Journal of Urban Health: Bulletin of the New York Academy of Medicine Vol. 81, No. 1, March 2004

The Content and Comprehensiveness of Hepatitis C Education in Methadone Maintenance and Drug-Free Treatment Units

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ABSTRACT *Although drug users are at elevated risk for hepatitis C virus (HCV) infection, many are uniformed or misinformed about the virus. Drug treatment programs are uniquely situated to provide comprehensive risk-modifying educational programs for decreasing HCV transmission, a strategy advocated in the most recent National Institutes of Health Consensus Development Conference Statement on the Management of Hepatitis C. Given the large proportion of patients that inject drugs in methadone maintenance treatment programs and the high prevalence of HCV among drug injectors, we compared a nationwide sample (N=246) of methadone maintenance treatment programs and drug-free programs regarding the content and comprehensiveness of HCV education. All of these programs provide HCV education to at least some of their patients. Results indicated that, compared to drug-free programs, methadone maintenance treatment programs cover a significantly greater number of HCV-related topics, and that a significantly greater proportion of the methadone programs cover specific topics (e.g., how to avoid transmitting HCV, the importance of testing for HCV, treatment options if HCV positive). Of special concern is that fewer than three quarters of the drug-free programs address what to do if co-infected with human immunodeficiency virus (HIV) and HCV and how to maintain health if HCV positive, and only about half of the drug-free and methadone maintenance treatment programs educate HCV-positive patients about the importance of obtaining vaccinations for hepatitis A and B. Drug treatment programs need to educate patients about the proactive steps these individuals can take to deal with HCV, provide critically needed HCV services, and encourage patients to make full use of these services.*

KEYWORDS *Drug treatment programs, Education, Hepatitis C.*

INTRODUCTION

Hepatitis C virus (HCV) infection has reached epidemic proportions in the United States, with approximately 4 million people estimated to have the virus.[1] The viral infection becomes chronic in about 85% of individuals who experience the acute phase of infection.[2] Serious liver complications, such as cirrhosis and liver cancer, ultimately develop in about 20% of those with chronic infection, often several decades after initial exposure.[3] Because they may not have symptoms of the virus until these serious complications develop,[4–7] many HCV-positive individuals remain

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unaware of their infection until their health is significantly compromised. By that time, treatment options may be severely limited, and they may have unknowingly transmitted the virus to others.

Given the ease with which HCV is transmitted through contaminated injection equipment, many past and present drug injectors have contracted the virus.[8,9] Nonetheless, in spite of its high prevalence among drug injectors, many individuals who inject or have injected drugs do not know their HCV serostatus.[10–13]. Many drug injectors are also uninformed or misinformed about the risks of disease progression and how to avoid contracting the virus if uninfected.[13] In addition, because drug users who have not injected drugs in the past may do so in the future, it is critical that they also be informed about the HCV-related risks involved in drug injection behaviors. Furthermore, noninjecting drug users are also at increased risk for HCV infection,[14,15] suggesting that all drug users can benefit from education about HCV.

Drug users, however, are a population that is medically underserved and difficult to reach,[16–18] and drug treatment programs are well situated to provide them with critically needed infectious disease–related education.[19,20] Some types of drug treatment programs are more likely to provide this education than others.[21–24] Our previous research involving a random nationwide sample of drug treatment programs indicated that methadone maintenance treatment programs, as compared with drug-free treatment programs, are more likely to provide HCV-related education to all of their patients[25,26] and to educate most or all of their staff about HCV.[26] Among drug-free treatment programs, residential programs are more likely than outpatient programs to provide HCV education to all of their patients.[27]

Little is known, however, about the specific topics covered and the comprehensiveness of the HCV education provided by drug treatment programs. Given the large number of patients in methadone maintenance treatment programs that injected drugs and the high prevalence of HCV among drug injectors, we compared a nationwide sample of methadone maintenance treatment programs and drug-free programs regarding the content and comprehensiveness of HCV education. All of these programs provided this education to at least some patients. Understanding differences in the content and comprehensiveness of HCV education in these two types of drug treatment programs can help provide a better understanding of the current level of HCV education services and illuminate areas in which there are gaps in this education.

METHODS

Screening for Eligibility and the Sampling Frame

Initially, a random, nationwide sample of drug treatment units was screened for eligibility for the research. By *drug treatment unit*, we mean a unit that primarily provides treatment on a one-on-one or on a group basis for drug (not only alcohol) abuse, dependence, or addiction. All of these units were included in the October 1, 2000, Inventory of Substance Abuse Treatment Services (I-SATS), a comprehensive list (N=17,160) of organized substance abuse treatment units known to the Substance Abuse and Mental Health Services Administration on that date.

Eligibility for the study was determined in telephone interviews with the managers of the units. To be eligible, units needed to be located within the 50 United States and the District of Columbia and to provide drug abuse treatment services on site

and to at least 50% of their patients. Units that provided only detoxification or very short term treatment (<7 days) were excluded. The screening questionnaire was enhanced to obtain basic information about the HCV services provided by the unit, including whether none, some, most, or all patients and staff received HCV education.

Drug treatment units were contacted sequentially and screened for eligibility according to the randomly ordered I-SATS list. A separate randomly ordered list of methadone maintenance treatment units (MMTUs) was created from which MMTUs were screened for eligibility and deliberately oversampled. Of the 1,286 units we attempted to contact between January and October 2001, 42% either were not eligible for the research or could not be contacted by telephone after repeated attempts, and 10% opted not to participate in the survey research at the time they were screened for eligibility. In all, 426 drug-free treatment units and 188 methadone units were determined to be eligible, completed the enhanced screening questionnaire, and agreed to consider participating in the survey. These 614 units constituted the sampling frame for the survey research.

Survey Research

The comprehensive, 3-hour computer-assisted telephone survey was preceded by assurances regarding the voluntary nature of the research and the confidentiality of responses. The survey received approval from the Institutional Review Board at the National Development and Research Institutes Inc. The survey questionnaire asked about the organizational structure of the unit and relationships with other organizations, finances, licensing and accreditation, the ideology of the director (especially regarding the innovation and implementation of HCV services), staffing, and patient demographics. It also asked about services provided by the unit, emphasizing health services (including medical referrals), especially as related to human immunodeficiency virus (HIV) and hepatitis C. HCV services included those involving education, HCV antibody testing, and medical monitoring and management of HCV-positive patients. Because of the great variety of topics covered, the survey sometimes involved separate interviews with the director, the staff supervisor, and the nurse (or the person most knowledgeable about the medical aspects of the unit).

Developing, Pilot Testing, and Finalizing the Survey With the exception of questions concerning medical services, much of the survey was modified from the one developed and used by D'Aunno and colleagues in their National Drug Abuse Treatment System Survey for outpatient substance abuse treatment units.[28,29] Guided by the literature on both HIV and HCV and by informal discussions with drug treatment unit managers, survey sections involving medical services (especially those related to HIV and HCV) were created expressly for the research by the project team together with its consultants. One such section focused on HCV education provided to patients and included a list of 12 topics that might be covered in this education effort. After developing a final draft of the survey questions, including those involving medical services, the data collection protocol, procedures, and the items were pilot tested in drug treatment units interviewed between October and December 2001. Based on information gathered during the pilot-testing phase, changes were made if necessary, and the final version of the survey questionnaire was implemented in January 2002. Data collection using this final version of the questionnaire continued through June 2003. Because the list of topics involving HCV education for patients did not change from the pilot version, data from both the pilot and final versions of the survey were included in the current analyses.

Procedures Project interviewers contacted eligible units to encourage them to participate in the telephone-administered survey questionnaire. If a unit expressed interest in participating in the research, information about the project and a packet of worksheets were mailed to the unit's director. The worksheets enabled respondents to gather some information in advance of the actual interview (e.g., proportion of HCV-positive patients, proportion of HIV-positive patients), information that might not be immediately known to the respondents.

After allowing sufficient time for units to complete the worksheets, interviewers arranged appointments to conduct the surveys with unit managers and medical staff. Interviewers conducted the survey at times that were convenient for respondents, dividing the interview into as many sessions as necessary to accommodate the needs of the units' respondents. A total of $100 for respondents in each unit was offered as incentive for completion of the survey and as compensation for their time.

Statistical Analysis

All analyses comparing methadone and drug-free treatment units involve chi-square tests (for categorical variables) and *t* tests (for continuous variables) for statistical significance. We report *P* values for results that are significant at the $P=.05$ level or less. We also used Cronbach's α[30] to examine the reliability of a 12-item scale (discussed below) created to assess the comprehensiveness of HCV education provided to patients.

The Study Sample

At the end of the data collection period on June 30, 2003, the survey interview database contained responses regarding HCV education from 264 of the 614 units in the sampling frame. In all, 246 of these units (152 drug-free units and 94 MMTUs) provided HCV education to at least some patients. These 246 units comprise the study sample for the current research. Based on their responses to the screening questionnaire, the 246 units in the study sample provided treatment to a larger number of patients each month than the remaining 368 units in the sampling frame (163 vs. 131, $P=.022$), and the 94 MMTUs in the study sample had significantly fewer staff with direct patient contact than the remaining 94 MMTUs in the sampling frame (13 vs. 17, $P=.014$).

Units in the study sample did not differ from the remaining units in the sampling frame, however, with respect to outpatient modality, operation by a hospital, membership in a network of units, for-profit ownership, or having medical staff on site (or at another part of the treatment agency in the case of a unit that was part of a network of units). In addition, these 246 treatment units did not differ significantly from the remaining treatment units in the sampling frame in terms of the proportion of units that educated all of their patients and most or all of their staff about HCV.

RESULTS

MMTUs and Drug-Free Units in the Study Sample

Respondents for survey questions concerning HCV education primarily included clinical supervisors, unit directors, and nurses (or other medical staff), with the number of respondents at each unit ranging from 1 to 3. In 160 of the units in the study sample, 1 individual responded to all of the survey questions, while in 55 of the units there were 2 respondents, and there were 3 respondents in the remaining 31 units.

TABLE 1. Organizational and patient characteristics in drug-free and methadone maintenance treatment units (MMTUs)

Characteristic	Drug free (N = 152)	MMTU (N = 94)
Organizational characteristics		
Private for profit, %*	17.1	40.4
Outpatient, %*	61.8	96.8
Network membership, %	73.7	67.0
Hospital affiliation, %	9.2	12.8
Number of current active patients, mean (SD)*	102 (161)	280 (182)
Number of patients in past year, mean (SD)	366 (468)	457 (387)
Number of staff with direct patient contact, mean (SD)	11 (15)	13 (8)
Unit has medical staff, %*	46.7	97.9
Patient characteristics		
Had any patients that ever injected drugs, %†	92.0	100.0
Of these, proportion that ever injected drugs, %*	20.4	78.7
Of these, proportion that injected in the past month, %*	10.5	71.1
Proportion HIV positive*	3.6	9.7
Proportion HCV positive*	13.7	62.7
Have patients co-infected with HIV and HCV, %*	39.4	86.8

*$P < .001$.
†$P < .01$.

As can be seen in Table 1, the 94 MMTUs and 152 drug-free units in the study sample did not differ significantly with respect to their affiliation with a hospital (10.6% of the units), their inclusion in a network of units (71.1%), or in the number of patients in the past year (400 patients on average), and the number of staff having direct contact with patients (12 staff, on average). MMTUs, however, were significantly more likely than drug-free treatment units to be outpatient units (96.8% vs. 61.8%, $P < .001$), for profit (40.4% vs. 17.1%, $P < .001$), and have medical personnel on staff (97.9% vs. 46.7%, $P < .001$). MMTUs also had almost three times the number of current active patients as compared with drug-free treatment units (280 vs. 102, $P < .001$).

There were statistically significant differences in a variety of patient characteristics in the two types of treatment units. MMTUs were significantly more likely than drug-free units to have at least some patients who ever injected drugs (100% vs. 92.0%, $P = .005$). Furthermore, among units having at least some injectors, MMTUs had both a greater proportion of patients who ever injected drugs (78.7% vs. 20.4%, $P < .001$) and patients who injected drugs in the month before entering the treatment unit (71.1% vs. 10.5%, $P < .001$). MMTUs were also significantly more likely to have a higher proportion of patients who were HIV positive (9.7% vs. 3.6%, $P < .001$) and HCV antibody positive (62.7% vs. 13.7%, $P < .001$). In all, a significantly greater proportion of the MMTUs than the drug-free treatment units had patients co-infected with HIV and HCV (86.8% vs. 39.4%, $P < .001$).

Content of HCV education

Table 2 lists 12 of the topics that might be covered in education about HCV and the proportion of MMTUs and drug-free units that include each of these topics in their education for patients. These two types of drug treatment units did not differ significantly in their provision of education about how HCV differs from other forms of

TABLE 2. Content of HCV education in drug-free and methadone maintenance treatment units (MMTUs) (%)

Topic	Drug free (N = 152)	MMTU (N = 94)
How HCV is contracted*	93.4	98.9
How HCV differs from other forms of hepatitis	84.2	87.2
Possible consequences of untreated HCV infection*	90.1	96.8
How to avoid contracting HCV if HCV negative*	84.9	93.6
How to avoid transmitting HCV if HCV positive†	84.9	96.8
How to maintain health if HCV positive‡	70.4	91.5
Importance of HCV testing*	85.5	95.7
Importance of obtaining HAV and HBV vaccinations if HCV positive	56.6	56.5
Effects of alcohol use in relation to HCV	86.8	90.4
What to do if co-infected with HCV and HIV†	63.2	80.9
Treatment for HCV†	75.0	88.3
Prevalence and incidence of HCV among drug users	80.9	88.3
Total number of topics covered, mean (SD)†	10.0 (3.4)	11.1 (1.7)

*$P \leq .05$.
†$P \leq .01$.
‡$P \leq .001$.

hepatitis (85.4% of the treatment units), the importance of obtaining vaccinations for hepatitis A virus (HAV) and hepatitis B virus (HBV) (56.5% of the units), the effects of alcohol use in relation to HCV (88.2% of the units), and the prevalence and incidence of HCV among drug users (83.7% of the units). There were, however, statistically significant differences between drug-free units and MMTUs in the proportion of units that educated patients concerning how HCV is contracted (93.4% vs. 98.9%, $P = .04$), the possible consequences of untreated HCV infection (90.1% vs. 96.8%, $P = .05$), how to avoid contracting HCV (84.9% vs. 93.6%, $P = .04$), how to avoid transmitting HCV (84.9% vs. 96.8%, $P = .003$), how to maintain health if HCV positive (70.4% vs. 91.5%, $P < .001$), the importance of testing for HCV (85.5% vs. 95.7%, $P = .01$), what to do if co-infected with HIV and HCV (63.2% vs. 80.9%, $P = .003$), and treatment options if HCV positive (75.0% vs. 88.3%, $P = .01$).

Comprehensiveness of HCV Education

We created a scale to measure the comprehensiveness of the HCV education services provided to patients. For each unit, we summed the number of topics included in patient education concerning HCV as presented in Table 2. Thus, each unit's score on this scale could range between 0 and 12. For the 246 units in the study sample that provided HCV education to their patients, the reliability of the scale (Cronbach's α) was .867. Scores on this scale were significantly lower for drug-free units than for MMTUs: Drug-free units averaged 10.0 (SD 3.4) versus 11.1 (SD 1.7) for MMTUs ($P = .01$).

CONCLUSIONS

Because both MMTUs and drug-free units treat several hundred patients each year, these units have the potential to provide essential HCV-related education to a large number of individuals in dire need of this service. From the perspective of HCV

prevalence, patients in MMTUs have a particularly acute need for HCV education. MMTUs in our study reported that almost two thirds of their patients are HCV positive, about five times the proportion in drug-free units. Furthermore, in units having patients that ever injected drugs (and therefore at special risk for HCV infection), about four fifths of the patients in the MMTUs were drug injectors compared to about one fifth in the drug-free units. It is therefore understandable that MMTUs provide more comprehensive patient education about HCV than drug-free treatment units. In addition, because almost 10% of the patients in MMTUs are HIV positive (as compared to 4% in drug-free units), and 87% of MMTUs have patients co-infected with HIV and HCV (as compared with 39% of the drug-free units), it is appropriate that MMTUs are more likely to include education about this co-infection.

Of concern, however, is the fact that only about half of both the MMTUs and the drug-free units educate patients about the importance of HAV and HBV vaccinations for patients who are HCV positive. Given the accelerated disease progression of HCV if co-infected with HAV or HBV,[31,32] it is prudent to inform patients about the value of these vaccinations. In addition, although the majority of the units educate patients about the importance of HCV testing, our previous research indicated that, even among units that offer HCV antibody testing to all patients, only 54% of the patients in drug-free units and 63% of those in MMTUs were actually tested.[33] Educating patients about the importance of HCV testing is therefore only a first step. Patients need to be offered this testing and actively encouraged to agree to be tested.

As we report in the current study, there is considerable variation in the proportion of drug treatment units (especially drug-free units) in the coverage of various topics of HCV education for patients. This variation, combined with variation in when HCV education is provided in treatment units (i.e., at admission, during treatment, or both),[26,27] makes it clear that there is currently no systematic protocol regarding when or what information to provide to drug treatment patients about HCV. Because the prevalence of HCV differs so markedly between drug-free and MMTUs, drug-free treatment units may need to emphasize *primary* HCV prevention in their patient education, and MMTUs may need to emphasize *secondary* prevention. Thus, the development of standardized, comprehensive HCV education curricula, tailored for each of the drug-free and methadone maintenance treatment modalities, would ensure thorough coverage of relevant information for patients in each of the two modalities. Future research needs to develop these curricula and determine the optimal time and way in which they can be presented to patients.

Such efforts have particular salience for urban areas given the density of the population, the efficiency of the transmission of HCV, and the proliferation of substance abusers who create a large reservoir for the spread of the virus. Patients educated by drug treatment units can serve as conduits for the dissemination of accurate and timely information about the virus to others in their social networks, thereby resulting in an extended impact of the drug treatment unit's HCV education effort.

There are a number of limitations to the research that should be acknowledged. First, some respondents may have been more knowledgeable about the HCV education services of their units than others. Thus, the accuracy of the responses to some of the questions is likely to have varied. Second, the data reflect the provision of HCV-related services by drug treatment units as reported by a unit administrator or medical staff member. Because patients at the treatment units were not interviewed, we are unable to report patients' perceptions of the adequacy or quality of these services. Finally, the 246 units in the study sample do not differ from the remaining units in the sampling frame in terms of a variety of organizational characteristics. Importantly,

the units in the study sample also do not differ from the remaining units in the sampling frame in terms of the proportion of units that educated all of their patients and most or all of their staff about HCV. Thus, these 246 units appear to be representative of the units in the sampling frame in terms of HCV education services, but it is difficult to know this for certain.

Nonetheless, this study provides important information concerning HCV education for patients in MMTUs and drug-free treatment units, education that is a critical component in the response to the HCV epidemic among drug users. This is consistent with the need to provide patients at risk with comprehensive risk-modifying educational programs for decreasing HCV transmission, a strategy encouraged in the most recent National Institutes of Health Consensus Development Conference Statement on the Management of Hepatitis C. Importantly, effective education about HCV needs to be accompanied by the availability of other critical HCV services for patients in drug treatment units (e.g., antibody testing, vaccinations for HAV and HBV) and strong encouragement for the use of these services by the staff of the drug treatment units.

ACKNOWLEDGEMENT

Funding for this study was provided by the National Institute on Drug Abuse (1-R01 DA13409). Points of view do not represent the official positions of the federal government, National Institute on Drug Abuse, or National Development and Research Institutes. We especially wish to thank Deborah Trunzo, of the Office of Applied Studies, Substance Abuse and Mental Health Services Administration, for her kind assistance in arranging for the project's use of the I-SATS database. We also thank Lelia Cahill, Sarah Krassenbaum, Kim Sanders, and Kristine Ziek, the project interviewers. Finally, we are grateful to the survey respondents, many of whom devoted a considerable amount of time in already overextended schedules to provide thoughtful responses to our questions.

REFERENCES

1. Alter MJ, Kruszon-Moran D, Nainan OV, et al. The prevalence of hepatitis C virus infection in the United States, 1988 through 1994. *N Engl J Med*. 1999;341:556–562.
2. Seeff LB. Natural history of hepatitis C. *Am J Med*. 1999;107(6B):10S-15S.
3. Centers for Disease Control and Prevention. Recommendations for prevention and control of hepatitis C virus (HCV) infection and HCV-related chronic disease. *MMWR Morb Mortal Wkly Rep*. 1998;47:1–39.
4. Heintges T, Wands JR. Hepatitis C virus: epidemiology and transmission. *Hepatology*. 1997;26:521–526.
5. Kiyosawa K, Sodeyama T, Tanaka E, et al. Interrelationship of blood transfusion, non-A, non-B hepatitis and hepatocellular carcinoma: analysis by detection of antibody to hepatitis C virus. *Hepatology*. 1991;12:671–675.
6. Simonetti RG, Camma C, Fiorello F. Hepatitis C virus infection as a risk factor for hepatocellular carcinoma in patients with cirrhosis: a case-control study. *Ann Intern Med*. 1992;116:97–102.
7. Yu MC, Tong MJ, Corsaget P. Prevalence of hepatitis B and C viral markers in black and white patients with hepatocellular carcinoma in the United States. *J Natl Cancer Inst*. 1990;82:1038–1041.
8. Hagan H, Thiede H, Weiss HS, Hopkins SG, Duchin JS, Alexander ER. Sharing of drug preparation equipment as a risk factor for hepatitis C. *Am J Public Health*. 2001;91:42–46.

9. Thomas DL, Vlahov D, Solomon L, et al. Correlates of hepatitis C virus infections among injection drug users. *Medicine*. 1995;74:212–220.
10. Best D, Noble A, Finch E, Gossop M, Sidwell C, Strang J. Accuracy of perceptions of hepatitis B and C status: cross sectional investigation of opiate addicts in treatment. *Br Med J*. 1999;319:290–291.
11. Dhopesh VP, Taylor KR, Burke WM. Survey of hepatitis B and C in an addiction treatment unit. *Am J Drug Alcohol Abuse*. 2000;26:703–707.
12. Kwiatkowski CF, Fortuin Corsi K, Booth RE. The association between knowledge of hepatitis C virus status and risk behaviors in injection drug users. *Addiction*. 2002;97:1289–1294.
13. Stein MD, Maksad J, Clarke, J. Hepatitis C disease among injection drug users: knowledge, perceived risk and willingness to receive treatment. *Drug Alcohol Depend*. 2001;61:211–215.
14. Rosenblum A, Nuttbrock L, McQuistion HL, Magura S, Joseph H. Hepatitis C and substance use in a sample of homeless people in New York City. *J Addict Dis*. 2001;20:15–25.
15. Tortu S, Neaigus A, McMahon J, Hagan D. Hepatitis C among non-injecting drug users: a report. *Subst Use Misuse*. 2001;36:523–534.
16. Bae JP. Assessing the need, use, and developments in mental health/substance abuse care. *Health Care Financ Rev*. 1997;18:1–4.
17. Chitwood DD, McBride DC, French MT, Comerford M. Health care need and utilization: a preliminary comparison of injection drug users, other illicit drug users, and nonusers. *Subst Use Misuse*. 1999; 34:727–746.
18. Contoreggi C, Rexroad VE, Lange WR. Current management of infectious complications in the injecting drug user. *J Subst Abuse Treat*. 1998;15:95–106.
19. Clapp JD. Organizational factors related to AIDS/HIV education in outpatient substance abuse treatment units. *J Health Soc Policy*. 1998;9:1–13.
20. Metzger DS, Navaline H, Woody GE. Drug abuse treatment as AIDS prevention. *Public Health Rep*. 1998;113(suppl 1):97–106.
21. D'Aunno T, Vaughn TE, McElroy P. An institutional analysis of HIV prevention efforts by the nation's outpatient drug abuse treatment units. *J Health Soc Behav*. 1999;40:175–192.
22. Friedmann PD, Alexander JA, D'Aunno TA. Organizational correlates of access to primary care and mental health services in drug abuse treatment units. *J Subst Abuse Treat*. 1999;16:71–80.
23. Grella CE, Etheridge RM, Joshi V, Anglin MD. Delivery of HIV risk-reduction services in drug treatment programs. *J Subst Abuse Treat*. 2000;19:229–237.
24. Polinsky ML, Hser Y-I, Anglin MD, Maglione MA. Drug-user treatment programs in a large metropolitan area. *Subst Use Misuse*. 1998;33:1735–1761.
25. Astone J, Strauss SM, Vassilev ZP, Des Jarlais DC. Provision of hepatitis C education in a nationwide sample of drug treatment programs. *J Drug Educ*. 2003;33:107–117.
26. Strauss SM, Astone J, Vassilev ZP, Des Jarlais DC, Hagan H. Gaps in the drug-free and methadone maintenance treatment program response to hepatitis C. *J Subst Abuse Treat*. 2003;24:291–297.
27. Strauss SM, Falkin GP, Vassilev Z, Des Jarlais DC, Astone J. A nationwide survey of hepatitis C services provided by drug treatment programs. *J Subst Abuse Treat*. 2002;22:55–62.
28. D'Aunno T, Vaughn TE, McElroy P. An institutional analysis of HIV prevention efforts by the nation's outpatient drug abuse treatment units. *J Health Soc Behav*. 1999;40:175–192.
29. D'Aunno TA, Vaughn TE. An organizational analysis of service patterns in outpatient drug abuse treatment units. *J Subst Abuse*. 1995;7:27–42.
30. Cronbach LJ. Coefficient α and the internal structure of tests. *Psychometrika*. 1951;16:297–334.
31. Vento S, Garofano T, Renzini C, et al. Fulminant hepatitis associated with hepatitis A virus superinfection in patients with chronic hepatitis C. *N Engl J Med*. 1998;338:286–290.

32. Wong V, Wreghitt TG, Alexander GJM. A prospective study of hepatitis B vaccination in patients with chronic hepatitis C. *Br Med J*. 1996;312:1336–1337.
33. Strauss SM, Astone J, Des Jarlais DC, Hagan H. The relationship between HIV testing and HCV antibody testing in methadone maintenance and drug-free treatment programs. Poster presented at: Sixty-fifth Annual Meeting of the College on Problems of Drug Dependence; June 16, 2003; Bal Harbour, FL.