U.S. Department of Veterans Affairs

Public Access Author manuscript

J Subst Abuse Treat. Author manuscript; available in PMC 2015 August 01.

Published in final edited form as:

J Subst Abuse Treat. 2015 August ; 55: 58–63. doi:10.1016/j.jsat.2015.02.009.

Maintenance of Access as Demand for Substance Use Disorder Treatment Grows

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Abstract

Due to the Affordable Care Act and other recent laws and regulations, funding for substance use disorder (SUD) treatment is on the rise. In the 2000s, the Veterans Health Administration (VA) implemented several initiatives that increased funding for SUD treatment during a period of growth in demand for it. A key question is whether access to and intensity of treatment kept pace or declined. Using VA SUD treatment funding data and patient-level records to construct performance measures, we studied the relationship between funding and access during the VA expansion. Overall, we observed an increase in access to and intensity of VA SUD care associated with increased funding. The VA was able to increase funding for and expand the population to which it offered SUD treatment without diminishing internal access and intensity.

Keywords

Substance use disorder treatment; Veterans; Veterans Health Administration; Process quality

1. Introduction

Due to the Patient Protection and Affordable Care Act (ACA; Pub. Law 111-148) and other recent laws and regulations, the U.S. is entering a period of expansion of financial support for health care in general and for mental health and substance use disorder (SUD) treatment in particular (Buck, 2011). Given that SUD treatment has historically been underprovided (Substance Abuse & Mental Health Services Administration, 2011), increased coverage for SUD treatment services will likely lead to more demand on the delivery system. The extent to which the delivery system can sufficiently respond to greater demand – maintaining or improving access, recommended intensity, and adequate quality – is an open question and a growing concern, particularly in light of the fact that hiring and retaining qualified SUD treatment staff are recognized challenges (Humphreys & McLellan, 2011).

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In this context, we studied a period of expansion in demand for SUD treatment within the Veterans Health Administration (VA) (2005–2010). Commensurate with that growth in demand, the VA increased resources for VA SUD treatment, designed to maintain or expand access to care, intensity, and quality. In the decade of the 2000s, the VA collected considerable data on SUD treatment programs and spent \$152 million in centrally administered funds targeted to hiring additional SUD treatment staff. Though characteristics of the VA – a national, integrated health system that employs clinical providers and serves a defined population – differ from those of the rest of the U.S. health care system, the observed relationship between the increase in SUD treatment resources and access and intensity of care within the VA is potentially germane. In particular, the VA must hire SUD treatment counselors from the same labor market as do non-VA provider organizations (Gugliotta, 2013). Therefore, the question of how well the VA can scale up operations – relative to the level and nature of care it provided previously – to expand provision of SUD care could be relevant beyond the VA. We return to the threats to generality of our findings in the concluding discussion.

Increasing financial support for SUD treatment could affect delivery performance in a variety of ways. On the one hand, it could increase quality by providing greater resources per patient. For instance, it could facilitate the hiring of more highly credentialed staff that are more receptive to provision of evidence-based treatment (Humphreys & McLellan, 2011). On the other hand, if the patient population grows as fast or faster than new funding, access, intensity, or quality could decline. This could happen if, for example, the system was already using resources (available workforce, space, and other inputs) efficiently and new resources were added unevenly. If, for instance, space was not expanded, then the new resources would be deployed in increasingly crowded conditions, diminishing efficiency and quality. Therefore, the effects of increasing SUD treatment delivery performance are empirical questions, which we investigate.

1.1. SUD treatment funding in the VA

Substance use is a common problem among users of the VA, which provides care for U.S. military veterans through an integrated delivery system with salaried clinicians. In the month prior to the date of interview, 23% of veterans responding to the National Survey on Drug Use and Health (NSDUH) had consumed five or more alcoholic drinks on the same occasion, 8% had done so at least five times, 4% had used marijuana, and 2% had used other drugs (Wagner et al., 2007). These figures could understate veterans' substance use because the NSDUH may underrepresent populations that include more prevalent users, e.g., poor, vulnerable, and homeless veterans that are difficult to survey.

Recognizing the gap between SUD treatment need and capacity, in the decade of the 2000s the VA collected considerable data on SUD treatment programs. Over the same period, the VA initiated several programs to direct funds toward SUD and broader mental health treatment. Under provisions of the Veterans Millennium Health Care and Benefits Act of 1999 (Pub. Law 106-117), Congress directed about \$30 million between 2000 and 2002 to hiring additional VA SUD treatment staff. Several years after the Millennium Act, the Veterans Health Administration Comprehensive Mental Health Strategic Plan, adopted in

2004, aimed to remove identified gaps in the VA's provision of mental health services (Ekstrand, 2006). As part of the VA's Mental Health Enhancement Initiative, which commenced in 2005, the department enhanced funding of mental health programs generally and SUD-specific treatment in particular. This was followed up in 2008 by the VA Mental Health and Other Care Improvement Act (Pub. Law 110-387) and the adoption of the VA Uniform Mental Health Services Handbook (Katz, 2010).

In total, between 2002 and 2010, the VA directed about \$152 million in centrally administered funds toward hiring additional SUD treatment staff. This represents about \$16.9 million per year, on average, which is 4.3% of overall VA spending on drug treatment in 2010 (Executive Office of the President of the United States, 2010). These centrally administered funds supplemented resources already allocated to SUD treatment from general funds routinely distributed to VA medical centers. If successful, centralized funding dedicated to SUD treatment would increase the resources devoted to it. Across many settings, economists have found that, relative to unrestricted resources, centrally administered, dedicated funds have a much larger effect on spending for the services to which they are targeted, including SUD treatment. Funds "sticking where they hit" or where they are targeted are known as a "flypaper effect" in the public finance economics literature (Inman, 2008). However, the flypaper effect may vary in strength because some dedicated funds may not stick and funding is fungible; general funds may be withdrawn to offset dedicated funds. Outside the VA, the flypaper effect for SUD treatment funding has been found to be large: the vast majority of funds are put to the use for which they are intended (Gamkhar & Sim, 2001; Huber, Pope, & Dayhoff, 1994; Jacobsen & McGuire, 1996; Ma, McGuire, & Weng, 2002).

Two prior studies investigated the use of these centrally administered funds in the VA. US Government Accountability Office (2006) examined the use of 2005 and 2006 funding associated with the 2004 VA Mental Health Strategic Plan, finding that some of the funding was not applied to its targeted use. Frakt, Trafton, Wallace, Neuman, and Pizer (2013) studied the flypaper effect by examining the extent to which these directed funds actually increased SUD treatment spending by VA medical centers. They found that between 2002 and 2008, the directed funds displaced pre-existing SUD treatment resources, leading to no net increase in spending for SUD treatment. However, in 2009 and 2010, 39% and 60%, respectively, of directed funding translated into increased VA medical center spending on SUD specialty treatment. VA SUD specialty treatment staffing levels increased almost 50% over the decade and were concentrated among more highly credentialed staff—graduate level counselors and medical management staff.

Our study complements prior work by relating centrally directed SUD treatment spending to measures of access and intensity of care. We focus on the years 2005–2010, which include the period during which VA directed funding for SUD treatment peaked and the years during which Frakt et al. (2013) found that it led to a net increase in SUD treatment spending by VA medical centers.

1.2. VA SUD process quality measurement

The Institute of Medicine's (2001) report "Crossing the Quality Chasm: A New Health System for the 21st Century" helped propel a dozen years of vigorous development and evaluation of access and quality measurement for physical health. Though less attention has been paid to mental health and SUD treatment (Pincus, Spaeth-Rublee, & Watkins, 2011), the VA has been among the leaders in studying (Harris, Bowe, Finney, & Humphreys, 2009; Harris, Kivlahan, Bowe, Finney, & Humphreys, 2009), implementing (Garnick, Lee, Horgan, Acevedo, & Washington Circle Public Sector Workgroup, 2009), and evaluating (Watkins et al., 2011) a suite of performance metrics consistent with the Washington Circle paradigm. That paradigm decomposes early engagement of SUD treatment into a sequence of three related phases – identification, treatment initiation, and treatment engagement – each of which can be associated with one or several performance metrics (Simpson, 2004). Some work within the VA has questioned the association of performance on metrics of early engagement with subsequent outcomes. However, sufficient engagement is likely to be at least a necessary condition for good treatment results (Harris, Humphreys, & Finney, 2007).

Beginning in 2010, the VA Office of Mental Health Operations (OMHO) implemented the Mental Health Information System (MHIS) Dashboard (Trafton et al., 2013). The Dashboard is populated with performance metrics that overlap with the Washington Circle conceptualization of early engagement with treatment and consistent with the goals of the VA's Uniform Mental Health Service Handbook (Department of Veterans Affairs, 2008). The Handbook describes required mental health treatments that must be available at VA facilities. The purpose of the MHIS Dashboard is to monitor and report on the state and variation of VA mental health and SUD programs and to help OMHO target resources (Trafton et al., 2013). The Dashboard domains span measures of staffing, access, screening and service delivery, as well as measures focused on specific populations such as those with a serious mental illness, post-traumatic stress disorder, or a SUD. In the SUD domain, the Dashboard includes measures of diagnosis and treatment rates, duration of care, rates of follow-up after detoxification, and pharmacotherapy use (Trafton et al., 2013). Additional details on the metrics of focus in our study are provided in the following section.

2. Materials and methods

We estimated the effects of dedicated funding with fixed effects, ordinary least squares (OLS) regression models on measures of access and intensity as dependent variables and dedicated funding amounts as the key independent variable, controlling for variations in the broader medical center budget. This is a potentially important control because an increase in total resources available to local policymakers could influence the quantity or quality of SUD care. Fixed effects controlled for permanent differences between localities (VA medical centers in our application). Additionally, we had six years of data, so we included year effects and interacted them with dedicated funding amounts to assess whether dedicated funds had different effects through time.

The equation below specifies the model, where the unit of analysis is the medical center-year:

$$\begin{aligned}
 (\text{performance measure})_{m,y} = & \alpha(\text{unrestricted medical center budget allocation}) \\
 & + \beta_y(\text{SUD specialty clinic dedicated funding})_{m,y} \\
 & + \gamma_m + \delta_y + \varepsilon_{m,y}.
 \end{aligned}$$

The variables in the equation – performance measure, unrestricted medical center budget allocation, SUD specialty clinic dedicated funding – are described in the subsections that follow. In the equation, m indexes medical centers, y years. The parameters α to δ are estimated by ordinary least squares (OLS) using Stata 10 (StataCorp, 2007). Note that α is fixed across years and medical centers, β is year varying, γ is a medical center fixed effect, δ is a year fixed effect, and ε is the error term.

To estimate the model we constructed an analytic file consisting of 766 medical center-year observations, spanning the years 2005 to 2010. There were 139 or 140 VA medical centers, depending on year of observation between 2005 and 2010. Our analytic file includes fewer than the total number of possible medical center-year combinations because the unrestricted budget allocation was missing for about 8% of medical center-year combinations and process measures could not be computed for <1% of observations with no qualifying patients. The file includes the variables shown in Table 1. The construction of each of those variables – and the data used to do so – is described below.

In addition to estimating the model described above, we used it to simulate the effect on performance measures of increasing SUD specialty clinic dedicated funding by 50% in 2010.

2.1. Dependent variables: performance measures

Beginning with a 100% sample of VA patient-level data from all VA medical centers and spanning 2005–2010, we built six performance measures for each VA facility and each year. Our selection of performance measures was guided by two principles. First, we wanted measures that were meaningful to current VA management and care. Therefore, we restricted attention to the set of measures that populate the VA's MHIS Dashboard. Second, from the MHIS measures, we selected a variety that are, in combination, relevant to the three Washington Circle domains of SUD treatment engagement: identification, treatment initiation, and treatment engagement (Garnick et al., 2009). In particular we selected: the proportion of VA patients diagnosed with a SUD (a measure of identification); the proportion of SUD diagnosed patients receiving any intensive SUD care, intensive residential SUD care, or intensive outpatient treatment (measures of treatment initiation)¹; and the average number of weeks receiving intensive residential or outpatient treatment (measures of treatment engagement). A complementary view of our measures, and one we adopt for simplicity, is that they encompass measures of access (e.g., proportion of SUD diagnosed patients receiving care of some type) and intensity (e.g., average number of weeks of care). All measures are at the year-medical center level.

¹The role of dedicated funds was to keep pace with the VA SUD-diagnosed population, which was expanding for other reasons, including that the population seeking VA care was expanding. Therefore, to avoid confounding, our identification and initiation measures are proportions of diagnosed patients receiving treatment, not numbers of patients.

The proportion of SUD diagnosed patients receiving any intensive SUD care is the number of patients with a diagnosed SUD who have at least one visit in an intensive outpatient, residential (or inpatient) SUD or mental health program in the year. Following methodology developed in the VA, the intensive residential and outpatient treatment measures are based on receipt of nine “weighted” hours of care within a one-week period, where inpatient days are weighted as 3 h and outpatient visits are weighted as 1.5 h. Therefore, an individual could be counted as receiving intensive SUD care without being counted as receiving either intensive residential or intensive outpatient treatment for the purposes of performance metrics, as defined by the VA. Consequently, about two times the number of SUD diagnosed patients are counted as receiving any intensive SUD care as the sum of those receiving either intensive residential or intensive outpatient care in our data.

Because the performance metric variables are not available from the MHIS Dashboard prior to 2010, we coded them for this work for all years in our sample, 2005–2010. In addition to aligning performance metric data with the period of peak dedicated funding, our approach ensures consistency of definition of metrics across time.

2.2. Independent variables

Between 2005 and 2010 (inclusive), some medical centers received SUD treatment-dedicated funds. The Program Evaluation and Resource Center (PERC) within the OMHO tracked the precise amounts of dedicated SUD treatment funding allocated to medical centers in each of those years. These year-specific SUD dedicated funding variables are our key independent variables. (See the “SUD clinics funding” variables in Table 1.)

Because they also influence the level of resources devoted to SUD treatment, it is important to control for unrestricted funds. In the VA, unrestricted funds take the form of an allocation by Congress that is first distributed by formula to the 21 regional Veterans Integrated Service Networks (VISNs). VISN directors then divide their allocation among medical centers within each of their regions in ways that potentially depend on needs and priorities of the VISN and medical centers. Consequently, medical centers’ commitment to or ambition for SUD treatment factors in the amount of unrestricted funds they receive. Likewise, unrestricted funds are a causal factor helping to determine the amount and nature of SUD treatment provided. In other words, unrestricted funds and funding allocated to SUD treatment are jointly determined. Since our interest is in the degree to which unrestricted funds influence SUD treatment performance measures, we use an approach developed by Pizer, Wang, and Comstock (2004) and employed by Frakt et al. (2013) to extract a measure of unrestricted funds that cannot be caused by same-year changes in medical center commitment to SUD treatment. The method is based on allocating VISN-level funds to medical centers using the prior year’s initial distribution of funds across medical centers. Any additional funding VISN directors allocate to medical centers during the year – perhaps in response to a new ambition for or commitment to SUD treatment or its quality – is not picked up by our measure. This breaks the joint determinacy of unrestricted funds and the extent to which they might be allocated for current-year SUD treatment. See Pizer et al. (2004) for details.

3. Results

Table 1 reports descriptive statistics for the dependent and independent variables. We focus first on the dependent variables: performance metrics. As shown, on average about 8% of VA patients were diagnosed with a SUD in 2005–2010; about 30% of SUD diagnosed patients received any intensive SUD care; about 7% received intensive residential SUD care and 7% received intensive outpatient treatment (these two categories are not mutually exclusive and they don't sum to the intensive SUD metric for the reason explained in Section 2.1); for patients receiving any intensive residential care, the average number of weeks of care was about 9; for those receiving any intensive outpatient treatment, the average number of weeks was about 4. Table 1 also shows that there exist medical centers at which no patients received either intensive residential care or intensive outpatient care for specific years (minimum values are zero for both these measures, but not for the any intensive SUD care measure). There are other medical center-years with treatment rates much higher than the mean (standard deviation for any SUD intensive care of 9% and a maximum value of 62%, for example).

Turning to the independent variables, Table 1 reports statistics for the unrestricted budget allocation and the interaction of dedicated SUD clinics funding with year indicators for 2006–2010 (2005 is the reference year). Though these are the variables used in our models, they don't clearly indicate mean, standard deviation, and max/min of dedicated funding levels because they include zeros for all but the indicated year (e.g., the statistics for the 2006 variable, by construction, includes zeros for all years other than 2006). For this reason, the bottom panel of Table 1 also reports statistics for dedicated funding levels by year, computed just for observations for each year (e.g., the statistics for the 2006 entry are based only on data from 2006). In particular, the 2010 average dedicated funding level was \$147,151. Using our estimated relationship between funding and performance measures (described below), we simulated the effect of a 50% increase in this funding level.

As shown in the bottom panel of Table 1, average dedicated funding levels grew from \$65,870 in 2005 to \$324,416 in 2007, falling to \$147,151 in 2009 and 2010. (The exact same medical centers received the exact same funding in both 2009 and 2010.) Not all medical centers received funding in each year (minimum values of zero) and funding was over \$1M for some medical centers in some years. For instance, in 2006 and 2007, about 27% of medical centers received no dedicated funding, whereas in 2009 and 2010 about 65% did not.

To aid our interpretation of findings, it is important to document the extent to which demand for VA SUD care grew over the period of study. We found that the number of VA patients with a SUD diagnosis grew from about 310,000 in 2005 to 439,000 in 2010, an increase of 42%. This suggests a substantial increase in need for SUD treatment in the population served by the VA. Over this period, the proportion of SUD diagnosed patients receiving intensive treatment, intensive residential treatment, or intensive outpatient treatment grew 41%, 23%, and 7%, respectively.

Table 2 reports regression results based on the specification of Section 2. As shown, if dedicated funds are correlated with a performance measure at all, this usually occurs in 2009 and/or 2010, though we also found some statistically significant correlations in 2008 and, in one case, 2006. That most statistically significant results are in 2009–2010 and are positive is consistent with the results of Frakt et al. (2013), which showed that dedicated funding was used to increase provision of intensive SUD treatment only in 2009 and 2010. All but one statistically significant value is positive, indicating that dedicated funding is generally associated with improvements in performance measures examined.

As shown in Table 2, in 2008–2010 both the percent of patients receiving intensive outpatient and residential care increased, but the former more so. The average number of weeks of intensive outpatient care increased in 2008 and 2010, but the average number of weeks of intensive inpatient care did not. This greater expansion of outpatient care, as compared to residential care, could be due to VA policy, which included efforts to enhance continuity of SUD care by providing a longer period of outpatient follow-up visits after residential care.

As a sensitivity check, we performed an analysis with the unrestricted budget allocation variable removed from the specification. This resulted in no appreciable change in coefficient values for dedicated funding and minor degradation of statistical significance.

To aid interpretation of the regression results, Table 3 reports the effect of a 50% increase in dedicated funding in 2010, if we interpret the relationship causally. The simulation shows that the percent of SUD diagnosed patients receiving intensive treatment would increase 1.35%, the percent receiving intensive outpatient treatment would increase 4.62%, and the average number of weeks of intensive outpatient treatment would increase 3.10%.² Other results are not statistically significant. Note that dedicated funding was a modest fraction of total funding for SUD treatment at most medical centers (i.e., including unrestricted budget allocation). Consequently, the simulated increase is a much smaller percentage of total treatment spending. Based on estimates in Frakt et al. (2013), this funding increase probably would have been less than 5% of the medical center-level total in 2010.

It is important to emphasize that the changes in performance measures we found are in the context of the large increase in demand for VA SUD treatment, as noted above. Though the number of VA patients with a SUD diagnosis increased considerably (41% over the period of study), measures of access and intensity did not decline.

4. Discussion

In the decade of the 2000s, the VA increased centrally-administered, dedicated funding for SUD treatment through several initiatives and developed metrics and systems for tracking access to and intensity of specialty SUD services. Until recently, no systematic, quantitative analysis of the association of dedicated VA funding with access to and intensity of SUD

²These are reported as percent changes for a 50% change in funding in 2010, so the associated elasticities are obtained dividing them by 50% yielding elasticities of 0.037, 0.092, and 0.062 for intensive treatment, intensive outpatient treatment, and average number of weeks of intensive outpatient, respectively.

treatment services had been undertaken. Our work follows that of Frakt et al. (2013), who found that in 2009 and 2010, but not in prior years, some dedicated funding was used to increase SUD treatment through additional staff. More recently, the VA has hired over 1600 additional mental health professionals (Gugliotta, 2013). However, Frakt et al. (2013) did not examine the effect of increased funding and staffing on population access and treatment intensity, leaving unanswered the question of whether, at the margin, SUD treatment programs that grow or start-up in a climate of expansion are able to maintain or improve access and service intensity amidst growth.

We examined the relationship between dedicated funding and SUD performance measures in years 2005–2010 within the VA. This was a period of growth in the number of veterans receiving VA care, diagnosed with a SUD, and in staffing levels for intensive SUD treatment. Consequently, it is reasonable to be concerned that additional resources might not keep pace with demand, resulting in lower access or treatment intensity. Our main finding is that there is a statistically significant and generally positive correlation between those additional, dedicated resources and access and treatment intensity; it's focused in later years, precisely when the funding was found to "stick" (Frakt et al., 2013). In short, access and quality kept pace with demand. We also found that the size of the correlations is substantial and likely clinically meaningful. For example, if results are interpreted causally, a 50% increase in dedicated funding would result in increases in the percent receiving intensive outpatient treatment of 4.62%; the average number of weeks of intensive outpatient treatment would increase 3.10%.

It is worth placing these findings in the context of other VA policy developments that coincide or just follow the time period of study. Our period of study overlaps a broad VA effort to bolster VA mental health (Frakt et al., 2013), which included the development of the VA Uniform Mental Health Services Handbook that explicitly required and monitored availability of intensive outpatient and residential SUD treatment. It is possible that this policy attention to SUD treatment supported the additional funding in maintaining and increasing access and intensity. Another, related possibility is that the longer duration focus on building SUD treatment capacity also increased local stakeholder investment in its quality. Following our period of study, in 2011, the VA implemented a mental health and SUD monitoring and quality improvement program that includes technical assistance and site visits to assist facilities in care delivery improvement.

To the extent our findings are generalizable, they offer encouraging news for expansion of SUD treatment and access beyond the VA. Due to a variety of laws and regulations, that expansion is underway. The final rule by the Department of Health and Human Services on the ACA's essential health benefits that must be offered by individual and small-market health insurance plans requires parity between mental health/SUD benefits and benefits for physical health. As a consequence, an estimated 62 million people will experience an enhancement in coverage for treatment for mental health and SUD (Kennedy, 2013). In addition, the recently issued final regulations of the Mental Health Parity and Addiction Equity Act ensure that the approximately 120 million Americans with large-group coverage receive mental health and SUD treatment benefits of the same generosity as benefits for physical health (Centers for Medicare & Medicaid Services, 2013). As of January 1, 2014,

Medicare no longer charges a 50% coinsurance rate for mental health and SUD care; it has been reduced to the same 20% that applies to coverage of other types of outpatient services. This change affects the approximately 50 million Americans enrolled in Medicare. Last, but not least, the expansion of Medicaid and private coverage ushered in by the ACA will increase by tens of millions the number of Americans with insurance for SUD treatment (Buck, 2011). All in all, funding for SUD treatment has recently expanded for the vast majority of Americans.

Our findings from examination of a VA expansion of SUD treatment suggest that access and intensity of SUD treatment need not decline as millions more Americans seek it. However, the margin of expansion we studied is not the same margin of expansion that is encouraged by the ACA and other provisions described above. Those represent a much larger expansion financing of SUD treatment than we examined. Moreover, the VA manages delivery of care differently than most of the rest of the health care system. In the VA, clinicians are directly employed by the organization that also provides coverage. And, the organization itself places emphasis on mental health and SUD treatment. This potentially leads to a greater alignment of incentives for access to and quality of such treatment not experienced in most other settings in which delivery and financing are provided by different organizations whose priorities could be somewhat in conflict and with less SUD focus. These differences in organization and financing may help to support more comprehensive treatment practices in VA programs compared to community programs (Davis et al., 2002). Though it is encouraging that the VA was able to expand SUD treatment with no loss in population access and intensity, the extent to which our estimates are generalizable to other parts of the health care system is uncertain.

Other potential limitations are worth noting. First, we have only examined the association of dedicated SUD treatment spending with overall access and intensity, not receipt of specific evidence-based services or outcomes. Some of the allocated funding was directed toward increasing access to specific modalities of services such as opioid agonist treatment for opioid dependence, and coordinated care for SUD and co-morbid posttraumatic stress disorder. Improvements in care access and intensity for subpopulations of SUD patients such as these may have been greater than for the population as a whole. Second, if facilities' prevalence of SUD screening is correlated with their ability to provide treatment, this could bias our findings. Though possible, we don't believe that this is likely to be a severe issue because SUD diagnosis in the VA largely occurs in primary care, not in intensive treatment settings, and is highly routinized. Third, funding could be endogenous if facilities with greater ability to maintain or improve access or intensity could also influence receipt of dedicated funding. This is mitigated, however, by the fact that in the years we examined, 2005–2010, dedicated funds were preferentially directed by national managers toward medical centers where programs were determined to be in need.

Despite our findings, it remains to be shown that increases in dedicated funding for SUD treatment within the VA causally improve outcomes at the individual level. Facility-level relationships, such as those we examined, between access and process quality measures and outcomes for SUD treatment have been found to be weak (Harris et al., 2007). However, owing to the ecological fallacy (Finney, Humphreys, Kivlahan, & Harris, 2011), patient-

level associations of process quality and outcomes can be stronger (Harris, Humphreys, Bowe, Tiet,& Finney, 2010). This is an area for future investigation. If expansion of treatment is shown to improve outcomes at the individual level, it would be a strong validation of the effectiveness of the expansion undertaken by the VA and would suggest that the expansion ongoing outside the VA will benefit Americans in general.

Acknowledgments

This work was funded by a Department of Veterans Affairs, Health Services Research and Development grant (CRE 12-023). The views expressed are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs, Boston University, or Northeastern University.

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Table 1

Descriptive statistics of sample.

Variable	Mean	Std. Dev.	Min	Max
Dependent Variables				
% SUD diagnosed ^a	7.9%	2%	3.5%	15.5
% receiving intensive treatment ^b	30%	9.3%	2.5%	62%
% intensive residential ^b	6.7%	8.7%	0.0%	54%
% intensive outpatient ^b	7.3%	6.4%	0.0%	31%
Ave weeks intensive residential ^c	8.98	6.23	0.00	61.87
Ave weeks intensive outpatient ^c	3.87	2.68	0.00	18.56
Independent Variables (inmillions of dollars)				
Unrestricted budget allocation	26.87	18.89	3.70	113.83
SUD clinics funding $\times$ 2006 ^d	0.037	0.12	0	0.98
SUD clinics funding $\times$ 2007 ^d	0.054	0.18	0	1.29
SUD clinics funding $\times$ 2008 ^d	0.037	0.15	0	1.40
SUD clinics funding $\times$ 2009 ^d	0.025	0.12	0	1.097
SUD clinics funding $\times$ 2010 ^d	0.025	0.12	0	1.097
SUD clinics funding by year				
2005	\$64,870	\$103,451	\$0	\$344,759
2006	221,331	222,302	0	976,527
2007	324,416	310,743	0	1,287,950
2008	223,271	299,881	0	1,396,928
2009	147,151	248,500	0	1,096,928
2010	147,151	248,500	0	1,096,928

Year and medical center fixed effects not shown. N = 766.

^a As a percent of all VA patients.^b As a percent of SUD diagnosed patients.^c Among patients receiving any such care.^d $\times$ year indicates interaction with a year dummy.

Table 2

Regression results.

Independent Variable	Dependent Variable					
	% SUD diagnosed ^a	% receiving intensive treatment ^b	% intensive residential ^b	% intensive outpatient ^b	Ave weeks intensive residential ^c	Ave weeks intensive outpatient ^c
Unrestricted budget allocation	0.000068 (0.000040) *	-0.0013 (0.00031) ***	0.00025 (0.00015) *	-0.00029 (0.00018)	-0.061 (0.028) *	-0.012 (0.0088)
SUD clinics funding × 2006 ^d	0.0022 (0.0023)	-0.0015 (0.018)	-0.0081 (0.0085)	-0.0070 (0.010)	-2.76 (1.59) *	0.0014 (0.50)
SUD clinics funding × 2007 ^d	0.00070 (0.0016)	0.0003 (0.013)	0.0029 (0.0060)	-0.0088 (0.0070)	-0.26 (1.12)	0.45 (0.35)
SUD clinics funding × 2008 ^d	0.00023 (0.0017)	0.041 (0.013) **	0.0074 (0.0064)	0.019 (0.0075) *	-1.36 (1.18)	0.79 (0.37) *
SUD clinics funding × 2009 ^d	0.00014 (0.0020)	0.058 (0.016) ***	0.017 (0.0077) *	0.033 (0.0090) ***	-1.95 (1.44)	0.52 (0.45)
SUD clinics funding × 2010 ^d	0.00237 (0.0020)	0.055 (0.016) ***	0.014 (0.0077) *	0.046 (0.0090) ***	-1.52 (1.44)	1.63 (0.45) ***

Year and medical center fixed effects not shown.

^a As a percent of all VA patients.^b As a percent of SUD diagnosed patients.^c Among patients receiving any such care.^d × year indicates interaction with a year dummy.

* p<0.05.

** p<0.01.

*** p<0.001, N=766.

Table 3

Percent change in performance for a 50% increase in average dedicated funding (\$73,575 per medical center) in 2010.

Dependent Variable							
	% SUD diagnosed ^a	% receiving intensive treatment ^b	% intensive residential ^b	% intensive outpatient ^b	Ave weeks intensive residential ^c	Ave weeks intensive outpatient ^c	
Percent change for a 50% increase in dedicated funding ^d	0.22%	1.35% ***	1.57%	4.62% ***	-1.25%	3.10% ***	

^a As a percent of all VA patients.

^b As a percent of SUD diagnosed patients.

^c Among patients receiving any such care.

*** p< 0.001