Linkage with Primary Medical Care in a Prospective Cohort of Adults with Addictions in Inpatient Detoxification: Room for Improvement

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Objective. To identify patient characteristics and health care experiences associated with primary care linkage after alcohol or drug detoxification.

Data Sources/Study Setting. Primary data collected over two years. Subjects were adults without primary medical care, in an urban residential detoxification program.

Study Design. A prospective cohort study in the context of a randomized trial of a linkage intervention, and an expansion of Medicaid benefits.

Data Collection/Extraction Methods. Data were collected by interview assessment of predisposing, enabling, and illness variables. Linkage was defined as self-report of at least one visit with a primary care clinician during follow-up.

Principal Findings. Of 400 subjects, 63 percent linked with primary medical care. In a multivariable model adjusting for randomization assignment, predisposing, enabling, and illness variables, women, those with no recent incarceration, those with support for abstinence by family or friends, and those who had visited a medical clinic or physician recently were significantly more likely to link with primary care. Those with health insurance during follow-up were also more likely to link. Recent mental health or addictions treatment utilization and health status were not associated with linkage.

Conclusions. A substantial proportion of adults with addictions do not link with primary medical care. These data suggest that efforts could be focused on those least likely to link, that contacts with mental health and addictions treatment providers are underutilized opportunities for these efforts, and that health policy changes such as expanding health insurance benefits may improve entry of substance-dependent patients into primary medical care.

Key Words. Primary care, addictions, health insurance, cohort, linkage

Many patients with addictions do not receive primary medical care. For example, of persons entering addiction treatment in Boston, only 41 percent reported having a primary care physician (Saitz, Mulvey, and Samet 1997). Yet these patients have many acute and chronic medical illnesses, both related and unrelated to their addictions (DeAlba, Samet, and Saitz in press; Saitz

2003). They also tend to use more costly episodic care for medical needs, such as the emergency department (McGeary et al. 2000; French et al. 2000). To address this shortfall there have been calls to link substance abuse treatment with primary care (Morris 1995; Levin et al. 1993; Samet, Friedmann, Saitz 2001). But how to link these systems to benefit patients, and which patients with addictions are at greatest risk of going without primary care, is unknown. In fact, several federal agencies have recently attempted to gather expertise and develop research agendas to answer these questions and have ongoing requests for research in this area (National Institute of Mental Health 2003).

Primary care can lead to better health for many groups of patients (Starfield 1998). In a recent retrospective cohort study, adults with addiction who received regular primary medical care were less likely to be hospitalized (Laine et al. 2001). In another study, onsite primary care was associated with improved addiction severity (Friedmann et al. 2003). In a randomized clinical trial, adults with addiction and substance-abuse-related medical conditions randomized to receive primary medical care integrated with their addictions care were more likely to be abstinent (Weisner et al. 2001). These studies confirm some of the predicted benefits of linkage of persons with addictions to primary medical care (Levin et al. 1993; Schlenger et al. 1992; Samet, Saitz, and Larson 1996). Recently, new therapeutic options have been proven effective in primary care settings, such as naltrexone for alcoholism, and buprenorphine for office-based opioid dependence treatment (O'Connor

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et al. 1998; O'Malley 2003). Other theoretical benefits are more efficient use of health services, opportunity for preventive health interventions, and better health.

Some addiction treatment programs offer primary medical care onsite (Weisner et al. 2001). One study of integrated medical care for patients with alcoholism has even shown a mortality benefit (Willenbring and Olson 1999). But these integrated programs require significant changes in existing systems. The more common pattern of organization of primary care and specialty addiction treatment services in the United States is no relationship, or a distributive one, rather than an integrative, onsite model. In the distributive pattern, medical and addictions care are delivered in separate locations, and patients and information are transferred from one location to another (Samet, Saitz, and Larson 1996). Yet this flow is anything but seamless (Samet, Friedmann, and Saitz 2001), since receipt of addictions care is not always associated with linkage to primary medical care (Saitz, Mulvey, and Samet 1997). In substance abuse programs opportunities to link patients with primary care are being missed.

Because regular medical care has been shown to have benefits, the need to improve linkage of addicted persons with primary medical care has become more urgent. A recent randomized trial found that an onsite multidisciplinary health evaluation, including motivational counseling, could increase linkage to primary medical care for adults with addictions and no regular physician (Samet et al. 2003). A greater understanding of which patients with addictions are more or less likely to link with medical care would help target such interventions and help in the design of additional efforts to link patients with primary medical care. In a retrospective cross-sectional study of patients entering addiction treatment, those more likely to have primary medical care were older, female, had health insurance, and had medical illness (Saitz, Mulvey, and Samet 1997). The study was limited, however, due to an inability to distinguish the temporal relationship between risk factors and linkage and to characterize those who link to medical care after contact with the addiction treatment system. Factors associated with linkage to primary medical care may certainly be different in patients with addictions undergoing detoxification than they are for the general population or for patients with addictions who are not yet receiving any specialty care. And patients undergoing detoxification, many of whom contact the health care system only at detoxification programs and emergency departments, are reachable and could potentially be connected with needed primary medical care, particularly if these efforts could be focused on those less likely to link without them.

Therefore, the objective of this study was to examine, using a prospective design, characteristics and health care experiences of adults with addictions associated with linkage to primary medical care. We hypothesized that greater addiction severity and access barriers (e.g., lack of insurance, ethnicity, incarceration) would interfere with linkage to primary medical care (Saitz, Mulvey, and Samet 1997; McGeary et al. 2000; French et al. 2000; Conklin, Lincoln, and Tuthill 2000; Hargraves, Cunningham, and Hughes 2001). We also hypothesized that women, those recognizing their substance problem and having social support for recovery, those believing medical care was important, those with worse health status, and those who had prior contacts with addiction, episodic medical or mental health specialty care, would be more likely to link with primary medical care (Saitz, Mulvey, and Samet 1997; McCarthy et al. 2002; Diamant et al. 2001).

METHODS

Design

The study was a prospective cohort. It was approved by the Institutional Review Board at Boston University Medical Center, and additional confidentiality protection was provided by a certificate of confidentiality provided by the National Institute on Alcohol Abuse and Alcoholism. All subjects provided written informed consent.

Subjects

All 2,062 adults admitted to and voluntarily staying at a free-standing urban residential alcohol and drug detoxification unit between June 1, 1997, and April 1, 1999, were screened for the study when research staff and patients were both available (Samet et al. 2003). They were screened for eligibility and enrolled on their second day or later in the detoxification unit. Inclusion criteria were the following: (1) alcohol, heroin, or cocaine as the patient's first or second drug of choice; (2) age greater than 17 years; and (3) residence in proximity to a referral primary care clinic or homelessness. The exclusion criteria were as follows: (1) an established primary care relationship that the patient intended to continue (980 persons, 69 percent of those ineligible); (2) mental deficiencies making the subject unable to provide pertinent history or informed consent (score of less than 21 of 30 on the Mini-Mental State Examination) (Folstein, Folstein, and McHugh 1975); (3) specific plans to leave the area in the next 12 months; (4) inability to provide three contact

names for follow-up tracking; (5) pregnancy; and (6) not fluent in English or Spanish. Of 642 eligible subjects, 470 provided consent and were enrolled in the cohort. All 470 participated in the randomized clinical trial, the Health Evaluation and Linkage to Primary care (HELP) study (Samet et al. 2003). All subjects were randomly assigned to receive either standard medical care referral by clinical addictions treatment staff on an as needed basis (usual care), or an enhanced effort for referral to primary medical care. This effort involved assessment by a physician, nurse, and social worker to address medical, psychological, and social issues, brief counseling by these providers trained in motivational interviewing to encourage primary care linkage, and making a specific appointment with a primary care physician and letters and phone calls to facilitate linkage (Samet et al. 2003). Neither option included ongoing primary medical care at the detoxification unit.

Assessments

After initial resolution of the symptoms of acute withdrawal during the first 24 hours, subjects were interviewed at the detoxification unit by trained research associates. Assessments included demographics, health care utilization, social support, barriers to primary care linkage, beliefs about primary care, substances used, addiction severity (Addiction Severity Index [ASI] alcohol, drug, and psychological sub-scales) (McLellan et al. 1992), consequences of drug use (Inventory of Drug Use Consequences [INDUC-2L]) (Miller and Tonigan 1995), readiness to change substance use (using the Stages of Change Readiness and Treatment Eagerness Scale, [SOCRATES 8AOD]) (Miller and Tonigan 1996), depressive symptoms (Center for Epidemiologic Studies Depression [CES-D] scale) (Radloff 1977), health-related quality of life (Short Form Health Survey [SF-36]) (Ware 1993), and questions regarding comorbid medical diagnoses (Stein et al. 1998; Saitz, Mulvey, and Samet 1997).

   Primary care linkage was determined by asking: "Is there one particular doctor that you consider to be your regular personal doctor?"; "Have you seen any doctors in the last six months (or since your last interview)?" If they did not report having a regular personal doctor but had seen a physician, they were asked: "Would you call or go to one of these/this doctor(s) if you had a medical problem that was not an emergency?"; "Do you think one of these doctors could be your regular doctor?" Subjects reporting either having or possibly having a regular personal doctor or that they would contact the doctor for nonemergent problems were asked, "What type of doctor is your regular personal/this doctor?"

For these subjects being detoxified from substances, problem use of alcohol or other drugs was defined as either frequent use ($\geq$ 3 times per week) for a year or more, or 5 or more days of use in the past 30 days for any substances listed in the ASI. For this problem use definition, alcohol use was defined as either intoxication or three or more drinks on one day (McLellan et al. 1992; Volpicelli et al. 1992).

Outcomes

Outcomes were assessed by in-person interview (phone as a secondary option) at 6, 12, 18, and 24 months after baseline. Time to first self-reported linkage to primary medical care during the 24 months following study enrollment was the primary outcome of this cohort study (as well as of the randomized trial), where first linkage could occur at 6, 12, 18, or 24 months. Linkage to primary care was defined as at least one visit to a primary care physician, nurse practitioner, or physician assistant. For the visit to be defined as primary care, the subject had to report having a "regular personal doctor," that they would call this doctor for a nonemergent issue, or that they saw a doctor that "could be their regular personal doctor." The clinician had to be in a specialty that could be considered primary care, including obstetrics and gynecology, family medicine, pediatrics, adolescent medicine, internal medicine, AIDS doctor, asthma doctor, pulmonary doctor, cardiologist, or a gastroenterologist. When the specialty was unknown to the subject or was a specialty other than those specifically queried, the physician's office was contacted to determine the specialty.

While we could not directly assess the validity of self-report, we did compare self-report with administrative data sources. Computerized databases of patients seen for primary medical care at Boston Medical Center (BMC) or by Boston Health Care for the Homeless Program were queried for visits by study subjects during a 12-month period following study enrollment. This database included visits to the two BMC-based primary care practices (>120 physicians and $>50,000$ visits per year), and visits to primary health care delivery sites for the homeless at BMC or in a citywide network for the homeless. Whereas subjects in the randomized trial intervention group were usually referred to care at BMC, all subjects in the cohort could pursue primary medical care anywhere. Administrative data were obtained for 95 percent of study subjects. Among subjects with any self-report data that were determined by administrative data to have linked, 81 percent (103/127) reported linkage (Kappa = 0.41).

Independent Variables and Statistical Analysis

Analyses used survival methods with time to event defined as the number of months between randomization and report of primary care linkage over the 24-month follow-up period. To aid in understanding the rate of linkage (accounting for censoring after linkage or last follow-up), we calculated annualized rates of linkage by dividing the number of linkage events by person-years of follow-up. Initial review of predictors of linkage was undertaken using stratified bivariable analysis.

Multivariable proportional hazards regression models (Cox) were used to compare the hazard ratio for different predictor variables while accounting for other factors. We used the original theoretical framework provided by Andersen et al. to understand determinants of medical care utilization in the United States as guidance for analyses, as well as Gelberg et al.'s extension of this framework to include domains for vulnerable populations (Andersen 1995; Gelberg, Andersen, and Leake 2000; Andersen and Newman 1973). Specific vulnerable population variables were incarceration, perception of medical need ("How important to you is treatment for medical problems," from the ASI), substance abuse problem recognition (SOCRATES), and mental illness symptoms (CES-D, suicide attempt history, and psychiatric medication use). We also included one system variable: randomized group. We chose variables for entry into multivariable models based on review of the literature, clinical importance, bivariable analyses (using the log-rank test to determine statistical significance) using the liberal criterion $p < 0.20$, and attention to conceptual overlap that could lead to collinearity (for example, health-related quality of life and report of a chronic medical illness). We then constructed multivariable models sequentially, in the order consistent with the theoretical framework. All models included age, gender, race, and randomization assignment. The first model also included predisposing variables. The second model added enabling variables to those variables found to be significant at $p < .20$ in the first model. To assess the effect of a variable not collected at baseline, the third model added health insurance as a time-variable predictor (same six-month time period as the report of linkage) to variables significant ($p < .20$) in Model 2. The final model included age, gender, race, randomization assignment, variables significant ($p < .20$) in prior models, and illness variables. All independent variables included in these models were those assessed at baseline except for the health insurance time-variable predictor. Because there could be disagreement among researchers as to whether a particular variable best belonged in a particular category, or with the

modeling strategy chosen, we entered all variables simultaneously and included them all in a multivariable model to assess the consistency of the findings.

Predisposing variables considered in these models included age, gender, race, marital status, birthplace, recent incarceration (five years), first language, family or friends using drugs, and family or friends supporting abstinence. Enabling variables included health insurance within six months prior to study enrollment, any visit to a medical clinic or private physician, or to an emergency department for medical care in the past six months, inability to get a regular doctor due to transportation problems, fear that others might find out about their health problems as a barrier to connecting with a regular doctor, the belief that the individual did not need a regular physician, alcohol and drug problems as measured by the total score of the InDUC-2L, injection drug use ever, current smoking, readiness to change (SOCRATES recognition and taking steps scales), and problem use of heroin, other opiates, and marijuana. Illness variables were physical health-related quality of life as measured by the SF-36 Physical Component Summary (PCS), the subject's belief that medical treatment is important, depressive symptoms (CES-D score), past suicide attempt or prescription of a medication for a psychiatric or emotional problem ever (from the ASI). Presence of any chronic medical illness replaced PCS as a dichotomous illness variable in a secondary analysis. To assess whether the association between these predictors and linkage varied by randomization group, we tested the interaction of each factor in the final model and randomization group in the HELP controlled trial, and repeated the multivariable model stratified by randomization group. Stratified results are presented only when relevant.

The Kaplan-Meier product limit estimator was used to estimate the unadjusted probability of linkage at a given time point (we chose 12 months, the midpoint of follow-up, to illustrate these proportions) for variables retained in the final model. Reported p-values are two-tailed, and a p-value of less than 0.05 was considered statistically significant. Analyses were carried out using *SAS/STAT* software (2001).

RESULTS

Of 470 subjects in the cohort, 2 died before follow-up and 400/468 (85 percent) completed at least one interview during the two-year follow-up period; there were 684 person-years of follow-up for the cohort. Subjects completed a mean of 17.5 months of follow-up (median 24 months). White

subjects were significantly less likely to be lost to follow-up (34 percent versus 54 percent), while subjects with family and friends that used drugs (71 percent versus 84 percent), and who believed medical treatment to be important (40 percent versus 58 percent), were less likely to be lost. Subjects lost to follow-up did not differ significantly by any other enabling, predisposing, or illness variable.

Subject Characteristics (Table 1)

Most of the 470 subjects were male, mean age was 36, and of the 11 percent for whom English was not their first language, 58 percent preferred to speak with their physician in English. Approximately 60 percent were employed and the same percentage had no health insurance in the past six months. Almost half were homeless. Most reported recent health care use.

Table 1:   Characteristics of 470 Adults with No Primary Medical Care in Inpatient Detoxification

Characteristic	Percent
Male	76
Race/ethnicity	
White	46
Black	37
Hispanic	11
Other	6
U.S. born	87
English first language	89
Married	8
Unemployed (past six months)	39
Uninsured (past six months)	60
Homeless (>1 night in the past six months)	47
Incarceration (past five years)	53
Recent health care use*	82
Recent medical visit**	26
Friends or family support abstinence	70
Friends or family use drugs	82
Current smoker	86
Problem alcohol use***	86
Problem heroin use***	38
Problem cocaine use***	75
Injection drug use (ever)	36
Chronic medical illness	47

*Addiction, mental health, episodic medical care, hospital, or emergency department visit in the past six months.
**At least one visit to a medical clinic or physician, not primary care, in the past six months.
***See methods for definition of problem use.

Many subjects reported barriers to linking with primary medical care. These barriers included inability to get to services due to transportation problems (28 percent), fear that others would find out about their health problems (11 percent), and not feeling that they need a regular physician (21 percent). On the other hand, 55 percent believed medical treatment was important.

Many subjects (69 percent) had problem marijuana use, and 87 percent had problem use of more than one substance (not including nicotine). The mean score on the recognition scale (possible range 7 to 35) of the SOCRATES was $33 +/-3$ (SD) and on the taking-steps scale (possible range 8 to 40) was $36 +/-4$ (SD).

With regard to medical and psychiatric illness, comorbidity was common. For example, 47 percent reported a chronic medical illness. The mean Short-Form Health Survey (SF-36) Physical Component Summary (PCS) score was $48+/-11$ (SD) (50 is the mean score for the U.S. general population, which has an older mean age than study subjects) (Ware 1994). Depressive symptoms were very common (CES-D mean score $33+/-12$); 90 percent had a CES-D score > 16, and 80 percent had CES-D score > 21, levels that correlate with a depression diagnosis (Radloff 1977). Other markers of psychiatric disease included the findings that 26 percent had ever been prescribed a medication for a psychiatric or emotional problem, and 22 percent had ever attempted suicide.

Linkage with Primary Medical Care

Of the 400 subjects with follow-up, 253 (63 percent) linked with primary medical care; 56 percent (109/195) of subjects in the nonenhanced (usual) primary care referral (control) group of the randomized HELP study linked with primary care. The annualized rate of linkage for the entire cohort was 53 linkage events per 100 person-years; the corresponding rate was 44 per 100 person-years in the control group of the HELP trial. The final multivariable model considering predisposing characteristics, enabling factors, and illness is reported in Table 2 along with unadjusted estimated predicted probabilities of linkage at one year, the midpoint of follow-up. All predictor variables were assessed during the baseline interview except for having health insurance during the follow-up period. Women, those with no recent incarceration, persons with support for abstinence by family or friends, and those who had visited a medical clinic or physician in the six months prior to study enrollment were significantly ($p<0.05$) associated with shorter time to linkage

Table 2:   The Relationship between Predisposing, Enabling, and Illness Variables and Linkage with Primary Medical Care over Two Years for Adults with Addictions ($n = 392$*)

	Hazard Ratio (Adjusted) (95% Confidence Interval)**		Predicted Probability of Linkage at Twelve Months[§] (Unadjusted for Other Factors)
Older age (years)	1.01 (0.99–1.03)	≥35 years	0.48
		<35 years	0.41
Female sex	1.67 (1.23–2.28)	Female	0.52
		Male	0.42
Minority race/ethnicity	1.32 (0.98–1.78)	Minority	0.48
		White	0.39
Married	1.49 (0.95–2.36)	Married	0.51
		Not married	0.44
Incarceration (past five years)	0.73 (0.56–0.96)	Incarceration	0.38
		No incarceration	0.52
Family or friends support abstinence	1.60 (1.18–2.18)	Support	0.49
		Do not support	0.36
Medical visit (episodic, past six months)[++]	1.48 (1.10–1.97)	One or more	0.53
		None	0.42
Smoking (current)	1.41 (0.92–2.14)	Smoker	0.47
		Nonsmoker	0.30
Substance problem recognition***	1.04 (0.99–1.10)	≥34	0.44
		<34	0.46
Belief that medical treatment is important	1.12 (0.81–1.56)	Important	0.46
		Not important	0.42
SF-36 PCS[^]	1.00 (0.98–1.01)	≥48.6	0.41
		<48.6	0.49
CES-D score[+]	1.01 (0.99–1.02)	>16	0.44
		≤16	0.47
Suicide attempt ever	0.95 (0.67–1.35)	Ever	0.49
		Never	0.44

Table 2. *Continued*

	Hazard Ratio (Adjusted) (95% Confidence Interval)**	Predicted Probability of Linkage at Twelve Months§ (Unadjusted for Other Factors)	
Psychiatric medication ever	1.14 (0.81–1.60)	Ever prescribed	0.48
		Never prescribed	0.44
Insurance during follow-up	1.63 (1.19–2.22)	Insurance	0.54††
		No insurance	0.41
Randomization to enhanced primary care referral	1.78 (1.36–2.34)	Enhanced referral	0.52
		Usual care referral	0.37

All variables in the model were collected at the baseline research interview except insurance during follow-up, which was assessed at 6, 12, 18, and 24 months for each preceding 6-month period and entered as a time-variable predictor (see text).

Cut-point for continuous variables was the median value, except for the CES-D for which the clinically meaningful 16 or greater cutoff was used. See text for predicted probability of linkage by insurance during follow-up.

*Eight of four hundred subjects with follow-up in the study had missing data on one or more of the variables listed and are therefore excluded from these proportional hazards regression analyses.

**Adjusted for all other variables listed in the table.

***Recognition subscale of the SOCRATES (Stage of Change Readiness and Treatment Eagerness Scale).

^SF-36 PCS = Short Form Health Survey Physical Component Summary.

+CES-D = Center for Epidemiologic Studies Depression.

++At least one visit to a medical clinic or physician, not primary care, in the past six months.

§Based on the Kaplan-Meier product limit estimator.

††Predicted probability of linkage at six months associated with insurance during that six-month follow-up period.

with primary medical care in analyses adjusted for age, race/ethnicity, marital status, smoking, belief that treatment was important for their medical problem, physical health-related quality of life, depressive symptoms, past suicide attempt, and prescription of a medication for a psychiatric or emotional problem. In the same model, minorities, married persons, and those recognizing their addiction linked sooner to primary medical care at a borderline level of significance ($p < 0.10$). In addition, although insurance at baseline was not significantly associated with linkage at follow-up (unadjusted Hazard Ratio 1.14, 95 percent CI 0.88–1.46), reported insurance status during follow-up was significantly associated with linkage to primary medical care during the same time period for which the insurance was reported (adjusted Hazard Ratio 1.63 [95 percent CI 1.19–2.22], where not having insurance is the reference group).

In a model in which SF-36 PCS score was replaced with the dichotomous indicator of chronic medical illness, results were similar. In a model that did not adjust for a recent episodic medical utilization, SF-36 PCS remained nonsignificant (adjusted HR 1.00, 95 percent CI 0.99–1.01). In a model that forced in these previously nonsignificant variables, alcoholism severity (adjusted HR 0.87, 95 percent CI 0.57–1.33), drug addiction severity (adjusted HR 0.50, 95 percent CI 0.19–1.34), addiction treatment (adjusted HR 1.10, 95 percent CI 0.82–1.48), or mental health visit (adjusted HR 0.94, 95 percent CI 0.62–1.45) in the past six months remained nonsignificant. Significant and nonsignificant variables in the final model using the sequential modeling approach remained so in a single model containing all of the independent variables.

There were no significant interactions between factors associated with linkage and randomized group in the HELP clinical trial except for a marginally significant interaction between randomization group and insurance during follow-up. In that multivariable model stratified by randomization group (e.g., enhanced referral intervention group versus nonenhanced [usual] primary care referral control group), the insurance effect was smaller among subjects in the intervention group (HR 1.30, 95 percent CI 0.85–1.98) than it was among subjects assigned to the control group (HR 2.45, 95 percent CI 1.44–4.16).

DISCUSSION

A substantial proportion of this relatively young cohort of addicted adults with high health care utilization but no existing regular primary medical care

relationship failed to link with primary medical care after residential detoxification. Women, those with recent episodic medical visits, family support for abstinence, and those with insurance after detoxification, were more likely to link with primary care. Recent incarceration decreased the likelihood of linkage.

Men with and without addictions are less likely to use primary medical care (Saitz, Mulvey, and Samet 1997; Lim et al. 2002; Gallagher et al. 1997). That men are less likely to link to care after detoxification suggests that interventions to improve linkage could target men when they are reachable in inpatient detoxification units. Many incarcerated adults report poor health status and failure to obtain needed medical care (Conklin, Lincoln, and Tuthill 2000). Since those with past incarceration were less likely to link with primary care after detoxification, efforts (already nascent in some communities [Conklin, Lincoln, and Flanigan 1998]) toward improving access to primary care should be studied.

Since our data suggest that prior contacts with episodic medical care enhance the likelihood of entering primary care after detoxification, these care sites could make linkage efforts standard practice. This finding is consistent with prior work finding that episodic medical illness is associated with having primary medical care in adults with addictions (Saitz, Mulvey, and Samet 1997). Our finding that social support for abstinence can increase linkage suggests that patients with little support could receive social support counseling, a method already known in other settings to improve follow-up ambulatory appointment-keeping (Tanner and Feldman 1998).

Health insurance during follow-up but not at the time of detoxification was one of the strongest predictors of linking with primary medical care. This was particularly true for subjects who had not received an enhanced referral to a primary medical care clinic that served patients regardless of ability to pay. In studies of other populations including those with addictions (Saitz, Mulvey, and Samet 1997; Bierman et al. 1999), having insurance is associated with use of medical services. But in this population of addicted adults, many people who had no primary medical care had health insurance (40 percent, Table 1). And having insurance at the time of contact with the detoxification unit was not enough to facilitate subsequent linkage with primary care. Only having health insurance at the right time—during the early period after detoxification when patients may begin to recognize and become concerned about medical symptoms as their sensorium clears and priorities change—was the predictor of importance.

Coincidentally, the period of follow-up in this study was a time when Massachusetts implemented a substantial Medicaid expansion (starting

July 1, 1997) (MassHealth 2002). And most of our subjects (90 percent) who had insurance in follow-up reported Medicaid as the insurer. Making health insurance coverage available to adults with addiction (a group disproportionately lacking primary medical care) at the right time (e.g., when they are more likely to access primary health care) is likely a generalizable strategy for improving receipt of primary care services (McCarthy et al. 2002). Differing findings regarding insurance at different times (at the time of detoxification and afterward) and during implementation of a statewide policy also demonstrate the importance of accounting for the dynamic nature of insurance coverage and changing policy in health services research.

We had hypothesized that ethnicity, recent addiction or mental health treatment utilization, addiction severity, health status, substance problem recognition, and perceived need for medical care would affect linkage, yet they did not. The association between minority race and linkage did not reach statistical significance but was in the same direction as has been previously reported for linkage with alcohol treatment (Kirchner et al. 2000). There were no discernible effects for mental health utilization or health status in our study. Health status was not associated with having a regular source of care in another study of a similarly vulnerable homeless population (Gallagher et al. 1997). This "need" or illness factor, generally associated with health care utilization (Bierman et al. 1999), and associated with having primary care for people with addictions (Saitz, Mulvey, and Samet 1997), may not have risen to the top of a priority list (Gallagher et al. 1997), or perhaps the need was met with episodic or emergency but not primary medical care. That patient beliefs about needing a physician did not lead to getting one, is also likely explained by a reordering of priorities (such as relapse or social, legal, or psychological needs) after leaving the residential detoxification facility. For addiction treatment utilization, addiction severity, and substance problem recognition, the effects were in the hypothesized direction but they did not reach statistical significance even in this large sample. In addition, the relatively low variability in the sample may explain why an expected association was not found (e.g., all had drug dependence severe enough to warrant inpatient detoxification).

The major strengths of this study were its focus on an understudied, reachable population in need, standardized prospective data collection with a high follow-up rate, and analyses based on theory. In addition, we used a broad definition of primary care based on how a physician functions in the eyes of the patient rather than based on how a health system categorizes them

(Starfield 1998); this deliberate choice makes it very likely that subjects reporting no primary medical care truly did not have it.

Limitations of our study include a 15 percent loss to follow-up that could have biased the results, however, the minimal losses and few differences in subject characteristics make this issue less of a concern. Assessment of primary medical care linkage by self-report may be a concern, but interview assessment of this outcome was a focus of the study; it was detailed, it referred to the recent past, and it was validated against administrative data. And recall for an event like a visit to a new primary care physician is more accurate than recall for less notable events (Means et al. 1989). Finally, the generalizability of our results may be limited to adults with addictions in similar low-socioeconomic-status detoxification and treatment programs typically found in cities in the United States.

Patients with addictions have many medical needs that go unaddressed (DeAlba, Samet, and Saitz in press; Saitz 2003). Regular primary medical care can improve their health care utilization and outcomes (Weisner et al. 2001). The challenge is to facilitate access to that care. Access could be improved by integrating primary care with addictions specialty care by having services onsite (Weisner et al. 2001), by better links between care sites (Samet, Friedmann, and Saitz 2001; Samet, Saitz, and Larson 1996), and by providing health insurance. Attention must also be paid to patient motivation and barriers to access (Teitelbaum et al. 1992).

Patients with addictions who have primary care physicians have already been described in the literature, and compared with those who do not (Saitz, Mulvey, and Samet 1997). But to our knowledge, no prospective study has reported on factors associated with linkage to primary medical care after detoxification for those without a physician. Detoxification is often not followed by addiction treatment or medical care (Samet et al. 2003; Mark et al. 2002). Thus detoxification presents an opportunity to reach patients without primary care, who could benefit from such care, and who may not seek it without facilitated access. Our data from this unique population do not simply mirror findings in the general population or even in persons with addictions (Saitz, Mulvey, and Samet 1997; Lim et al. 2002; Gallagher et al. 1997). In this setting, social support for abstinence, episodic medical care delivery contacts, incarceration, and insurance at the right time take on importance for patients with addictions who do not have, but who need primary medical care. Identification of these factors, and others significant in general and other vulnerable populations (e.g., gender), suggest clinical and policy interventions targeted to those at greatest risk as we have outlined in this discussion. We

anticipate that this knowledge of potentially modifiable factors that affect linkage with ongoing care could be used by health systems, detoxification or addiction treatment programs, and by researchers designing interventions to improve entry into primary care at a specific common point of contact with the health care system for patients with addictions.

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