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On-site Basic Health Screening and Brief Health Counseling of Chronic Medical Conditions for Veterans in Methadone Maintenance Treatment

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Abstract

Background—In order to improve the delivery of health services for chronic medical conditions in our methadone clinic, we added an onsite health screening and brief health counseling to the treatment plans for patients receiving methadone maintenance treatment at the Atlanta Veterans Affairs Medical Center (VAMC). We then conducted a follow up retrospective chart review to assess whether this intervention improved health outcome for those patients.

Methods—We reviewed the charts of one hundred and two patients who received treatment at Atlanta VAMC methadone clinic between 2002 and 2008. We sought to determine whether our increased health education and screening intervention was associated with improved: 1) Improved drug addiction outcome (as measured by comparing percentage of opiate and cocaine positive drug screens from admission to most recent). 2) Basic health screening, (as measured by the patient's compliance with primary care physicians (PCP) appointments and current smoking status). 3) Management of co-occurring medical conditions (as measured by levels of LDL cholesterol, hemoglobin A1c, and systolic blood pressure (SBP). 4) Presence of QTc prolongation (difference in QTc between baseline and most recent EKG).

Results—Illicit drug use (opiate and cocaine) markedly decreased in patients overall. The effect was more robust for those successfully “retained” (n=55, p<0.0001) in treatment, compared to those who “dropped out” (n=40, p=0.05) of treatment. Compliance with PCP appointments was high (82% and 88% before and after the onsite intervention, respectively) for “retained” patients. LDL cholesterol level was within normal range for all patients. A1c improved by 40% after the onsite intervention as reflected by the decreased percentage of patients with A1c > 7 % from before to after the intervention (90% vs. 50%, p=0.05). However, the prevalence of uncontrolled hypertension did not significantly improve after the onsite intervention (38% vs. 28%, p=0.34). As might be expected with MMT, the prevalence of QTc prolongation actually increased from 399 m sec. (+/- 92) to 439 msec. (+/- 22) after the onsite intervention (p=0.003).

Conclusions—Our retrospective study supports the previous literature that methadone maintenance therapy is effective in reducing illicit drug use. Although patients with history of heroin

dependence and in methadone maintenance treatment are at increased risk for chronic medical conditions like hepatitis C and diabetes, there are minimal federal guidelines for medical care, except than a physical exam upon admission, and basic screening for some infectious diseases e.g. HIV and Hepatitis C for those patients. Our study demonstrated the need for and potential benefit of enhancing the delivery of health promotion services for chronic medical conditions in methadone maintained patients. Improving management of hepatitis C, diabetes, hypertension, and other related conditions, in this high risk, difficult-to-treat, and underserved population may reduce their morbidity and premature mortality.

Keywords

mass screening; health education; health promotion; methadone; diabetes mellitus

Introduction

Premature death is common in heroin-addicted patients. Some studies reported that the annual death rate in this population is about 1-3% (1-2). One study reported that heroin addicts not receiving opioid agonist treatment suffer an average age at death of 47 years (3). Several factors contribute to premature death in this population including overdose, chronic liver disease, human immunodeficiency virus (HIV) infection, and accidents (3). Impulsivity, personality disorders, unemployment, legal problems, high-risk behaviors such as intravenous (IV) drug use, and psychiatric co-morbidity may also contribute to premature death in heroin addicts (4,5). Fortunately, methadone maintenance treatment (MMT) can prolong survival in this population due the reduction in the aforementioned risk factors (6-9). Nevertheless, although patients on methadone may be protected from risk factors associated with active IV drug use, they are not immune from other diseases that increase the risk for premature mortality, e.g. chronic obstructive pulmonary disease (COPD), hypertension (HTN), diabetes mellitus (DM), HIV and/or hepatitis C. Indeed, the prevalence of chronic health conditions has been shown to be much greater in MMT patients than community populations (10,11). Howard et al. reported that men receiving methadone were over six times more likely to have previously diagnosed DM compared with men who were not receiving methadone (11).

Although patients with history of heroin dependence and in methadone maintenance treatment are at increased risk for chronic medical conditions like hepatitis C and DM, there are minimal federal guidelines for medical care, specifically- a physical exam upon admission and annual screening for some infectious diseases e.g. HIV and Hepatitis C. Medical care for patients in MMT varies across programs and most programs provide minimal onsite medical services other than urine drug screening. Patients in MMT with medical co-morbidities across the United States usually have limited access to lab testing, EKG screening and proper diagnosis and management of their medical co-morbidities. This is not the case for MMT programs enrolled in the Veterans Healthcare Administration (VA) system. The VA system is unique among MMT programs in its capacity to provide comprehensive medical services like laboratory testing, access to routine EKG, medications for co-occurring conditions (e.g. for hepatitis C treatment and smoking cessation) and referral to sub-specialty clinics if needed (e.g. hepatology and cardiology).

Despite the marked decrease in illicit drug use of older veterans presenting for methadone maintenance treatment (MMT) at Atlanta Veterans Affairs Medical Center (VAMC), a retrospective chart review revealed that in these patients (n=91), diabetes and cancer significantly increased risk for premature death in these patients (average age at death was 57 years). Moreover, the prevalence of chronic medical conditions [i.e. diabetes mellitus (DM), hypertension (HTN), hepatitis C] was much greater compared to other community populations (10). In order to improve the delivery of health services for chronic medical conditions in our

methadone clinic, we added onsite health screening and brief health education to the treatment planning sessions for patients receiving methadone maintenance treatment at the Atlanta Veterans Affairs Medical Center (VAMC). We then conducted a follow up retrospective chart review to assess if this intervention was associated with improved health outcome for those patients.

Methods

Subject Selection and Data Collection

Records from all patients who are currently or had previously been maintained on methadone in the methadone maintenance program at the Atlanta VA Medical Center during the years 2002-2008 were evaluated. Of the 132 patients treated at the clinic between 2002 and 2008, 30 were excluded from the study because they had been treated as guests (had been in treatment in other clinics but received methadone dosing temporarily from our clinic), or were treated in the clinic for less than one month. Thus, 102 patient charts were selected for review and the following information was collected: sociodemographic (age, gender, marital status and race); results of urine drug screens (UDS) for opiates and cocaine (first 4 screens after admission to the program and last 4 screens); dose and duration of methadone treatment; HIV, hepatitis B or C status; nicotine use; diagnosis of DM, hypertension (HTN), heart disease (coronary artery disease-CAD), chronic obstructive pulmonary disease (COPD), or cancer; intravenous (IV) drug use; and missed appointments with primary care physician (PCP).

UDS were performed at admission, weekly for the first month, and then randomly 2-3 times per month after that. The patient's status for HIV and hepatitis B and C was confirmed by antibody lab tests. The diagnosis of DM, nicotine use, TN, CAD, COPD, IV drug use, and cancer were obtained from the patient problem list and confirmed from the clinician notes. Information on compliance with PCP appointments was obtained from PCP notes in the electronic medical records system.

Subject Classification—Subjects were categorized into one of three groups based on their methadone treatment status:

1. *Retained in treatment*: patients currently in active treatment.
2. *Dropped out*: patients who did not show up for dosing for 5 consecutive days, who were administratively discharged for noncompliance, or who were detoxified (tapered off methadone against medical advice) from the program.
3. *Deceased*: patients who died while being treated with methadone.

Brief health screening and counseling intervention for retained patients—A brief onsite counseling and health screening for every patient receiving methadone maintenance treatment was provided in our clinic during 2007. The methadone clinic treatment team consists of an addiction psychiatrist, a social worker, a nurse and an addiction therapist. Performed by the addiction psychiatrist, patients received a 20-30 minute, health education intervention every 3-6 months during treatment planning meetings. Results of EKG, LDL and A1c were reviewed by the psychiatrist who provided feedback for each patient and arranged for appropriate referrals as needed. Compliance with PCP appointments was encouraged, as well as smoking cessation (including offering nicotine replacement, bupropion or varenicline), diets congruent with the USDA food guide pyramid and thrice-weekly, regular exercise of at least 30 minutes duration and of sufficient intensity (12). The team focused on four chronic medical conditions for health screening and counseling including hepatitis, diabetes, smoking and cardiovascular. Table (1) illustrates the points of brief counseling, treatment plans modification and onsite screening for those chronic medical conditions.

In 2008, using a retrospective chart review, we sought to confirm our previous findings that patients retained in methadone treatment have improvement in illicit drug use from baseline to most recent measure. We also sought to determine whether our health promotion intervention was associated with improved health monitoring, smoking cessation, compliance with medical care, and health status.

Our study was approved by the Institutional Review Board (IRB) of Emory University and the Research and Development committee of the Atlanta VAMC. We created a form for data collection from the Atlanta VA Medical Center Computerized Patient Record System (CPRS). Two of the staff of the methadone clinic collected the data from CPRS onto the research data collection forms. Before they started, they received training by the Principle Investigator (PI) on the accuracy and standardization of the data collection. The PI and a Co-investigator reviewed those forms for accuracy and inter-rater agreement. These data collection forms were scrubbed of any identifiers after the data were transferred to the excel sheets. De-identified data was given to the bio-statistician for analysis.

Outcome Measures

We compared illicit drug use by urine drug screen at admission and at most recent samples for all three groups- retained, dropped out and deceased. All other comparisons were between the year before to the year after the health promotion intervention for the retained patients only. Patients who dropped out or died were not available for the health promotion intervention. Outcome measures consisted of the following:

- a. Health monitoring as measured by the presence of documented A1c, LDL, EKG and blood pressure reading in the CPRS the year before and after the onsite health promotion intervention).
- b. Smoking cessation as measured by the rate of smoking cessation per patient report during treatment team meetings for each patient the year before and after the health promotion intervention).
- c. Patient's compliance with PCP appointments as measured by the percentage of scheduled primary care appointments attended for the year before and after the health promotion intervention
- d. Health status (LDL, A1c, and SBP the year before and after the health promotion intervention),
- e. Presence of QTc prolongation (baseline EKG QTc at admission to most recent EKG QTc for each patient).
- Screenings were classified as abnormal with LDL cholesterol > 160 mg/dl, A1c > 7.0%, SBP > 140 mm Hg, and QTc > 440 msec.

Statistical Analysis

For comparing change in percentage of positive urine drug screens from the first four to the last four urine samples, we used the Chi-square test. The two-tailed paired student t-test was used for testing the significance of change in continuous data such as QTc interval from the year before to the year after the intervention. The Chi-square test was also used to test the significance of change in categorical variables such as percentage of patients with elevated hemoglobin A1C from before to after the intervention for patients retained in the clinic. p values less than or equal to 0.05 were considered statistically significant. We used SPSS 16.0 package for statistical analysis.

Results

Patients Characteristics

Table 2 presents demographic and baseline characteristics for patients in all three groups. Most of the MMT patients were male, African American, hepatitis C positive, smokers, and IV heroin users. Many had chronic multiple conditions such as HTN, DM, coronary artery disease and COPD. Seven percent of our patients died, 54% were retained and another 39% dropped out of MMT. The deceased patients had significantly higher rates of diabetes mellitus (86% vs. 18% and 25%, for the retained and dropped out respectively, $p = 0.004$), COPD (43% vs. 16% and 10%, $p = 0.05$), and malignant neoplasms (43% vs. 5% and 8%, $p = 0.004$). The neoplasms primarily involved the liver and GI tract. They had an average age at death of 57 years.

Opiate and cocaine illicit drug use from admission to most recent UDS performed: (table 3)

As shown in Table 3, there was improvement in opiate and cocaine illicit drug use from admission to most recent UDS performed. The deceased group had a statistically significant reduction of their drug use when compared the result of the first and last 4 urine drug screens for opiate and cocaine ($p=0.004$ for opiate and $p=0.04$ for cocaine). The retained group also had a statistically significant reduction of their drug use when compared the result of the first and last 4 urine drug screens for opiate and cocaine ($p<0.0001$ for opiate and cocaine). On the other hand the dropped out group had a significant improvement for reduction of illicit opiate use but not for illicit cocaine use ($p=0.05$ for opiate and $p=0.38$ for cocaine).

Basic health screening, patient compliance with primary care appointments and smoking cessation for retained patients: (table 4)

Table 4 presents pre and post-intervention results for health screening, PCP appointment compliance and smoking cessation. The onsite screening for EKG (13% before vs. 93% after, $p<0.0001$) and A1c (51% before vs. 95% after, $p<0.0001$) showed statistically significant improvement. There was no significant difference in rate of screening for LDL cholesterol, SBP checks, smoking cessation, or compliance with PCP appointments from before to after the intervention.

Health Maintenance- Levels of LDL Cholesterol, A1c and SBP for retained patients: (table 4)

Table 4 presents pre and post-intervention results for Levels of LDL Cholesterol, A1c and SBP: LDL (mean mg/dl +/- SD) before and after the onsite intervention 88 (+/- 28) vs. 100 (+/- 30), 38% of patients who were diagnosed with HTN, had SBP > 140 mm Hg vs. (28%), 90% vs. 50% of patients who were diagnosed with DM had A1c > 7%. The onsite intervention was associated with a significant difference for improvement in A1c levels for the patients who were diagnosed with DM ($p=0.05$).

EKG QTc prolongation from baseline for retained patients: (table 4)

Table 4 presents pre and post-intervention results for EKG QTc prolongation from baseline: EKG (QTc) (mean msec +/- SD) before and after the onsite intervention 399 (+/- 92) vs. 439 (+/- 22), and 18% of patients had QTc > 440 msec at baseline vs. 45% at most recent EKG. QTc readings showed statistically significant prolongation from baseline ($p=0.003$).

Discussion

In our clinic, patients were retained in treatment as well as those who died prematurely realized significant reduction in illicit opiate and cocaine use. The patients who dropped out showed a significant reduction of illicit opiate use but not of cocaine use. This study confirms earlier reports that MMT is associated with reduction in illicit opioid use (4,5,13). Because both the

retained and deceased groups realized improvement in cocaine use as well, it raises the question of whether attention to other illicit drug use may improve retention in treatment. Although the average age of death of our deceased patients (57 years) is significantly different than that of the general population, it is significantly better than that reported in previous studies of patients with opioid dependence who were not treated with MMT. This study adds additional confirmation to the long-term benefits of MMT on extending longevity in persons with opioid dependence.

In a previous study, our group demonstrated that the prevalence of hepatitis C, smoking, DM and HTN was high in our clinic compared to the general populations (10). In this study, seven cases of premature death (death before the age of 65 as defined by the CDC) occurred in our clinic within five years period. All of whom were hepatitis C positive. Three of them died secondary to GI cancer (hepatoma and colon cancer), one secondary to ruptured aortic aneurysm and three natural deaths of unknown reasons. Unfortunately, those patients did not have autopsy exams to provide an accurate cause for their death. As methadone maintenance treatment has been available since 1960s (14), patients in MMT have become older and medical problems associated with aging occur more often in this population. Decades of unhealthy life styles, i.e. IV drug use, cigarette smoking, poor diet, and a sedentary lifestyle, likely increase the risk of premature death in this population. The current study examines a larger sample that includes many of the same patients as in the previous report. It confirms our findings in the previous study that patients who died prematurely had higher rates of certain chronic medical conditions including DM, COPD, and cancer. We felt that health promotion within our Opioid Agonist Treatment Program (OATP) may have a significant impact on improving longevity. During the one year period of our onsite intervention, we did not have any premature death in our clinic. However, more long term follow up would need to be done on a larger sample to reflect more accurate results.

In our clinic compliance with PCP appointments for retained patients was relatively high (82% before and 88% after the onsite intervention) and significantly higher than that of the dropped out group at baseline (29%). Even though veterans have better access to primary care than most MMT patients, the ones who dropped out failed to comply with PCP appointments compared to those who were retained. This finding supports the notion of offering health promotion within the MMT. Clinics with large numbers of patients without primary care may realize an even greater health outcome. Perhaps because of the high compliance rate at baseline, retained patients did not show significant improvement after the onsite intervention.

There was a non-significant trend for improvement in the rate of smoking cessation from 87% to 78%. The rate of smoking in our clinic is very high compared to the general population (78% vs. 23%) (15). It may be that veterans with other drug dependence need a more intensive intervention for smoking cessation to be successful. We plan to continue to gather data on this cohort and continue our brief interventions, but future research is needed on what smoking cessation interventions would be optimal in this population.

Most patients who entered methadone maintenance treatment in our clinic had several risks factors for developing certain chronic medical conditions. The high rates of past IV drug use, and consequently of hepatitis C in this patient population, could be a risk factor for liver cancer and DM, as reported in earlier studies (16-19). Smoking is also a risk factor for different types of cancer, including colorectal and lung cancer (20-22). Thus, the high rates of hepatitis C at entrance into methadone treatment may have played a role in the later development of chronic medical conditions. Offering treatment for nicotine dependence and hepatitis C early in the course of MMT may decrease the morbidity and mortality for those patients.

Similarly, before and after our onsite intervention, nearly all of our patients had a LDL level checked. There was a non significant trend for the elevation in the average level of LDL after the onsite intervention. Although this difference may due to random chance in our small sample size, it raises the question of whether health promotion in methadone maintenance should include interventions for hyperlipidemia, including nutrition, exercise, and medications.

Screening for A1c level showed significant improvement after the onsite intervention. Ten patients out of 55 (18%) were diagnosed with DM in the clinic. Ninety percent had A1c > 7 before the onsite intervention and 50% had A1c > 7 after the onsite intervention ($p=0.05$). Although the sample size is small, the magnitude of the improvement by 40% after the onsite intervention is encouraging; nevertheless, 50% of our patients with DM remained below the American Diabetic Association (ADA) goal of A1c < 7% after intervention. In this sample, 6/7 (or 86%) of patients who died prematurely in our clinic had DM and two thirds of those had an A1c > 7%. There is evidence that pathophysiologic factors, i.e. insulin resistance related to opioid dependence (23-27), and hepatitis C (28-32), may make glycemic control more challenging for MMT patients with DM. Though the exact mechanism is not clearly understood, a recent study reported that over-expression of protein phosphatase 2A (PP2A) in the liver contributes to the pathogenesis of insulin resistance in patients with chronic hepatitis C which is a common co-morbid disease in IV drug users (33). Other studies reported a relationship between opiate addiction, insulin resistance and decreased insulin secretion compared to healthy controls (23-27). Because of the association of DM with premature death in our population and the potential adverse effects of hepatitis C and opioid use on glycemic control, we feel that further MMT clinic based health promotion is an important intervention for MMT patients with DM.

The health promotion intervention was associated with marked improvement in obtaining annual EKGs. Eighty-two percent of the patients had baseline EKGs at admission. Of these 45% ($P=0.003$) exhibited QTc prolongation after the onsite intervention. The prevalence of QTc prolongation was likely due to MMT or concurrent use of antidepressant or antipsychotic medications. Some antidepressants may increase the risk for QT prolongation. Some atypical antipsychotics may also increase the risk for QT prolongation as well as the metabolic syndrome and DM. 55% of patients in our clinic are on antidepressants and 27% are on atypical antipsychotics. Our results support recent recommendations by an expert panel for EKG screening and monitoring in methadone treatment (34). Some of those recommendations include obtaining a pretreatment EKG for all patients to measure the QTc interval and a follow-up EKG within 30 days and annually. Additional EKG is recommended if the methadone dosage exceeds 100 mg/d or if patients have unexplained syncope or seizures. If the QTc interval is greater than 450 ms but less than 500 ms, the clinician needs to discuss the potential risks and benefits with patients and monitor them more frequently. If the QTc interval exceeds 500 ms, the clinician needs to consider discontinuing or reducing the methadone dose; eliminating contributing factors, such as drugs that promote hypokalemia; or using an alternative therapy. Clinicians should be aware of interactions between methadone and other drugs that possess QT interval-prolonging properties or slow the elimination of methadone. While non-cardiac factors (e.g. continued illicit opioid use, hepatitis C, uncontrolled DM, HTN and smoking) are much more likely to lead to premature death in our population than cardiac arrhythmias, the presence of QTc prolongation on top of other chronic medical conditions may increase the risk for premature death.

Limitations of this study included a small sample size consisting predominantly of males, and the retrospective nature of the data collection. However, improved onsite screening in our clinic as reflected by significant improvement of EKG and A1c monitoring helped us to identify some risk factors for increased morbidity and mortality. Our initial onsite brief counseling intervention was associated with some improvement in those chronic conditions. However,

future research should include randomized trials to control of factors other than our intervention that may have improved health outcome. We are delighted that a very brief intervention, essentially 2 or 3 extra minutes of physician and nurse time doing health promotion at multidisciplinary treatment planning meetings resulted in significant improvement in diabetes management and improved detection of QTc prolongation. Diabetes mellitus is high in our clinic population which in addition to factors such as diet, obesity, and sedentary lifestyle that affect all Americans has additional challenges to their glycemic control from opioid medication and Hepatitis C. Although we realized significant improvement from before to after the intervention, we would prefer that all of our patients with diabetes be able to maintain glycemic control and improve their longevity and quality of life.

Future research should address patient factors (diet, exercise, weight loss), clinician factors (monitoring and health promotion) and pathophysiologic factors contributing to improved management of Hepatitis C, nicotine dependence, DM, cardiovascular, and other related conditions, in this high risk, difficult-to-treat, and underserved population. Improving management of those chronic medical conditions at the beginning of MMT may decrease the morbidity and premature mortality in this population. While we have the resources to offer screening and treatment for those chronic problems at the VA system, many US methadone programs may not have such resources. Increasing the public awareness to allocate more resource to screen and treat chronic medical conditions in MMT patients is needed to reduce the morbidity and premature mortality in this underserved population.

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Table 1
Health Screening and Counseling of VAMC Patients in the MMT

Chronic Medical Condition	Patients Counseling Points	Treatment Plan Modification and Onsite Screening
- Hepatitis:	<ul style="list-style-type: none"> Rates of viral hepatitis are high in our opioid agonist treatment clinic (OATC), 78% (general population is 2%). Viral hepatitis is a risk factor for liver cancer and diabetes. 	<ul style="list-style-type: none"> Offer Hepatitis B vaccination to all patients. Refer patients who are hepatitis C positive to the GI clinic for hepatitis C monitoring and treatment.
- Diabetes:	<ul style="list-style-type: none"> Hepatitis C, methadone and history of opiate dependence may increase risk for diabetes. Counsel each patient about healthy diets, regular exercise and medication compliance. 	<ul style="list-style-type: none"> Monitor HgA1C annually for all patients Refer patients with abnormal HgA1C>7% to: Primary Care Physician Learning center for education about healthy lifestyle, diet and exercise.
- Smoking:	<ul style="list-style-type: none"> In our OATC smoking rate is about 87% (general population is 23%). Cigarette smoking is a risk factor for COPD and cancer Counsel each patient on smoking cessation during treatment planning, 	<ul style="list-style-type: none"> Offer nicotine replacement treatment or anti-craving medications during treatment planning. Refer patients with nicotine dependence to smoking cessation group.
- Cardiovascular:	<ul style="list-style-type: none"> Methadone can prolong QT interval and increase the risk of cardiac arrhythmia. Educate patients about symptoms of Torsade de Points e.g. dizziness and syncope 	<ul style="list-style-type: none"> Annual EKG for all patients. Compare initial and annual results of EKG Refer patients with QTc >500 msec to Primary Care Physician or initiate cardiology consults, decrease methadone dose or switch to buprenorphine as needed. Check blood pressure in the clinic for each patient during nursing visits and encourage them to check it at home.

Table 2
Sociobiologic and Treatment Variables of Methadone-Maintained Patients

Variables	Deceased (n=7)	Retained (n=55)	Dropped out (n=40)	*P Value
Age (years)(Mean +/- SD)	57 +/- 3	56 +/- 9	53 +/- 6	ns
Gender (% male)	100%	93%	98%	ns
Marital status (% married)	43%	40%	50%	ns
Race (% African American)	100%	60%	58%	ns
Methadone dose (mg) (mean +/- SD)	77 +/- 40	90 +/- 48	82 +/- 41	ns
Methadone tx duration (months) (mean +/- SD)	36 +/- 16	38 +/- 31	12 +/- 11	0.003*
HIV (% positive)	0%	7%	0%	ns
Hepatitis C (% positive)	100%	78%	73%	ns
Hepatitis B (% positive)	0%	5%	18%	ns
Nicotine abuse/dependence (%)	86%	87%	88%	ns
Hypertension (%)	71%	69%	43%	0.0001*
Diabetes (%)	86%	18%	25%	0.004*
Coronary artery disease (%)	29%	22%	15%	ns
COPD (%)	43%	16%	10%	0.05*
Malignant neoplasm (%)	43%	5%	8%	0.004*
Missed PCP appointments (%)	26%	18%	71%	0.02*
Intravenous drug use (%)	100%	93%	93%	ns

* Chi-Square or Student t-test

Abbreviations: tx=treatment, HIV=human immune deficiency virus, COPD=Chronic obstructive Pulmonary Disease, PCP= Primary Care Physician, ns= non-significant

Table 3
Retention in MMT associated with Diminished Percentage of “Positive” Urine Drug Screens in Methadone-Maintained Patients

Urine Drug Screen	Deceased (n=7)			Retained (n = 55)			Dropped out (n=40)		
	First 4 UDS	Last 4 UDS	P	First 4 UDS	Last 4 UDS	P	First 4 UDS	Last 4 UDS	P
Opiate (% positive)	71%	0%	0.004*	16%	1%	<0.0001*	40%	31%	0.05*
Cocaine(% positive)	43%	0%	0.04*	15%	1%	<0.0001*	38%	35%	ns

* Chi-square-test
Abbreviations: UDS = urine drug screen, ns = nonsignificant

Table 4
Health Screening of VAMC Patients in the MMT Clinic Before, and After, the Performance Improvement Project (2007)

Health Screening Variable	Before Project (n=55)	After Project (n=55)	* <i>P Value</i>
LDL (% of patients monitored)	96%	96%	ns
LDL (mean mg/dl +/- SD)	88 +/- 28	100 +/- 30	0.07
% of patients with LDL < 160 mg/dl	96%	96%	ns
% of patients smoking	87%	78%	0.25
EKG (% of patients monitored annually)	13%	93%	<0.0001 *
EKG (QTc) (mean msec +/- SD)	399 +/- 92	439 +/- 22	0.003 *
% of patients with QTc > 440 msec	18%	45%	<0.0001 *
SBP (% of patients monitored)	(82%)	(89%)	0.27
SBP (mean +/- SD)	135 +/- 33	129 +/- 20	0.18
SBP > 140 mm Hg for patients diagnosed with HTN (% of patients)	(38%)	(28%)	0.34
A1c (% of patients monitored)	(51%)	(95%)	<0.0001 *
A1c (mean % +/- SD)	6.9 +/- 2	6 +/- 1.1	0.049 *
A1c > 7% for patients diagnosed with DM (% of patients)	(90%)	(50%)	0.05 *
Compliance with PCP Appointments	82%	88%	0.42

* Chi-Square or Student t-test

Abbreviations: LDL=low density lipoprotein, EKG= electrocardiogram, SBP=systolic blood pressure, HTN=hypertension, A1c=hemoglobin A1c, DM=diabetes mellitus