



Published in final edited form as:

*J Adolesc Health*. 2011 March ; 48(3): 229–233. doi:10.1016/j.jadohealth.2010.08.001.

## Acceptability of Drug Testing in an Outpatient Substance Abuse Program for Adolescents

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### Introduction

Laboratory testing for drugs of abuse, commonly known as “drug testing,” may be an effective therapeutic adjuvant to reduce drug use in patients with substance use disorders. [1-3] Participants in drug testing programs typically receive either positive reinforcement such as cash rewards or small gifts when a drug test is negative or negative consequences when a drug test indicates ongoing drug use. [4] Research has consistently demonstrated the efficacy of these programs among adults, and emerging research suggests that drug testing is acceptable and effective with adolescents and young adults participating in drug abuse treatment programs.[5,6]

While available research is promising, significant obstacles to implementing drug testing programs with adolescents remain. Drug testing is technically challenging and a substantial proportion of drug tests are susceptible to interpretation error.[7] Few physicians have the skills necessary to use this procedure effectively.[8] Standardized protocols that may help to limit interpretation errors have been published for work place [9] and treatment settings [4], but these protocols were designed for adults. We were unable to find a standardized drug testing protocol designed to address issues unique to adolescents.

While drug testing has been shown to reduce drug use by adolescents in a subspecialty treatment program, it also significantly increases treatment cost over counseling alone, with voucher payments and staff time accounting for much of the additional cost. [10] To minimize these costs, clinicians could counsel and support parents in developing appropriate

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responses to drug test results, decreasing overall expenses of the program. However, whether adolescents would be willing to participate in a drug testing program that required informing parents of results has not yet been established.

The current report describes a drug testing program for adolescents participating in an outpatient adolescent substance abuse treatment program, which was designed to address previously identified programmatic challenges, and reports on the acceptability of this program to patients and parents.

## Methods

This manuscript reports the enrollment status of 114 consecutive patients who were invited to participate in a drug testing program at a hospital based, outpatient substance abuse treatment program for adolescents.

## Patients

Adolescents and young adults 13-21 years old who presented to a children's hospital-based outpatient adolescent substance abuse program with a parent or guardian completed a clinical evaluation, [11] which included a determination of eligibility for a randomized controlled trial of a urine drug testing program. Patients were eligible to participate in the study if they were at high risk for a substance use disorder, as determined by a score of  $\geq 1$  on the CRAFFT screening tool [12,13] and had used alcohol, marijuana or another drug on  $\geq 2$  occasions in the preceding 30 days or  $\geq 6$  occasions in the preceding 90 days. Patients were ineligible if 1) the clinical team recommended hospitalization, 2) they met dependence criteria for inhalant use, because inhalants are not easily detectable in urine or 3) they were mandated to participate in a drug testing program (e.g., by a juvenile or criminal court or school).

A clinician described the drug testing protocol in detail, including parental notification of test results to all adolescents for whom drug testing was recommended and their parents. For all adolescents who were eligible for the drug testing study, the clinician also described the randomization procedure and the control arm (i.e. adolescents randomized to control did not participate in the drug testing protocol during the 12 week study period but were offered the 12 week protocol free of charge upon study completion.) Eligible adolescents who agreed to participate met with a research assistant, who completed informed consent procedures with adolescents and their parents. The study protocol was approved by the Children's Hospital Boston Committee on Clinical Investigations.

Patients who were ineligible, based on insufficient quantity/frequency of drug use and those who refused study participation were invited to participate in an identical drug testing protocol that did not randomize to a non-testing arm. Families who chose this option paid an out-of-pocket fee for administrative coordination; financial assistance was available for any family who wished to participate but could not afford it. Patients who were referred to a more intensive level of care were also offered the clinical drug testing program, until they were admitted to a suitable program.

We recorded eligibility status along with gender, age, race, ethnicity, grade in school, parental education, substance use disorder diagnoses and treatment recommendations. We asked all patients for permission to include their demographic data and diagnostic and treatment information in the study database regardless of their study eligibility status or their decision to enroll in the trial; 2 patients declined and were not included in this analysis. Clinicians asked reasons for refusal of all adolescents who declined any drug testing.

## Laboratories and Urine Collection Procedures

At the time of enrollment, each participant selected a conveniently located commercial laboratory and we sent orders to their laboratory of choice. Whenever possible, we used the collection procedures checklist as specified by Substance Abuse and Mental Health Services Administration (SAMHSA) protocol for urine collection, [9] which includes presenting photographic identification, removing bags and outer wear, and using a lavatory without running water and with toilet water dyed blue. If the teen and family were unable to use a laboratory that offered these collection procedures, the laboratory's standard (unobserved) collection procedures were used; though we recorded the urine collection procedures for each sample. This was necessary because many families were unable to locate a convenient laboratory necessary for repeated testing that offered the SAMHSA urine collection protocol. Adolescents were unaware of differences in urine collection procedures at the time of enrollment and laboratory selection. We checked a random urine creatinine level and specific gravity to monitor for diluted specimens, because dilution is the simplest method for circumventing positive drug test results.

## Drug Testing Schedule

The research team generated a random drug-testing calendar for the drug-testing program using an Excel spread sheet, which selected one day per week on average, for a total of 8-16 calls during the 12 week period. If a testing date fell on a day when the laboratory was closed the program automatically moved to the next work day. Using this method we over-represented Mondays and days following holidays when drug use by adolescents is more likely. In addition to the scheduled calls, parents were asked to notify a staff member as soon as possible after suspecting that their teenager had used alcohol or drugs, and we then called the adolescent for an additional drug test on the next weekday.

We considered a test “on time” if it was completed within 36 hours of notification, “late” if it was completed 36 - 60 hours after notification (excluding weekends and holidays), and “missed” if not completed within 60 hours. These cut-offs are different than those used by work place drug testing programs; the Department of Health and Human Services drug testing guidelines recommend up to 48 hours for a test to be considered on time for a job applicant, but does not include a “late” category. [14] We chose these definitions because adolescents are often dependent on adults for transportation to a laboratory, which makes the timing of testing dependent on both the adolescent and adult schedules. We have found these time periods are practical for the majority of adolescents participating in an outpatient substance abuse program while also participating in school and other activities while not being overly sensitive to missed tests. We left a minimum of one day between tests so that we could determine the status of the previous test (on time, late, or missed) prior to the subsequent test because in our experience many adolescents called to test on two consecutive days would only present for a single test.

## Notification

We called parents' personal cell phones the day before a scheduled drug test and reminded them not to inform their child. If a parent reported that the adolescent could not present to the laboratory on the testing day, we rescheduled the test to the next available day. If the parent was unable to be reached, we left a voice mail message. If a parent did not have a cell phone with voice mail, we left a message on the home phone asking for a return call to minimize interference by adolescents receiving messages before their parents. On testing days, adolescents received an automated text message by 8 am instructing them to go for a drug test and to confirm completion via a return text message.

## Drug Testing Panel and Confirmation

We ordered a multi-drug screening panel (Tetrahydrocannabinol, Amphetamines, Barbiturates, Benzodiazepine Metabolites, Cocaine, Methadone, Methaqualone, Opiates, Phencyclidine, Propoxyphene), routine urinalysis (with specific gravity) and random urine creatinine level on every urine specimen. We considered specimens with a creatinine level of less than 25 mg/dL and specific gravity less than 1.005 too dilute for interpretation, and tests with a creatinine level of less than 2 mg/dL substituted (not urine). While these parameters are more stringent than those used by federal workplace testing programs, [15] we believe that they are appropriate for an adolescent substance use treatment program, because many adolescents with moderately dilute urine specimens have reported intentional dilution in an attempt to avoid a positive drug test. [8] Laboratory staff made a note on the report if they detected an unusual smell or color, and we considered these specimens adulterated.

In addition to a standard, multi-drug panel, we included additional tests as indicated by the teen's history. For example, we ordered an expanded opioid panel for all teens with a history of opioid analgesic misuse/abuse; synthetic opioids such as oxycodone are not detected on standard opiate screens, which are designed to detect natural occurring opiates (morphine and codeine). We ordered an expanded amphetamine panel for adolescents with a history of 3,4-methylenedioxymethamphetamine ("Ecstasy") use, and an expanded benzodiazepine panel or a separate test for dextromethorphan as indicated by history, because none of these substances are detected on routine screening panels. The laboratory performed gas chromatography/mass spectrometry (GC/MS) confirmatory testing for all positive screens to rule out false-positive tests, and quantitative cannabinoid levels which we used to calculate a cannabinoid/creatinine ratio. [16] For adolescents who reported a history of daily or more marijuana use, we calculated a cannabinoid/creatinine ratio for each positive test. We interpreted tests results as indicative of new marijuana use if the ratio remained constant or increased between two consecutive tests, or "prolonged excretion" if the cannabinoid/creatinine ratio decreased between two consecutive tests.

## Interpretation of Urine Screen Results

We recorded all current prescription medications in the medical record, and asked parents to notify us if another physician prescribed a new medication (and provide a copy if their child was prescribed narcotic pain medication) or if their child used any over-the-counter medications at any time during the 12-week program. We instructed teens to avoid foods and medications that contain alcohol, such as over-the-counter liquid cold medications, during the testing period.

A clinician reviewed all drug test results. We reviewed negative tests to ensure that they were adequately concentrated, i.e., a creatinine concentration of  $\geq 25$  mg/dL. We reviewed the patient's list of medications whenever a test was positive to determine whether a prescribed medication could cause the observed result. If we interpreted a test as positive, substituted or adulterated, quantity insufficient for conducting testing panels or missed, we notified parents that we had identified a problem with a drug test and asked them to schedule an appointment to review results. No immediate intervention was made for a single dilute test; if two or more consecutive tests were dilute, the patient was asked to make an in-person appointment. Parents were notified if a single test was late (completed 36-60 hours after the request); participants were asked to make an appointment to discuss test results if 2 or more tests were late. Whenever an adolescent presented for an in-person visit, a physician reviewed results privately with him/her to determine whether an explanation other than illicit drug use could explain the observed results. After interpreting whether the drug test

results indicated new drug use or not, the physician invited the parent into the meeting and shared the final interpretation.

Families self-addressed 2 envelopes and received a report card via United States mail detailing all of the laboratory results at 6 and 12 weeks. Parental notification was the only consequence of a positive drug test implemented by the program. We offered to all parents the opportunity to meet with a clinician to discuss parenting strategies, including praise and encouragement for negative tests, and logical consequences for positive drug tests.

### Data Management

We recorded study eligibility, treatment recommendations, enrollment status in the study or clinical program, or reasons for refusal on paper during clinical meetings with patients and their families and later entered responses electronically for tracking. These data were then imported into SPSS™ v. 15.0 for analyses. We calculated simple frequencies for each variable. We used the chi-square test of association to examine the relationship between adolescent characteristics (i.e., gender, age, race, parent education and diagnosis of substance use disorders) and participation in drug testing (PDT). A two-sided p-value of <0.05 was used to indicate statistically significant associations.

### Results

Adolescents in our sample ranged from 13.4-21.0 years old with a median age of 17.2 years. Most were boys (68%) and self-categorized as white, non-Hispanic (79%). Sixty-nine percent had a parent who had graduated college. One hundred ten of 114 (97%) eligible participants met DSM-IV criteria for at least one substance use disorder; 76% met criteria for either alcohol abuse or dependence, 90% met criteria for either cannabis abuse or dependence and 28% met criteria for abuse or dependence of a substance other than alcohol or cannabis.

Of the first 114 eligible adolescents, 67 (59%) enrolled in drug testing – 35 (31%) elected the fee-for-service program and 32 (28%) enrolled in the study. One patient declined drug testing because of the time commitment it entailed, and 6 patients decided to seek treatment in another program. None of the other adolescents gave specific reasons for refusal to participate in the drug testing study. No patients were excluded for a diagnosis of inhalant dependence.

### Discussion

We found that the majority of adolescents presenting to an outpatient substance abuse program were willing to participate in a structured drug testing protocol that required parental notification of results. Drug testing of adolescents is controversial. The American Academy of Pediatrics Committee on Substance Abuse stated that *involuntary* drug testing is inappropriate for adolescents with decisional capacity. [17] This statement referred to screening programs that require drug testing of unselected adolescents, but it could dissuade physicians from drug testing at all. One national survey found that less than half of physician respondents said they would recommend drug testing based on a parents' concern or their own suspicion of drug use; overall there was little consistency to physicians' approach to drug testing. [18] However, Schwartz et al. [19] found that most parents (81.7%) and a small majority (53.7%) of adolescents presenting for routine health care believed that parents have the right to ask their physician to order a urine drug test without a teen's consent; slightly more adolescents (57%) agreed that a physician had the right to order a nonconsensual urine test for a teen with interpersonal, behavioral, or academic problems, suggesting that parents and most adolescents are willing to consider drug testing as part of

medical assessment and treatment. However, the adolescent respondents in this study were drawn from a general medical clinic sample, and responding to hypothetical questions. Our study builds on this finding by demonstrating that the majority of adolescents who present for a substance abuse evaluation agree to participate in a drug testing protocol.

This protocol is unique among drug testing programs in that the only consequence of a positive drug test implemented by the program is a report to parents, who ultimately determine and implement rewards for abstinence or consequences for drug use. All participating adolescents were willing to share drug test results with parents. We recommend this approach because research has demonstrated improved outcomes for adolescents when parents are involved in treatment.[20,21] Parents can implement potentially powerful, low-cost positive and negative consequences, such as approbation, expansion of privileges such as more time with friends, or logical consequences such as suspension of driving privileges when a drug test indicates ongoing drug use. These steps can significantly reduce cost of the contingency management and may enhance the adolescent's safety. Relying on parents to support treatment may also reduce the amount of staff time required to manage a drug testing program, potentially making it more practical for use in a general medical setting.

Substance use and its related problems and disorders are common among adolescents. Approximately 45% of adolescents presenting for routine care in a New England network of primary care practices reported substance use; 14% reported 1 or more serious problems related to substance use, 7% met the diagnostic threshold for abuse and 3% for dependence. [22] Only a small percentage of teens that need treatment enter structured programs. [23] Primary care providers most often recommend a return visit to their office when they are concerned about substance use by an adolescent. [24] The protocol described in this report could make drug testing practical by primary care physicians, and meet two important needs –diagnostic certainty (i.e. when there is lack of agreement regarding the nature and extent of the problem), and monitoring (when an adolescent is willing to commit to quitting drug use, but unwilling or unable to participate in structured treatment). Fisher et al. found that about half of parents whose children had used alcohol or marijuana were aware of their adolescent's drug use, and parents were more likely to be aware if their child had a substance use disorder [25]. Hassan et al. found that 47% of adolescents who met criteria for a substance use disorder in a primary care population were receiving mental health counseling. [24] Drug testing could be used as a therapeutic adjuvant for adolescents who already receive counseling or as a treatment modality for those whose parents are already aware of or are concerned about their use.

## Limitations

A number of potential limitations should be noted. We are reporting on a sample that included boys and girls with a range of substance use disorders, but was drawn from a treatment population. We do not know whether this program would be acceptable to adolescents coming for primary care. However, many participants were referred by their primary care providers, suggesting that some adolescents and their families discuss substance use with their physicians and seek advice and treatment recommendations from them.

This analysis examined the acceptability rate of drug testing in the context of a randomized controlled trial of a drug testing program. Adolescents and their parents discussed participation with clinicians who were specially trained and motivated to invite eligible adolescents. It is possible that participation rates would be lower outside the context of such a study. We think that this is unlikely, however, because more adolescents and parents decided to forgo the study with all of its benefits in order to avoid possible randomization to a control arm which would result in a delay in starting drug testing.

## Conclusions

The majority of patients presenting for a substance abuse evaluation were willing to participate in the drug testing protocol described in this manuscript. The highly structured nature of the protocol and use of parental involvement may reduce staff demands enough to make dissemination of this program feasible in a more general medical setting. Future research is warranted to assess costs, and potential risks and benefits of this program.

## Acknowledgments

This work was supported in part by grants # K23 DA 19570 and # K24 DA 022288 from the National Institute on Drug Abuse. The authors would like to acknowledge Dr. Leonard Rappaport for his support in preparing this manuscript.

## References

1. Stitzer ML, Bigelow GE, Liebson IA, et al. Contingent reinforcement for benzodiazepine-free urines: evaluation of a drug abuse treatment intervention. *J applied behavior analysis* 1982;15(4): 493–503. Winter.
2. Chutuape MA, Katz EC, Stitzer ML. Methods for enhancing transition of substance dependent patients from inpatient to outpatient treatment. *Drug alcohol depend* Jan 1;2001 61(2):137–143. [PubMed: 11137278]
3. Petry NM, Tedford J, Austin M, et al. Prize reinforcement contingency management for treating cocaine users: how low can we go, and with whom? *Addiction* (Abingdon, England) Mar;2004 99(3):349–360.
4. Petry NM. A comprehensive guide to the application of contingency management procedures in clinical settings. *Drug alcohol depend* Feb 1;2000 58(1-2):9–25. [PubMed: 10669051]
5. Kamon J, Budney A, Stanger C. A contingency management intervention for adolescent marijuana abuse and conduct problems. *J Am Acad Child Adolesc Psychiatry* Jun;2005 44(6):513–521. [PubMed: 15908833]
6. Carroll KM, Rounsaville BJ. A perfect platform: combining contingency management with medications for drug abuse. *Am J Drug Alcohol Abuse* 2007;33(3):343–365. [PubMed: 17613963]
7. Levy S, Harris SK, Sherritt L, et al. Drug testing of adolescents in general medical clinics, in school and at home: physician attitudes and practices. *J Adolesc Health* Apr;2006 38(4):336–342. [PubMed: 16549293]
8. Levy S, Harris SK, Sherritt L, et al. Drug testing of adolescents in ambulatory medicine: Physician practices and knowledge. *Arch Pediatr Adolesc Med* Feb;2006 160(2):146–150. [PubMed: 16461869]
9. Substance Abuse and Mental Health Services Administration. Mandatory guidelines for federal workplace testing programs. [May 5, 2008]. Available from: <http://www.dwp.samhsa.gov>
10. Olmstead TA, Sindelar JL, Easton CJ, et al. The cost-effectiveness of four treatments for marijuana dependence. *Addiction* (Abingdon, England) Sep;2007 102(9):1443–1453.
11. Levy S, Vaughan BL, Angulo M, et al. Buprenorphine replacement therapy for adolescents with opioid dependence: early experience from a children's hospital-based outpatient treatment program. *J Adolesc Health* May;2007 40(5):477–482. [PubMed: 17448411]
12. Knight JR, Shrier LA, Bravender TD, et al. A new brief screen for adolescent substance abuse. *Arch Pediatr Adolesc Med* Jun;1999 153(6):591–596. [PubMed: 10357299]
13. Knight JR, Sherritt L, Shrier LA, et al. Validity of the CRAFFT substance abuse screening test among adolescent clinic patients. *Arch Pediatr Adolesc Med* Jun;2002 156(6):607–614. [PubMed: 12038895]
14. Department of Health and Human Services. Model plan for a comprehensive drug-free workplace program. 1990
15. Gourlay, D.; Howard, HA.; Yale, CA. *Urine Drug Care in Primary Care: Dispelling the Myths and Designing Strategies*. California Academy of Family Physicians; San Francisco: 2002.

16. Huestis M, Cone E. Differentiating new marijuana use from residual drug excretion in occasional marijuana users. *J Anal Toxicol* 1998;22(6):445–454. [PubMed: 9788519]
17. American Academy of Pediatrics. Testing for Drugs of Abuse in Children and Adolescents. *Pediatrics* 1996;98(2):305–307. [PubMed: 8692638]
18. Levy S, Harris SK, Sherritt L, et al. Drug testing in general medical clinics, in school and at home: Physician attitudes and practices. *J Adolesc Health* 2006;38:336–342. [PubMed: 16549293]
19. Schwartz RH, Silber TJ, Heyman RB, et al. Urine testing for drugs of abuse: a survey of suburban parent-adolescent dyads. *Arch Pediatr Adolesc Med* 2003;157(2):158–161. [PubMed: 12580685]
20. Williams RJ, Chang SY. A Comprehensive and Comparative Review of Adolescent Substance Abuse Treatment Outcome. *Clin Psychol* May 1;2000 7(2):138–166.
21. Liddle HA, Rowe CL, Dakof GA, et al. Early intervention for adolescent substance abuse: Pretreatment to posttreatment outcomes of a randomized clinical trial comparing multidimensional family therapy and peer group treatment. *J Psychoactive Drugs* Mar;2004 36(1):49–63. [PubMed: 15152709]
22. Knight JR, Harris SK, Sherritt L, et al. Prevalence of positive substance abuse screens among adolescent primary care patients. *Arch Pediatr Adolesc Med* 2007;161(11):1035–1041. [PubMed: 17984404]
23. Substance Abuse and Mental Health Services Administration. Young Adults' Need for and Receipt of Alcohol and Illicit Drug Use Treatment: 2007.. The NSDUH Report, June 2009. Available at <http://www.oas.samhsa.gov/2k9/157/YoungAdultsDrugTxTHTML.pdf>
24. Hassan A, Harris SK, Sherritt L, et al. Primary Care Follow-up Plans for Adolescents With Substance Use Problems. *Pediatrics* 2009;124:144–150. [PubMed: 19564294]
25. Fisher SL, Bucholz KK, Reich W, et al. Teenagers are right--parents do not know much: an analysis of adolescent-parent agreement on reports of adolescent substance use, abuse, and dependence. *Alcohol Clin Exp Res* Oct;2006 30(10):1699–1710. [PubMed: 17010137]