infection yielded high seropositivity rates (20.5%) and identified young adults who were more likely to have been recently exposed than their older counterparts. However, the surveillance data we examined, while limited, indicate that only 37.8% of HCV antibody-positive former inmates and detainees who were given a referral followed up with HCV clinical care post-release. The data also indicate that follow-up often occurred more than six months after release. The initiative also served to reengage 43 individuals who had previously tested

positive for HCV antibody. This percentage represents 35% of individuals testing positive through the initiative and indicates that incarceration represents an opportunity for reengagement in care and treatment as well as diagnosis of new infections.

Because HCV testing was built upon, and integrated into, a functional HIV program, the costs of this initiative were low. The additional costs were for specimen collection, shipping, and testing; a moderate increase in personnel time to administer education, testing, and linkage activities; and the purchase of hepatitis A and B vaccine. Hepatitis A and B vaccination is available throughout the county system and at BCSD as part of the integrated system. While testing for tuberculosis and sexually transmitted infections is part of basic medical services and not part of the integrated program, integration of these additional services is worth exploring.

Figure. HCV test results and evidence of linkage to care among detainees and inmates at BCSD: Massachusetts, July 2009–April 2012



^aEvidence of HCV testing includes test results in the Massachusetts Virtual Epidemiologic Network for any of the following: HCV antibody, RNA, genotype, or viral titer.

^bHCV confirmatory testing includes the following assays: RNA, genotyping, or viral titer.

^cThis category excludes the following individuals: 22 inmates who also received confirmatory HCV testing (RNA, genotyping, or viral titer) prior to BCSD incarceration; 15 inmates who remained incarcerated as of April 15, 2012; two individuals who received confirmatory HCV testing while incarcerated; and one individual who died during follow-up.

HCV = hepatitis C virus

BCSD = Barnstable County Sheriff's Department

EIA = enzyme immunoassay

RNA = ribonucleic acid

The delayed follow-up care in the community suggests that, even for those seen by clinicians upon release, not all participants received appropriate supplementary testing despite the availability of MDPH-funded HCV medical management programs in the targeted community and the increased availability of health insurance resulting from Massachusetts's health-care reform. Confirmatory viral RNA testing may need to be offered within the correctional facility to ensure complete diagnostic testing for current infection. Further, these results indicate that additional support for inmates at the time of release may be needed to ensure linkage to medical care. This type of service is provided in Massachusetts and other jurisdictions for people with HIV infection; expansion of state-funded corrections-to-community programs for those mono-infected with HCV should be explored.

While screening in the correctional setting has been recommended by CDC, the Institute of Medicine, and others,^{6,14-16} and the data from this pilot clearly indicate that there can be a high yield from such programs, there can be hesitation to adopt the program due to the costs associated with HCV care and treatment. Confirmatory testing and HCV disease staging may not be factored into correctional health medical budgets, and currently available antiviral treatments may cost \$20,000–\$65,000 per patient. Short stays in county facilities make it difficult, if not impossible, to initiate evaluation and complete antiviral treatment, with assurance of continuity of care upon release. However, with the increase in HCV infection among young people,¹¹ the low rate of diagnosis in the general population,^{6,7} and the availability of increasingly effective medications, all opportunities to diagnose those at risk and treat people who may not otherwise be engaged in health care must be explored.

CONCLUSION

The SHAPE initiative has demonstrated that targeting correctional facilities for integrated HIV and HCV screening, with sufficient infrastructure and support from within the facility, can be an efficient and high-yield endeavor. While such a program may require modification and be difficult to implement in other states and facilities, our findings lend support to the feasibility of successful integration programs in correctional settings. Expansion of this program model would provide increased opportunities for education, testing, and linkage to care.

This study was exempt from Institutional Review Board review by the Massachusetts Department of Public Health.

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