Managing Acutely Ill Substance-Abusing Patients in an Integrated Day Hospital Outpatient Program

Medical Therapies, Complications, and Overall Treatment Outcomes

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BACKGROUND: Substance-abusing adults are admitted to hospitals for medical complications from their drug and alcohol use at substantially higher rates than the general public; yet, their care is often defined by against medical advice (AMA) discharges and low rates of referral to addiction treatment programs.

METHODS: We present findings from a chart review of consecutive admissions to an integrated medical-substance abuse treatment program designed for acutely ill, hospitalized substance using adults. We specifically looked at factors associated with program completion and medical complications in this cohort of at-risk adults.

RESULTS: Overall, 83 patient cases were studied. The mean age was 41.2 years; most were African American (73.5%), male (68.7%), and homeless (77.1%). Heroin (96.4%) and cocaine (88.0%), followed by alcohol (44.6%) were the most commonly used substances before admission. The most common admitting diagnoses were infectious endocarditis (43.4%), abscess or nonhealing ulcer (18.1%), and osteomyelitis (13.3%) with intravenous antibiotic (68.7%), physical therapy (48.2%), or wound care (41.0%), the most commonly prescribed care on the integrated care/day hospital unit. The mean length of stay in the day hospital was 12.4 days. Overall, 69.9% of patients successfully completed their medical therapy, and 63.9% were successfully referred to an outpatient substance abuse treatment program. Only 10.8% required an unscheduled hospital readmission and 15.7% required an after-hours emergency department visit during their stay.

CONCLUSION: Outpatient/day hospital-based integrated treatment is a viable option for medically ill substance-abusing adults who would otherwise be hospitalized and is associated with higher than expected completion rates and low rate of complications. Co-locating the unit at a hospital and integrating extensive social supports appear to be key components to this model.

KEY WORDS: substance abuse; homeless; medical complications; treatment outcomes; health services delivery.

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Substance-abusing adults become sick more often and utilize acute and emergent health services at a much higher rate than the general population. In 1 study, they were over 2 times more likely to use an emergency department and almost 7 times more likely to be hospitalized than nondrug users.¹ The health care needs associated with these hospitalizations are often complex,² requiring longer lengths of stay and often with suboptimal outcomes. Previous studies have

noted delayed and inaccurate identification of addiction issues during acute hospitalizations,³ low rates of completed medical care,⁴ low rates of successful referral to treatment by the health care providers,⁵ and a high proportion leaving the hospital against medical advice (AMA).⁶

There are several factors likely contributing to and reinforcing these outcomes. Trying to provide medical care to drug-abusing patients can be frustrating for the treating physicians and has been associated with more negative feelings and lower levels of professional satisfaction.⁷⁻⁹ At the same time, co-occurring medical, mental health, and psychosocial needs of these patients are complex and multifaceted, requiring resources and expertise that often go beyond the means of the acute facility and treatment team. Delayed and deferred health care and lack of follow-up for chronic conditions often result in more acute and severe illness presentations. Co-occurring detoxification, pain management, and other addiction-related needs^{2,10,11} are often difficult, if not impossible, to address in the fragmented and scattered care models defining most traditional acute medical care access sites.

Alternative wrap-around and integrated treatment models have been proposed and evaluated with generally favorable results in outpatient and other subacute settings.¹²⁻¹⁵ Aszalos et al. described improved treatment entry and retention outcomes when methadone maintenance therapy was started during the acute hospitalization and used as a bridge to outpatient treatment. Willenbring and colleagues demonstrated improved alcohol abstinence outcomes in an integrated outpatient medicine-substance abuse treatment program for older men with congestive heart failure. Weisner et al., in a randomized control trial of integrated primary care and outpatient substance abuse treatment in a health maintenance organization (HMO) setting, showed improved abstinence rates and cost-effectiveness of integrated treatment for individuals with substance abuse-related medical conditions. However, the Willenbring and Weisner studies describe interventions targeted at medically stable patients and their primary care or chronic care needs. Much less is known about the integration of services earlier in the acute care event and with less stable patients. This is important because of the high cost of inpatient medical care and the opportunities for capitalizing on situational motivation for drug and alcohol treatment precipitated by an acute medical event.

In this paper, we present findings from a cohort of medicine patients admitted from an acute care hospital to an in-

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egrated medicine-substance abuse treatment day hospital/outpatient program. All patients were stabilized but still required ongoing medical therapy and/or skilled nursing care when they were transferred to the day hospital unit. We specifically looked at factors associated with medical treatment completion and medical complications/events occurring during their day hospital/outpatient stay that required readmission to the hospital, after-hours emergency department care, or a specialist consultation.

METHODS

We conducted a chart review of all consecutively admitted medicine service patients to the First Step Day Hospital Treatment Program at Johns Hopkins Hospital from October 2001 to July 2003, abstracting events data during their stay on the day hospital substance abuse treatment unit.

Treatment Unit

The day hospital program consists of individual and group cognitive-behavioral therapy interspersed with a medical care treatment plan that had been initiated in the hospital. This typically includes intravenous antibiotics, intensive wound care, physical therapy, etc. Treatment is provided in an ambulatory care/day hospital model located on the grounds of the hospital. Approximately 12 clients (6 transferred from medicine services; 6 from psychiatry services) stay on the unit for approximately 10 h/d where they receive all their medical care, formal addiction treatment services, and their meals in a structured, supervised setting. All clients spend their nights in an off-site supervised group residential shelter that incorporates a modified therapeutic community, 12-step recovery model. Clients referred from the medicine services stay in the program until they have completed their medical therapy and are stable enough to proceed to an intensive outpatient program to continue their recovery efforts. This typically takes at least a week and most are eligible for discharge within 4 weeks of admission.

Day hospital staffing for 7 d/wk, 10 h/d coverage consists of an internist coordinating the medical care for patients referred from the inpatient medicine services (0.5 full time equivalent [FTE]), a psychiatrist coordinating the care of patients referred from the inpatient psychiatry units (0.5 FTE), 3 full-time addictions counselors, 1.5 FTE occupational therapists, and 4 full-time psychiatry trained RN-level nurses. Eligibility for the program includes the following: client willingness to voluntarily enter the program and abide by program rules; full mobility with intact activities of daily living (ADL) capacity and able to fully participate in day hospital programs; have a concurrent medical problem requiring skilled nursing care (wound care, intravenous antibiotics, etc.); and be actively using drugs and/or alcohol on admission to the hospital. Most clients were uninsured as only 1 Medicaid carrier and no commercial or Medicare carriers were willing to cover this "blended" service.

Chart Identification

Eligible charts were identified by review of program census logs during the study period. Charts were excluded if the client admission to the program occurred before the start of the study period even if their length of stay extended into that

time period. Similarly, if their length of stay extended beyond the end of the study period, they were also excluded. For individuals who had more than 1 unrelated admission to the unit during the study, only the first admission was included in this case series. This was done to reduce the possibility that the care or outcomes in the second admission were influenced or driven by care events in the first.

Abstracted Variables

Physician-written history and physical and progress notes, nursing notes, and the addiction therapist's initial assessment and progress notes were all used in the abstracting process. Additionally, any consult notes and diagnostic procedures (i.e., radiologic exams) as recorded in the chart were also reviewed. Abstracted variables included the following: patient demographics, primary and secondary diagnoses, pain management/detoxification care during unit stay, consults and diagnostic procedures, and patient disposition. New diagnoses (including new infections) were defined as discrete and recognized conditions (as opposed to a constellation of symptoms) definitively recorded in the attending physician and consulting physician notes that had not been previously identified on admission. If the note refers to an earlier history of having that diagnosis even though it was not recorded in the admission history and physical, it was then coded as a secondary diagnosis and not considered as new. Medical complications/events occurring during the day hospital were defined as follows: new diagnoses occurring during that stay; new or recurrent infections; and unplanned or unscheduled emergency department visits or hospital readmissions. After-hours emergency department care episodes and readmissions to the hospital were first identified in the progress notes and then confirmed by review of the electronic record (if care was at JHH) or discharge paperwork (if at another area hospital).

Data Abstracting

Data were abstracted by one of the co-authors (J.C.) and reviewed by another author (T.O.) to ensure internal consistency. All abstracting occurred after the patient had been officially discharged or left the program. Once consensus was reached on the abstracted data, it was stripped of any unique identifiers and entered into an ACCESS database for subsequent analyses.

Analyses

Descriptive data are presented on the study cohort, followed by univariate analysis of those patients who successfully completed the program (which included both completing medical treatment and being successfully referred to an outpatient substance abuse treatment program) with those patients who left the program against medical advice, and of those patients who developed a medical complication or event during their course of therapy on the day hospital unit. χ^2 analyses or Fisher's exact test were used for categorical data and Student's *t* test for continuous data, with a *P* value of less than .05 considered to be significant. SPSS 10.0, 12.0, and StatXact statistical software packages were used for analyses.

RESULTS

Overall, 83 patients were included in this case series, representing all eligible consecutive admissions from the inpatient medicine services between October 2001 and July 2003. Sixteen day hospital admissions were excluded: 3 admissions because their care on the unit was ongoing at the time the study was closed, and 13 admissions because it was the second or third admission for the same person during the study period. The data presented represent 84% of all cases during the study period. The 83 patients were drawn from a pool of 410 persons admitted to the medicine inpatient service and evaluated by the study team during this time period. There was no significant difference in age, gender, race/ethnicity, insurance status, or education level between those persons admitted to the day hospital and those evaluated but not admitted. Day hospital patients were more likely to be homeless, abuse heroin and cocaine (but not alcohol), and to have endocarditis and osteomyelitis; nonadmitted hospital patients were more likely to have cellulitis.

Demographics

As shown in Table 1, the mean age was 41.2 years (SD 8.2), with a range of 22 to 52 years. Overall, 68.7% were male, 73.5% were African American, and 77.1% were homeless at the time of admission to the unit. The emergency department was the most common source for usual care in this cohort (38.6%), with only 4.8% reporting an ambulatory care site. Only 45.8% had at least a high school education (≥ 12 th grade) and 91.6% were unemployed at the time of admission. Most of the cohort was polysubstance abusers (89.2%), with 96.4% reporting heroin use, 88.0% reporting cocaine use, and 44.6% reporting alcohol use (Table 2). Study subjects abusing alcohol were significantly older (43.1 years vs 39.7; $P=.05$) and more likely to be African American (86.5% vs 63.0%; $P=.02$). There were no differences in gender, homeless status, employment, insur-

Table 2. Reasons for Hospitalization, CoMorbid Conditions, Substance Use, and Day Hospital Disposition

	N (%)
Hospitalization lead diagnosis	
Endocarditis	36 (43.4%)
Abscess/nonhealing ulcer	15 (18.1%)
Osteomyelitis	11 (13.3%)
Bacteremia	4 (4.8%)
HIV-related	3 (3.6%)
Other	14 (16.8%)
Secondary medical diagnoses	
Hepatitis B/C	57 (68.7%)
HIV/AIDS	32 (38.6%)
Hypertension	11 (13.3%)
Gastrointestinal dso	9 (10.8%)
Diabetes	6 (7.2%)
Cancer	6 (7.2%)
Respiratory disorder (asthma, COPD)	4 (4.8%)
Seizure disorder	3 (3.6%)
Mental health conditions	
Depression	22 (26.5%)
Anxiety disorder	2 (2.4%)
Bipolar disorder	7 (8.4%)
Drug use previous 30 d	
Heroin	80 (96.4%)
Cocaine	73 (88.0%)
Alcohol	37 (44.6%)
Marijuana/cannabis	13 (15.7%)
More than one substance	74 (89.2%)
Length of Day Hospital stay (d)	
Mean	12.4 (SD 8.9)
1 to 7	32 (38.6%)
8 to 14	24 (28.9%)
15+	26 (31.3%)
Day Hospital treatment completion	58 (69.9%)
Discharge disposition	
Home	3 (3.6%)
Left AMA/AWOL	23 (27.7%)
SA treatment facility	53 (63.9%)
Other	4 (4.8%)

COPD, chronic obstructive pulmonary disease; AMA, against medical advice; AWOL, away without leave; SA, substance abuse.

Table 1. Day Hospital Patient Demographics (N=83)

	N (%)
Age (mean)	41.2 (SD 8.2)
Gender	
Male	57 (68.7%)
Race	
White (non-Hispanic)	21 (25.3%)
African American	61 (73.5%)
American Indian	1 (1.2%)
Last known residence	
Apartment or house they own or rent	12 (14.5%)
Homeless	64 (77.1%)
Other	2 (2.4%)
Missing	5 (6.0%)
Employment status	
Unemployed	76 (91.6%)
Education (≥ 12 th grade)	38 (45.8%)
Source of usual care	
None	8 (9.6%)
Emergency department	32 (38.6%)
Ambulatory clinic	4 (4.8%)
Insurance status	
None	56 (67.5)
Medical assistance	12 (14.5)
Medicare	5 (6.0%)

ance, or medical and mental health conditions between these 2 groups.

Table 2 shows the most common admitting primary diagnosis: endocarditis (43.4%) requiring prolonged intravenous antibiotic therapy; deep tissue abscess/nonhealing abscess or ulcer (18.1%); and osteomyelitis (13.3%); 3.6% of admissions were reportedly HIV related. Among secondary diagnoses, the most commonly noted were as follows: hepatitis B/C (68.7%), followed by HIV/AIDS (38.6%), and hypertension (13.3%). Overall, 26.5% had a diagnosis of depression and 8.4% had a diagnosis of bipolar disorder.

Pain Management and Detoxification Treatment While in the Day Hospital

As shown in Table 3, only 6.0% of patients on the unit did not receive any pain treatment while in the day hospital. The majority received opiate-based therapy (54.2%), which consisted of pain stabilization, followed by a tapering of opiates and replacement with nonsteroidal antiinflammatory drugs (NSAIDs) or transition to a buprenorphine detoxification once their acute pain syndrome had subsided; 39.8% received only nonsteroidal antiinflammatory agents or acetaminophen during their day

Table 3. Medical Treatment and Outcomes While at Day Hospital

	N (%)
Medical treatment while at FSDH	
IV antibiotic	57 (68.7%)
Physical therapy	40 (48.2%)
Wound care	34 (41.0%)
Anticoagulation	13 (15.7%)
Blood transfusion	5 (6.0%)
Other	14 (16.9%)
Diagnostic procedures while at FSDH	
Ultrasound	31 (37.3%)
X-ray	10 (12.0%)
CT scan	6 (7.2%)
MRI	3 (3.6%)
Consults while at FSDH	
Surgery	18 (21.7%)
Infectious diseases	17 (20.5%)
HIV clinic	13 (15.7%)
Ophthalmology	9 (10.8%)
Orthopedics	7 (8.4%)
Renal	2 (2.4%)
Cardiology	2 (2.4%)
Obstetrics/gynecology	2 (2.4%)
Other	16 (19.3%)
Complications while at FSDH	
Unscheduled readmission to hospital	9 (10.8%)
ED visit	13 (15.7%)
New infection/re-infection	3 (3.6%)
New diagnoses	28 (33.7%)
Pain management	
Opiate taper	45 (54.2%)
NSAIDS/acetaminophen only	33 (39.8%)
None	5 (6%)
Detoxification protocol	
Buprenorphine	26 (31.3%)
NSAIDS/acetaminophen only	10 (12.0%)
Supportive care	38 (45.8%)
None	19 (22.9%)

CT, computed tomography; MRI, magnetic resonance imaging; ED, emergency department; NSAIDS, nonsteroidal antiinflammatory drugs; IV, intravenous; FSDH, first stop day hospital.

hospital admission. Among detoxification regimens, 22.9% received no detoxification treatment while 45.8% received supportive care (NSAIDS, transdermal clonidine, quaternary cyclic drugs for sleep disorders, and an antispasmodic agent for intestinal cramping), which often overlapped with the opiate for pain management. Overall, 31.3% underwent a buprenorphine detoxification during their day hospital stay. No patients during the study period were admitted on or were started on methadone maintenance therapy while in the day hospital.

Medical Care Received While in the Day Hospital Program

The mean length of stay in the day hospital program was 12.4 days (SD 8.9), with 38.6% of the cohort staying between 1 and 7 days, 28.9% staying 8 to 14 days, and 31.3% staying longer than 15 days on the unit (Table 2). During their stay on the day hospital unit, 68.7% received intravenous antibiotics, 48.2% physical therapy, 41.0% wound care, 15.7% anticoagulation therapy (initiation or maintenance), and 6% received a blood transfusion. Among diagnostic procedures, the 3 most commonly performed were ultrasound (37.3%), followed by x-rays (12.0%) and computed tomography (CT) scans (7.2%). Among specialty consults that included both new consults and follow-

Table 4. Variables Associated with Completing Medical Treatment at Day Hospital

	Completing Treatment (58)	Non Completing Treatment (25)	P Value
Age, mean (SD)	42.7 (7.1)	37.6 (9.4)	<.01
Gender			
Male, % (N)	75.9 (44)	52 (13)	
Female, % (N)	24.1 (14)	48 (12)	.03
Race			
White (non Hispanic)	19 % (11)	40 % (10)	
Afro-American	79.3 % (46)	60 % (15)	.11
American Indian	1.7 % (1)	0	
Homeless (43)	54.4% (31)	57.1% (12)	.83
Endocarditis (36)	46.6% (27)	36% (9)	.37
Osteomyelitis (11)	13.8% (8)	12% (3)	1.0
Any bacteremia infection (51)	63.8% (37)	56% (14)	.5
(endocarditis, osteomyelitis, or bacteremia)			
Abscess (15)	17.2% (10)	20% (5)	.76
Hepatitis B/C (57)	63.8% (37)	80% (20)	.14
HIV (secondary diagnosis) (32)	46.6% (27)	20% (5)	.02
Mental health comorbidity (31)	36.2% (21)	40% (10)	.74
Ambulatory clinic (source of usual care) (4)	6.9% (4)	0	.31
Health insurance (22)	29.8% (17)	23.8% (5)	1.0
Heroin polysubstance (80)	96.6% (56)	96% (24)	1.0
Cocaine polysubstance (73)	87.9% (51)	88% (22)	1.0
Alcohol use (3)	51.7% (30)	28% (7)	.05
Opiate-based pain management (45)	56.9% (33)	48% (12)	.46
Buprenorphine-based detox (26)	31% (18)	32% (8)	.93
Complications (36)	48.3% (28)	32.0% (8)	.17

up consults for care initiated during the acute medical hospitalization, 21.7% received a surgery consult, 20.5% an infectious disease consult, 15.7% aftercare at the University HIV/AIDS clinic, 10.8% ophthalmology, and 8.4% orthopedic consults (Table 3). Overall, 55.4% of all patients received a consult during their day hospital stay and 45.8% of patients had a diagnostic procedure performed.

Also shown in Table 3, 33.7% received a new diagnosis, either of a mental health condition (i.e., depression, anxiety disorder) or a secondary medical diagnosis such as hypertension. Overall, 15.7% of the cohort required an after-hours evaluation in the emergency department, 10.8% had an unscheduled readmission to the hospital, and 3.6% developed a new infection or reinfection while on the unit. There were no deaths among day hospital patients during this study period. Factors associated with developing a medical complication (defined as acquiring a new diagnosis, having to go to the emergency department, having an unscheduled hospital readmission, or developing a new infection) included the following: being homeless (68.6% vs 44.2%; $P=.03$), having HIV/AIDS as a secondary diagnosis (52.8% vs 27.7%; $P=.02$), and having health insurance (Medicaid) (40.0% vs 18.6%; $P=.04$).

Day Hospital Treatment Outcomes

Overall, 69.9% of this study cohort successfully completed their medical therapy and 63.9% successfully transitioned from the day hospital unit to an affiliated intensive outpatient program to continue their substance abuse treatment; 3.6% were discharged with no information on follow-up care and 27.7% of clients dropped out of treatment and left the program against medical advice before completing their medical thera-

Table 5. Variables Associated with Developing a Medical Complication While at Day Hospital

	Complications (36)	No Complications (47)	P Value
Age, mean (SD)	42.3 (6.9)	40.3 (9)	.25
Gender			
Male (57) % (N)	69.4 (25)	68.1 (32)	
Female (26) % (N)	30.6 (11)	31.9 (15)	.90
Race			
White (non Hispanic) (21)	25% (9)	25.5% (12)	
Afro-American (61)	72.2% (26)	74.5% (35)	.51
American Indian (1)	2.8% (1)	0	
Homeless (43)	68.6% (24)	44.2% (19)	.03
Endocarditis (36)	50% (18)	38.3% (18)	.29
Osteomyelitis (11)	13.9% (5)	12.8% (6)	1.0
Hepatitis B/C (57)	77.8% (28)	61.7% (29)	.12
Any bacteremia infection* (51)	63.9% (23)	59.6% (28)	.69
HIV (secondary diagnosis) (32)	52.8% (19)	27.7% (13)	.02
Mental health condition (31)	41.7% (15)	34% (16)	.48
Ambulatory clinic (source of usual care) (4)	2.8% (1)	6.4% (3)	.63
Health insurance (22)	40% (14)	18.6% (8)	.04
Heroin polysubstance (80)	100% (36)	93.6% (44)	.25
Cocaine polysubstance (73)	94.4% (34)	83% (39)	.18
Alcohol use (37)	47.2% (17)	42.6% (20)	.67
Opiate-based pain management (45)	61.1% (22)	48.9% (23)	.27
Buprenorphine-based detox (26)	33.3% (12)	29.8% (14)	.73

*Endocarditis, osteomyelitis, or bacteremia

py. Patients successfully completing their medical treatment in the day hospital were significantly more likely to be older (42.7 years vs 37.6 years; $P<.01$), male (75.9% vs 52.0%; $P=.03$; Table 4), have HIV/AIDS as a secondary diagnosis (46.6% vs 20.0%; $P=.02$), and to use alcohol (51.7% vs 28.0%; $P=.05$; Table 4). Neither buprenorphine-based detoxification nor homelessness was associated with early treatment withdrawal or AMA discharges.

DISCUSSION

This case series describes a structural intervention early in the course of treatment for an acute medical event that is associated with high rates of medical treatment completion and referral to drug treatment. Notably, these findings were obtained in a study cohort of predominantly drug-using homeless persons that has historically been very difficult to treat. Several studies have noted the high rate of hospitalizations and other health care events in this population,^{1,3,16,17} yet, relatively few of these care episodes typically result in a successful referral to drug or alcohol treatment.⁵ Earlier research also found that the specialty drug treatment system serves only a small proportion of heavy drug users in the community, while large numbers of out-of-treatment individuals are instead found accessing social service agencies, incarcerated, or in health care facilities (emergency departments and hospitals).¹⁸ Hospital-based structural interventions have typically consisted of consult-liaison services and provider-administered brief interventions, both of which have generated significantly improved rates of successful referral or reductions in problem drinking compared with usual care.¹⁹⁻²² Outpatient approaches for more clinically stable patients have usually started with clients enrolled in a treatment program and integrating and co-

ordinating treatment with specialty¹⁴ or primary medical care.¹⁵ In all of these approaches, the common feature is that they avail of an inherent illness-driven motivation to facilitate a behavior change. Weisner's study exemplifies this with improved abstinence and cost-effectiveness findings limited to study subjects with substance abuse-related medical conditions.¹⁵ A requisite for admission to our program was that they had to have an acute medical illness that resulted from their active substance use but none of our patients were engaged in substance abuse treatment. The need for prolonged medical treatment provided an opportunity and the time to take advantage of this situational motivation. It is notable that two-thirds went on the drug and alcohol treatment despite the fact that most of the medical conditions precipitating their initial hospitalization were self-limited and resolved by the time of discharge. This suggests an internalization of their motivation during the course of the integrated treatment, which has been associated with greater sustainability,²³ and supports initiating treatment early in an acute illness when clients may be more open to behavior change. In our study, HIV/AIDS was associated with completing the program. Given the high rate of injection drug use in this cohort, acquiring HIV/AIDS is likely substance abuse-related and its positive association with treatment completion reflects the motivational effect of a chronic substance abuse-related medical condition, similar to that found in the Weisner study.¹⁵

Discharges against medical advice during acute hospitalizations are extremely common in this population and were commonly noted in our cohort as well. In 1 study, almost 20% of hospitalized patients with a primary or secondary substance abuse diagnosis left the hospital against medical advice.⁶ In another study, 42% of patients discharged against medical advice had a diagnosis of chronic alcoholism and 22% had a diagnosis of drug addiction.²⁴ Chan et al.⁴ found that recent injection drug users were 2 times more likely to leave an HIV/AIDS hospital ward against medical advice. The consequences of these discharges are not insignificant. Hwang et al.²⁵ found that 21% of those persons leaving AMA were readmitted within 15 days of their departure. The cumulative costs of hospitalization among those patients leaving AMA were 56% higher than otherwise projected.²⁶ In our study, while almost 70% of clients completed their medical treatment, and over two-thirds went on to outpatient addiction treatment, 27.7% left the program against medical advice. These were typically younger, drug-using female patients without a chronic substance abuse-related medical condition (HIV/AIDS). Additional studies are needed to determine optimal strategies for this population.

Our results were obtained in a lower cost setting than the acute hospital, making it possible to incorporate many of the wrap-around services that were likely factors contributing to the enhanced outcomes.^{13,27} The supportive housing was particularly beneficial to this cohort given the high rate of homelessness in the group and the need for 24-hour support in a neighborhood where drug use is extremely high. Identifying community resources that can complement and contribute to the treatment milieu is essential to programs of this kind and help make them cost-effective alternatives to inpatient and nursing home care.

The decision on whether to base a service such as this in an acute medical facility, ambulatory care setting, or in a substance abuse facility will likely depend on illness severity and

scope of related medical needs of the clients being served. These data suggest that the medical needs of patients this early in their hospital treatment/convalescence require a more medically oriented base for the integrated and wrap-around service delivery than what has typically been described in the literature for primary and continuity care-based programs.^{14,15} This includes having the capacity and resources for managing medical needs after-hours and having timely access to specialist consultations. The overall rate of new infections was relatively low. However, the proportion requiring off-hours emergency department evaluations and readmissions to the hospital are not insignificant. Similarly, specialty service consults, particularly from the infectious disease and surgery services, and the proportion receiving x-rays and other diagnostic procedures while in the day hospital program are also notable.

Being homeless, having HIV/AIDS, and having medical insurance were all significantly associated with experiencing a medical complication during their day hospital admission. Homelessness and HIV/AIDS likely serve as surrogates for a higher level of morbidity and illness severity in this population. Similarly, eligibility for health insurance (Medicaid) requires a chronic disabling condition that would suggest a medical frailty predisposing to medical complications during an acute illness. These broadly defined medical complications would likely have also occurred in a hospital or a skilled nursing facility given the social circumstances and medical conditions of these patients. Subsequent studies using a control group and more rigorous methodologies are needed to validate these findings and assertions.

It is notable that only 6% of this cohort did not receive any pain management care while the majority of patients did receive a long-acting opiate taper during the course of their treatment. When combined with the 31.2% who received a buprenorphine taper for acute withdrawal symptoms, the vast majority of patients did receive some form of opiate replacement or antagonist-agonist therapy to minimize pain and withdrawal symptoms. Previous research showed that the use of methadone in the care of hospitalized injection drug using adults was associated with reduced odds of a discharge against medical advice.⁴ Aggressive management of pain and withdrawal symptoms likely contributed to our high program completion rate and supports the role of dedicated staff who are trained and sensitized to detect and manage acute pain and withdrawal syndromes in substance-abusing patients.

There are several limitations to consider in this study. First, we present data from a case series report of consecutive patients admitted to this service. We do not have a control group with which to compare our findings. There is also a potential selection bias toward patients who did not leave AMA earlier in their hospital course and who may be more likely to succeed from this level of intervention. Second, the data presented were obtained by abstracting chart data and may not necessarily capture all of the relevant variables associated with program completion or medical complications. This might include attitudes about and responses to the substance abuse treatment being provided, or external mitigating and inciting factors that might influence a relapse or an AMA discharge. Finally, the data presented are from 1 inner city urban academic health center and may not necessarily be representative of patients from other socio-economic groups, geographic areas, or with other illness presentations.

In summary, these data suggest that an acutely ill substance-abusing population can be safely and effectively managed in an outpatient integrated care setting with treatment and referral compliance rates better than traditionally seen in this predominantly homeless population. Distinct structural accommodations and the co-location of services in or near an acute care facility appear necessary for this type of program to adequately address the still active medical needs of this cohort.

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