CHAPTER 9: SUMMARY AND CONCLUSIONS

The importance of rigorous evaluation of prison-based drug treatment programs is crucial given an increasingly larger population of incarcerated drug users in the recent decade as well as a paucity of outcome evaluation results. This report showed that treatment programs in prison, when properly implemented, can work. The findings showed that offenders who completed the residential drug abuse treatment program and had been released to the community for three years were less likely to recidivate or use drugs. Our findings consistently showed that the residential Drug Abuse Treatment Programs (DAP's) in the BOP contributed to a reduced likelihood of post-release failure among men, when failure was defined as arrest for new offense or revocation and when failure was defined as return to drug use. Among female inmates, while the effect of treatment was not statistically significant, the failure rate for recidivism and drug use of treated inmates compared with untreated inmates suggested a positive effect for treatment.[1] Our findings also showed positive effects of in-prison treatment on employment among women. In addition to providing information on the effectiveness of prison-based intensive drug-treatment on 3-year post-release outcomes, this report described the federal substance abusing population and provided information on what types of incarcerated drug users are more likely to volunteer for and enter treatment.

Our 3-year outcomes analyses improved upon the methodological rigor used in previous prison-based evaluation studies in several ways. First and foremost, we addressed the issue of selection bias, the most commonly neglected methodological problem in other drug treatment evaluation studies. Not only did we address the issue of selection bias but we conducted sensitivity analyses by comparing the results using two different methods of addressing selection bias. While this has added significantly to the materials presented in this report, it has also provided greater confidence in our results and in the conclusions we have drawn because of the increased rigor and scrutiny we brought to bear on our empirical analyses. We used an instrumental variable approach which provides unbiased (at least in terms of individual selection bias), albeit conservative, results. The results are conservative since they represent the effects of having treatment available and not a direct effect of being in treatment. Our second approach, the Heckman approach, not only addressed the problem of selection bias but also provided information on whether selection bias occurred and, if so, the nature of the selection bias.

We used a third approach which did not address selection bias, which we referred to as the unadjusted model. By comparing the treatment effect in the unadjusted model to the solutions

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[1]We note that in this chapter the phrases "individuals who entered and completed treatment" and "treated individuals" refers to the joint conditional probability of entering and competing treatment. These terms are not to be confused with other studies where researchers compared actual treatment completers to drop-outs, comparison subjects, etc. We refer readers to our discussion of the analytic strategies in Chapter 8 and to our discussion in Chapter 7 of the probit model for estimating the probability of entering and completing treatment.

addressing selection bias, we gained an understanding of the direction and level of selection bias.

Despite some similarity of our unadjusted model to models used in previous studies, we improved upon these previous studies in several ways. First, our models included a comprehensive set of control variables. Second, we used event history techniques that most adequately controlled for the right censoring of data (Allison, 1984; Blossfeld and Rohwer, 1995).[2] Third, our study was multi-site. Previous evaluations of prison-based drug treatment programs are primarily based on one site. The multi-site nature of our study increased the generalizability of our findings.

In addition to providing results which improved upon the methodological rigor of previous studies, our study also represented a step in increasing the understanding of gender differences in the treatment process. We presented separate models for men and women both for our analyses of treatment entry and retention as well as all our outcome analyses. Furthermore, we included predictors of treatment entry and post-release outcomes that were not based solely upon studies of male drug users, but also studies of female drug users. We also provided descriptive statistics which examined gender differences in an incarcerated population with a history of drug use.

A last commentary on the important contributions of this study pertains to treatment entry and retention. A number of researchers have found that among those entering treatment, those who do not stay in treatment have less favorable post-treatment outcomes (Hubbard et al., 1989; Gerstein and Harwood, 1990; Simpson, Joe, and Brown, 1997; Simpson, Joe, and Rowan-Szal, 1997). However, treatment retention processes may vary across different populations because of differences in the type of individuals who enter treatment. As suggested by some studies on treatment seeking behavior within non-incarcerated populations, individuals with more serious problems were more likely to enter treatment programs. Our study provided the first study of treatment entry within an incarcerated population. In doing so, we also examined gender differences in the treatment entry process.

Summary of Findings

We begin the summary of our findings by discussing the results pertaining to treatment entry and treatment retention. We then present our findings for post-release outcomes and focus upon the effect that selection bias had on the different outcomes of interest: a new arrest, a new arrest or a revocation, evidence of drug use, post-release employment behavior, and CCC placement failure. We conclude with a discussion of the consistency in findings across our three modeling techniques.

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[2]Right censoring occurred for study participants who had not experienced the post-release outcome in question. These subjects remained at risk of experiencing the event, and our event history models took the censoring of the observations at the 36-month point into account.

Treatment Entry and Completion

We modeled treatment entry and completion for the methodological purpose of addressing the problem of selection bias. However, we also modeled treatment entry to provide information on the types of incarcerated Bureau of Prisons drug users who are being served by the programs. Our analyses represent the first such analysis within an incarcerated sample.

Regarding selection into and out of treatment, most of the attention in the drug treatment field has been on treatment retention. This focus is a result of the well-established correlation between treatment retention and positive outcomes. However, our understanding of treatment retention, particularly within a prison setting, is limited without information on what type of offender is receiving treatment. Are the treatment programs serving individuals with more serious problems or individuals with less serious problems?

Our analyses of treatment entry and retention included predictors that were selected based upon a review of previous research and included predictors to acknowledge possible gender differences. Our models predicting treatment entry as well as those predicting treatment entry and completion showed both gender similarities and differences. We consistently found that both men and women who were motivated to change were more likely to enter and complete treatment. These findings were important since we controlled for external incentives such as the availability of a sentence reduction for successful completion of treatment. The results point to the importance of an individual's recognition of a drug abuse problem and willingness to address the problem in volunteering for treatment. It is notable that one of the factors indicative of high risk for recidivism – prior commitment – was not found to be related to treatment entry or treatment entry and completion. Our results also showed that women with a lifetime diagnosis of depression were less likely to enter treatment than women without this diagnosis. Among men, we did not find any evidence of a relationship between mental health disorders and treatment entry or retention.

Our findings confirmed the need to perform separate analyses for men and women because the pathway by which men and women enter and complete treatment differed in several important ways. Information on the different processes of treatment entry and retention can assist drug treatment staff in identifying individuals who are less likely to enter treatment and complete treatment. They may use this information to consider specific mechanisms for attracting those types of offenders who are in need of treatment but less likely to volunteer for and complete treatment.

Recidivism

We found that DAP treatment did seem to "work" by lowering the odds of 3-year post-release recidivism. The positive results of DAP treatment on post-release recidivism and drug use were statistically significant for men but not for women. We found a positive effect of in-prison drug abuse treatment in lowering the likelihood of post-release failure for men, where failure was

defined as a new arrest or revocation. The probability of arrest or revocation for men released to supervision who entered and completed treatment was 44.3 percent as compared to a probability of approximately 52.5 percent for untreated subjects. Thus, men who received and completed in-prison treatment were 16 percent less likely to recidivate. Although the results for women were not statistically significant, the difference between the treated and comparison group suggests that treatment helped to reduce recidivism among women. Among women who completed residential drug abuse treatment, 24.5 percent were likely to be arrested for a new offense or have supervision revoked within 3 years after release compared to 29.7 percent among untreated inmates; that is, those women who completed residential drug abuse treatment were 18 percent less likely to recidivate in the first 3 years following release than those who did not receive treatment.

We modeled post-release recidivism as indicated by a new arrest – either for supervised and unsupervised subjects or supervised subjects only – or a new arrest or revocation using three approaches, two of which addressed selection bias. The findings from all three approaches for all three indicators of recidivism were consistent. There was evidence of selection bias among men but not women. The selection process was such that men who entered treatment were riskier prisoners. They were more likely to fail than comparison subjects in the absence of treatment. The existence of selection bias and the direction of the bias explains why the treatment effect was larger in the two models that addressed selection bias. Among men, our unadjusted model served to mute the effects of treatment. In contrast, with no evidence of selection bias among women, the treatment effects were similar across the different models.

First Detected Drug Use

Our results for post-release drug use were similar to those we found for recidivism. We found positive results of DAP treatment on post-release drug use. The results were statistically significant for men but not for women. Among male inmates who completed residential drug abuse treatment, 49.9 percent were likely to use drugs within 3 years after release compared to 58.5 percent among untreated inmates. Male inmates who entered and completed in-prison residential drug abuse treatment were 15 percent less likely to use drugs 3 years following release than those who did not receive treatment. Among female inmates who completed residential drug abuse treatment, 35.0 percent were likely to use drugs within 3 years after release compared to 42.6 percent among untreated inmates; that is, female inmates who completed residential drug abuse treatment were 18 percent less likely to use drugs in the 3 years following release. The results for women, however, were not statistically significant,

Post-release failure, defined as the first detected drug use, was modeled following the same strategy used for recidivism, *i.e.*, using all three approaches. Similar to our findings for recidivism, the findings for drug use showed evidence of selection bias among men but not women. In the absence of treatment, male prisoners selected for treatment would have been more likely than comparison subjects to return to drug use upon release. Once again, we found that the models for men which adjusted for selection bias showed a somewhat larger treatment effect than

did the unadjusted model. We also found that, with no evidence of selection bias occurring among women, the treatment effect was statistically insignificant in all three models.

Post-release Employment

As with post-release recidivism and drug use, we found positive effects of DAP on post-release employment outcomes for two different employment measures. However, unlike the results for our outcome measures of recidivism and drug use, we found significant and positive effects of DAP treatment on post-release employment for women but not men.

The two different indicators of post-release employment were employment rate – the percentage of time employed during the post-release period – and a categorical variable representing ordinal levels of employment. The results for employment rate showed that women who entered and completed in-prison residential treatment were employed 68.6 percent of the post-release period and untreated women were employed 59.1 percent of the time. In addition, by examining the different levels of employment, we found that 30.6 percent of the treated women were employed full-time the entire post-release period as compared with 18.3 percent of the untreated women. In contrast, men who entered and completed treatment were employed 70.5 percent of their post-release period as compared with 68,6 percent of the untreated men. Furthermore, 36 percent of the treated men were employed full-time the entire post-release period as compared with 38 percent of the untreated men.

We modeled employment rate using all three approaches and we modeled employment level using two approaches, the unadjusted and the instrumental variable approaches. We did not find evidence for selection bias effects among either men or women. These results explain why the parameters for the treatment effect were very similar across all three modeling approaches for employment rate among both men and women.

CCC Placement Failure

We did not find any effects for DAP treatment on CCC placement failure among either men or women. Our models of CCC placement failure were limited to the unadjusted approach and the instrumental variable approach. Thus, we were unable to determine the direction of selection bias effects, if any. We noted, however, that the results for men suggested that without adjusting for selection bias as we did through our instrumental approach, we might have concluded that treatment had a positive effects, when in fact, there was no positive effect.

Our ability to ascertain the effect of in-prison treatment upon CCC placement failure was hampered by the fact that approximately one-quarter of the subjects were not released to the community via a CCC placement. Furthermore, we know that by policy, the most risky offenders are not allowed to be released to a CCC. This selection process reduces our ability to find treatment effects on CCC failure.

Selection Bias

The substantive results across the two modeling approaches addressing selection bias were consistent for all of our outcome measures. These findings give us more confidence in our results and confirm that our findings were not method-dependent. However, the size of the treatment parameter did vary, with the effect generally being larger in the Heckman models than in the instrumental models. While it is clear that we cannot assume that two different methods of addressing selection bias will yield identical results, we would expect, that if there truly is a treatment effect, the Heckman model results would show stronger treatment effects because of the inherent inefficiency of the instrumental variable approach.

We note that the Heckman model was able to provide important information about the nature of self-selection into treatment. We found that our male treatment subjects were at a higher risk of experiencing negative outcomes than were individuals not self-selecting into treatment when our outcome measures were arrest for a new offense, arrest or revocation, and drug use. We did not, however, find evidence of selection bias among men for our outcome measures of post-release employment and CCC placement failure. Among women, we did not find evidence of selection bias for any of our four outcome measures. These findings explain why the effects of treatment on post-release recidivism and drug use were muted for men but not for women in the unadjusted models. It is worth noting that in our application, the selection process drew riskier offenders into the residential drug treatment programs. However, it is not difficult to conceive of other situations or applications in which a creaming effect occurs. Less risky inmates are selected or self-select into a treatment program. In that case, without controlling for selection bias, we might overestimate the effect of an intervention. In the present application, had we not addressed the selection bias issue, we could have underestimated the effect of residential drug treatment.

Discussion

We begin our discussion highlighting implications of the gender differences in the covariates found to be significant predictors of post-release outcomes. We continue with a discussion of some of the methodological limitations of our outcome measures.

Gender Differences

As mentioned earlier in our discussion of findings relating to selection bias, we found evidence of selection bias only among men. This finding along with our findings describing gender differences in our treatment entry models clearly point to the need to account for gender differences in treatment processes and outcomes.

We found significant gender differences both in the background characteristics, post-release behaviors, treatment entry, treatment entry and retention, and in the effects of treatment. Not only did the effects of treatment differ between men and women but the factors other than treatment

which were predictive of post-release outcomes also differed. Our findings suggest that the pathways to treatment entry and retention, post-release recidivism, drug use and employment differ across gender.

We saw gender differences in background characteristics both in our models of treatment entry and retention as well as in the characteristics we used as covariates in our outcome models. In general, our findings were consistent with previous findings: drug-abusing women have more life problems than men. Women were more likely to have a lifetime diagnosis of depression, to have been unemployed before incarceration, to have a spouse with a drug problem, to have a history of previous mental health treatment, and to have a history of sexual abuse. As has also been previously found, women were less likely to have a criminal history.

The difference in the overall post-release recidivism rate of men and women was consistent with previous findings for overall recidivism of prison releasees. As discussed in our literature review in Chapter 3, men generally have higher recidivism rates than do women (Chard-Wierschem, 1992; Donnelly and Bala, 1994; Florida Department of Corrections, 1999; Saylor and Gaes, 1995). The findings for our outcome measures of recidivism and drug use were consistent with the limited literature on gender differences in post-release outcomes: women are found to have lower overall failure rates than men or to have similar failure rates. In addition, our findings provide some support for the notion of a "gender paradox" pinpointed by Fiorentine et al. (1997) and Rounds-Bryant (1999): despite a greater number of life problems among women, the post-treatment or post-release outcomes of women are better than those of men. The one exception was for employment: women were less likely to be employed both before and after incarceration. However, we note that information on women's employment before and after treatment is even more sparse than is information for outcome measures such as criminal behavior and drug use.

The results confirm the need to separately analyze men and women. The use of gender as a covariate in multivariate outcome models is not sufficient for understanding gender differences. This is particularly true when samples are comprised mostly of men where the effects will reflect primarily the effects for men. For example, in our interim 6-month outcome report (Pelissier et al., 1998) where we were not able to separately analyze recidivism and drug use for men and women, we found that women had lower failure rates than men. We also found that individuals living with a spouse after release were less likely to recidivate or use drugs. Yet, when conducting separate analyses by gender in the present outcome analyses, we found that living with a spouse was significant for men but not for women. Our inability to detect an effect for living with a spouse among women is consistent with the literature on gender differences. We suggest consideration of the following explanation: it is possible that we did not find an effect for living with a spouse after release among women because some of the women may have been married to an individual with a drug use problem. We know that a much higher percentage of women were married to individuals with a drug problem before incarceration than were men.

Other gender differences point to differences between men and women in the recovery process. Such differences point to the need for clinicians to pay attention to and address issues specific to

categories of high-risk individuals, these categories differing by gender. We found that well known predictors of recidivism – criminal history and age – were associated with a higher probability of recidivism among men but not women. We also found a relationship between the type and amount of drugs used on a daily basis before arrest and post-release drug use among men but not women. The factor that appeared to be important for women was whether or not they had ever used an illicit drug on a daily basis. We found that age and drug use in the year before incarceration were predictors of post-release employment among men. In contrast, we did not find these to be predictors of post-release employment among women.

Methodological Caveats

There are several measurement issues that limit comparisons of our results to other studies and which also point to issues which require consideration for future studies We discussed the problem of limiting our measure of recidivism to arrest for a new offense because revocation for a violation of a condition of supervision is a competing event. However, our primary measure of recidivism which includes arrest for a new offense as well as revocation also has its problems. There is evidence that revocation decisions vary from one district to another due to differences in treatment philosophies and other factors. A revocation may also reflect the Probation officer's discretionary decision that an offender's behavior pattern is not satisfactory. Post-release supervision is conducted by Probation officers; however, the supervision system is organized into 94 separate jurisdictions. Each jurisdiction can set policy within discretionary limits of the law. We looked at the overall percent of written violation reports that resulted in a revocation by district as an indicator of differences in the probability that a violation of a condition of supervision will result in a revocation. We found that between 1995 and 1997 these percentages ranged between a low of 7 percent and a high of 85 percent. Some judicial districts have set policies that dictate revocation after a certain number of positive urine tests, while others have no set policies. While we do not yet have clear mechanisms for increasing the precision of our measures of recidivism, we must recognize the limitations of our measure.

Our measure of drug use, although not plagued by the limitations of self-report data, fails to provide a measure of severity of drug use. As is often discussed in the relapse prevention literature, a lapse – that is, one episode of drug use – should not be viewed as a failure. In fact, this is seen as helping an individual identify high-risk situations and alternative methods of coping and thus preventing a full relapse. Thus, it is possible, for example, that individuals who were referred to additional treatment by their Probation officer after a lapse, in fact, are able to avoid further use of drugs. Our measure does not distinguish those who had a lapse from those who had a relapse, that is, returned to regular drug use.

Forthcoming Report

Effects of Other Components of the Treatment Continuum

While the focus of this report has been upon the effects of in-prison DAP treatment, we recognize the importance of viewing treatment as a continuum of programs, not limited solely to services received while subjects are incarcerated. To more fully understand the effects of treatment services, a second report will examine more broadly the role of treatment across its entire spectrum, including treatment received during a CCC placement – e.g., transitional drug treatment – and post-release treatment received while under supervision of a Probation officer. Even though transitional drug treatment is automatic for in-prison DAP program graduates who receive a CCC placement, many of our comparison subjects began receiving drug treatment services during their CCC placement. Furthermore, not all in-prison DAP program graduates received treatment after release. Fifty percent of the men and 45 percent of the women did not receive treatment during their first 6 months of supervised release. To increase our understanding of the treatment continuum we also need to test for interactive effects between treatments. That is, we need to address such questions as: "are the effects of treatment additive in nature across the treatment continuum?"

The first issue to be addressed in our second report on 3-year follow-up outcomes concerns the effects of transitional drug treatment. Analyses will be limited to our comparison sample. We will not include the in-prison treatment sample because the effects of in-prison treatment cannot be disentangled from the effects of transitional services. By policy, in-prison drug treatment graduates receive transitional drug treatment only if they receive a CCC placement and thus the effects that could be assessed for these subjects are inextricably confounded with receiving a CCC placement. On the other hand, we can assess the effects of transitional services for our comparison subjects, among whom only 37 percent of the men and 26 percent of the women released to a CCC received such services. Offenders generally do not self-select into transitional drug treatment. Most often they are required to participate because their CCC placement is housed at a CCC facility which requires participation of all individuals with an assessed need for treatment, or because the Community Corrections Service manager required treatment as a condition of CCC placement. In order to address the potential selection bias resulting from the process of staff selection into treatment, our analyses will include models of selection into transitional drug treatment.

Another topic of our second report pertains to the effects of post-release treatment services provided while under supervision of a U.S. Probation officer on post-release behaviors. Our analyses will prevent the confounding of selection into and out of in-prison treatment with that of selection into post-release treatment by separately analyzing DAP treatment subjects and comparison subjects – DAP comparisons and non-DAP controls. Our analyses will also include models of the selection into post-release treatment.

The last issue to be addressed in the forthcoming report pertains to inter-institutional effects. As

done in our 6-month interim report, we will determine whether there is significant inter-institutional variation in outcome. If such variation is found, we will identify, from the available information, factors which may account for these inter-institutional variations. Measures will include factors such as program maturity and type of staff.

Other Future Research Efforts

Women

The findings we report point to the need to further study gender differences in treatment entry and retention as well as treatment process and outcomes. It would be desirable to conduct another evaluation study of in-prison residential drug treatment for women with a larger sample size to better assess treatment effectiveness. Such a study within the BOP may not be feasible since the rate of volunteering has dramatically increased since the inception of the current evaluation project. With the changes in the sentencing laws (e.g., VCCLEA), most of the women in need of treatment receive treatment. This would preclude the ability to sample from a group of women who do not enter treatment.

To increase our understanding of gender differences in recovery and the effects of treatment, future evaluation efforts would need to include additional measures. Information on the first age of abuse, the frequency of abuse, the criminal activities and drug use behaviors of an individual's partner or friends, the selection of husbands and partners after treatment, and the role of children, would assist in identifying factors which mediate the effects of in-prison treatment.

Proximal Outcomes

A dimension of outcome not included in this report, but important in and of itself, concerns proximal outcomes. These proximal outcomes represent the intervening mechanism through which the treatment program affects the ultimate outcomes (*i.e.*, "distal outcome") such as recidivism and drug use.

Each program makes assumptions about the cognitive and behavioral deficiencies of the clientele served, and programs are designed to ameliorate these deficiencies. Without addressing these deficiencies, the programs cannot be expected to have any effect on the "distal outcomes," as these deficiencies contribute to these outcomes. It is likely that these proximal outcomes (such as increases in self-efficacy and changes in ways of coping with stressful situations) can also contribute to our understanding of inter-site differences as well as gender differences.

Although our findings suggested that drug abuse treatment had a positive effect, our study lacked the programmatic specificity to identify the particular factors that contributed to this successful outcome. Such specificity would require the identification of intervening mechanisms. An assessment of the extent to which the population served had the purported deficiencies and the

extent to which these deficiencies were remedied will help us understand *how* the treatment programs work. Furthermore, gender differences in the percent with the purported deficiencies and in the percent with remedied deficiencies will increase our understanding of gender differences in the treatment process.

Beyond the theoretical grounding, there is a methodological rationale for examining proximal outcomes. The causal link between treatment and outcomes is strengthened when a strong association between treatment and proximal outcomes predicted by theory exists, as well as a strong association between the proximal outcome and the distal outcome (in this case, arrests and drug use) (Mohr, 1992). This concept of an intervening mechanism based upon theory will be examined in future analyses using pre- and post-treatment measures selected because of their relationships to the theoretical underpinnings of the DAP's. Structural equation models which include both proximal and distal outcomes may also be useful in assessing the causal links.

Another rationale for the examination of the proximal outcomes arises from the goal of generalization in any evaluation research. More recent evaluation research recognizes the limited utility of research that solely addresses the question of whether a program works (Chen, 1990). When the response is yes, as appears to be the case here, the successful replication of the program and its improvement depend upon an understanding of the causal mechanisms that lead to this "success."

A Final Note

A commentary on future analyses pertains to increasing the understanding of the relationship among the various outcomes of interest. Among men, both recidivism and drug use were affected by drug treatment. Among women, only employment was affected by drug treatment. Comparisons of the causal processes by gender may provide another avenue for better understanding the nature of gender differences in treatment needs and outcomes. Disentanglement of the causal nature of the relationships between recidivism, drug use and employment, some of which are most likely to be reciprocal in nature, will require utilizing a path analytic method. Although path analytic methods do not lend themselves to addressing selection bias issues, such techniques may assist us in identifying the direct and indirect effects of treatment.

Another commentary pertains to addressing the question of "what works with whom." Future studies could focus on examining the effects of factors other than residential treatment on the various outcomes. Such studies could no longer assume a linear additive model. Interaction effects between variables such as treatment and level of drug addiction would need to be considered. Such interaction effects could identify the variation in treatment effectiveness among men and women for individuals with different characteristics.

Our last commentary pertains to cost-benefit. In the future, we will consider the cost-savings for the monies spent given the effect size. For each dollar spent on treatment, how much of a cost

savings, if any, do we receive?

We have attempted to identify some of the limitations of the conclusions we have drawn, to identify the issues to be discussed in the second 3-year outcome report, and to identify the general issues important to future research. Major topics for future research concern gender differences in treatment process and outcome, the role of proximal outcomes and the relationship between the various outcome measures.