Addressing the clinical needs of problem drug user patients

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Abstract

Introduction—Illicit drug use is a serious public health problem associated with significant co-occurring medical disorders, mental disorders, and social problems. Yet most individuals with drug use disorders have never been treated, though they often seek medical treatment in primary care. The purpose of the present study was to examine baseline characteristics of persons presenting in primary care across a range of problem drug use severity to identify their clinical needs.

Methods—We examined socio-demographic characteristics, medical and psychiatric comorbidities, drug use severity, social and legal problems, and service utilization for 868 patients with drug problems recruited from primary care clinics in a safety-net medical setting. Based on Drug Abuse Screening Test (DAST-10) results, individuals were categorized as having low, intermediate, or substantial/severe drug use severity.

Results—Patients with substantial/severe drug use severity had serious drug use (opiates, stimulants, sedatives, intravenous drug use), high levels of homelessness (50%), psychiatric comorbidity (69%), arrests for serious crimes (24%), and frequent use of expensive emergency department and inpatient hospitals. Patients with low drug use severity were primarily users of marijuana with little reported use of other drugs, less psychiatric co-morbidity, and more stable lifestyles. Patients with intermediate drug use severity fell in-between the substantial/severe and low drug use severity subgroups on most variables.

Conclusions—Patients with highest drug use severity are likely to require specialized psychiatric and substance abuse care in addition to ongoing medical care that is equipped to address the consequences of severe/substantial drug use including intravenous drug use. Because of their milder symptoms, patients with low drug use severity may benefit from a collaborative care model that integrates psychiatric and substance abuse care in the primary care setting. Patients with intermediate drug use severity may benefit from selective application of interventions

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suggested for patients with highest and lowest drug use severity. Primary care safety-net clinics are in a key position to develop a range of responses to serve patients with problem drug use which are locally effective and which may also inform national efforts to establish Patient-Centered Medical Homes and to implement the Affordable Care Act.

Keywords

Drug Abuse; Comorbidity; Delivery of Health Care; Integrated Primary Care; Health Care Costs

INTRODUCTION

Illicit drug use is a serious public health problem with high economic impact.[1] There is high comorbidity between drug use disorders and both medical[2,3] and mental health[4] disorders, and drug use is commonly associated with a host of social problems such as homelessness,[5] criminal justice involvement[6] and unemployment.[5] Despite this substantial disability and comorbidity, most individuals with drug use disorders have never been treated.[2] This finding underscores the importance of the detection and referral roles of primary care physicians in the treatment of individuals with substance use disorders, who are often seen in primary care due to their heightened prevalence of medical conditions.[3]

The Affordable Care Act (ACA) has established a number of mechanisms designed to promote person-centered care. These changes greatly expand responsibilities of primary care providers, especially given the ACA's expectations for better outcomes and reduced costs for those with comorbid conditions.[7] Yet, very little is known about individuals with problem drug use who present in primary care, as most information about this population comes from national surveys,[2,4] studies of treatment-seeking populations,[3,5] or studies carried out in emergency departments (EDs).[8]

To address this gap, the present study was designed to take advantage of a randomized controlled trial that examined the impact of a brief intervention on persons with problem drug use in a safety-net primary care setting, where patients with socioeconomic disadvantage often associated with drug use may be seen.[9,10] Our goal was to examine baseline characteristics of the 868 patient with problem drug use in order to identify their clinical needs. This information can serve as a guidepost for primary care physicians who must perform a rapid needs assessment on patients they serve and determine how to utilize the limited resources that they might have.

METHODS

Participants

All 868 participants were recruited between April 2009 and September 2012 from the waiting rooms of 7 primary care clinics in a safety-net medical system in Seattle, Washington;[9,10] 86.4% of participants came from 3 of these clinics. Exploratory analyses revealed that the full range of drug use severity was represented in each of these clinics, including one clinic that specialized in HIV and infectious disease which contributed approximately 7% of participants to this study. An ANOVA comparing mean Drug Abuse

Screening Test (DAST-10)[11] scores across each of the 7 sites revealed a significant site effect ($P<0.001$); post-hoc Tukey analyses indicated that the mean DAST-10 scores of participants at one of the 3 large sites were higher than the other 2 large sites. Because the full range of drug use severity was represented in each of the clinics, because the clinics were reflective of the diverse patient populations served by this safety-net medical system, and because we saw no reason to believe that the greater concentration of participants with higher drug use severity at one of the sites would impact the overall relationship between DAST-10 scores and baseline characteristics—the primary purpose of this study—we felt justified in combining data across sites.

Included in the study were adults age 18 and older who acknowledged using an illegal drug or a prescription medication for nonmedical reasons at least once in the 3 months before screening; were currently receiving care in the primary care clinic and planning to continue such care for the next year; were English-speaking and able to read and understand screening and consent forms (6th grade literacy); and had phone or e-mail access to facilitate scheduling follow-up assessments. Excluded were individuals who attended formal substance abuse treatment in the past month (excluding self-help groups such as Narcotics Anonymous). Also excluded were individuals who had imminent high suicide risk, life-threatening medical illness, severe cognitive impairment, or active psychosis in order for participants to be capable of providing informed consent, able to fully comprehend the intervention, and to be "safe" (i.e., to not be in a life-threatening status). All participants gave written informed consent and received a $25 gift card for completing study procedures at baseline. The study was approved by the University of Washington Institutional Review Board and an independent Data and Safety Monitoring Board.

Measures

Participants were sorted into 3 subgroups based on their DAST-10 scores: low drug use severity defined as a DAST-10 score of 1 or 2; intermediate drug use severity as a score of 3 to 5; substantial/severe drug use severity as a score of 6 to 10.[12] Drug use severity corresponds to the extent of consequences related to drug misuse and also maps on to treatment recommendations that correspond to the American Society of Addiction Medicine placement criteria such that a DAST-10 score of 1–2 corresponds to a treatment recommendation for brief counseling; a score of 3–5 to a recommendation for outpatient or intensive outpatient services; a score of 6–8 to a recommendation for intensive outpatient or residential/inpatient services; and a score of 9–10 to a recommendation for residential/inpatient services or medically managed intensive inpatient services.[12]

Participants were also characterized along a dimension of psychiatric severity as measured by the Addiction Severity Index-Lite (ASI) psychiatric composite score that ranges from 0 to 1, with 1 representing greatest severity.[13] High psychiatric severity was defined as a score of >0.38.[14] Other measures used in this study included the Treatment Services Review,[15] the Thoughts about Abstinence Scale,[16] the HIV Risk-taking Behaviour Scale,[17] and standard demographic information.

Self-reported data collected from participants were supplemented with data from several administrative sources including state chemical dependency (CD) treatment records, felony

and gross misdemeanor arrest records from the Washington State Patrol, and medical costs and utilization (including ED visits, inpatient hospital admissions, and outpatient medical visits) from encounter and billing records maintained by the medical center where the study took place. We also identified a number of chronic conditions for each participant using International Classification of Diseases version 9 (ICD-9) codes from medical records and the Chronic Illness and Disability Payment System (CDPS).[18] Data were available for the 2 years prior to baseline for all administrative measures.

Data Analysis

Demographic, medical, psychiatric, substance use/treatment, and other psychosocial characteristics for the 3 DAST-10 drug use severity subgroups were compared with descriptive statistics. Chi-square tests were used for proportions, ANOVA for continuous variables meeting distributional assumptions for parametric statistics, and Kruskal Wallis tests for variables meeting distributional assumptions for non-parametric statistics. Post-hoc tests were conducted to identify specific subgroup differences: pairwise comparisons for proportions were adjusted using a Bonferroni correction; Tukey and Games-Howell tests were used for continuous measures. Statistical significance was evaluated at $P<.05$.

RESULTS

Description of the Overall Sample

A descriptive summary of the overall sample's (n=868) baseline demographic, substance use/treatment, and other psychosocial characteristics can be found in Table 1. Approximately 70% of the sample was male, 55% were non-white, 81% were single, 91% were not working, and 30% reported being homeless 1 or more nights in the past 3 months.

According to ASI responses, most participants admitted to using marijuana in the previous 30 days (76%), 42% to using stimulants, about 26% to using opiates, and 8% to intravenous drug use; 45% used 2 or more drugs in the previous 30 days. Almost 69% endorsed using alcohol in the previous 30 days and 72% endorsed using nicotine. In the 2 years prior to study enrollment, state records indicated 17% had been admitted to CD treatment at least once, 8% had been admitted to detoxification services with no subsequent CD treatment admission, and 14% had been arrested for a felony or gross misdemeanor. About 37% indicated a goal of total abstinence from drugs.

Medical and psychiatric characteristics of participants are summarized in Table 2. In the 2 years prior to study enrollment, participants had a high number of co-existing chronic medical conditions (mean >7 chronic medical conditions) and substantial service utilization, with 62% having 1 or more ED visits, 27% hospitalized 1 or more times with a preceding ED visit, and almost 92% receiving 1 or more outpatient medical services. ASI responses revealed the majority of participants experienced psychiatric problems with 71% having received prescribed medication for psychological or emotional problems in their lifetime. Almost 64% had at least 1 mental illness diagnosis in their medical record in the previous 2 years.

The twenty most frequently recorded ICD-9 diagnoses for 848 participants for whom we had medical data are summarized over the 2 years prior to study enrollment in Table 3. The most frequent diagnosis was hypertension, followed by tobacco use disorder, depressive disorder, pain in limb, and chronic pain Only 4% of these episodes of care were covered by a commercial payer, with the remaining covered by Medicaid (38%), Medicare (27%), or unsponsored/uncompensated care (31%).

Severity of Drug Use

DAST-10 drug severity subgroups were compared on demographic, substance use/treatment, other psychosocial, medical, and psychiatric variables with results of these comparisons summarized in Tables 1, 2, 4, and 5.

Substantial/Severe Drug Use Severity—Results indicated that patients with the highest drug use severity differed from patients with intermediate and low drug use severity as follows: they were younger, more likely to be homeless, to have used stimulants, opiates, 2 or more drugs, and drugs intravenously in the previous 30 days, and to have a goal of total abstinence from drugs. They were less likely to have used marijuana in the previous 30 days. In the 2 years prior to study enrollment, a higher proportion was admitted to CD treatment and/or detoxification services and a higher proportion had at least 1 arrest for a felony or gross misdemeanor. They had ASI composite scores indicating more difficulties in the family/social domains, and higher scores on the HIV Risk-taking Behaviour Scale.

In the 2 years prior to study enrollment, patients with highest drug use severity had a higher mean number of ED visits, mean ED costs, and mean number of inpatient hospital admissions preceded by an ED visit than patients with intermediate or low drug use severity. They were also more likely to have an ASI psychiatric severity composite score >0.38[19] and to have received prescribed medication for psychological or emotional problems in their lifetime that patients with intermediate or low drug use severity.

Low Drug Use Severity—Patients with low drug use severity differed from intermediate and substantial/severe drug-using patients in that they were more likely to be educated, less likely to be homeless, and to have lower ASI drug use composite scores (reflecting less serious drug problems). Most reported use of marijuana and reported little use of other drugs, and were less likely to have a goal of abstinence from drugs. In the 2 years prior to study enrollment, they were less likely to have been admitted to CD treatment or to have been arrested for a felony or misdemeanor. They were also less likely to score in the high psychiatric range of the ASI psychiatric composite and were more likely to have lower ASI social/family composite scores (reflecting fewer problems).

Intermediate Drug Use Severity—Patients in the intermediate drug use severity subgroup were in-between and significantly different from both low and severe drug use severity patients in the proportion reporting being homeless, using marijuana, stimulants, opiates, 2 or more drugs, having a goal of abstinence from drugs, being admitted to CD treatment, arrested for a felony or misdemeanor in the 2 years prior to study enrollment, or ASI family/social composite score.

They were not significantly different from low drug use severity patients in their intravenous drug use or alcohol use in the 30 days prior to baseline; in inpatient medical admissions in the 2 years prior to baseline; or in the proportion of patients who reported taking prescribed medication for psychological or emotional problems in their lifetime. They were not significantly different from substantial/severe drug use severity patients in their ED use or in their reported use of non-prescribed methadone and other opiates/analgesics/sedatives.

DISCUSSION

Individuals who used illicit drugs and who were seeking primary care within a safety-net medical setting were found to have multiple co-existing social, psychiatric, and health problems—similar to observations reached in studies focused on treatment-seeking drug users,[3,5] studies based on national surveys,[2] or studies of such individuals presenting at EDs.[8] The present study is distinguished from previous efforts in that it was carried out in primary care clinics with patients who were not explicitly seeking substance abuse treatment. It is also distinctive in its focus on examining characteristics across the range of drug use severity as a strategy to identify clinical needs across the drug-using population.

As a group, participants in our study had significant medical needs. They had an unusually high number of chronic comorbid medical conditions, averaging 7 CDPS categories when the average number for disabled Medicaid beneficiaries is less than 2.[18] Although a relatively young group with a mean age of 48 years, the most frequent diagnoses reflected serious chronic conditions such as hypertension. Clearly this is a population that will need ongoing medical care.

Severity of Drug Use

Patients with the highest level of drug use severity were significantly different from their less severe drug-using counterparts in ways that can interfere with seeking appropriate medical treatment as well as understanding and adhering to treatment recommendations, such as having high levels of homelessness (50%), psychiatric severity (70%), and low family support.. Because of their drug use history—such as use of opiates, stimulants, and sedatives, as well as recent intravenous drug use— it is not surprising that they were experiencing greater legal consequences than their lower drug use severity counterparts with almost 24% having recent history of 1 or more felony or gross misdemeanor arrests.

Patients with the highest drug use severity frequently treated their medical problems by using intensive and costly ED and inpatient hospital services, having twice the number of ED visits and about double the mean ED cost relative to patients with low levels of drug use severity. They had a history of more frequent inpatient hospital admissions preceded by an ED visit—a pattern often characterized as reflecting unplanned admissions to the hospital. Almost 17% of this group had a recent history of being admitted to detoxification services with no subsequent treatment, another crisis service. It is noteworthy that costs of medical services received by participants in our study were paid almost exclusively by public funds: Medicare, Medicaid, or unsupported/uncompensated care.

Despite the multiplicity and seriousness of problems concentrated in the substantial/severe drug use severity subgroup, this subgroup had the highest proportion of patients with a goal of future abstinence from drugs (almost 61%) and also contained the highest proportion of patients admitted to CD treatment in the previous 2 years (34%). Although not conclusive, these findings open the possibility that this subset of illicit drug users may be among those most open to treatment recommendations. We recommend future research examine this.

Their multiple co-morbidities suggest need for specialized addictions and psychiatric care as well as primary care services that can address the medical consequences of substantial/severe drug use, including intravenous drug use. Access to buprenorphine or methadone treatment for addiction is particularly relevant for safety-net clinics that serve patients with severe drug problems.[20] Unstable lifestyles associated with substantial/severe drug use may require coordination with social services.

In contrast, patients with the lowest DAST-10 scores were primarily users of marijuana with little reported use of stimulants and opioids coupled with more stable lifestyles than those in the intermediate or substantial/severe subgroups: they were less likely to be homeless, to have co-occurring psychiatric problems, to have been arrested for a felony or gross misdemeanor in the 2 years prior to study enrollment, or to report having family/social problems. They also had fewer ED visits. On one hand, this set of characteristics suggests a population that may be easier to treat in primary care than those with more severe problem drug use. But few patients with low drug use severity had the goal of abstinence from drugs and, correspondingly, few sought treatment for their drug use in the 2 years prior to study enrollment. They may be experiencing fewer consequences of their problem drug use and, as such, may not be as open to recommendations for specialized CD treatment as might patients who are experiencing more frequent and severe consequences.

Characteristics of patients with Intermediate drug use severity fell between patients with substantial/severe and low drug use severity on most measures. As such, selective application of interventions suggested for patients with high and low drug use severity may be useful with them.

Psychiatric Severity

Psychiatric severity was most pronounced among patients with high drug use severity (almost 70%) although the percentages of low and intermediate drug use severity patients with high psychiatric severity were still noteworthy, 41% and 53%, respectively. In the present study, the most frequently reported mental health-related diagnostic code was depressive disorder (Table 3). Collaborative care approaches integrating behavioral health into primary care have shown promise in effectively treating populations who present with depression, particularly those who are among the least or moderately severe.[21–23] A collaborative care approach is consistent with emphasis in the ACA for integrated services[7] and with medical societies such as the American Board of Family Medicine which has explicitly identified integrated behavioral healthcare as a core principle of the patient-centered medical home (PCMH).[24,25] Despite support, evidence suggests that implementation of integrative models is still in the early stage of development.[26] This places primary care safety-net clinics in a key position to develop a range of responses to serve

patients with problem drug use which are locally effective. In so doing, results of their work may have the potential to inform national efforts to establish PCMHs and to implement the ACA.

Identifying Patients with Problem Drug Use

The DAST-10 was used to identify patients with problem drug use in the present study. It is short, easy to administer and score, and it maps well onto American Society of Addiction Medicine (ASAM) placement criteria. However, it bears less relationship to ICD and DSM diagnoses which may interfere with acceptance of its placement guidelines as the basis for coverage decisions by public and third-party payers. Other instruments used to screen for problem drug use include the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) and the Addiction Severity Index (ASI).[19,27]

Strengths and Limitations

A strength of this study is the relatively large sample size (n=868) and the fact that the sample was drawn from primary care. This combination is unusual when viewed in the context of existing literature. There are also limitations. First, we had no comparison group thus all analyses are based on within-group comparisons. As such, they are descriptive and exploratory in nature and are best regarded as a rich source of hypotheses for the design of future studies rather than being definitive. Second, results from this sample are only generalizable to public sector health care or safety-net settings although the exclusion criteria used in this study may have inadvertently resulted in a disadvantaged sample that has milder characteristics than the target population. Third, our use of the ASI composite score to define psychiatric severity had important limitations. This measure was not designed to serve as a formal stand-alone psychiatric assessment, and does not provide psychiatric diagnostic information. Nonetheless, it provided an important opportunity to identify provisional relationships that can be more definitively explored in future studies. Finally, medical records may have been incomplete in their documentation of medical and psychiatric diagnoses; such omissions may serve to complicate care provision.

Summary and Conclusions

The purpose of the present study was to examine baseline characteristics of persons across the range of problem drug use in order to identify their clinical needs. Results confirmed that, as a group, patients with problem drug use had an unusually high number of co-occurring medical conditions, many serious and chronic, suggesting they are likely to need ongoing medical care. Results also indicated that patients with the highest drug use severity were unusual in the frequency and degree of psychiatric and substance abuse problems they present, their unstable lifestyles characterized by homelessness, frequent arrests, and low social/family support, as well as their frequent use of ED and inpatient medical services. Such patients are likely to require specialized psychiatric and substance abuse care, ongoing medical care that is equipped to address the consequences of severe drug use including intravenous drug use, and coordination with social services. Patients with low drug use severity were primarily users of marijuana with little reported use of other drugs, less psychiatric co-morbidity, and more stable lifestyles than those with more severe drug use severity. Because of their milder symptoms, these patients may benefit from a collaborative

care model that integrates psychiatric and substance abuse care in the primary care setting. Patients with intermediate drug use severity may benefit from selective application of interventions suggested for patients with highest and lowest drug use severity. Safety-net primary care clinics are currently in a key position to develop a range of responses to serve patients with problem drug use which is locally effective and, in so doing, may also inform national efforts to establish PCMH and to implement the ACA.

Acknowledgments

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Table 1

Select Baseline Characteristics of Participants Overall and by DAST-10 Drug Use Severity Subcategories

| Characteristics | Overall (N = 868) | DAST-10 Drug Use Severity Subcategory[*] | | | |
		Low (n = 278)	Intermediate (n = 328)	Substantial/Severe (n = 262)	P Value[†]
Demographics	--	--	--	--	--
Age, mean years (SD)	47.76 (10.89)	48.73 (11.69)	48.28 (10.83)	46.09 (9.89)	.01
Male	604 (70)	183 (66)	235 (72)	186 (71)	.25
Race[‡]	--	--	--	--	.01
White	386 (45)	143 (52)	132 (41)	111 (43)	--
Black	320 (37)	82 (30)	126 (39)	112 (43)	--
Other	150 (18)	49 (18)	65 (20)	36 (14)	--
Hispanic	72 (9)	19 (7)	25 (8)	28 (12)	.16
Marital status	--	--	--	--	.04
Married/living with partner	161 (19)	51 (18)	73 (22)	37 (14)	--
Divorced/separated/widowed	348 (40)	99 (36)	132 (40)	117 (45)	--
Never married	357 (41)	126 (46)	123 (38)	108 (41)	--
Education	--	--	--	--	<.001
High school or less	166 (19)	38 (14)	66 (20)	62 (24)	--
High school graduate	254 (29)	70 (25)	98 (30)	86 (33)	--
Beyond high school	447 (52)	170 (61)	163 (50)	114 (44)	--
Employment status	--	--	--	--	.01
Working	78 (9)	35 (13)	31 (9)	12 (5)	--
Unemployed/retired/in school/ homemaker/other	238 (27)	84 (30)	89 (27)	65 (25)	--
Disabled and unable to work	551 (64)	159 (57)	208 (63)	184 (70)	--
Homeless in shelter or on street 1 night in past 90 days	263 (30)	42 (15)	91 (28)	130 (50)	<.001
Substance Use/Treatment	--	--	--	--	--
ASI days most frequently used drug, mean (SD)[§]	13.82 (11.00)	12.25 (11.00)	14.35 (11.08)	14.84 (10.77)	.01
ASI Drug Use composite score,	0.11 (0.10)	0.06 (0.05)	0.10 (0.09)	0.19 (0.12)	<.001

Characteristics	Overall (N = 868)	DAST-10 Drug Use Severity Subcategory*			P Value[†]
		Low (n = 278)	Intermediate (n = 328)	Substantial/Severe (n = 262)	
mean (SD)[§],[‖]					
ASI drug use, any in past 30 days¶	--	--	--	--	--
Marijuana	656 (76)	243 (87)	249 (76)	164 (63)	<.001
Stimulants¶	362 (42)	40 (14)	141 (43)	181 (69)	<.001
Cocaine	325 (37)	34 (12)	130 (40)	161 (61)	<.001
Amphetamines	63 (7)	7 (3)	20 (6)	36 (14)	<.001
Opiates¶	228 (26)	33 (12)	93 (28)	102 (39)	<.001
Heroin	59 (7)	1 (0)	13 (4)	45 (17)	<.001
Methadone and other opiates/analgesics non-prescribed	208 (24)	33 (12)	86 (26)	89 (34)	<.001
Sedatives/hypnotics/tranquilizers	72 (8)	7 (3)	28 (9)	37 (14)	<.001
Other drugs[§],#	51 (6)	9 (3)	19 (6)	23 (9)	.02
2 or more drugs used in past 30 days[§]	389 (45)	63 (23)	152 (46)	174 (66)	<.001
Intravenous drug use past 30 days	72 (8)	5 (2)	15 (5)	52 (20)	<.001
Goal of total abstinence from drugs[§], **	323 (37)	40 (14)	124 (38)	159 (61)	<.001
ASI Alcohol Use composite score, mean (SD)[‖]	0.15 (0.20)	0.08 (0.13)	0.13 (0.18)	0.25 (0.25)	<.001
ASI alcohol use, any in past 30 days	598 (69)	182 (65)	220 (67)	196 (75)	.04
Nicotine use, any in past 30 days	620 (72)	169 (61)	242 (74)	209 (80)	<.001
CD treatment services[†],[††]	--	--	--	--	--
Admitted to CD treatment	147 (17)	17 (6)	44 (14)	86 (34)	<.001
Detoxification (not followed by CD treatment)	65 (8)	9 (3)	14 (4)	42 (17)	<.001
Other Psychosocial	--	--	--	--	--
1 Felony misdemeanor gross	122 (14)	17 (6)	45 (14)	60 (24)	<.001

Characteristics	Overall (N = 868)	DAST-10 Drug Use Severity Subcategory*			P Value[†]
		Low (n = 278)	Intermediate (n = 328)	Substantial/Severe (n = 262)	
arrests[††]					
HIV risk-taking score, mean (SD)[§§]	3.35 (4.21)	2.57 (3.16)	3.12 (3.67)	4.46 (5.45)	<.001
ASI Family/Social composite score, mean (SD)[§]	0.17 (0.22)	0.12 (0.18)	0.17 (0.21)	0.22 (0.25)	<.001

Data are reported as No. (%) of participants unless otherwise indicated. Missing values are not included in this table.

*
Out of 10,337 individuals screened, 1,621, or about 16% were found eligible. Of these, 520 declined to participate and 154 were excluded for other reasons (e.g., left during consent process). The remaining 947 provided consent. Of these 947, 79 were excluded (22 due to current participation in chemical dependency treatment, 9 due to acute suicidality or psychosis, 8 due to no drug use in the past 3 months, 3 due to not being a primary care patient, 2 with insufficient contact information), 32 declined to participate, and 3 were excluded for other reasons, leaving 868 as the final sample.

[†]
P value based on chi square, ANOVA, or Kruskal Wallis test.

[‡]
Assessed by self-report using National Institutes of Health reporting categories for federally funded clinical research.

[§]
Excludes use of alcohol or nicotine.

[||]
ASI composite scores range from 0 to 1, with 1 indicating greatest problem severity.

[¶]
ASI drug use groups reported are not mutually exclusive.

[#]
"Other drugs" can include all other abused medications (e.g. antihistamines, antidepressants) or drugs of abuse (e.g., hallucinogens, inhalants) not included in the existing categories.

[**]
From the Thoughts about Abstinence measure, which is used to assess one's goal for changing drug use (no goal, controlled use, occasional use, temporary abstinence, total abstinence slip is possible, total abstinence never use again). The reported "Goal of total abstinence from drugs" includes "Total abstinence, never use again", and "Total abstinence, slip is possible."

[††]
Administrative data available for 848 participants in the 2 years prior to study enrollment.

[§§]
HIV risk taking score ranges from 0 to 50, with 50 indicating greatest HIV risk.

DAST-10, Drug Abuse Screening Test 10-item; ASI, Addiction Severity Index; CD, chemical dependency.

Table 2

Medical and Psychiatric Characteristics of Participants Overall and by DAST-10 Drug Use Severity Subcategories

| Characteristics | Overall (N = 868) | DAST-10 Drug Use Severity Subcategory[*] | | | | P Value[†] |
		Low (n = 278)	Intermediate (n = 328)	Substantial/Severe (n = 262)	
Medical	--	--	--	--	--
CDPS medical conditions, mean (SD)	7.42 (3.78)	7.26 (3.86)	7.54 (3.52)	7.45 (4.00)	.66
Emergency department	--	--	--	--	--
1 ED visit	528 (62)	140 (51)	208 (64)	180 (71)	<.001
Mean visits (SD)	2.52 (4.27)	1.49 (2.11)	2.26 (3.40)	3.94 (6.20)	<.001
Mean cost (SD), US $	1,347.69 (2,436.81)	847.87 (1,641.90)	1,203.20 (2,152.93)	2,069.52 (3,212.05)	<.001
Median visits (IQR)	1.00 (3.00)	1.00 (2.00)	1.00 (3.00)	2.00 (5.00)	<.001
Median cost (IQR), US $	363.81 (1,565.18)	56.12 (1,006.36)	265.76 (1,502.64)	896.02 (2,792.61)	<.001
Outpatient medical	--	--	--	--	--
1 Outpatient visit	780 (92)	245 (90)	307 (95)	228 (90)	.04
Mean visits (SD)	18.94 (17.98)	21.22 (18.62)	19.25 (17.37)	16.08 (17.72)	.004
Mean cost (SD), US $	7,114.62 (8,918.87)	7,752.36 (8,694.52)	6,826.72 (6,964.86)	6,796.55 (11,110.28)	.36
Median visits (IQR)	14.00 (22.00)	17.00 (25.00)	15.00 (21.00)	10.00 (18.00)	<.001
Median cost (IQR), US $	4,563.84 (8,060.05)	5,417.63 (8,647.68)	4,677.26 (7,146.79)	3,911.40 (6,509.43)	.004
Inpatient preceded by an ED visit	--	--	--	--	--
1 Inpatient admissions	227 (27)	63 (23)	73 (22)	91 (36)	<.001
Mean admissions (SD)	0.44 (0.94)	0.34 (0.77)	0.37 (0.87)	0.62 (1.14)	.001
Mean cost (SD), US $	6,055.14 (22,329.21)	4,788.08 (17,591.21)	4,128.98 (13,675.27)	9,876.45 (32,908.00)	.005
Median admissions (IQR)	0.00 (1.00)	0.00 (0.00)	0.00 (0.00)	0.00 (1.00)	<.001
Median cost (IQR), US $	0.00 (2,928.17)	0.00 (0.00)	0.00 (0.00)	0.00 (5,990.48)	<.001
Psychiatric	--	--	--	--	--
High psychiatric severity, ASI	470 (54)	114 (41)	175 (53)	181 (69)	<.001
Psychiatric Status composite					

| Characteristics | Overall (N = 868) | DAST-10 Drug Use Severity Subcategory[*] | | | |
		Low (n = 278)	Intermediate (n = 328)	Substantial/Severe (n = 262)	P Value[†]
score >0.38[‡]					
ASI Psychiatric Status composite score, mean (SD) [‡], [§], [∥]	0.38 (0.24)	0.30 (0.24)	0.38 (0.24)	0.47 (0.21)	<.001
1 Mental ICD - 9 diagnosis illness	542 (64)	160 (59)	210 (65)	172 (68)	.08
Prescribed medication for psychological or emotion problems, lifetime[‡]	619 (71)	181 (65)	231 (70)	207 (79)	<.001

Data are reported as No. (%) of participants unless otherwise indicated. Missing values are not included in this table.

[*] Administrative data available for 848 participants for the 2 years prior to study enrollment unless otherwise noted.

[†] P Value based on chi square, ANOVA, or Kruskal Wallis test.

[‡] Data available for 868 participants.

[§] ASI composite scores range from 0 to 1, with 1 indicating greatest problem severity.

[∥] A score of >0.38 was defined as high psychiatric severity[14] and represents a value of 1 standard deviation (.22) above the mean (.16) of the psychiatric severity composite score for nearly 3,900 chemical dependency treatment outpatients assessed by the ASI.[19] The 0.38 cut-off exceeds the 0.22 cut-off identified by Cacciola et al as the level likely to be associated with a psychiatric disorder among patients admitted to chemical dependency treatment.[28]

DAST-10, Drug Abuse Screening Test 10-item; IQR, interquartile range; ED, emergency department; CDPS, Chronic Illness and Disability Payment System; ASI, Addiction Severity Index.

Table 3

Twenty Most Frequently Recorded ICD-9 Diagnosis Codes for Trial Participants [*],[†]

Diagnosis Category	No. (%) of Participants
Hypertension, not otherwise specified	397 (47)
Tobacco use disorder	388 (46)
Depressive disorder, not elsewhere classified	361 (43)
Pain in limb	296 (35)
Chronic pain, not elsewhere classified	256 (30)
Lumbago	244 (29)
Cough	217 (26)
Hyperlipidemia, not elsewhere classified/not otherwise specified	207 (24)
Vaccine for influenza	201 (24)
Physical therapy, not elsewhere classified	195 (23)
Abdominal pain (unspecified site)	193 (23)
Chest pain, not otherwise specified	192 (23)
Viral Hepatitis C (unspecified without mention of hepatic coma)	187 (22)
Lack of housing	184 (22)
Diabetes mellitus (without mention of complication, type 2 or unspecified, not stated as controlled)	180 (21)
Esophageal reflux	179 (21)
Backache, not otherwise specified	175 (21)
Anxiety state, not otherwise specified	151 (18)
Palpitations	146 (17)
Acute upper respiratory infection, not otherwise specified	141 (17)

[*] Diagnosis categories based on 2,927 distinct ICD-9 codes.

[†] Based on data collected in the 2 years prior to study enrollment for 848 participants.

ICD-9, International Classification of Diseases Version 9.

Table 4

Post Hoc Results for Statistically Significant Baseline Characteristics in Table 1

| | Post Hoc *P* | | |
	Substantial/ Severe vs. Low	Substantial/ Severe vs. Intermediate	Intermediate vs. Low
Characteristic			
Demographics			
Age [*]	0.01	0.04	ns
Race [†]	0.02	ns	0.05
Marital status [†]	ns	ns	ns
Education [†]	<0.001	ns	0.04
Employment status [†]	0.002	0.14	ns
Homeless in shelter or on street ≥1 night in past 90 days [†]	<0.001	<0.001	<0.001
Substance Use/Treatment			
ASI days most frequently used drug [*]	0.02	ns	ns
ASI Drug Use composite score [‡]	<0.001	<0.001	<0.001
ASI drug use, any in past 30 days [†]			
Marijuana	<0.001	0.001	<0.001
Stimulants	<0.001	<0.001	<0.001
Cocaine	<0.001	<0.001	<0.001
Amphetamines	<0.001	0.005	0.10
Opiates	<0.001	0.02	<0.001
Heroin	<0.001	<0.001	<0.001
Methadone and Other Opiates	<0.001	0.12	<0.001
Sedatives/hypnotics/tranquilizers	<0.001	ns	0.005
Other Drugs	0.019	ns	ns
≥2 or more drugs used in past 30 days [†]	<0.001	<0.001	<0.001
Intravenous drug use in past 30 days [†]	<0.001	<0.001	ns
Goal of total abstinence from drugs [†]	<0.001	<0.001	<0.001
ASI Alcohol Use composite score [‡]	<0.001	<0.001	0.001
Alcohol use, any in past 30 days [†]	0.05	ns	ns
Nicotine use, any in past 30 days [†]	<0.001	ns	0.002
CD treatment services [†]			
Admitted to CD treatment	<0.001	<0.001	0.009
Detoxification (not followed by CD treatment)	<0.001	<0.001	ns
Other Psychosocial			
≥1 Felony or gross misdemeanor arrest [†]	<0.001	0.008	0.007
HIV risk-taking score [‡]	<0.001	0.002	ns

Characteristic	Post Hoc *P*		
	Substantial/ Severe vs. Low	Substantial/ Severe vs. Intermediate	Intermediate vs. Low
ASI Family/Social composite score[‡]	<0.001	0.02	0.01

[*] Data provided as Tukey-adjusted *P* values.

[†] Data provided as Bonferroni-adjusted *P* values.

[‡] Data provided as Games-Howell–adjusted *P* values.

ASI, Addiction Severity Index Lite; CD, chemical dependency; HIV, human immunodeficiency virus; ns, not significant.

Table 5

Post Hoc Results for Statistically Significant Medical and Psychiatric Characteristics in Table 2

Characteristics	Post Hoc *P*		
	Substantial/ Severe vs. Low	Substantial/ Severe vs. Intermediate	Intermediate vs. Low
Medical			
Emergency department			
1 ED visit [*]	<0.001	ns	0.004
Mean visits [†]	<0.001	<0.001	0.002
Mean costs [†]	<0.001	0.001	ns
Outpatient medical			
1 Outpatient visit [*]	ns	ns	ns
Mean visits [‡]	0.004	ns	ns
Inpatient preceded by an emergency department visit			
1 Inpatient admissions [*]	0.003	0.001	ns
Mean admissions [†]	0.003	0.01	ns
Mean costs [†]	ns	0.03	ns
Psychiatric			
High psychiatric severity, ASI Psychiatric Status composite score >0.38 [*]	<0.001	<0.001	0.007
ASI Psychiatric Status composite score [†]	<0.001	<0.001	<0.001
Prescribed medication for psychological or emotional problems, lifetime [*]	<0.001	<0.001	ns

[*] Data provided as Bonferroni-adjusted *P* values.

[†] Data provided as Games-Howell–adjusted *P* values.

[‡] Data provided as Tukey-adjusted *P* values.

ASI, Addiction Severity Index Lite; ED, emergency department; ns, not significant.