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**A Multi-Site Evaluation of Prison-Based Drug Treatment:**

**A Research Partnership Between**

**The Pennsylvania Department of Corrections and Temple University**

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## **Executive Summary**

### **The Problem**

Therapeutic community (TC) drug treatment programs have become the preferred treatment approach in correctional settings. Previous evaluations of prison-based TC have produced promising results, including significant reductions in recidivism over follow-up periods ranging from three to five years. However, studies have also been criticized for small sample sizes, less-than-optimal research designs (e.g., uncontrolled selection and attrition biases), and insufficient attention to interactions between inmate characteristics, treatment process, and treatment outcomes (e.g., rearrest, reincarceration, drug relapse). No studies have examined prison-based TC across multiple sites while controlling for individual and programmatic variations in analyses of outcome. Numerous questions remain about the true impact of prison-based TC, and the potential impacts of unmeasured variations in inmate characteristics, treatment programs, and multiple outcome measures.

### **Purpose of This Project**

The purpose of this project was to examine multiple, post-release outcomes over a post-release period of five years for inmates who participated in Therapeutic Community (TC) drug treatment programs or comparison groups at five Pennsylvania State Correctional Institutions (SCI's). The research was greatly facilitated by a strong, collaborative research partnership between Temple University and the Department of Corrections which began in 1998 and continues to the present.

### **Research Design**

Using a combination of automated databases and manual data collection techniques, we collected post-release data (e.g., reincarceration, rearrest, drug relapse, employment) on 2,809 inmates admitted to a drug treatment program at five state correctional institutions (SCI) between January and November of 2000. Adhering to principles of informed consent, we previously collected pre-treatment (e.g., demographics, criminal history, and assessed need for drug treatment) and in-treatment data (e.g., psychosocial functioning, inmate responses to treatment) for all research subjects.

The current grant allowed us to add 1,079 additional cases (i.e., new releases from prison) to a prior research sample, increasing our total n to 2,693 cases, and extending the post-release follow-up period to five years. We examined in-treatment predictors and multiple post-release outcomes for inmates who participated in TC drug treatment programs (n = 749) or comparison groups (n = 2,060) at five state prisons. Matched comparison groups made up of TC-eligible inmates participating in less intensive forms of treatment (e.g., short-term drug education and outpatient treatment groups) at the same five institutions were constructed based upon known predictors such as drug dependency, need for treatment and criminal history. Process and outcome measures incorporated a range of institutional, intermediate (e.g., attitudinal and behavioral change, participation in treatment) and post-release measures (e.g., drug relapse, rearrest and reincarceration).

## Major Results

No prior studies have simultaneously examined or reported all three outcomes used in this study. Three different outcomes (reincarceration, rearrest, and drug relapse) were tracked for the experimental (TC) and control groups for up to five years or more, making these results comparable to the longest follow-up studies on prison TC conducted to date. In addition, this study had a much larger sample than previous studies, and was better able to account for individual and programmatic differences across multiple sites. Three main research questions were examined.

1. *How effective are in-prison TC programs in reducing drug relapse and recidivism rates (rearrest and reincarceration), and do in-prison therapeutic community programs improve long term outcomes of released offenders (i.e., length of time without drug relapse, rearrest or reincarceration)?*
2. *Which kinds of inmates benefit most from in-prison TC programs?*
3. *How do inmate v. programmatic factors independently and interactively influence long term outcomes?*

### *Effectiveness of Prison-Based TC Drug Treatment*

- Major results are shown in the table below. TC had a strong, significant impact on reducing the probability of reincarceration over the five year follow-up period. The effect on rearrest was marginally significant ( $p < .09$ ); the effect on drug relapse was minimal. Possible explanations for these findings are discussed in the report.

*Major Results: Effects of TC and Other Predictors on Three Measures of Outcome*

<b>Outcome</b>	<b>Comparison Group</b>	<b>TC Group</b>	<b>Was TC Effective?</b>	<b>Other Significant Predictors (+ or – indicates direction of effect on outcome)</b>
Reincarceration Rate	59.3%	50.5%	Yes ( $p < .05$ )	Time remaining until minimum release date (-); Successful completion of TC (-), Post-release employment (-), Time at risk in the community (-).
Rearrest Rate	59.3%	52.3%	Marginally ( $p < .09$ )	Time remaining until minimum release date (-); Age (-); Current Offense Severity (-); Prior Offense Severity (+); Post-release employment (-); Time at risk in the community (-).
Drug Relapse Rate	51.2%	50.8%	No ( $p > .10$ )	Time remaining until minimum release date (-); Post-release employment (-); Need for treatment (+);

- The non-significant effect of TC on drug relapse accords with mixed findings from prior research. Only one of the three major prison TC studies (Delaware) examined drug urinalysis as an outcome and found significant treatment effects. While prison TC addresses both addiction and criminal behavior, it is clear that the two types of behavior can exist independently, and drug using behavior appears more resistant to change.
- In contrast to previous studies, prison TC alone *did* result in a significant mean effect size for reincarceration and rearrest. In prior studies, TC reduced drug relapse *only* when mandatory aftercare was provided. Mandatory aftercare may thus be more important for reducing *drug relapse* than *criminal recidivism*.
- Most inmates who were reincarcerated in this sample were returned to prison for a parole violation rather than a new conviction. Increases in parole violations (especially for technical parole violations such as drug or alcohol use), rather than increases in crime per se, have fueled rapidly increasing rates of incarceration observed over recent years. Our results, therefore, support arguments that changes in crime control *policies*, rather than crime rates per se, are the major drivers of incarceration rates.
- The first twelve months following release from prison are a particularly critical period of reentry. A very high short-term failure rate was observed for relapse in particular, suggesting that much greater efforts are needed to improve successful reintegration for drug-involved offenders. Much more comprehensive and coordinated efforts are needed to address both risk and protective factors during the first year back from prison.

#### *Inmate characteristics predictive of long term success*

- One of the most consistent empirical findings in criminology is that previous criminality predicts future criminality. However, for two out of three outcomes examined (reincarceration and drug relapse), prior offense severity had no effect at all.
- Only for rearrest did we find a significant (positive) relationship with prior criminality. Even then, prior offense severity dropped out of the equation after all control variables were entered. Results question arguments that criminal propensity remains stable throughout the life course. Rather, criminal propensity appears to be changeable in response to intensive, well-structured treatment (i.e., prison based TC).
- Current offense severity actually predicted lower rates of rearrest (even after entering all control variables); this lends further ambiguity to the idea that prior criminal behavior is a stable predictor of future criminal behavior. PADOc's own studies have found consistently lower rates for violent and sex offenders than for property and drug offenders. Part of the explanation is that less serious crimes such as property and drug offenses are committed more frequently, while serious crimes such as rape and murder are rarer.
- Results supported arguments that dynamic rather than static predictors are better predictors of recidivism, and that criminal "propensity," if such a thing exists independently of an individual's social context and experience, may be malleable in response to well-implemented, intensive criminal justice interventions, as well as other turning points.

- Inmates who had more time remaining in their minimum sentence upon admission to prison drug treatment had lower reincarceration, rearrest, and drug relapse rates upon release from prison. It is possible that inmates who were motivated to participate in drug treatment benefited from receiving treatment somewhat earlier in their sentence. A second possibility is that there was a “deterioration effect” of treatment over time, at least for inmates who remained in prison following successful treatment completion.
- Inmates who successfully completed treatment had lower reincarceration and rearrest rates than those who did not. However, when personality characteristics (motivation, negative affect, and self confrontation) were entered into regression equations, the effects of treatment retention became nonsignificant. It is likely, therefore, that dynamic individual characteristics such as motivation influence one’s likelihood of both entering and completing treatment.
- Inmates who were at risk in the community for longer periods of time did better on the post-release outcomes of reincarceration and rearrest (although time at risk was examined mainly as a variable to control for the passage of time). This effect remained after controlling for baseline individual characteristics. It appears that inmates who did not recidivate during the first two years of their release from prison had a higher likelihood of desisting from crime.
- Inmates who were employed full-time or part-time did much better than those who were unemployed and/or unable to work (confirming results of prior studies). In fact, the magnitude of effect of post-release employment was stronger than that of treatment (i.e., participation in TC). Inmates employed full-time showed the lowest rates of reincarceration and drug relapse. For rearrest, however, only older inmates benefited from fulltime employment. Relationships between employment, recovery, recidivism, and relapse are discussed further in the report.
- An age effect was found for rearrest only, and was based on official records rather than offender self-reports. Consistent with previous research, younger offenders had higher rates of rearrest. However, older (rather than younger) offenders had slightly higher rates of drug relapse. These results are consistent with the findings of Laub and Sampson (2003), who found that the peak age for drug offending was later and the rate of decline in drug offending over time was slower.

#### *Influence of Individual and Programmatic Factors on Long Term Success*

- Psychosocial characteristics of inmates *at baseline* (e.g., anxiety, depression, hostility) were not strong predictors of post-release outcomes; post-release employment remained the strongest predictor.
- No significant interactions between TC program and individual inmate characteristics predicted rearrest, reincarceration, or drug relapse. These results hint that *post-release contextual variables* (e.g., human and social capital) rather than *individual* factors are more predictive of successful reentry. However, individual inmate “traits” may also change over time in response to treatment, as well as in response to post-release factors such as social supports, opportunities, peer associations, etc.

- Treatment effects were invariant across the five institutions, although variance in outcomes was greatest for drug relapse. All five programs previously evidenced implementation fidelity, and all five programs were of similar duration. Programs did vary somewhat on dropout rate and other contextual factors, however (see *Methods* section).
- There is little doubt that assessing programmatic and institutional variation in independent (e.g., treatment) and dependent (e.g., recidivism) measures can be a useful exercise both for theoretical and policy purposes. However, the relatively small number of programs assessed remains a substantial challenge for researchers that seek to examine between-program characteristics.

### **Implications and Recommendations for Policy**

It is generally agreed that a multistage therapeutic community treatment continuum (TCTC) for drug dependent offenders (e.g., TC treatment in prison, followed by transitional TC in a work-release setting, followed by supervision and aftercare treatment in the community) is associated with significant reductions in drug use and crime for up to 5 years after prison release. This evidence-based intervention has become the dominant paradigm for treating drug dependent inmates. Our results support evidence regarding the efficacy of this approach, but also highlight some pressing needs for further research.

Unexamined variations in TCTC implementation practices (e.g., staff selection, training, and evaluation) and implementation outcomes (e.g., fidelity) are likely to influence client outcomes, especially when multiple programs, institutions, agencies, and measures are examined. Despite recommendations that treatment researchers need to more systematically measure implementation processes as predictors of treatment outcomes, researchers have been relatively slow to assess such factors. Between-program, between-unit, and between-agency differences in implementation practices and outcomes may threaten the internal validity of many multisite outcome studies. Policy-relevant research would benefit greatly from more careful attention to mapping critical dimensions of implementation associated with TCTC, and examining how diverse implementation practices (including core implementation components, organizational factors, and external influences) influence outcomes.

Several other policy-relevant questions about prison TC remain unanswered. Perhaps most important among these are “*How long does prison-based TC need to be in order to be effective?*” Studies are needed to address questions about the stability and generalizability of prison TC effectiveness, given that the definitive studies were all based on treatment durations of 12 months or more, while the *majority* of prison drug treatment programs (61%) now last 6 months or less. Almost no research has specifically sought to identify the minimum length of treatment needed to realize significant reductions in post-release criminal behavior and drug abuse.

In general, policy-relevant research should further explore more detailed interactions between inmate characteristics, treatment process, and post-release outcomes. There is good reason to believe that prison TC can be a life altering experience for many drug involved offenders, but future research should incorporate a longitudinal perspective that includes more detailed assessments of the diverse individual, programmatic and environmental influences of offender behavior pre-, during-, and post-prison.

## **Limitations**

- Missing data on the instruments measuring inmate responsiveness to treatment (REST and CRC) at Time 2 (6 months) and Time 3 (12 months) limited our ability to examine inmate responsiveness to treatment over time, or examine relationships between during-treatment change and recidivism. More research is definitely needed to assess to what degree dynamic risk factors change over time in response to prison-based TC drug treatment, and what kinds of individuals may be most likely to benefit from well-implemented TC treatment.
- In the current study, major variables predictive of recidivism were statistically controlled, constituting a strong alternative to a randomized experiment (Mitchell et al., 2006; Pearson & Lipton, 1999). It is still possible, however, that unmeasured sources of bias could have influenced the results. Well-crafted experimental and longitudinal studies are still needed to examine inmate responsiveness to treatment and long term outcomes.
- While we cannot rule out the possibility that some inmates may have received some kind of post-release aftercare treatment, the lack of mandatory aftercare treatment for released offenders in PA and the scarcity (and expense) of residential beds available for ex-offenders seriously restrict the likelihood that such services were provided on any meaningful scale to inmates in our sample. It is possible that previous studies may have overstated the effects of community aftercare, and understated the independent effects of prison TC treatment on long term outcomes. However, glaring differences in definitions and implementation of aftercare services across jurisdictions have inhibited advances in this area of research.
- Although the measurement of employment preceded the measurement of recidivism in the present study, more detailed, longitudinal data on pre- and post-release employment (e.g., type of employment, employee performance, earnings) are needed to examine how non-relapsing or non-recidivating parolees differ from others. However, none of the control variables examined in this study substantially weakened the observed relationships between post-release employment and three different measures of recidivism, suggesting that the effect of post-release employment is robust.
- It is possible that larger samples of programs may yield different findings. Two of the five TC units studied were quite large (100+ inmates), and staffing ratios (inmates per counselor) ranged from 9:1 to 26:1. Although overall program dropout rates were low, two programs evidenced lower rates than the others. More systematic assessments of programs as well as individuals are needed, as are larger samples of programs.

## **Conclusions**

- Participation in intensive prison-based TC drug treatment produced significant, long term reductions in recidivism. However, in contrast to previous studies, prison TC exerted strong, significant treatment effects *independently* of community aftercare, and did so across five different prison sites.
- The effects of prison TC drug treatment varied depending upon the outcome examined. TC significantly lowered the likelihood of reincarceration and rearrest, but not drug relapse. Post release employment emerged as the strongest predictor of all three outcomes.

- Further research should explore how both individual and programmatic variations influence treatment outcomes over time, and explore why prison-based drug treatment seems to have stronger effects on reducing criminal behavior than drug using behavior. The effects of prison TC and aftercare (both independent v. cumulative and short-term v. long-term) remain ripe areas for future research.

## Project Description

The purpose of the proposed project was to examine multiple post-release outcomes for 2,809 inmates who participated in TC drug treatment programs (n = 749) or comparison groups (n = 2,069) at five Pennsylvania State Correctional Institutions (SCI's). Using a quasi-experimental matching design, matched comparison groups made up of TC-eligible inmates participating in less intensive forms of treatment (e.g., short-term drug education and outpatient treatment groups) at the same five institutions were constructed based upon known predictors such as drug dependency, need for treatment and criminal history (NIDA, 1981, 1999).

At the expiration of our PCCD grant (Subgrant #1999/2000-DS-19-011188) in 2002, 462 TC inmates and 1152 Comparison inmates had been released from prison, with post-release follow-up periods extending up to a maximum of 26 months (mean = 13 months). Numerous significant findings were reported (Welsh, 2002). For example, TC treatment significantly reduced reincarceration and rearrest rates, but not drug relapse rates. The positive effects of TC treatment were contingent upon employment following release from prison. Comparison inmates who failed to obtain full-time employment following release were 9.6 times more likely to be reincarcerated. TC inmates evidenced numerous improvements in psychosocial functioning and active involvement during treatment, including significant decreases in *depression* and *risk-taking behavior*, and significant increases in *therapeutic engagement*, *personal progress*, *trust in group*, *opinions of program staff*, and *perceptions of counselor rapport*.

The major limitation in the initial post-release sample was the brevity of the follow-up period and the attendant small sample sizes available for some multivariate analyses (Welsh, 2002). For example, our ability to examine the predictive power of in-treatment changes (REST and CRC subscales) upon post-release outcomes (recidivism) was limited. At that time, fewer than 100 TC inmates who had

completed two or more repeated measures on the REST and CRC had been released from prison. Under the additional data collection afforded by the current study, 2,693 of the 2,809 inmates in the original sample (95%) have now been released from prison. With larger sample sizes and follow-up periods extended up to five years, this unique database provides one of the most comprehensive sources of information on prison-based drug treatment ever assembled, allowing researchers to examine critical interactions between client selection, program structure and process, inmate responses to treatment and outcomes.

### ***Literature Review***

Dependent substance abusers are responsible for a high proportion of crime (Ball et al., 1983; Chaiken, 1989; Inciardi, 1979; Lipton, 1995). For chronic users, activities and behaviors surrounding drug acquisition and use pervade their lifestyle (Johnson et al., 1985; Walters, 1992).

Drug-involved offenders comprise a large portion of local, state and federal correctional populations. At midyear 2005, 2.2 million inmates were incarcerated in U.S. jails and prisons, a rate of 738 per 100,000 adults (up from 601 in 1995) (Harrison & Beck, 2006). Drug offenses accounted for 21% of sentenced prisoners under State jurisdiction in 2002, and 55% of sentenced prisoners under Federal jurisdiction in 2003 (Harrison & Beck, 2005).

The existing delivery of correctional drug treatment is inadequate relative to need. In the 1997 Survey of Inmates in State and Federal Correctional Facilities, about 2 out of 3 inmates admitted drug histories, but less than 15% received any professional treatment while in prison (Mumola, 1999). Belenko and Peugh (2005) estimated that about one-third of male inmates and more than half of female inmates in this sample needed long-term residential treatment. Although inmates in the most severe drug use categories were more likely to receive treatment while incarcerated, only about one-fifth received *any* clinical treatment services.

In the 2004 Survey of Inmates in State and Federal Correctional Facilities, the Bureau of Justice Statistics included for the first time measures of drug dependence and abuse based on criteria specified in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV) (Mumola & Karberg, 2006). Fifty-three percent of State and 45% of Federal prisoners met DSM-IV criteria for drug dependence or abuse. Among drug dependent prisoners, 40% of State and 49% of Federal inmates took part in some type of drug abuse program including self-help groups, peer counseling, and drug education. However, the percentage who took part in treatment programs with a trained professional (15%) remained unchanged from 1997. In short, a tremendous need for evidence-based prison-based drug treatment remains largely unmet.

Prison-based therapeutic community (TC) drug treatment has been shown to be effective in breaking the cycle of relapse and recidivism among seriously drug-involved offenders (Gaes, Flanagan, Motiuk, & Stewart, 1999; Mitchell, MacKenzie & Wilson, 2006; Mitchell, Wilson, & MacKenzie, 2007; Pearson & Lipton, 1999). At the same time, studies of prison TC have been vulnerable to criticisms of inadequate research design, unknown or compromised program implementation, and inadequate measures of treatment process and outcome (Austin, 1998; Fletcher & Tims, 1992; Gaes et al., 1999; Mitchell et al., 2006). Critical questions regarding interactions between inmate characteristics, treatment process, and outcomes remain largely unexamined.

In-prison TC is a drug-free residential setting which provides an intensive (6-12 months), highly structured pro-social environment for the treatment of substance abuse and addiction. It differs from other treatment approaches principally in its use of the community as the key agent of change, in which treatment staff and recovering clientele interact in both structured and unstructured ways to influence attitudes, perceptions, and behaviors associated with drug use (DeLeon, 2000). In contrast to other types of treatment, TC provides total immersion into the treatment experience, i.e. one is living it full time.

The TC uses a staged, hierarchical model in which treatment stages are related to increased levels of individual and social responsibility. Peer influence, mediated through a variety of group processes, is used to help residents learn and assimilate social norms and develop more effective social skills. The therapeutic approach generally focuses on changing negative patterns of thinking and behavior through individual and group therapy, group sessions with peers, and participation in a therapeutic milieu with hierarchical roles, privileges, and responsibilities. Strict and explicit behavioral norms are emphasized and reinforced with specific contingencies (rewards and punishments) directed toward developing self-control and responsibility.

Inmates typically move through three phases of treatment in a 12-month TC program. The first phase consists of orientation, diagnosis, and an assimilation process. In the second phase, typically lasting 5 to 6 months, inmates are expected to take on increased responsibility and involvement in the program. Those who have been in the program longer are expected to share their insights, teach new members and assist in the day-to-day operation of the TC. Group counseling focuses on self-discipline, self-worth, self-awareness, respect for authority, and acceptance of guidance for problem areas. Seminars take on a more intellectual approach. Debate is encouraged as a means of self-expression. During the third phase, preparation for community reentry, which lasts 1 to 3 months, inmates strengthen planning and decision making skills and design their individual aftercare plans. Many programs add a fourth phase that includes relapse prevention training.

## **Effectiveness of Prison TC**

Techniques of meta-analysis have become popular to analyze treatment effects in different domains. Meta-analyses use quantitative procedures to synthesize the findings from numerous studies. They typically estimate effect sizes due to treatment and examine the influence of factors that may increase or decrease effect size (including characteristics of the sample, the research design, and the intervention). Meta-analysts examining prison-based drug treatment to date have consistently bemoaned the lack of conclusive findings in this area due to methodological weaknesses.

In a systematic review prepared for the Campbell Collaboration, Mitchell et al. (2006, 2007) argued that the effectiveness of prison-based TC drug treatment is less clear than commonly assumed, largely due to methodological deficiencies including inadequate comparison groups, inadequate statistical controls, and selection bias. The effectiveness of other types of prison-based drug treatment (e.g., outpatient treatment, 12-step groups) remains largely unknown.

Mitchell et al. (2006, 2007) examined published and unpublished studies of prison drug treatment in North America or Western Europe since 1979. In addition, the study had to be based upon either an experimental design or two-group quasi-experimental design, the study had to report an outcome measure related to criminal behavior, and the study had to be reported in the English language. Recidivism and drug-use outcomes from each study were calculated using the odds-ratio effect size.

Researchers located twenty-six studies meeting the eligibility criteria, and coded 32 different effect sizes (several studies assessed more than one drug treatment program). To avoid confounding due to differential attrition, authors either eliminated studies that used dropouts as a comparison group or (where possible) combined dropouts into the total sample of treatment admissions. Seventeen effect sizes were calculated from TC programs; ten were computed from counseling or drug education programs

(including 12-step programs);<sup>1</sup> three were from boot camp programs; and two pertained to a jail-based methadone maintenance program.

Researchers used a four-point index of internal validity based upon the University of Maryland's Scientific Methods Scale (Sherman et al., 1998). Experimental designs were rated as a "4" unless they had significant attrition, in which case they were rated as a "3." Rigorous quasi-experiments (studies with carefully matched comparison groups and/or multivariate statistical controls for relevant pre-intervention differences) were rated as a "3." Quasi-experiments with questionable comparison groups or lacking multivariate statistical analyses were rated as a "2." Studies where the comparison group was markedly different than the treatment group on pre-intervention characteristics were rated as a "1."

Only three studies (9%) were rated "4" on the scientific methods scale, and only eight studies (25%) were rated "3." Twenty-one studies (66%) used methods generally considered too weak to draw valid conclusions (i.e., no matching, inadequate statistical controls, inadequate comparison groups).<sup>2</sup> More curiously, only eleven studies examined post-intervention drug use as an outcome variable.

Three-quarters of the studies had effect sizes favoring the treatment group over the comparison group, with an overall mean odds ratio of 1.25 (roughly translated into recidivism rates of 50% v. 44.5%). Therapeutic community drug treatment programs produced the strongest overall effect (mean odds ratio = 1.47).

Effect size was statistically unrelated to sample characteristics (age, gender, race, or offender type) or program characteristics (e.g., length of intervention, prison v. work-release, inclusion of aftercare component). However, researchers cautioned, few studies provided sufficient detail about characteristics of the samples or the programs, limiting the ability of meta-analysts to make valid conclusions about the influence of such factors on effect sizes.

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<sup>1</sup> Unfortunately, the authors do not treat these as three distinct types of programs.

<sup>2</sup> The paper did not report the methodological quality of the TC studies or other treatment types separately from the total sample of studies.

In one of the largest meta-analyses of correctional treatment to date, the Correctional Drug Abuse Treatment Project (CDATE) identified 1,606 distinct studies conducted between 1968 and 1996 (Pearson & Lipton, 1999). Similar to the University of Maryland Scientific Methods Scale (Sherman et al., 1998), Pearson and Lipton used a four-point “quality of methods” scale (1 = *poor, very low confidence*, 2 = *fair, low confidence*, 3 = *good, midlevel of confidence*, and 4 = *excellent, high level of confidence*) in their analyses.

The meta-analysis verified that TC was effective in reducing recidivism, finding a significant, weighted mean effect size of .133. However, of the seven TC studies examined, none was rated as “excellent;” only one was rated as “good;” three were rated as “fair;” and three were rated as “poor.” Higher quality studies tended to show a slightly higher effect size, although the relationship between method quality and effect size did not reach statistical significance. Pearson and Lipton were able to compute an effect size of TC on drug/alcohol relapse for only one of the studies (of fair methodological quality), finding an effect size of .17. Pearson and Lipton cautioned that methodological weaknesses have limited the conclusions that can be drawn from these studies.

Gaes et al. (1999) reached similar conclusions in a review of adult correctional treatment. They particularly noted the persistence of bias caused by subject selection and/or attrition. In many studies, inmates were allowed to self-select into treatment, they were selected on criteria unrelated to their assessed level of need for treatment, and/or they dropped out of treatment at high rates. Dropouts have often been incorrectly analyzed as if they were a valid, independent comparison group (Gaes et al., 1999). In each case, outcomes are potentially biased due to selection or attrition processes (see also Austin, 1998; Pearson and Lipton, 1999).

Although Gaes et al. (1999) found evidence of positive prison drug treatment effects, especially prison TC, they offered four warnings: 1) few studies provided detailed descriptions of the treatment delivered; 2) few studies monitored the quality or integrity of program implementation; 3) subject

selection and attrition bias were persistent problems; and 4) few studies used “strong inference” designs (i.e., studies that not only detected a treatment effect, but were able to detect a reduction in the client’s needs or deficits that was statistically related to observed outcomes).

Outside of Pennsylvania, the most extensive evaluations of prison-based TC drug treatment to date have been conducted in three states (Delaware, California, and Texas). These studies are briefly reviewed to clarify the major findings and flaws identified by meta-analyses. The three studies all used extended follow-up periods for tracking outcomes (minimum of three years). Each found that graduates of prison TC had lower rates of recidivism than comparison samples, especially when prison TC was combined with structured aftercare following release from prison.

In Delaware, prisoners with a history of drug-related problems are referred to the 12-month KEY Therapeutic Community (TC) program, and following prison release, these individuals go to the CREST program, a 6-month TC-based work-release program for transitional aftercare (Inciardi, Martin, Butzin, Hooper, & Harrison, 1997; Nielsen, Scarpitti, & Inciardi, 1996; Lockwood, Inciardi, & Surratt, 1997). Finally, after release from residential aftercare, the clients receive supervised outpatient-based aftercare. Random assignment was used only for one cohort of inmates randomly assigned to work release (CREST) or not. No random assignment was used to assign subjects to the experimental treatment (KEY, the TC program) or control group. Three years following their release to the community, significantly more of the clients who completed the in-prison program and the transitional aftercare program remained arrest-free (55%) than an untreated comparison group (29%) (Martin, Butzin, Saum, & Inciardi, 1999). Those who also received outpatient aftercare following the transitional residential treatment had the best outcomes (69% arrest free after 3 years). Results for relapse to drug use (as measured by both self-reports and urinalysis) were similar, with 17% of those who completed only the in-prison therapeutic community, 27% who had the in-prison treatment and the transitional residential treatment, and 35% who also had outpatient aftercare remaining drug-free during the follow-up period, compared to only 5% of

the comparison group. Findings reported for 5-year outcomes were similar, with those who went through both KEY and CREST or through CREST alone having significantly lower recidivism rates than the comparison group (Inciardi, Martin, & Butzin, 2004). According to authors, participation in prison TC treatment alone did not significantly improve 5-year outcomes (p. 103), although those analyses were not presented.

In the Amity, California prison study (Wexler et al., 1999), researchers used randomization to assign inmates who *volunteered* for treatment to either TC or a wait-listed, “intent-to-treat” comparison group. Volunteers were deemed eligible for TC if they had a drug problem (no information on the severity of drug problem or the means of assessment was given), and had at least 9 to 14 months remaining in their sentence prior to parole eligibility. Inmates remained in the TC-eligible pool until they had less than 9 months to serve, then they were removed from the pool and designated as members of the “no-treatment” control group. In reality, inmates in the “no-treatment” comparison group may have received some unknown mix of drug education, self-help, or outpatient services: “The control group did not receive any formal substance abuse treatment during their prison stay, although limited drug education and 12-step groups were available” (p. 325). Those who successfully completed prison TC plus aftercare showed a three-year reincarceration rate of 27%, compared to 75% for a no-treatment comparison group (Wexler et al., 1999). However, when the entire “treatment” group (i.e., before removing dropouts from TC or aftercare) was considered together, the reincarceration rate for the treatment group increased to 69%, a difference that was no longer statistically significant. Curiously, the five-year outcome results for this sample<sup>3</sup> suggested a “rebound” effect: the treatment group now had a significantly lower reincarceration rate (76%) than the no-treatment control group (83.4%). It is difficult to interpret the stability of these findings, as the authors acknowledge, because “the unbiased assignment

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<sup>3</sup> Prendergast et al. (2004:43) do not report the sample sizes for the experimental and comparison groups at the five-year followup, although they report that the total sample included 576 subjects.

of randomization no longer operates, and selection bias becomes a possible (although by no means exclusive) explanation for the findings” (Prendergast et al., 2004: 53).

In Texas (Knight, Simpson & Hiller, 1999), authors constructed a matched comparison sample (n = 103) based upon TC-eligible inmates who were either rejected by the parole board or who had too little time remaining on their sentence. TC-eligible parolees were rejected because the parole board judged them either as unlikely to benefit from the program or inappropriate for the program (Knight, Simpson, Chatham, and Camacho, 1997:82), introducing selection bias into the research design. Researchers separated treatment admissions into Aftercare Completers (TC + Aftercare; n = 169) and Aftercare Dropouts (TC only; n = 122). Aftercare completers had a 3-year reincarceration rate of only 25%, significantly better than the 42% reincarceration rate of the Comparison group and the 64% reincarceration rate of the Aftercare Dropouts. Because the treatment and comparison groups differed significantly on prior offense and problem severity (and perhaps other unmeasured characteristics), researchers further broke down the three groups into low-risk and high-risk subgroups (six comparisons overall, with sample sizes < 100 in four of the six groups). Treatment effects were greatest for high-risk inmates who completed both TC and Aftercare (3-yr. rearrest rate of 26%).

In sum, results from studies of prison-based TC are promising but inconclusive. Studies have been vulnerable to criticisms of inadequate research design, unknown or compromised program implementation, and inadequate measures of treatment process and outcome (Austin, 1998; Fletcher & Tims, 1992; Gaes et al., 1999; Mitchell et al., 2006, 2007; Pearson and Lipton, 1999). The current study attempted to address these gaps in the literature to date.

### ***Research Questions***

Relationships between inmate characteristics, treatment process and outcomes remain only partially understood (Farabee et al., 1999; Fletcher & Tims, 1992; ONDCP, 1996; Pearson & Lipton,

1999). What are the independent and interactive effects of individual and programmatic characteristics (Welsh & Zajac, 2004a)? Few studies to date satisfy Platt's (1964) requirement of a "strong inference" design. A strong inference design requires the scientist to articulate both the theoretical reasons and under what conditions a behavioral change (outcome) is expected to occur.

In this study, we examined prison-based TC across multiple sites while including programmatic and contextual variations in analyses of outcome. Three major research questions were addressed:

1. *How effective are in-prison TC programs in reducing drug relapse and recidivism rates (rearrest and reincarceration), and do in-prison therapeutic community programs improve long term outcomes of released offenders (i.e., length of time without drug relapse, rearrest or reincarceration)?*
2. *Which kinds of inmates benefit most from in-prison TC programs?*
3. *How do inmate v. programmatic factors independently and interactively influence long term outcomes?*

## Project Scope and Methodology

### **Background**

Pennsylvania consistently ranks among the ten highest prison populations in the country (Harrison & Beck, 2006). The Pennsylvania Department of Corrections (PADOC) operates 27 state correctional institutions, 14 community corrections centers and 36 community contract facilities. The department housed 46,028 inmates as of December 31, 2007, with males representing 95% of the state's inmate population (PADOC, 2007a). The inmate population consisted of 50% African Americans, 38% Caucasians, and 11% Hispanics, with one percent accounted for by other ethnicities or races. The average age is 37 years old. In fiscal year 2005-06, PADOC budgeted \$26.1 million in state funds and \$1.3 million in federal funds on alcohol and other drug (AOD) treatment (PADOC, 2006a). At year-end 2005, 16,250 inmates were enrolled in AOD treatment programs (PADOC, 2006a).

At the time data were collected, the Department's AOD programming was grouped into four major categories: (1) *Drug and Alcohol Education Programs* offered to inmates identified as having any level of drug and alcohol involvement; (2) *Outpatient Treatment Programs* offered to inmates in need of more intermediate levels of intervention, including individual and group counseling sessions; (3) *Therapeutic Communities* offered to inmates identified as needing intensive substance abuse intervention; and (4) *Ancillary Groups*, such as self-help and peer counseling, offered to inmates as a supplement to other treatment (PADOC, 2002).<sup>4</sup>

TC inmates move through three phases of treatment. The first phase, *orientation* (1-3 months duration), consists of orientation to TC philosophy and concepts, diagnosis, and an assimilation process. In the second phase, *primary treatment* (3-7 months duration), inmates take on increased responsibility

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<sup>4</sup> The Department revised its AOD treatment policy 7.4.1 effective January 19, 2006 (PADOC, 2006b). Stand-alone Drug Education programs are no longer offered. Instead, drug education is now incorporated into regular Outpatient and TC programming.

and involvement in the program including teaching new members and assisting in the day-to-day operation of the TC. Through peer interactions as well as individual and group counseling, primary treatment focuses on positive behavior management, social and confrontation skills, acceptance of guidance for problem areas, effective participation in the inmate house structure (e.g., morning meetings, inmate committees), identification of personal relapse triggers, effective use of recovery tools, trust and relationship issues, self-identity, and awareness of criminal thinking. During the third phase, reentry (1-3 months duration), inmates strengthen planning and decision making skills, develop a relapse prevention plan, and design an individual release plan signed by both the inmate and the treatment specialist. Counselors inform inmates of the availability of 12-step groups such as AA and NA in the community and encourage inmates to use these services (PADOC, 2002). PADOC also offered an in-prison Alumni program for inmates who completed TC treatment but had not yet qualified for community placement or parole (PADOC, 2002). In contrast to studies of prison TC in Delaware, California and Texas, however, no mandatory community aftercare treatment was provided to TC graduates.<sup>5</sup>

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<sup>5</sup> While individual release plans could include a stated *intention* by the offender to participate in some type of post-release recovery program, the responsibility for following through on any stated intention resided solely with the inmate. For example, questions on the form asked: “Where and when will you continue in AOD treatment upon your release from this institution?” and “What issues do you want to address in continuing care?” When present at all, plans to participate in 12-step groups *only* were signed by both the inmate and the treatment specialist.

**Research Design**

A Steering Committee consisting of senior executive, research and treatment personnel from the Pennsylvania Department of Corrections and Temple researchers was formed in January of 1999 to guide research activity and facilitate the department’s overall research agenda (Table 1). We emphasized an interactive approach that involves all key stakeholders in the identification of research needs, goals, and procedures (Zajac, 1997; Zajac & Comfort, 1999; Welsh, 2002). This research has influenced departmental policies including inmate screening procedures and program standardization plans (Welsh et al., 2001; Welsh and Zajac, 2001; Welsh and Zajac, 2004a; Welsh and Zajac, 2004b).

**Table 1**

***Steering Committee for the Five-Site TC Project***

<b>PENNSYLVANIA DEPARTMENT OF CORRECTIONS</b>	<b>TEMPLE UNIVERSITY</b>
<p><b>Senior Staff</b></p> <ul style="list-style-type: none"> <li>• John S. Shaffer, Ph.D., Executive Deputy Secretary</li> <li>• Mary V. Leftridge-Byrd, Deputy Secretary for Specialized Facilities and Programs</li> </ul> <p><b>Bureau of Inmate Services</b></p> <ul style="list-style-type: none"> <li>• Mike Kazor, Acting Director.</li> <li>• Roxanna Dinesen, Chief, Treatment Division.</li> <li>• Babu Suseelan, Ph.D., Drug and Alcohol Treatment Program Manager.</li> </ul> <p><b>Bureau of Management Information Services, Division of Planning, Research, Statistics and Grants</b></p> <ul style="list-style-type: none"> <li>• Kathleen Gnall, Chief.</li> <li>• Gary Zajac, Ph.D., Research and Evaluation Manager.</li> <li>• Bob Flaherty, Security Data Analyst.</li> <li>• Bethany Gardner, Research and Evaluation Analyst.</li> </ul> <p><b>State Correctional Institutions</b></p> <ul style="list-style-type: none"> <li>• Harry Wilson, Superintendent, SCI-Cresson.</li> <li>• Harry Davis, DATS Manager, SCI-Muncy.</li> <li>• Mike Ciaverella, DATS II, SCI-Huntingdon.</li> <li>• Mark Harshberger, DATS Supervisor, SCI-Cresson.</li> <li>• Gerry Galinski, DATS Manager, SCI-Graterford.</li> <li>• John Gellatt, DATS Manager, SCI-Waymart.</li> <li>• Jennifer Rossman, DATS Supervisor, SCI-Houtzdale.</li> </ul>	<ul style="list-style-type: none"> <li>• Wayne N. Welsh, Ph.D., Associate Professor of Criminal Justice (Principal Investigator)</li> <li>• Nicole Salamatin, Graduate Research Associate</li> <li>• Patrick McGrain, Graduate Research Associate</li> </ul>

While the advantages of randomized research designs are well known, many programs are legally and/or ethically obligated to select clients on the basis of their need and suitability for treatment.

However, a strong research design was afforded by the opportunity to use *statistical controls* to form comparison groups (Rossi, Lipsey & Freeman, 2003). Research has consistently indicated the priority of several static predictors: offender age, number and severity of previous convictions (property, person, or drug offenses), and prior history of drug use (Andrews et al., 1990). These data items were available from Pennsylvania Department of Corrections data systems.

The eligible comparison group pool consisted of all those offenders who were eligible for participation in a Therapeutic Community (TC) treatment program. Because a shortage of space precluded intensively treating all those who were assessed with a high need for drug and alcohol treatment, a large pool of eligible offenders who were assigned to less intensive forms of treatment (e.g., outpatient treatment, drug education) was accessible.

Formal classification assessments<sup>6</sup> and drug and alcohol assessments<sup>7</sup> were conducted on all inmates. We examined average scores on the *Pennsylvania Department of Corrections Screening Instrument* (PACSI) and the *TCU Drug Screen*<sup>8</sup> for inmates in each program, and we determined how

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<sup>6</sup> The *Pennsylvania Additive Classification Tool* (PACT), in use at the time the treatment sample for this study was recruited, was later replaced by the Level of Service Inventory (LSI) in 2005. The PACT was designed to evaluate the offender's custody and security level requirements based on the nature of current and prior offenses, prior institutional and assaultive behavior, escape history, time to release, and program/work/housing performance, as well as stability factors such as marital status, age, and educational level.

<sup>7</sup> Up until the end of December 2000, DOC used the *Pennsylvania Department of Corrections Screening Instrument* (PACSI) to determine if an inmate had a problem with substance abuse. The instrument assesses previous and current drug use (frequency and type), physical and emotional effects, effects on life circumstances (e.g., relationships, employment, school, family), and previous and current involvement in treatment. The PACSI results in a need for treatment score that ranges from 0 - 10. As of January 1, 2001, DOC began using the TCU Drug Screen to screen all inmates for AOD treatment needs (Simpson, 1994; Simpson and Knight, 1998). In fact, the Department's adoption of that instrument was largely in response to recommendations made by Temple researchers as a result of the research partnership between the two agencies (Welsh, 2001).

<sup>8</sup> The TCU Drug Screen has been widely used and validated with inmate populations, and has evidence excellent reliability (Broome, Knight, Joe and Simpson, 1996; Peters et al., 2000). Score values of 3 or greater indicate relatively severe drug-related problems, and correspond approximately to DSM drug dependence diagnosis.

many inmates fell into low, medium, or high need categories. If TC clients were all “high need” clients, for example, valid comparison groups would need to consist of high need clients also.

With the assistance of DOC, we previously identified major descriptors of drug and alcohol programming at all DOC institutions, including the number of treatment slots available in each AOD program (Welsh, 2001; Welsh & Zajac, 2004a). Considerations of travel distance and the complexity of data collection favored limiting the scope of the project to five institutions. We thus focused our evaluation efforts on TC programs at Cresson (Security Level 3, pop. = 1,302), Graterford (Security Level 4, pop. = 3,638), Houtzdale (Security Level = 3, pop. = 1,500), Huntingdon (Security Level 4, pop. = 1,668) and Waymart (Security Level 2, pop. = 1,218)<sup>9</sup> (see Figure 1). At the time of the study, Cresson had 52 TC beds; Graterford had 50 TC beds, Houtzdale had 120 TC beds, Huntingdon had 36 TC beds, and Waymart had 100 TC beds.<sup>10</sup>

### **Sample**

Inmates were informed that their participation in the research was voluntary, and they were asked to sign a subject consent form. During the original subject recruitment period (January 1 - November 30, 2000), we collected data on a monthly basis for all inmates admitted to or discharged from TC, Outpatient, and Drug Education programs at each of the five institutions. We continued monthly tracking throughout the study to determine treatment outcomes (e.g., successful v. unsuccessful completion of treatment). In some cases, the same inmate was admitted to more than one program during the study period.<sup>11</sup> We were able to account for each treatment outcome separately, and we were able to account for an inmate’s total treatment exposure based upon the length of time he spent in each program (number of

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<sup>9</sup> Custody levels vary from 1 (community) to 5 (disciplinary custody).

<sup>10</sup> These five TCs represented the majority of the PADOs TC capacity as of January 2000. The only ones excluded were Chester (which we later evaluated separately), Muncy (female), and privately contracted TC programs at SCI Dallas.

<sup>11</sup> Multiple admissions could occur through several mechanisms. For example, an inmate’s first admission was into an Education program, but his second and third admissions were into different Outpatient programs (a group counseling program,

weeks) multiplied by the program's intensity (number of hours per week). The inmate's first admission determined his assignment to the treatment (TC) or comparison (Education or Outpatient) group.<sup>12</sup>

A total of 2,809 inmates participated in AOD programs at the five institutions between January 1 and November 30 of 2000. Of these, 749 (27%) were TC inmates, constituting the experimental group. The comparison group (n = 2,060) consisted of 1,154 inmates (41%) who entered the less intensive Education programs and 906 inmates (32%) who entered less intensive Outpatient programs (**Figure 1**).

### ***Instruments***

Researchers at Texas Christian University (TCU) have designed several well-validated inmate and counselor self-report instruments. Researchers at Temple University have designed several treatment process measures, including an Alcohol and Other Drug (AOD) Program Census (Welsh, 2001; Welsh & Zajac, 2004a). Together, these instruments assessed critical variables (both inmate and programmatic) potentially related to treatment outcomes (see Table 2).

All inmates in the treatment and comparison groups completed the Pennsylvania Corrections Screening Instrument (PACSI), the TCU Drug Screen, or both.<sup>13</sup> TC clients were asked to complete additional self-report measures (described below) that tapped psychological constructs and inmate perceptions of the treatment experience, and TC counselors were asked to complete periodic reassessments of each inmate's participation in treatment.

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for instance, and a relapse prevention program). In other cases, an inmate may have multiple admissions because he was unsuccessfully terminated one or more times from the same program and readmitted one or more times.

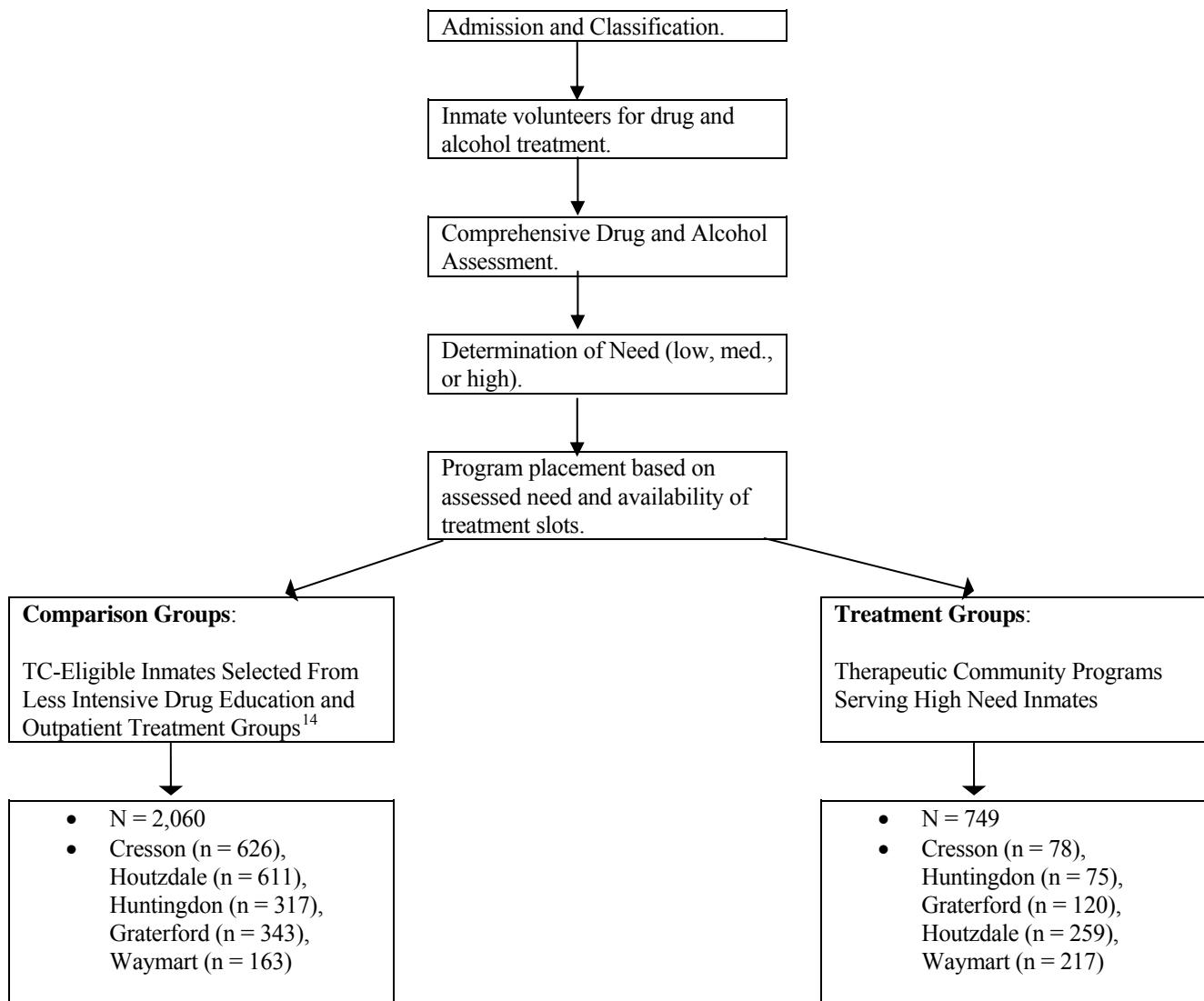
<sup>12</sup> If an inmate was admitted to a TC program on a subsequent program admission, he was assigned to the TC group. All inmates received credit for their prior treatment experience in Education or Outpatient programs (i.e., total treatment exposure).

<sup>13</sup> While all inmates entering Pennsylvania state prison prior to January 1, 2001 were supposed to be assessed on the PACSI at the time of their classification, valid scores were missing from the database for a number of inmates. However, all inmates participating in the research study were asked to complete the TCU Drug Screen. Because some inmates had a score on one instrument, some inmates had another, and some inmates had both scores, statistical analyses utilized only standardized z-scores rather than raw scores on these instruments.

**Table 2**

***Treatment Program and Offender Variables***

<p><b>Program Variables</b> (Sources: Program documents, program surveys, process evaluation instruments)</p>	<p><b>Offender Variables</b> (Sources: Program Records, DOC databases, inmate self-report surveys, counselor surveys)</p>
<ul style="list-style-type: none"> <li>• Program duration and intensity (e.g., program length, total hours of programming)</li> <li>• Use of different treatment approaches (e.g., cognitive-behavioral, rational emotive therapy, 12-step)</li> <li>• Program content (e.g., life skills, criminal thinking, communication skills)</li> <li>• Eligibility criteria for program admission (e.g., inmate motivation, institutional behavior, AOD needs assessment, minimum release date)</li> <li>• Program staffing ratios</li> <li>• Percentage of time spent by staff on treatment v. non-treatment tasks</li> <li>• Ratings of Treatment Process (Therapeutic Engagement, Personal Progress, Trust Group, Program Staff, Counselor Rapport, Counselor Competence, Program Structure, Program Sessions, Peer Support): REST</li> </ul>	<ul style="list-style-type: none"> <li>• Prior and current offense history</li> <li>• Level of drug dependency and need for treatment (PACSI and TCU Drug Screen)</li> <li>• Psychological Functioning (Self Esteem, Anxiety, Depression, Self Efficacy, Hostility, Risk Taking, Social Conformity) and Treatment Motivation (Treatment Readiness, External Pressures): Resident Evaluation of Self and Treatment (REST)</li> <li>• Counselor Rating of Client (CRC) forms: counselor ratings of inmate participation and involvement in treatment</li> <li>• Successful or unsuccessful inmate completion of treatment</li> <li>• Inmate’s length of time in treatment (number of weeks, highest treatment phase completed)</li> <li>• Institutional behavior (pre-, during, and post-treatment if returned to general population): number and type of misconducts</li> </ul>



**Figure 1. Framework for Research Design**

<sup>14</sup> Drug dependency scores and other statistical controls were applied in analyses.

The **TCU Drug Screen** was specifically developed for self-administration to a prison population. Items in this screening tool represent key clinical and diagnostic criteria for substance dependency as they appear in the DSM and the NIMH Diagnostic Interview Schedule. The inmate's score on the drug screen (0 to 9) helps determine the inmate's level of need for treatment. According to scoring criteria for the TCU Drug Screen, score values of 3 or greater indicate relatively severe drug-related problems, and correspond approximately to DSM drug dependence diagnosis. This instrument, self-administered to inmates upon program admission, takes about 5 minutes to complete.

This instrument has shown excellent reliability and validity, and has been widely used with prisoner populations (Broome, Knight, Joe and Simpson, 1996; Peters et al., 2000). For example, Peters et al. (2000) found that the TCU Drug Screen had a high overall accuracy in detecting drug or alcohol dependence (82.1% agreement with the Structured Clinical Interview for DSM-IV). The instrument resulted in relatively few "inappropriate" referrals (the positive predictive value was 83.5%). Sensitivity, which refers to the proportion of dependent participants who were correctly identified by the TCU-DS as dependent, was assessed at 84.9%. Based on its positive predictive value, sensitivity, and accuracy, the TCU Drug Screen was found to be among the most effective instruments for identifying substance abuse and dependence disorders in an inmate population (Peters et al., 2000). The test-retest reliability of the TCU Drug Screen was .95.

The TCU **Resident Evaluation of Self and Treatment** (REST) form contains a series of questions asking about the inmate's perceptions of his drug-related problems, psychological functioning (e.g., self-esteem, depression, anxiety, decision-making), and treatment process, including perceptions of program structure, participation in therapeutic groups, counselor attitudes and behavior, and counseling sessions (Knight, Simpson, Chatham and Camacho, 1997:81). The REST also includes several motivational scales potentially related to treatment engagement, retention and post-release criminality

(Blankenship, Dansereau, & Simpson, 1999; Hiller, Knight, & Simpson, 1999; Simpson, Joe, & Brown, 1997).

The REST consists of 111 questions organized into 18 subscales. Item response categories are based on Likert scales that range from 1 (“Strongly Disagree”) to 7 (“Strongly Agree”). All scales have evidenced good reliability and have been well validated upon inmate treatment populations (Knight, Holcum and Simpson, 1994; Simpson, 1994; Simpson and Knight, 1998). The REST was administered to inmates within 30 days after admission, again after 6 months, again at the end of 12 months, and again at discharge if the inmate remained in TC longer than 12 months. The form takes about 15 minutes to complete.

Counselor ratings of inmate participation in treatment were similarly gathered one month, 6 months, and 12 months following admission to treatment. The TCU **Counselor Rating of Client (CRC)** form is designed to assess staff ratings of inmate engagement in treatment. This form takes about five minutes to complete. The CRC consists of two sections: 25 items describe the counselor’s interactions with the inmate, and 23 items describe the inmate’s involvement and engagement in specific treatment activities. Using factor analysis, Hiller, Knight, Rao and Simpson (2000) identified four main themes related to counselor interactions: *self-confrontation*, *life skills development*, *family*, and *financial management*. Four scales described the inmate’s involvement in treatment: *treatment engagement*, *rapport with others*, *denial*, and *psychological problems*. Alpha reliability coefficients exceeding .71 were found for all scales.

### **Outcome Measures**

After release, treatment and comparison groups were tracked over time to monitor reincarceration, rearrest, drug use, and employment. Post-release data collection tracked all released

inmates in the study sample for up to five years following completion of their in-prison treatment program. Post–release outcome measures are summarized in **Table 3**.

Reincarceration data were collected by printing out the Department of Corrections “MOVE” screens for each inmate, which detailed the inmate’s entire history of incarceration, including his most recent date of release from custody, type of release (e.g., parole v. full sentence served) and any new incarcerations thereafter (including type of offense and sentence). Mechanisms for extracting offender-based predictors (e.g., prior and current offense severity, assessed need for treatment) from DOC databases were already in place through our research partnership with DOC.

Access to state rearrest and conviction data was granted by the Pennsylvania Commission on Crime and Delinquency (PCCD). As with DOC, we submitted the same list of released inmates to the PCCD. From the rap sheets obtained for each inmate we coded date, type and disposition of rearrest offense (if any).

**Table 3**

*Post-Release Outcome Measures And Sources Of Data*

<b>Measures</b>	<b>Source Of Data</b>
Rearrests and Reconvictions (number and type of offenses; dispositions; survival rate)	<ul style="list-style-type: none"> <li>● PA Commission on Crime and Delinquency (PCCD)</li> </ul>
Reincarceration (number and type of offenses; survival rate)	<ul style="list-style-type: none"> <li>● DOC Inmate Records System</li> </ul>
Relapse to Drug Use (type of drug, frequency of use)	<ul style="list-style-type: none"> <li>● PA Board of Probation and Parole (incl. drug tests)</li> </ul>
Participation In Aftercare Treatment Program (e.g., length and type of treatment)	<ul style="list-style-type: none"> <li>● PA Board of Probation and Parole (PBPP)</li> </ul>
Post-Release Employment (e.g., number of days employed or enrolled in job training)	<ul style="list-style-type: none"> <li>● PA Board of Probation and Parole (PBPP)</li> <li>● PA Dept. of Labor</li> </ul>

Other post-release data (e.g., drug testing, employment) were provided by the Pennsylvania Board of Probation and Parole (PBPP). We determined whether an inmate successfully completed his term of parole or not, and whether the inmate tested positive for any type of drug use while on parole. If an inmate were resentenced into DOC custody for a parole violation, we would identify such activity through the DOC “MOVE” system. Examination of parole data, however, also allowed us to detect cases where an inmate may or may not have been found guilty of a parole violation, and thus may or may not have been reincarcerated. Parole also provided several other important post-release measures, including employment.

### ***Analytical Approach***

We were able to track an inmate before, during, and after treatment, and we were able to factor into our analyses as independent variables or covariates not only individual inmate characteristics, but actual programmatic variations that may have influenced treatment outcomes. Analyses of outcome employed multivariate techniques including logistic regression and survival analyses.

Logistic regression is useful for examining dichotomous outcomes, including analyses of factors influencing successful treatment completion (or not), rearrest (or not), parole violation (or not), and so on. Logistic regression also allows the researcher to enter categorical (e.g., specific treatment program inmate was in) or continuous variables (e.g., level of motivation) as covariates.

Finally, survival analysis allows the researcher to examine outcomes such as recidivism in rich detail. Recidivism is conceptualized as dynamic behavior; requiring consideration of how much time has elapsed between release and specific behavior such as drug relapse or rearrest for parole violation or a new offense. We are thus concerned not only with examination of inmate and programmatic variables that predict who is left standing at the end of 5 years, but variables that influence early v. later relapse over time. This consideration is critical in examining outcomes related to drug abuse, since multiple

relapses almost inevitably precede any long-term recovery, especially for seriously addicted inmates.

Survival analysis allows researchers to add precision to predicting critical outcomes such as drug relapse and recidivism. It also allows for entry as independent variables both categorical and continuous variables (e.g., Cox regression with covariates), and both individual as well as programmatic variables. Analyses also examined relationships between inmate characteristics (e.g., prior criminal behavior), treatment process (e.g., motivation, participation) and recidivism over time.

Three examples of the timing of post-release data collection are presented below, using the first-month (January 2000, seven-month (July 2000) and eleven-month (November 2000) admission cohorts. The table shows that the estimated post-release follow-up period extends to five years for all subjects in our sample. Recidivism analyses adjusted for differences in release dates and amount of time at risk in the community.

<i>Date of admission To TC</i>	<i>Estimated Date completed 12-month prison treatment</i>	<i>Estimated Date of 3-yr. follow-up</i>	<i>Estimated Date of 4-yr. follow-up</i>	<i>Estimated Date of 5-yr. follow-up</i>	<i>Estimated Date of 6-yr. follow-up</i>
Jan. 2000	Jan. 2001	Jan. 2004	Jan. 2005	Jan. 2006	Jan. 2007
July 2000	July 2001	July 2004	July 2005	July 2006	July 2007
Nov. 2000	Nov. 2001	Nov. 2004	Nov. 2005	Nov. 2006	Nov. 2007

\*Follow-up data periods were calculated from the end of the 12-month prison treatment program because it was expected that most inmates would be released to the community on prerelease or parole status at this point.

## Findings and Analyses

### *Inmate Characteristics*

The sample can be described in terms of several important inmate characteristics (e.g., total treatment exposure), risk factors (e.g., prior and current offense history, assessed level of need for drug treatment, age) and program selection criteria (e.g., time remaining to minimum release date). Table 4 provides descriptive information for inmates in the experimental and comparison groups.

As expected, the experimental and comparison groups differed on total treatment exposure (Table 4). Treatment exposure was calculated for each inmate in the sample by multiplying the number of weeks he spent in each treatment program by the program's intensity (number of hours of treatment programming per week). TC inmates had 15 times as much treatment exposure as inmates in the Comparison group, thus providing a strong rationale for the quasi-experimental research design.

Age at time of admission was calculated by subtracting the inmate's birth date from the date of program admission. DOC supplied time remaining to minimum release date, a primary program selection criterion, as part of monthly data runs on all program admissions. Likewise, DOC, based on the Pennsylvania Sentencing Commission Guidelines, supplied current and prior offense gravity scores. Standardized drug scores, as noted earlier, were calculated based on the inmate's TCU Drug Screen score, if available, or the inmate's PACSI score, if the TCU was not available. Because the TCU is a 0-9 scale, and the PACSI (the former DOC drug screening instrument prior to Jan. 1, 2001) is a 0-10 scale, scores were transformed into standardized z-scores and saved for analyses. Using one-way ANOVA, experimental and comparison means were compared for eight key inmate variables.

**Table 4*****Sample Characteristics by Comparison vs. Experimental Group***

	<b>Comparison Group</b>		<b>TC Group</b>		<b>F (d.f.)</b>
	<b>Valid N</b>	<b>Mean (s.d.)</b>	<b>Valid N</b>	<b>Mean (s.d.)</b>	
<b>Age at time of admission</b>	2056	35.2 (9.2)	749	35.6 (9.1)	0.98 (1,2803)
<b>Time to minimum (months)</b>	2032	1.086 (104.8)	746	10.4 (71.3)	5.08* (1,2776)
<b>Current Offense Severity (0-10)</b>	2032	5.1 (2.9)	740	5.5 (2.5)	9.86* (1,2770)
<b>Prior Offense Severity (0-10)</b>	2032	4.7 (3.0)	740	4.8 (2.7)	0.97 (1,2770)
<b>Standardized Drug Score (Z)</b>	1579	-.26 (1.0)	722	.33 (.88)	178.45* (1,2299)
<b>TCU Drug Screen Score (0-9)</b>	823	3.8 (2.9)	564	5.6 (2.7)	135.46* (1,1385)
<b>PACSI Drug Score (0-10)</b>	1351	7.0 (3.0)	660	8.5 (1.9)	139.60* (1,2009)
<b>Total treatment exposure</b>	2027	54.8 (116.0)	749	835.5 (544.9)	3709.06* (1,2774)

\* p &lt; .05

Inmates in the comparison and experimental groups did not differ significantly on age at the time of program admission. However, significant variability was observed in time remaining to minimum release date. Many inmates were already well past their minimum release date, suggesting that many had already been denied parole at least once.<sup>15</sup> Time remaining to minimum release date (in months) ranged from -261 to 1181 for the Comparison group, and -293 to 1181 for the Experimental group. Thirty-nine inmates in the sample were lifers; of these, 14 had minimum release dates well into the future (e.g., 01-January-2099). Some (not all) of the higher values for *time remaining to minimum release date* are thus explainable by the presence of lifers.

TC inmates were likely to have more serious current (but not prior) offense histories, suggesting that higher risk inmates were targeted for TC placement. Relatively high prior offense severity scores may partially explain why so many inmates have seen their minimum release dates come and go. The Parole Board would certainly consider both prior and current offense histories in considering parole applications.

The Experimental and Comparison groups also differed significantly on need for treatment, regardless of which of three criteria were examined (TCU Drug Screen score, PACSI score, or standardized Z score on either instrument). In each case, TC inmates had slightly higher mean drug scores, suggesting appropriate program placement into TC. However, Table 4 also revealed clearly that most inmates in the sample, even those placed in low-intensity Education and Outpatient programs (i.e., the Comparison group), met and surpassed the minimum eligibility criteria for TC placement (i.e., a minimum TCU Drug Screen score of 3, or a minimum PACSI score of 5).

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<sup>15</sup> Data inspections conducted by DOC personnel also suggested that some inmates in our sample simply "rolled over" from one sentence to another (e.g., consecutive sentences for different convictions). As a result, they may have been assigned a new inmate number, but their old minimum release date remained

While appropriate statistical controls and/or matching are required to adjust for these initial selection differences,<sup>16</sup> results shown in Table 4 clearly indicate that the majority of inmates in the sample, regardless of whether they were in the experimental or comparison group, were classified as high-need and TC-eligible. We thus have a fortunate situation in terms of research design (i.e., many high-need inmates are present in programs of dramatically different treatment dosages), but an unfortunate one in terms of responsiveness (i.e., there were simply not enough TC beds to assign all high-need inmates to high-intensity treatment programs, with the result that many inmates received some form of less intensive treatment).

### ***Program Characteristics***

As reported by Welsh (2006a, 2006b), programmatic differences (e.g., duration, intensity, structure) may influence treatment process (e.g., treatment engagement) as well as outcomes (relapse and recidivism). In response to our previous recommendations (Welsh, 2001; Welsh and Zajac, 2001; Welsh et al., 2001), DOC has largely standardized the content, structure and duration of its AOD treatment programs. However, at the time that inmate admission data was collected for this study in 2000, TC programs still evidenced some variability in terms of duration and intensity.

Sources of programmatic data included the following: (1) results from a previous Survey of Alcohol and Other Drug (AOD) Programs (Welsh, 2001), (2) inmate ratings of treatment process (i.e., scales from the REST), and (3) program records collected by researchers, including monthly admission and discharge information, program mission statements, inmate handbooks, and operational manuals (Welsh, 2002). Major TC program descriptors are summarized in **Table 5**.

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attached to their old inmate number in the DOC database. In some cases we were able to make corrections based upon individual database searches.

<sup>16</sup> Criminal history and level of substance abuse problem often drive observed outcomes for this population (Andrews et al., 1990; Farabee et al., 1999; Fletcher and Tims, 1992; ONDCP, 1996, 1999; Pearson and Lipton, 1999).

**Table 5*****TC Program Descriptors***

	<b>Cresson</b>	<b>Graterford</b>	<b>Houtzdale</b>	<b>Huntingdon</b>	<b>Waymart</b>
<b>Capacity (# of TC beds)</b>	52	50	124	36	100
<b>Number of TC Staff (excluding DATS Supervisor)<sup>a</sup></b>	2	2	5	4	7
<b>Stated Program Duration (weeks)</b>	56-72	48	48	52	36
<b>Program Intensity (hr/wk)</b>	15	30	15	30	15
<b>Primary Treatment Approach</b>	Holistic <sup>b</sup>	Holistic	Holistic	Holistic	12-step
<b>Termination Rate (# of failures/# of admissions)</b>	32%	71%	20%	22%	5%

<sup>a</sup> Staffing ratios are imprecise due to the fact that TC staff are assigned exclusively to TC in some institutions (Graterford, Cresson, Waymart), while TC staff in others (Huntingdon, Houtzdale) also provide Education and Outpatient programming to the general population.

<sup>b</sup> Includes individual counseling, psychodynamic group therapy, cognitive behavioral therapy, behavior modification, rational emotive therapy, milieu therapy and standard 12-step groups.

First, the five TC units varied in terms of size. Two units had 100 or more beds. Large units make it more difficult to properly implement the TC philosophy, which depends upon positive peer interactions and close staff supervision. At Waymart, the TC was subdivided into two separate units, one upstairs and one downstairs. The two units had separate TC meetings, although they shared some of the same treatment groups and the same treatment staff. Houtzdale, on the other hand, had the difficult task of monitoring and supervising complex interactions between 124 inmates who all lived on the same unit (Welsh, 2000b).

We observed staffing ratios (inmates per counselor) that ranged from 9:1 to 26:1. Although definitive clinical standards for prison-based TC have not yet emerged, and existing guidelines are voluntary (ONDCP, 1999), experts often recommend a maximum of 15 clients per counselor (DeLeon, 2000).

Based upon inspection of program documents, TC schedules, and interviews with drug treatment supervisor at each institution, we estimated that 3 TC programs offered approximately 15 hours per week of actual treatment (individual or group counseling, or phase classes run by treatment staff). Two of the TC programs (Huntingdon and Graterford) offered weekly programming of 30 hours or more per week. Only one (Graterford) ran a full 7 days a week (ONDCP, 1999; DeLeon, 2000), although inmates on that unit appeared exhausted at times. One program lasted only 36 weeks; another lasted nearly twice as long. While more research into the effects of TC of varying durations and intensity levels is needed (DeLeon, 2000), such differences in treatment exposure may influence observed outcomes. Of course, outcomes also depend on the quality of treatment, not just the quantity (Pearson and Lipton, 1999).

All TC programs offered what they called a “holistic” approach, although one explicitly stated in its mission statement that the 12-step approach was its major framework. At the time

the sample for this study was collected in 2000, the department's overall approach to alcohol or other drug (AOD) programs was informed by a holistic health model that treated substance abuse as a complex problem with physiological, psychological, emotional, behavioral, spiritual, environmental and sociopolitical dimensions (Pennsylvania Department of Corrections, 2002).

We observed significant differences in termination rates across the five TC programs. Although the attrition rate overall was about 26%, one program (Waymart) rarely terminated anyone, and another (Graterford) terminated more than two-thirds of its clients. Arguments about program failure rates can go two ways. For example, an intensive supervision probation program that closely monitors clients, enforces the rules vigorously, and demands accountability is likely to have a high attrition rate (Petersilia and Turner, 1993). Arguably, good programs have high attrition rates because clients are held accountable. However, another argument could be made that a TC program should attempt to correct the behavior that led to the violation and enlist peer support to encourage the inmate to take responsibility for his/her behavior. Under this premise, programs would rarely bounce out misbehaving inmates, except when a "cardinal rule" (e.g., no physical violence against other TC residents, no sexual relations) has been broken. Data collected through inmate interviews and self-report surveys, however, suggested that a low threshold existed for successfully completing the Waymart program (Welsh, 2002).

Next we observed differences in characteristics of inmates admitted to the five programs (**Table 6**). Both Houtzdale and Waymart tended to recruit slightly older inmates, who tend to be better behaved and pose lower risks for misconduct and recidivism. The other units recruited inmates in their early thirties.

**Table 6**

*Inmate Characteristics by TC Program: Oneway ANOVA*

	<b>Cresson</b>	<b>Graterford</b>	<b>Houtzdale</b>	<b>Huntingdon</b>	<b>Waymart</b>	<b>F Value</b>
	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	(d.f.)
<b>Age (years)</b>	30.9 <sub>a</sub> (8.5)	31.7 <sub>a</sub> (8.6)	37.4 <sub>b</sub> (8.2)	32.0 <sub>a</sub> (8.4)	35.5 <sub>b</sub> (9.1)	22.86* (4,704)
<b>Time Remaining to Minimum Release Date (months)</b>	13.6 <sub>a</sub> (22.5)	24.2 <sub>a</sub> (119.7)	-1.6 <sub>a</sub> (58.0)	-0.19 <sub>a</sub> (55.4)	14.6 <sub>a</sub> (87.5)	2.81* (4,701)
<b>Current Offense Severity (0 – 10)</b>	6.1 <sub>bc</sub> (2.1)	5.3 <sub>ab</sub> (3.2)	5.4 <sub>ab</sub> (2.2)	6.5 <sub>c</sub> (2.0)	5.3 <sub>ab</sub> (2.6)	4.74* (4,695)
<b>Prior Offense Severity (0 – 10)</b>	4.6 <sub>b</sub> (2.7)	4.8 <sub>b</sub> (2.9)	5.5 <sub>bc</sub> (2.3)	6.2 <sub>c</sub> (1.8)	3.7 <sub>a</sub> (2.9)	18.84* (4,695)
<b>TCU Drug Screen Score (0 – 9)</b>	6.3 <sub>bc</sub> (2.4)	7.0 <sub>c</sub> (2.3)	5.4 <sub>ab</sub> (2.7)	6.8 <sub>c</sub> (2.1)	4.5 <sub>a</sub> (2.8)	16.45* (4,522)
<b>PACSI Screening Score (0 – 10)</b>	8.5 <sub>a</sub> (1.9)	8.4 <sub>a</sub> (2.0)	8.8 <sub>a</sub> (1.8)	8.4 <sub>a</sub> (2.2)	8.2 <sub>a</sub> (1.8)	2.40* (4,618)
<b>Program Duration: Graduates (# wk)</b>	82.5 <sub>d</sub> (19.6)	58.5 <sub>c</sub> (15.5)	49.1 <sub>b</sub> (13.7)	51.6 <sub>b</sub> (6.4)	41.6 <sub>a</sub> (20.0)	63.99* (4,512)
<b>Program Duration: Failures (# wk)</b>	33.4 (25.4)	19.7 (16.5)	22.3 (17.7)	23.4 (17.7)	18.7 (15.4)	2.90* (4,187)

p < .05

Means with differing subscripts differ significantly at the .05 level, using Tukey-B post hoc comparison tests.

We found wide variability in time remaining until minimum sentence. The average time remaining (until minimum release date) at Houtzdale and Huntingdon was negative, indicating several possibilities (not mutually exclusive). For example, some inmates had already seen their minimum release date come and go. Some had already been turned down for parole. Some may have been uninterested in treatment until they were mandated to go. Some minimum release dates in the DOC database may have been incorrect or outdated (e.g., if an inmate completed one sentence but then began a new one without ever being released). Some inmates may have been released on parole and returned for technical violations, without having a new minimum release date set. Our recidivism data confirmed the latter explanation in many cases. As a result, the minimum release date obtained from DOC automated databases was less than 100% reliable.

We also found significant differences in prior and current offense severity (Table 6). Waymart recruited somewhat lower risk inmates than the other programs.<sup>17</sup> Huntingdon admitted the highest risk inmates. Assessed level of need for treatment was high, regardless of which instrument was examined (PACSI or TCU Drug Screen). TCU Drug Screen results, however, suggested that Huntingdon, Graterford and Cresson recruited the highest need inmates.

We then examined program duration for both graduates and failures (i.e., early terminations). Cresson had the highest mean duration for program graduates at 83 weeks. Three institutions were in between (52 – 58 weeks), with the exception of Waymart, which had a mean duration of 42 weeks for successful program graduates. The five TC programs also differed significantly on program duration for failures, although all five programs took a long time to make a decision about termination. At Cresson, the average amount of time spent in the TC prior to being terminated was 33 weeks.

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<sup>17</sup> Waymart is a Level 2 security classification; Cresson and Houtzdale are Level 3 facilities; Graterford and Huntingdon are Level 4 facilities.

While the five programs consistently implemented the overall TC philosophy and framework, some differences in TC implementation were apparent. Graterford was somewhat more punitive than the other TC programs, as suggested by its higher attrition rate. Treatment duration at Cresson was longer than in the other TC programs. Waymart TC residents tended to be slightly lower risk, and program intensity was somewhat lower. Two TC programs (Cresson and Waymart) did not use pull-ups as part of their system of sanctions and rewards.<sup>18</sup>

Whether inmate and programmatic differences significantly influence treatment outcomes (reincarceration, rearrest and relapse) or not is an important empirical question. Because some significant differences were found across the five TC programs, multivariate analyses of outcome should be sensitive to their potential influence. In multivariate analyses (logistic regression), we entered into equations individual inmate differences such as prior and current offense severity. To examine the potential influence of programmatic differences on outcomes, we entered dummy variables reflecting the potential influence of each separate program and institutional setting. In this way, we could determine the degree to which treatment outcomes were influenced (if at all) by programmatic differences.

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<sup>18</sup> Pull-ups are often perceived as an important vehicle for encouraging inmate self-determination and responsibility in a TC program (DeLeon, 2000; ONDCP, 1999).

## **Recidivism Findings**

As of May 21, 2007, 2,693 inmates (95% of the total sample) had been released from prison. Excluding inmates who were “*Deceased*” (n = 20), “*Serving a previous county, state, or federal sentence*” (n = 20), “*Administrative releases*” (n = 4)<sup>19</sup>, “*Escapees*” (n = 18),<sup>20</sup> and members of the TC Alumni group who were not in treatment at the beginning of the study (n = 109), a final sample of 2,522 inmates was available for recidivism analyses (**Table 7**).

Two-thirds of inmates released (67%) were released via parole; this type of release was especially likely for TC inmates (Table 9). An additional 12.5% of the sample was reparaoled (i.e., after serving time for a previous parole violation). Only 20% served their full sentence. A small portion of others (< 1%) were released by court order or bail. We first present results for reincarceration, then rearrest, and then drug relapse. Sample sizes varied somewhat depending upon the number of variables remaining in the final statistical solution and the number of missing cases in each analysis.

Since the length of time an ex-offender has been in the community is related to the probability of recidivism, it is important to control for this factor in analyses of recidivism. **Table 8** presents the distribution of ‘time at risk’ by one year intervals. Table 10 shows that the vast majority of the sample (75%) has now been out of prison for two years or more, ensuring valid analyses of recidivism. The average time since release from prison was 45.5 months. We are also able to examine the survival (and failure) rates of each comparison group over time.

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<sup>19</sup> “Deceased” = inmate died while in prison, “Serve Prev. Cty/St/Fed” = inmate released to custody of other authority, “Administrative” = transfer or change in sentence status without being released from custody.

<sup>20</sup> All “escapees” were walk-aways from minimum-security Community Correctional Centers.

**Table 7*****Type of Release from Prison by Comparison Group, as of May 21, 2007***

<b>Type of release from DOC</b>	<b>Comparison Experimental</b>		<b>Total</b>
	<b>Group</b>	<b>(TC) Group</b>	
Reparoled	285 (15.7%)	30 (4.3%)	315 (12.5%)
Paroled	1093 (60.1%)	589 (83.8%)	1682 (66.7%)
Maxed Out	423 (23.3%)	82 (11.7%)	505 (20.0%)
Released by court order	14 (0.8%)	2 (0.3%)	16 (0.6%)
Bailed	4 (0.2%)	0 (0.0%)	4 (0.2%)
<b>Total</b>	<b>1819</b> <b>100.0%</b>	<b>703</b> <b>100.0%</b>	<b>2522</b> <b>100.0%</b>

*Note.* "Reparoled" = paroled for the second time after serving time for previous parole violation, "Paroled" = inmate applied for and received parole, "Maxed Out" = inmate served full sentence, "Court Order" = inmate released by court order.

**Table 8*****Time at Risk since Release from Prison by Comparison Group***

<b>Time at Risk</b>	<b>Comparison Group</b>	<b>Experimental (TC) Group</b>	<b>Total</b>
> 0 but < 1 yr.	165 (9.1%)	59 (8.4%)	224 (8.9%)
> 1 yr. but < 2 yr.	307 (16.9%)	94 (13.4%)	401 (15.9%)
> 2 yr. but < 3 yr.	233 (12.8%)	90 (12.8%)	323 (12.8%)
> 3 yr. but < 4 yr.	301 (16.5%)	113 (16.1%)	414 (16.4%)
> 4 yr. but < 5 yr.	255 (14.0%)	91 (12.9%)	346 (13.7%)
> 5 yr. but < 6 yr.	211 (11.6%)	113 (16.1%)	324 (12.8%)
> 6 yr. but < 7 yr.	300 (16.5%)	117 (16.6%)	417 (16.5%)
> 7 yr. but < 8. yr.	47 (2.6%)	26 (3.7%)	73 (2.9%)
<b>Total</b>	<b>1819</b> <b>100.0%</b>	<b>703</b> <b>100.0%</b>	<b>2522</b> <b>100.0%</b>

## ***Reincarceration***

We used stepwise logistic regressions to examine post release reincarceration rates for the TC and Comparison groups. These techniques enter into regression equations only those variables that exceed a specified probability of statistical significance ( $p < .05$ ), and remove variables that fail to reach a specified level of significance ( $p < .10$ ). These procedures allow the researcher to estimate models of outcome that reflect only the most robust and significant predictors. Several predictor variables were entered.

We examined the overall reincarceration rate for all subjects released from prison, controlling for potential selection differences between the TC and Comparison groups (**Table 9**, Model 1). The major predictor of interest was membership in either the TC or Comparison group. If TC were effective, we would expect a significant coefficient for TC even when controlling for inmate differences. Control variables included prior and current criminal history, time remaining to minimum sentence at the time of program admission, age at the time of program admission, and standardized drug score (z-score). We also controlled for actual time at risk in the community since release from prison (in months).

Three categorical variables were also entered as predictors. First, we examined whether the effects of TC varied by institution, since some differences in TC implementation were observed at the five institutions. We entered a categorical variable that reflected the effect of the institutional setting of each TC program. A second categorical variable reflected whether the inmate successfully completed his treatment program or not. A third categorical variable represented post-release employment status (full-time or part-time, unemployed but able, and unemployed and

unable to work).<sup>21</sup> Inspections for possible multicollinearity revealed no difficulties (e.g., no paired correlations exceeded .50), and the Hosmer-Lemeshow goodness of fit statistic indicated an excellent model fit ( $\chi^2 = 2.183$ , 8 d.f.,  $p < .975$ ). After listwise deletion, the final sample available for analyses included 555 TC inmates (36%) and 998 comparison inmates (64%).

Variables that significantly predicted reincarceration included comparison group (the TC group had a significantly lower rate of reincarceration), time remaining until minimum release date (those with more time remaining until their minimum release date had a lower reincarceration rate), treatment completion status (those who successfully completed treatment had a lower rate of reincarceration), time at risk in the community (those who were at risk for longer periods of time had a lower rate of reincarceration), and post-release employment status (inmates employed full-time or part-time had a much lower rate of reincarceration). We emphasize that these effects remained statistically significant even when we controlled for potential selection biases (i.e., differences in inmates admitted into the TC vs. Comparison groups), a major deficit of previous studies.

None of the institutional effects were statistically significant, suggesting that the impact of TC on reincarceration was invariant across the five institutions. Several other variables failed to reach statistical significance and dropped out of the equation: age at time of admission to treatment (although younger inmates tended to have a higher rate of reincarceration,  $p < .06$ ), current offense gravity score, prior offense gravity score, and standardized drug score.

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<sup>21</sup> We used the most recent employment status available from automated Parole Board data. Because very few inmates were classified as "part time" ( $n = 39$ ), these were combined with the "full time" category, resulting in the following three employment categories: (1) employed full time or part time (25%), (2) unemployed but able to work (13%), and (3) unemployed and unable to work (due to disability or legal status) (62%).

We then estimated reincarceration rates using predicted probabilities from logistic regression equations in Model 1.<sup>22</sup> **Figure 2** shows that TC resulted in a significantly reduced probability of reincarceration (59% v. 50%) after nearly five years, even when results were adjusted for the effects of all control variables. **Figure 3** shows that post-release employment also dramatically reduced the probability of reincarceration, controlling for the effects of other independent variables.

Life tables for survival and risk (hazard) of reincarceration are shown in **Table 10**. For the comparison group, 323 (55%) of the 587 recidivists were reincarcerated within 12 months of their release from prison; 425 (72%) of the 587 recidivists were reincarcerated within 18 months of their release from prison. For the experimental group, 147 (53%) of the 278 recidivists were reincarcerated within 12 months; 193 (69%) of the 278 recidivists were reincarcerated within 18 months. It is clear that the first 12 - 18 months following release from prison make up the vast majority of reincarcerations in both groups, providing strong evidence that this time period is critical in any attempt to understand or prevent recidivism.

Statistical tests confirmed that the survival rate for the TC group over the 5-year follow-up period (**Figure 4**) was significantly greater than that of the comparison group (Wilcoxon = 13.874, 1 d.f.,  $p < .001$ ). The median survival time for the comparison group (24.7 months) was less than half of the median survival time for the experimental group (51.6 months), providing strong evidence for the effectiveness of prison-based TC drug treatment. Based on the logistic regression

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<sup>22</sup> Probabilities of reincarceration for different groups were estimated using logistic regression equations with all predictor and control variables entered:  $\text{Prob}(\text{event}) = \frac{1}{1 + e^{-Z}}$ , where  $Z = \sum B_k X_{ik}$  (Hanushek and Jackson, 1977; Lichter, 1989, Norusis, 1990).

results presented in Table 9, Model 1, TC subjects were 42% less likely to be reincarcerated than Comparison subjects ( $1 - \text{Exp}(B) = 1 - .578 = .422$ ).

Table 9

*Stepwise Logistic Regression of Reincarceration Rates on Predictor and Control Variables*

	Model 1			Model 2		
	B	S.E.	Exp(B)	B	S.E.	Exp(B)
Age	-----			-----		
Time To Minimum	-.031 *	.004	.970	-.050 *	.014	.951
OGS-Current	-----			-----		
OGS-Prior	-----			-----		
Drug Score	-----			-----		
Time at Risk	-.119 *	.007	.888	-.140 *	.017	.870
TxGrad (1)	-.776 *	.272	.460	-----		
Proctype(1)	-.548 *	.250	.578			
Prison(1)	-----			-----		
Prison(2)	-----			-----		
Prison(3)	-----			-----		
Prison(4)	-----			-----		
Employment Status (1)	-2.987 *	.304	.050	-2.571 *	.731	.076
Employment Status (2)	-2.112 *	.366	.121	-2.746 *	.919	.084
Negative Affect				-----		
Self Confrontation				-----		
Motivation				-----		
Constant	6.223 *	.395	504.04	6.767 *	.831	868.51
Chi-square (df)	1599.8 *			394.68 *		
	7			(4 df)		
	(6 df)					
-2 Log likelihood	529.50			87.74		
Nagelkerke R-Squared	.86			.90		
N of cases	1553			348		

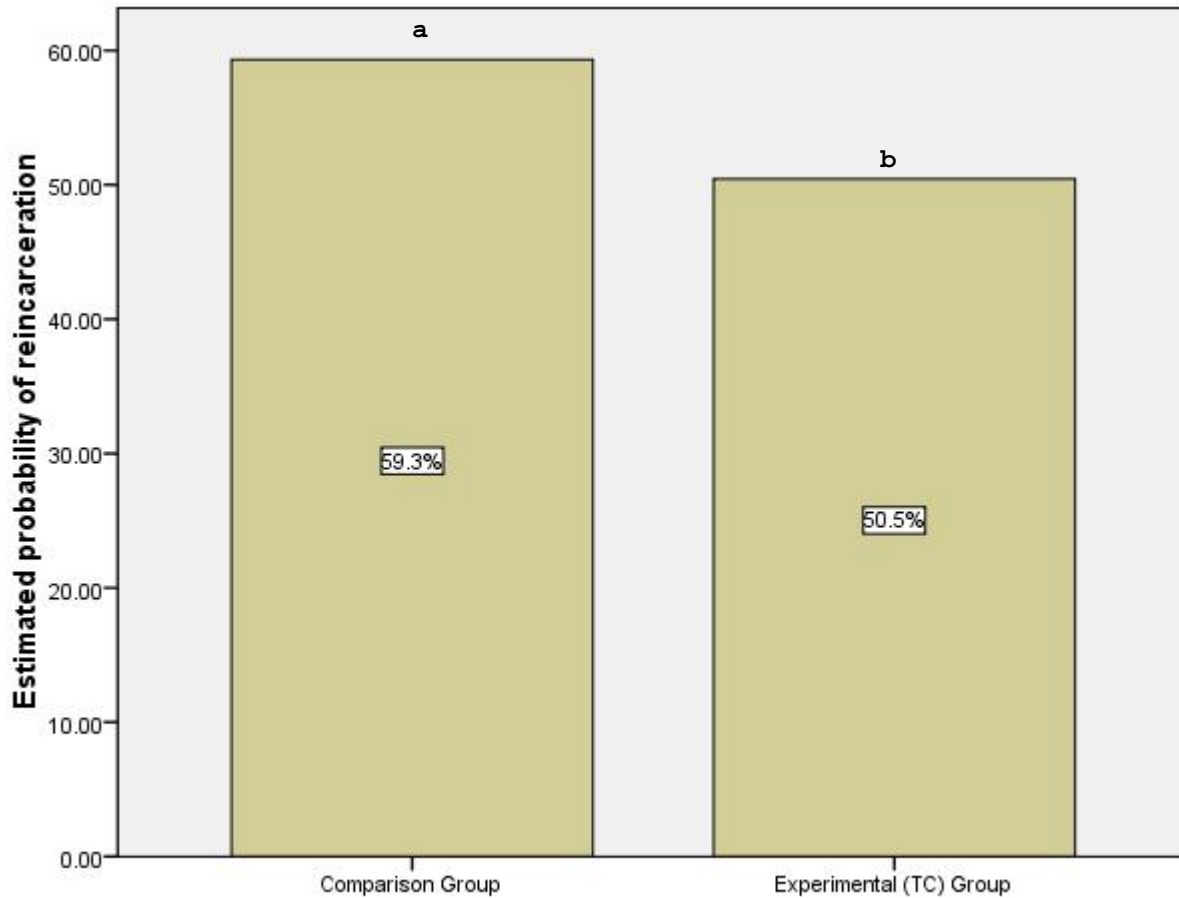
\*p &lt; .05

Note. TIME TO MIN = Time remaining to minimum release date at time of program admission; OGS = Offense Gravity Score, Current and Prior (1 - 10); TxGRAD: 1 = SUCCESSFULLY COMPLETED TREATMENT, 0 = UNSUCCESSFULLY DISCHARGED); PROGTYPE:1 = TC, 0 = COMPARISON GROUP; PRISON: 1 = CRESSON, 2 = GRATERFORD, 3 = HOUTZDALE, 4 = HUNTINGDON; EMPST(1) = full- or part-time employment, EMPST(2) = unemployed and able to work.

Table 10

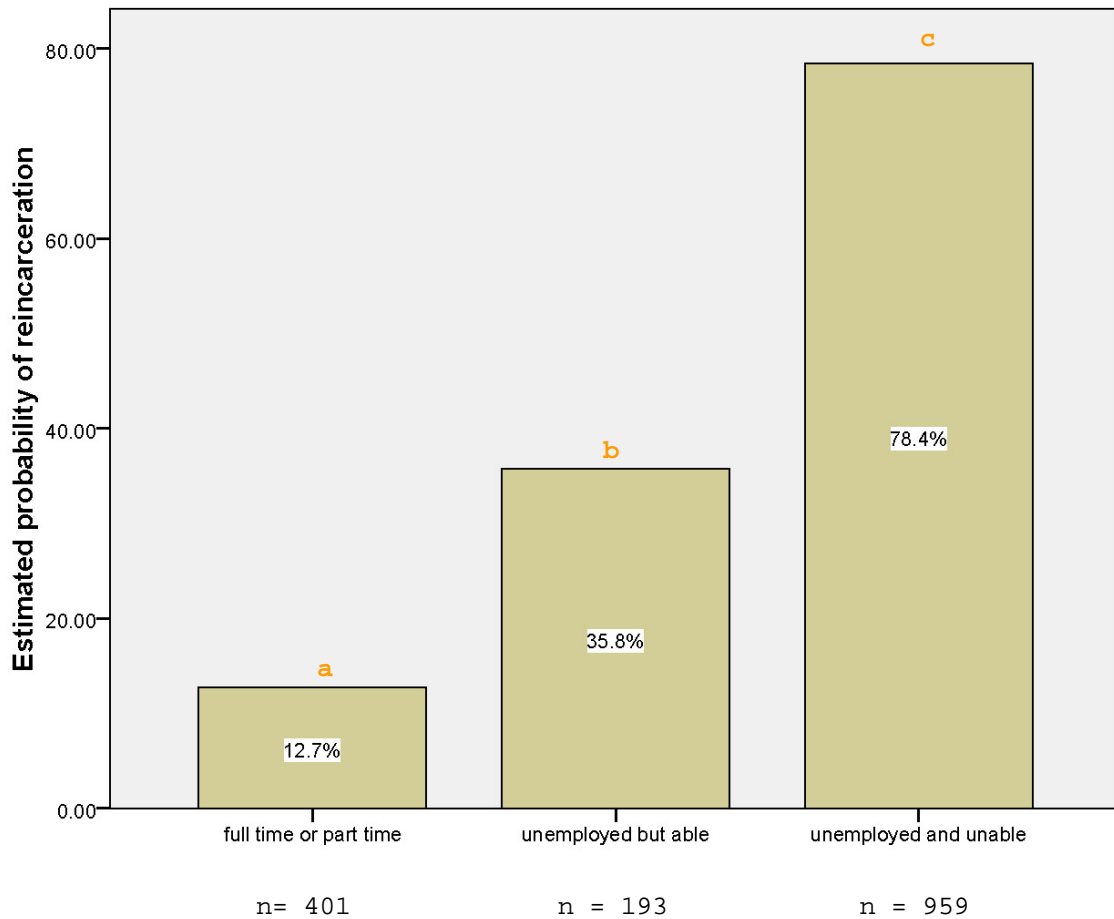
*Survival Analysis: Life Tables for Reincarceration*

	Interval	Number	Number	Number	Number of	Proportion	Proportion	Cumulative	Std. Error of	Probability	Std. Error of	Hazard Rate	Std. Error of
Comparison Group	0	998	9	993.500	168	.17	.83	.83	.01	.028	.002	.03	.00
	6	821	16	813.000	155	.19	.81	.67	.01	.026	.002	.04	.00
	12	650	3	648.500	102	.16	.84	.57	.02	.018	.002	.03	.00
	18	545	1	544.500	59	.11	.89	.51	.02	.010	.001	.02	.00
	24	485	10	480.000	45	.09	.91	.46	.02	.008	.001	.02	.00
	30	430	12	424.000	22	.05	.95	.43	.02	.004	.001	.01	.00
	36	396	18	387.000	18	.05	.95	.41	.02	.003	.001	.01	.00
	42	360	24	348.000	9	.03	.97	.40	.02	.002	.001	.00	.00
	48	327	21	316.500	7	.02	.98	.39	.02	.001	.001	.00	.00
	54	299	24	287.000	2	.01	.99	.39	.02	.000	.000	.00	.00
Experimental (TC) Group	0	555	4	553.000	74	.13	.87	.87	.01	.022	.002	.02	.00
	6	477	2	476.000	73	.15	.85	.73	.02	.022	.002	.03	.00
	12	402	2	401.000	46	.11	.89	.65	.02	.014	.002	.02	.00
	18	354	0	354.000	30	.08	.92	.59	.02	.009	.002	.01	.00
	24	324	4	322.000	22	.07	.93	.55	.02	.007	.001	.01	.00
	30	298	15	290.500	12	.04	.96	.53	.02	.004	.001	.01	.00
	36	271	6	268.000	7	.03	.97	.52	.02	.002	.001	.00	.00
	42	258	10	253.000	2	.01	.99	.51	.02	.001	.000	.00	.00
	48	246	15	238.500	10	.04	.96	.49	.02	.004	.001	.01	.00
	54	221	18	212.000	2	.01	.99	.49	.02	.001	.001	.00	.00



*Note.* Estimated probabilities are adjusted for all control variables, using logistic regression coefficients reported in Table 11, Model 1. Based on stepwise logistic regression results (Forward conditional) where  $N = 708$  (TC = 217; Comp = 491). Criteria: p-in (.05), p-out (.10). Means with different subscripts are significantly different from each other ( $p < .05$ ).

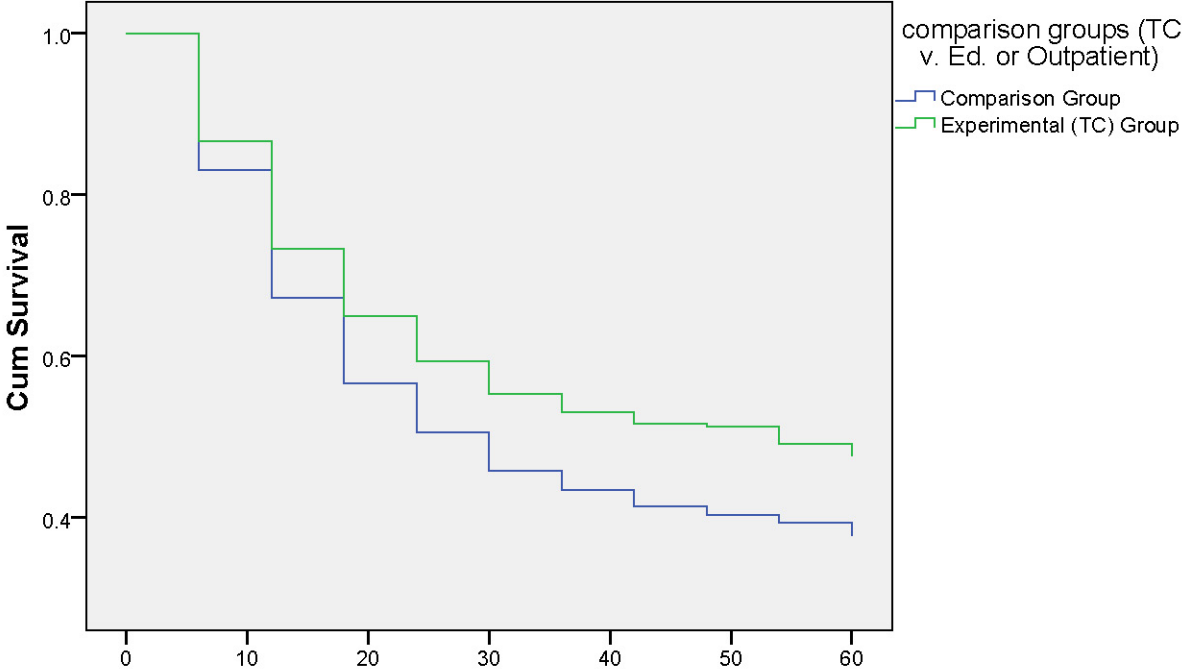
**Figure 2.** *Estimated Probabilities of Reincarceration for Comparison and TC Groups (Adjusted for Control Variables)*



Note. Estimated probabilities are adjusted for all control variables, using logistic regression coefficients reported in Table 11, Model 1. Based on stepwise logistic regression results (Forward conditional) where N = 1553 (TC = 555; Comp = 998). Criteria: p-in (.05); p-out (.10). Means with different subscripts are significantly different from each other ( $p < .05$ ).

**Figure 3.** *Estimated Probabilities of Reincarceration by Post-Release Employment Status (Adjusted for Control Variables)*

### Survival Function



Note. Wilcoxon Statistic = 13.874, 1 d.f.,  $p < .001$

**Figure 4. Reincarceration Survival Function by TC v. Comparison Group**

## Effects of Psychosocial Variables and Perceptions of Treatment on Reincarceration

We also wished to examine the impact on reincarceration of inmate psychosocial characteristics and perceptions of treatment (as measured by REST and CRC scales). These analyses were conducted for exploratory purposes only, to examine during-treatment variables as possible predictors of reincarceration. The definitive results for the experimental effect (i.e., the effects of TC v. the Comparison group) were shown in Table 9, Model 1. These additional exploratory analyses were possible for TC inmates only, since comparison group subjects were not asked to complete the REST due to their short durations of stay in non-residential, outpatient or drug education programs. The maximum sample size available for regression analyses (prior to entering REST and CRC variables) was thus  $n = 555$  (the number of TC inmates for whom there was no missing data on the predictors already entered in Table 9).

Prior to entering any of the REST or CRC variables into regression analyses, we were interested in whether any of these measures could distinguish between those who were reincarcerated and those who were not. With reincarceration (0 = no, 1 = yes) as the grouping variable, we examined univariate ANOVA results for all 18 REST scales and 8 CRC scales assessed at 1 month into treatment. The goals of this strategy were to narrow down the number of predictors to be entered into regression equations, reduce collinearity, reduce missing values, and increase statistical power (see Tabachnik & Fidell, 2006; Hosmer & Lemeshow, 1989).

Results are presented in **Table 11**. Seven *REST scales* were significant predictors of reincarceration: Depression (T1), Social Efficacy (T1), Hostility (T1), Risk Taking (T1), Social Conformity (T1), Treatment Readiness (T1), and Program Sessions (T1). Two *CRC scales* were significant predictors of reincarceration: Self confrontation (T1), and Family Issues (T1).

To reduce potential multicollinearity amongst this group of independent variables, all significant predictors from Table 13 were then entered into a principal components factor analysis with varimax rotation. The Kaiser-Meyer-Ohlin measure of sampling adequacy = .559, indicating a factorable matrix. Three factors accounting for 59.3% of the explained variance were extracted (**Table 12**).



Table 11

*REST and CRC Scales x Reincarceration - Oneway ANOVA Results*

Reincarceration											
Measures	0 = No				1 = Yes				F	d.f.	p
	Mean	Std. Error	95% CI		Mean	Std. Error	95% CI				
			Lower	Upper			Lower	Upper			
<b><i>REST scales</i></b>											
Depression (T1)	34.3	.55	33.2	35.3	37.1	.67	35.8	38.4	10.90	1,546	.001*
Self Efficacy (T1)	61.4	.34	60.8	62.1	62.5	.35	61.8	63.2	5.02	1,551	.025*
Hostility (T1)	28.9	.81	27.4	30.5	32.4	.88	30.7	34.2	8.60	1,547	.003*
Risk Taking (T1)	46.8	.56	45.8	47.9	49.0	.56	47.9	50.1	7.35	1,549	.007*
Social Conformity (T1)	59.0	.40	58.3	59.8	56.9	.48	55.9	57.8	11.89	1,545	.001*
Treatment Readiness (T1)	59.6	.48	58.7	60.6	61.7	.46	60.8	62.6	9.60	1,541	.002*
Program Sessions (T1)	43.5	.87	41.8	45.2	47.1	.90	43.3	48.9	8.23	1,549	.004*
<b><i>CRC scales</i></b>											
Self Confrontation (T1)	49.3	.67	48.0	50.6	51.5	.70	50.1	52.9	5.29	1,496	.022*
Family (T1)	49.4	.70	48.0	50.7	51.5	.76	50.0	53.0	4.41	1,499	.036*

\* p &lt; .05

Table 12

*Principal Component Factor Loadings of REST and CRC Scales*

<b>Scale</b>	<b>Factor 1: Negative Affect</b>	<b>Factor 2: Therapist Foci</b>	<b>Factor 3: Motivation</b>
<b>Hostility</b>	.836		
<b>Risk Taking</b>	.658		
<b>Depression</b>	.603		
<b>Program Sessions</b>	.534		
<b>Self Confrontation</b>		.913	
<b>Family Issues</b>		.910	
<b>Self Efficacy</b>			.720
<b>Treatment Readiness</b>			.720
<b>Social Conformity</b>			.609

Note. Factor loadings < .40 are not shown to ease interpretability.

The first factor (Eigenvalue = 1.961), consisting of hostility, risk taking, depression, and a perception that more treatment sessions were needed, was labeled “negative affect,” in accordance with both three- and five-factor theories of personality. Over the past 20 years, psychological research has suggested that a small number of *master traits* can be used to describe major facets of personality. Such master traits, particularly *negative affect*, have been linked to addictive, delinquent, and criminal behavior (Agnew, Brezina, Wright and Cullen, 2002; Rothbart and Bates, 1998; Wright, Caspi, Moffitt and Silva, 2001).<sup>23</sup> The second factor (Eigenvalue = 1.747), labeled “*self confrontation*,” consisted of the two CRC therapist foci scales (a dual emphasis in counseling on self confrontation and family issues). The third factor (Eigenvalue = 1.631), consisting of self efficacy, treatment readiness, and social conformity, was labeled “*Motivation*,” as it indicated a willingness and capacity on the part of the offender to change his lifestyle.

The three factor scores representing *negative affect*, *self confrontation*, and *motivation* were then entered into stepwise logistic regressions along with the first block of predictors previously examined: age, OGS (prior and current), TCU Drug Screen II, time at risk in community, time remaining until minimum release date, institutional setting, successful treatment completion, and post-release employment status (see Table 11, Model 2). Inspections for possible multicollinearity revealed no difficulties (e.g., no paired correlations exceeded .60), and the Hosmer-Lemeshow goodness of fit statistic indicated an excellent model fit ( $\chi^2 = 7.49$ , 8 d.f.,  $p < .485$ ). After listwise deletion, the final sample available for analyses included 348 TC inmates.

Significant predictors of reincarceration in Model 2 (Table 11) included time remaining until minimum release date (those with more time remaining until their minimum release date had a

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<sup>23</sup> Some have argued for five factors including *agreeableness*, *conscientiousness*, *emotional stability*, *openness to experience* and *extraversion* (Costa & McCrae, 1985; Digman, 1990, John, 1990; McCrae & Costa, 1987). Tellegen (1985) argues

lower reincarceration rate), time at risk in the community (those who were at risk for longer periods of time had a lower rate of reincarceration), and post-release employment status (inmates employed full-time or part-time had a much lower rate of reincarceration). As in Model 1, these effects remained statistically significant even controlling for potential selection differences (e.g., differences in criminal history and level of drug dependence). None of the institutional effects were statistically significant, suggesting that the impact of prison setting on reincarceration was invariant. None of the three psychosocial variables significantly predicted reincarceration, although *motivation* had the largest effect of the three ( $p < .13$ ).

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for a three-factor scheme that includes *negative emotionality*, *constraint*, and *positive emotionality*.

## **Rearrest**

We used stepwise logistic regressions to examine post release rearrest rates for the TC and Comparison groups. These techniques enter into regression equations only those variables that exceed a specified probability of statistical significance ( $p < .05$  or  $.10$ ), and remove variables that fail to reach a specified level of significance ( $p < .10$ ). These procedures allow the researcher to estimate models of outcome that reflect only the most robust and significant predictors. Several predictor variables were entered.

We examined the overall rearrest rate for all subjects released from prison, controlling for potential selection differences between the TC and Comparison groups (**Table 13**, Model 1). The major predictor of interest was membership in either the TC or Comparison group. If TC were effective, we would expect a significant coefficient for TC even when controlling for inmate differences. Control variables included prior and current criminal history, time remaining to minimum sentence at the time of program admission, age at the time of program admission, and standardized drug score (z-score). We also controlled for actual time at risk in the community since release from prison (in months).

Three categorical variables were also entered as predictors. First, we examined whether the effects of TC varied by institution, since some differences in TC implementation were observed at the five institutions. We entered a categorical variable that reflected the effect of the institutional setting of each TC program. A second categorical variable reflected whether the inmate successfully completed his treatment program or not. A third categorical variable represented post-release employment status (full-time or part-time, unemployed but able, and unemployed and

unable to work).<sup>24</sup> Inspections for possible multicollinearity revealed no difficulties (e.g., no paired correlations exceeded .30), and the Hosmer-Lemeshow goodness of fit statistic indicated a good model fit ( $\chi^2 = 10.484$ , 8 d.f.,  $p < .233$ ). After listwise deletion, the final sample available for analyses included 539 TC inmates (36%) and 963 comparison inmates (64%).

Variables that significantly predicted rearrest (Table 13, Model 1) included age (older offenders were less likely to be rearrested), time remaining until minimum release date (those with more time remaining until their minimum release date had a lower rearrest rate), current offense gravity score (those with a more serious *current* offense were less likely to be rearrested), prior offense gravity score (those with a more serious criminal *history* were more likely to be rearrested), time at risk in the community (those who were at risk for longer periods of time had a lower rate of rearrest), and post-release employment status (inmates employed either full-time or part-time had a lower rate of rearrest). As with the reincarceration analyses, these effects remained statistically significant even when controlling for potential selection differences (i.e., differences in inmates admitted into the TC vs. Comparison groups).

Another group of variables predicted rearrest at the  $p < .10$  significance level, but not at the more widely accepted .05 level of statistical significance. These included comparison group (the TC group had a lower rate of rearrest,  $p < .086$ ), treatment completion status (those who successfully completed treatment had a lower rate of rearrest,  $p < .051$ ), and institutional setting ( $p < .058$ ). None of the four institutional dummy variables was significant, however, suggesting that treatment effects were relatively invariant across the five institutions. One other variable failed to

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<sup>24</sup> We used the most recent employment status available from automated Parole Board data. Because very few inmates were classified as "part time" ( $n = 39$ ), these were combined with the "full time" category, resulting in the following three employment categories: (1) employed full time or part time (25%), (2) unemployed but able to work (13%), and (3) unemployed and unable to work (due to disability or legal status) (62%).

reach statistical significance and dropped out of the equation: standardized drug score. While level of drug dependence is an important control variable with this population of offenders, it does not appear to influence the likelihood of rearrest independently of the other variables in the equation.

We then examined rearrest rates using predicted probabilities from logistic regression equations in Table 13, Model 1.<sup>25</sup> Although the effect of TC on rearrest did not quite reach accepted levels of statistical significance ( $p < .086$ ), **Figure 5** shows that TC resulted in a somewhat reduced probability of rearrest (59% v. 52%) after five years, even when results were adjusted for the effects of all control variables. **Figure 6** shows that post-release employment (either full or part time) significantly reduced the probability of rearrest, controlling for the effects of other independent variables.

Life tables for survival and risk (hazard) of rearrest are shown in **Table 14**. For the comparison group, 201 (36%) of the 552 recidivists were rearrested within 12 months of their release from prison; 275 (49%) of the 552 recidivists were rearrested within 18 months of their release from prison.

For the experimental group, 87 (33%) of the 265 recidivists were rearrested within 12 months; 116 (44%) of the 265 recidivists were rearrested within 18 months. Interestingly, these hazard rates for rearrest during the first 18 months after release from prison were lower than the comparable hazard rates for reincarceration during the same period (TC = 69%; Comparison = 72%). These differences are likely due to the high likelihood of reincarceration for a parole violation rather than a new conviction. In other words, *ex-offenders get reincarcerated at higher rates than they get rearrested.*

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<sup>25</sup> Probabilities of rearrest for different groups were estimated using logistic regression equations with all predictor and control variables entered:  
 $\text{Prob}(\text{event}) = \frac{1}{1 + e^{-Z}}$ , where  $Z = \sum B_k X_{ik}$  (Hanushek and Jackson, 1977; Lichter, 1989, Norusis, 1990).

Statistical tests confirmed that the survival rate for the TC group (**Figure 7**) over the 5-year followup period was significantly greater than that of the comparison group (Wilcoxon = 13.014, 1 d.f.,  $p < .001$ ). The median survival time for the comparison group (40.6 months) was considerably less than the median survival time for the experimental group (57.2 months), providing further evidence for the effectiveness of prison-based TC drug treatment. Although the treatment effect of TC on rearrest was only marginally significant in the logistic regression analyses ( $p < .086$ ), our overall conclusion based on all analyses including survival analyses is that TC continues to reduce the likelihood of rearrest over a substantial period of time (5 yr.). Based on the logistic regression results presented in Table 13, Model 1, *TC subjects were 27% less likely to be rearrested than Comparison subjects ( $1 - \text{Exp}(B) = 1 - .733 = .267$ ).*

Table 13

*Stepwise Logistic Regression of Rearrest Rates on Predictor and Control Variables*

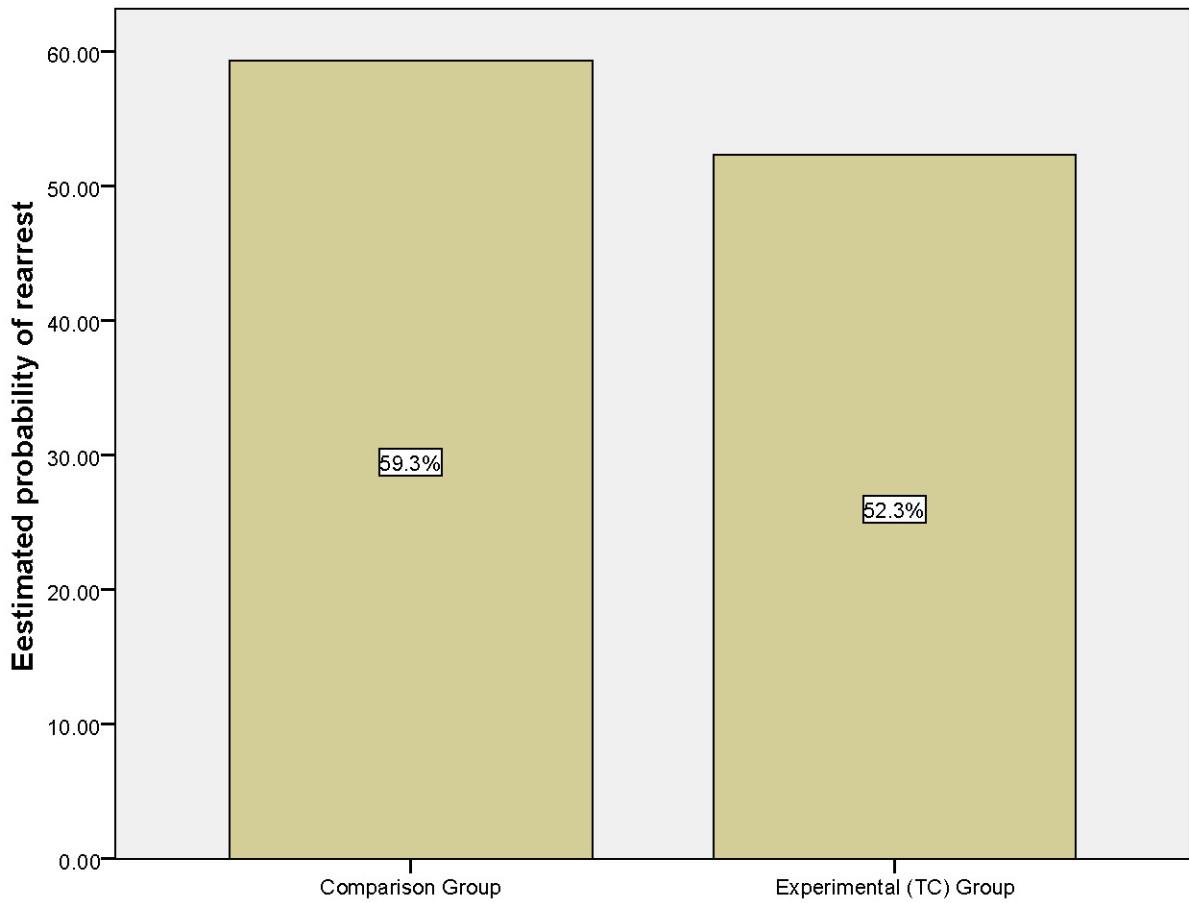
	Model 1			Model 2		
	B	S.E.	Exp(B)	B	S.E.	Exp(B)
Age	-.033 *	.010	.967	-----		
Time To Minimum	-.015 *	.003	.985	-----		
OGS-Current	-.118 *	.039	.889	-.185 *	.072	.831
OGS-Prior	.138 *	.032	1.148	-----		
Drug Score	-----			-----		
Time at Risk	-.108 *	.005	.897	-.100 *	.011	.905
TxGrad (1)	-.403	.206	.669	-----		
Progtype(1)	-.311	.181	.733			
Prison(1)	-.249	.290	.780	-----		
Prison(2)	-.272	.313	.762	-----		
Prison(3)	.308	.261	1.361	-----		
Prison(4)	-.335	.318	.715	-----		
Employment Status (1)	-.475 *	.190	.622	-.977 *	.366	.376
Employment Status (2)	.243 *	.257	1.275	-.202	.495	.817
Negative Affect				-----		
Self Confrontation				-----		
Motivation				-----		
Constant	6.570 *	.566	713.16	5.974 *	.773	393.21
Chi-square (df)	1102.45 *			224.0 *		
	(13 df)			(4 df)		
-2 Log likelihood	951.97			240.06		
Nagelkerke R-Squared	.70			.65		
N of cases	1502			335		

\*p &lt; .05

Note. TIME TO MIN = Time remaining to minimum release date at time of program admission; OGS = Offense Gravity Score, Current and Prior (1 - 10); TxGRAD: 1 = SUCCESSFULLY COMPLETED TREATMENT, 0 = UNSUCCESSFULLY DISCHARGED); PROGTYPE:1 = TC, 0 = COMPARISON GROUP; PRISON: 1 = CRESSON, 2 = GRATERFORD, 3 = HOUTZDALE, 4 = HUNTINGDON; EMPST(1) = full- or part-time employment, EMPST(2) = unemployed and able to work. Criteria for entry (p-in) = .10, criteria for removal (p-out) = .10.

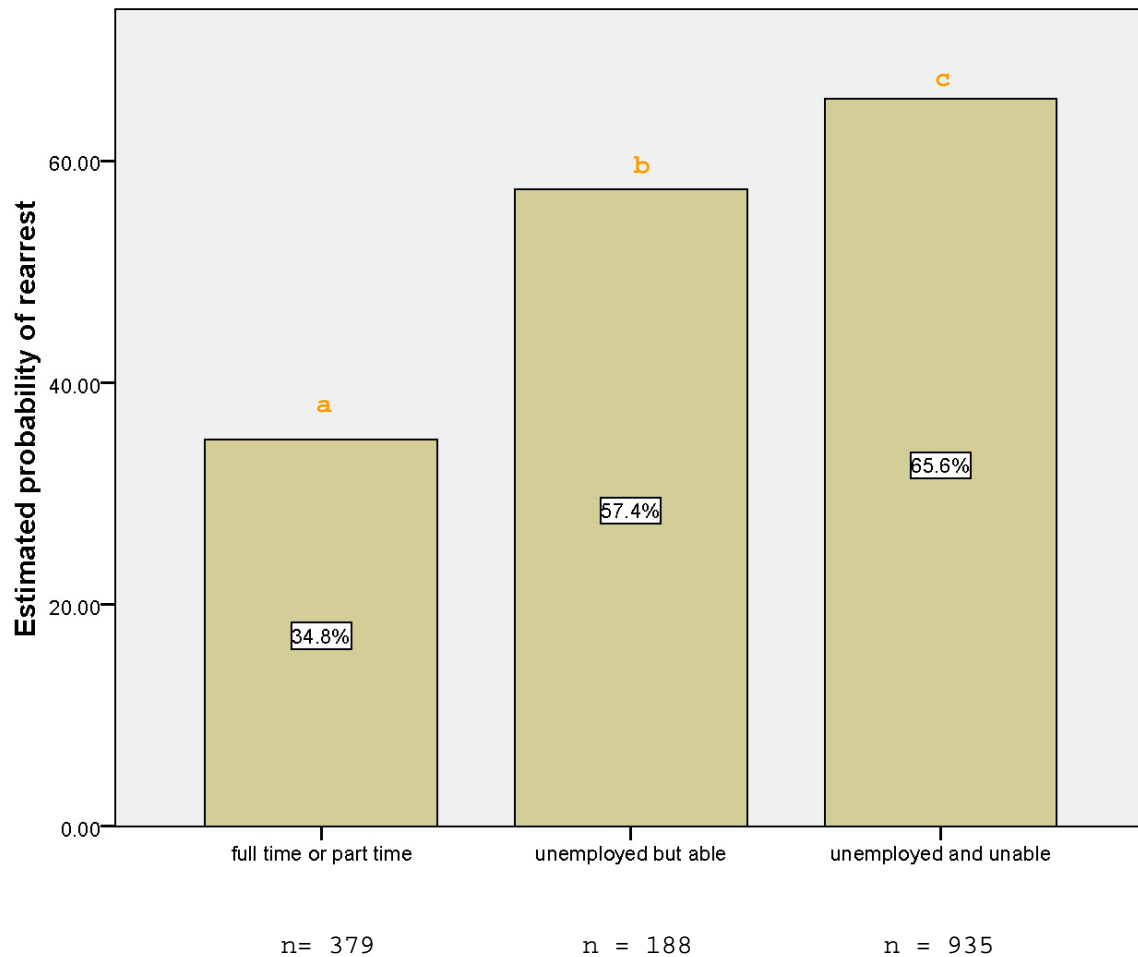
Table 14  
*Survival Analysis: Life Tables for Rearrest*

First Order Controls	Interval Start Time	Number Entering Interval	Number Withdrawing during Interval	Number Exposed to Risk	Number of Terminal Events	Proportion Terminating	Proportion Surviving	Cumulative Proportion Surviving at End of Interval	Std. Error of Cumulative Proportion Surviving at End of Interval	Probability Density	Std. Error of Probability Density	Hazard Rate	Std. Error of Hazard Rate
Comparison Group	0	963	0	963.000	96	.10	.90	.90	.01	.017	.002	.02	.00
	6	867	0	867.000	105	.12	.88	.79	.01	.018	.002	.02	.00
	12	762	0	762.000	74	.10	.90	.71	.01	.013	.001	.02	.00
	18	688	5	685.500	76	.11	.89	.64	.02	.013	.001	.02	.00
	24	607	14	600.000	50	.08	.92	.58	.02	.009	.001	.01	.00
	30	543	23	531.500	40	.08	.92	.54	.02	.007	.001	.01	.00
	36	480	27	466.500	43	.09	.91	.49	.02	.008	.001	.02	.00
	42	410	29	395.500	32	.08	.92	.45	.02	.007	.001	.01	.00
	48	349	35	331.500	13	.04	.96	.43	.02	.003	.001	.01	.00
	54	301	36	283.000	23	.08	.92	.40	.02	.006	.001	.01	.00
Experimental Group	0	539	0	539.000	43	.08	.92	.92	.01	.013	.002	.01	.00
	6	496	0	496.000	44	.09	.91	.84	.02	.014	.002	.02	.00
	12	452	0	452.000	29	.06	.94	.78	.02	.009	.002	.01	.00
	18	423	2	422.000	29	.07	.93	.73	.02	.009	.002	.01	.00
	24	392	14	385.000	34	.09	.91	.67	.02	.011	.002	.02	.00
	30	344	6	341.000	18	.05	.95	.63	.02	.006	.001	.01	.00
	36	320	14	313.000	23	.07	.93	.58	.02	.008	.002	.01	.00
	42	283	12	277.000	20	.07	.93	.54	.02	.007	.002	.01	.00
	48	251	13	244.500	11	.04	.96	.52	.02	.004	.001	.01	.00
	54	227	25	214.500	14	.07	.93	.48	.02	.006	.001	.01	.00



*Note.* Estimated probabilities are adjusted for all control variables, using logistic regression coefficients reported in Table 11, Model 1. Based on stepwise logistic regression results (Forward conditional) where N = 1502 (TC = 539; Comp = 963). Criteria: p-in (.10), p-out (.10).

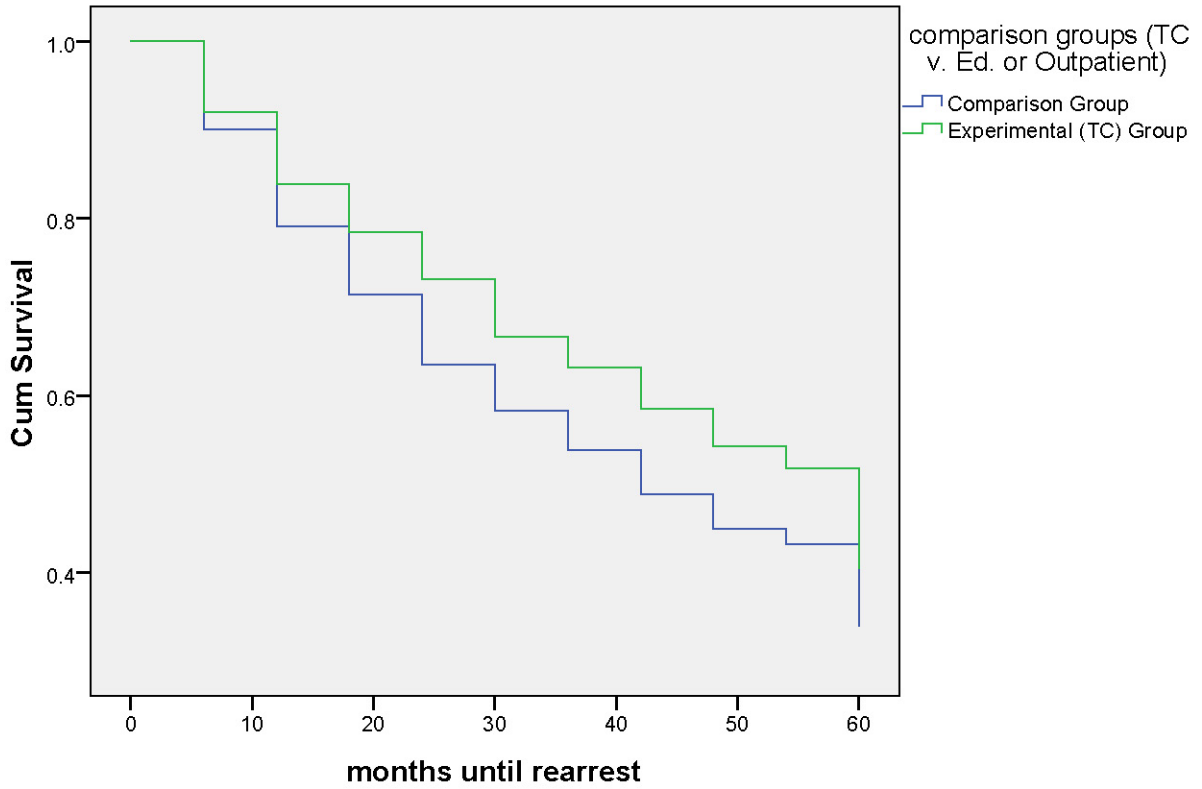
**Figure 5.** *Estimated Probabilities of Rearrest for Comparison and TC Groups (Adjusted for Control Variables)*



Note. Estimated probabilities are adjusted for all control variables, using logistic regression coefficients reported in Table 15, Model 1. Based on stepwise logistic regression results (Forward conditional) where N = 1502 (TC = 539; Comp = 963). Criteria: p-in (.10); p-out (.10). Means with different subscripts are significantly different from each other ( $p < .05$ ).

**Figure 6.** *Estimated Probabilities of Rearrest by Post-Release Employment Status (Adjusted for Control Variables)*

### Survival Function



Note. Wilcoxon Statistic = 13.014, 1 d.f.,  $p < .001$

**Figure 7.** Rearrest Survival Function by TC v. Comparison Group

## Effects of Psychosocial Variables and Perceptions of Treatment on Rearrest

As with reincarceration, we also wished to examine the impact on rearrest of inmate psychosocial characteristics and perceptions of treatment (as measured by REST and CRC scales). These analyses were conducted for exploratory purposes only, to examine during-treatment variables as possible predictors of rearrest. The maximum sample size available for regression analyses (prior to entering REST and CRC variables) was thus  $n = 539$  (the number of TC inmates for whom there was no missing data on the predictors already entered in Table 11).

The three factor scores representing *negative affect*, *self confrontation*, and *motivation* were then entered into stepwise logistic regressions along with the first block of predictors previously examined: age, OGS (prior and current), TCU Drug Screen II, time at risk in community, time remaining until minimum release date, institutional setting, successful treatment completion, and post-release employment status (see Table 13, Model 2). Inspections for possible multicollinearity revealed no difficulties (e.g., no paired correlations exceeded .40), and the Hosmer-Lemeshow goodness of fit statistic indicated an excellent model fit ( $\chi^2 = 6.11$ , 8 d.f.,  $p < .635$ ). After listwise deletion, the final sample available for analyses included 335 TC inmates.

Significant predictors of rearrest in Model 2 (Table 13) included time at risk in the community (those who were at risk for longer periods of time had a lower rate of rearrest), current offense gravity score (those who had been incarcerated for a more serious current offense were less likely to be rearrested), and post-release employment status (inmates employed full-time or part-time had a lower rate of rearrest). As in Model 1, these effects remained statistically significant even controlling for potential selection differences (e.g., differences in prior criminal history and level of drug dependence). None of the institutional effects were statistically significant, suggesting that the impact of prison setting on rearrest was invariant. None of the three psychosocial variables

significantly predicted rearrest, although a focus on *self confrontation* in therapy had the largest effect of the three ( $p < .55$ ).

## ***Drug Relapse***

We used stepwise logistic regressions to examine post release drug relapse rates for the TC and Comparison groups. These techniques enter into regression equations only those variables that exceed a specified probability of statistical significance ( $p < .10$ ), and remove variables that fail to reach a specified level of significance ( $p < .10$ ). These procedures allow the researcher to estimate models of outcome that reflect only the most robust and significant predictors. Several predictor variables were entered.

We examined the overall relapse rate for all subjects released from prison, controlling for potential selection differences between the TC and Comparison groups (**Table 15**, Model 1). The major predictor of interest was membership in either the TC or Comparison group. If TC were effective, we would expect a significant coefficient for TC even when controlling for inmate differences. Control variables included prior and current criminal history, time remaining to minimum sentence at the time of program admission, age at the time of program admission, and standardized drug score (z-score). We also controlled for actual time at risk in the community since release from prison (in months).

Three categorical variables were also entered as predictors. First, we examined whether the effects of TC varied by institution, since some differences in TC implementation were observed at the five institutions. We entered a categorical variable that reflected the effect of the institutional setting of each TC program. A second categorical variable reflected whether the inmate successfully completed his treatment program or not. A third categorical variable represented post-release employment status (working full-time or part-time, unemployed but able to work, or

unemployed and unable to work).<sup>26</sup> Inspections for possible multicollinearity revealed no difficulties (e.g., no paired correlations exceeded .30), and the Hosmer-Lemeshow goodness of fit statistic indicated a good model fit ( $\chi^2 = 8.373$ , 8 d.f.,  $p < .398$ ). After listwise deletion, the final sample available for analyses included 531 TC inmates (36%) and 950 comparison inmates (64%).

Variables that significantly predicted relapse (Table 15, Model 1) included time remaining until minimum release date (those with more time remaining until their minimum release date had a lower relapse rate), standardized drug score (those with a high need for drug treatment at admission had a higher drug relapse rate),<sup>27</sup> and post-release employment status (inmates employed either full-time or part-time had a lower rate of drug relapse). One variable (age) predicted relapse at the  $p < .10$  significance level, but not at the more widely accepted .05 level of statistical significance. Older inmates were slightly more likely to relapse in this sample.

Other variables failed to reach statistical significance and dropped out of the equation. These included treatment group (TC and comparison groups had comparable rates of relapse), current offense gravity score, prior offense gravity score, time at risk in the community, treatment completion status, and institutional setting (treatment effects were invariant across the five institutions).

We then examined relapse rates using predicted probabilities from logistic regression equations in Table 15, Model 1.<sup>28</sup> **Figure 8** shows a similar probability of relapse for the TC and comparison groups (51.2% v. 50.8%), even when results were adjusted for the effects of all control variables. **Figure 9**, however, shows that post-release employment (either full or part time)

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<sup>26</sup> We used the most recent employment status available from automated Parole Board data.

<sup>27</sup> This speaks well to the validity of the TCU Drug Screen; these were indeed higher need individuals.

<sup>28</sup> Probabilities of rearrest for different groups were estimated using logistic regression equations with all predictor and control variables entered:  $\text{Prob}(\text{event}) = 1/(1 + e^{-Z})$ , where  $Z = \sum B_k X_{ik}$  (Hanushek and Jackson, 1977; Lichter, 1989, Norusis, 1990).

significantly reduced the probability of relapse, controlling for the effects of other independent variables.

Life tables for survival and risk (hazard) of relapse are shown in **Table 16**. For the comparison group, 177 (37%) of the 476 inmates who tested positive for at least one illegal drug while on parole did so within 12 months of their release from prison; 275 (58%) of the 476 who relapsed did so within 18 months of their release from prison.

For the experimental group, 97 (36%) of the 270 inmates who tested positive for at least one illegal drug while on parole did so within 12 months of their release from prison; 158 (58%) of the 270 who relapsed did so within 18 months of their release from prison. Once again, we see very high rates of failure within 18 months of release from prison, suggesting that this time period is critical for reintegration efforts.

Statistical tests confirmed that the survival rate for the TC group over the 5-year follow-up period (**Figure 10**) was not significantly greater than that of the comparison group (Wilcoxon = 1.06, 1 d.f.,  $p < .304$ ). The median survival time for the comparison group (26.5 months) was similar to the median survival time for the experimental group (29 months), thus failing to provide further evidence for the effectiveness of prison-based TC drug treatment (although the effects of TC on reducing both rearrest and reincarceration were significant).

Table 15

*Stepwise Logistic Regression of Drug Relapse Rates on Predictor and Control Variables*

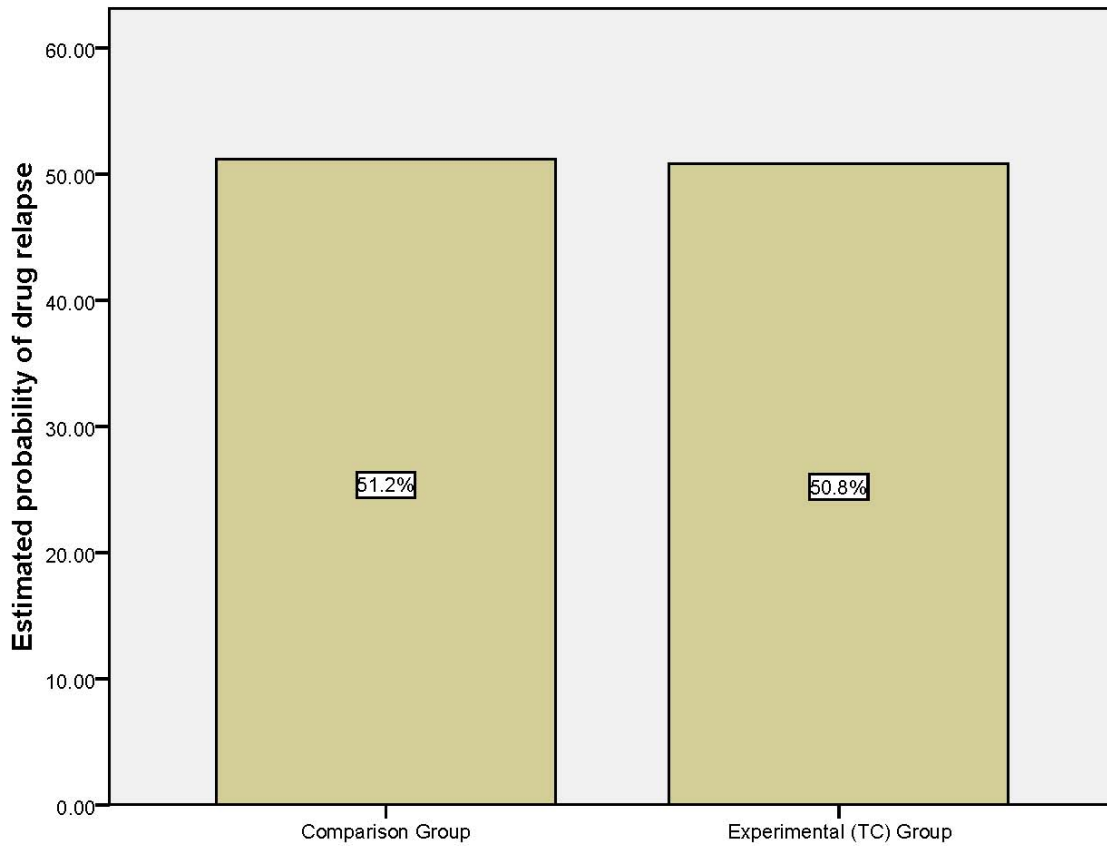
	Model 1			Model 2		
	B	S.E.	Exp(B)	B	S.E.	Exp(B)
Age	.011	.006	1.011	-----		
Time To Minimum	-.004 *	.002	.996	-----		
OGS-Current	-----			-----		
OGS-Prior	-----			.085 *	.044	1.089
Drug Score	.112 *	.053	1.119	-----		
Time at Risk	-----			-----		
TxGrad (1)	-----			-----		
Progtype(1)	-----			-----		
Prison(1)	-----			-----		
Prison(2)	-----			-----		
Prison(3)	-----			-----		
Prison(4)	-----			-----		
Employment Status (1)	-.729 *	.124	.482	-1.336 *	.251	.263
Employment Status (2)	-.569 *	.169	.566	-1.373 *	.393	.253
Negative Affect				-----		
Self Confrontation				-----		
Motivation				-----		
Constant	-.054	.214	.948	.339	.259	1.404
Chi-square (df)	57.09 *			40.44 *		
	(5 df)			(3 df)		
-2 Log likelihood	1995.37			434.22		
Nagelkerke R-Squared	.05			.15		
N of cases	1481			341		

\*p &lt; .05

Note. TIME TO MIN = Time remaining to minimum release date at time of program admission; OGS = Offense Gravity Score, Current and Prior (1 - 10); TxGRAD: 1 = SUCCESSFULLY COMPLETED TREATMENT, 2 = UNSUCCESSFULLY DISCHARGED); PROGTYPE:1 = TC, 0 = COMPARISON GROUP; PRISON: 1 = CRESSON, 2 = GRATERFORD, 3 = HOUTZDALE, 4 = HUNTINGDON; EMPST(1) = full- or part-time employment, EMPST(2) = unemployed and able to work. Criteria for entry (p-in) = .10, criteria for removal (p-out) = .10.

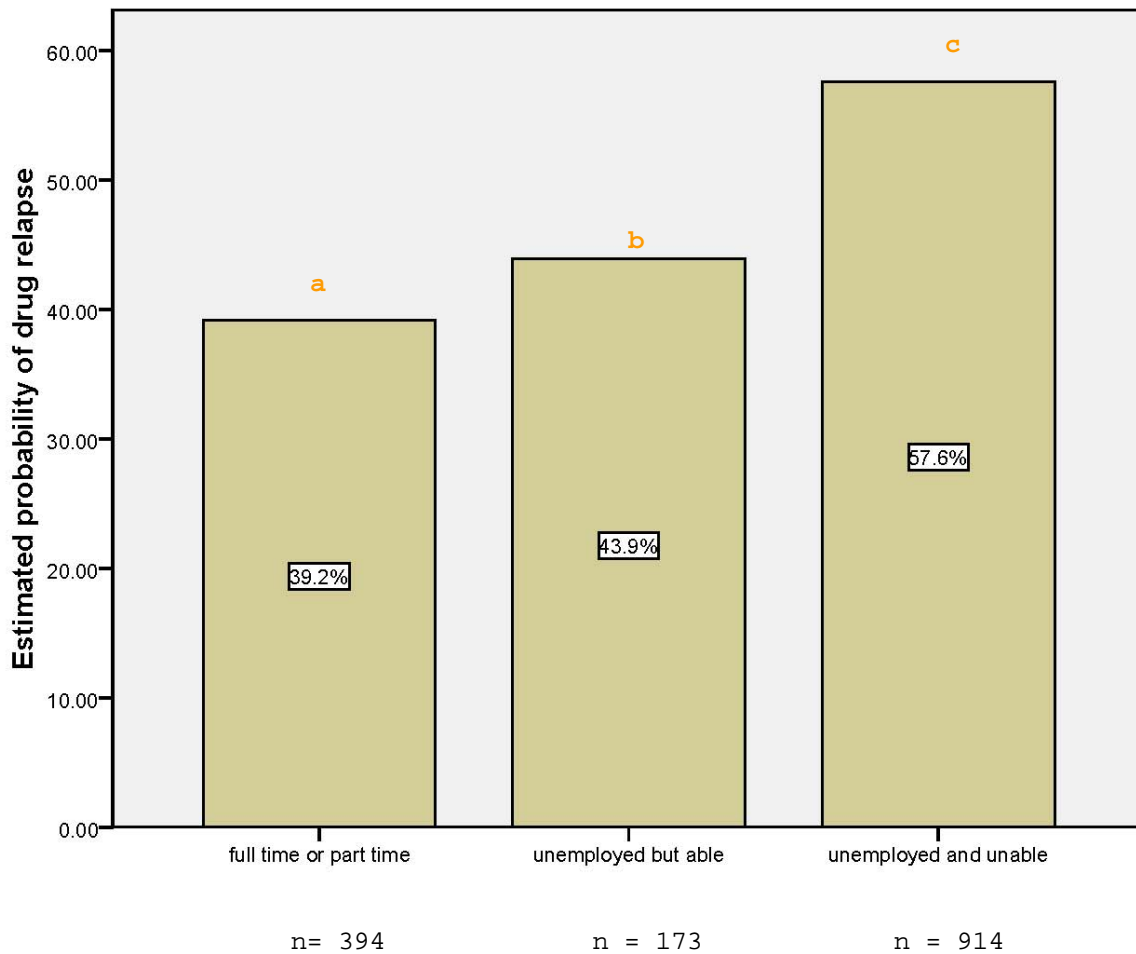
Table 16  
*Survival Analysis: Life Tables for Drug Relapse Relapse*

First Order Controls	Interval Start Time	Number Entering Interval	Number Withdrawing during Interval	Number Exposed to Risk	Number of Terminal Events	Proportion Terminating	Proportion Surviving	Cumulative Proportion Surviving at End of Interval	Std. Error of Cumulative Proportion Surviving at End of Interval	Probability Density	Std. Error of Probability Density	Hazard Rate	Std. Error of Hazard Rate
Comparison Group	0	950	84	908.000	68	.07	.93	.93	.01	.012	.001	.01	.00
	6	798	101	747.500	109	.15	.85	.79	.01	.022	.002	.03	.00
	12	588	89	543.500	98	.18	.82	.65	.02	.024	.002	.03	.00
	18	401	53	374.500	66	.18	.82	.53	.02	.019	.002	.03	.00
	24	282	50	257.000	39	.15	.85	.45	.02	.013	.002	.03	.00
	30	193	33	176.500	41	.23	.77	.35	.02	.018	.003	.04	.01
	36	119	28	105.000	24	.23	.77	.27	.02	.013	.003	.04	.01
	42	67	14	60.000	16	.27	.73	.20	.02	.012	.003	.05	.01
	48	37	9	32.500	7	.22	.78	.15	.02	.007	.002	.04	.02
	54	21	5	18.500	8	.43	.57	.09	.02	.011	.003	.09	.03
Experimental Group	0	531	39	511.500	33	.06	.94	.94	.01	.011	.002	.01	.00
	6	459	44	437.000	64	.15	.85	.80	.02	.023	.003	.03	.00
	12	351	41	330.500	61	.18	.82	.65	.02	.025	.003	.03	.00
	18	249	31	233.500	30	.13	.87	.57	.02	.014	.002	.02	.00
	24	188	37	169.500	24	.14	.86	.49	.03	.013	.003	.03	.01
	30	127	20	117.000	21	.18	.82	.40	.03	.015	.003	.03	.01
	36	86	14	79.000	15	.19	.81	.32	.03	.013	.003	.03	.01
	42	57	13	50.500	11	.22	.78	.25	.03	.012	.003	.04	.01
	48	33	11	27.500	7	.25	.75	.19	.03	.011	.004	.05	.02
	54	15	3	13.500	4	.30	.70	.13	.03	.009	.004	.06	.03



*Note.* Estimated probabilities are adjusted for all control variables, using logistic regression coefficients reported in Table 17, Model 1. Based on stepwise logistic regression results (Forward conditional) where N = 1481 (TC = 531; Comp = 950). Criteria: p-in (.10), p-out (.10).

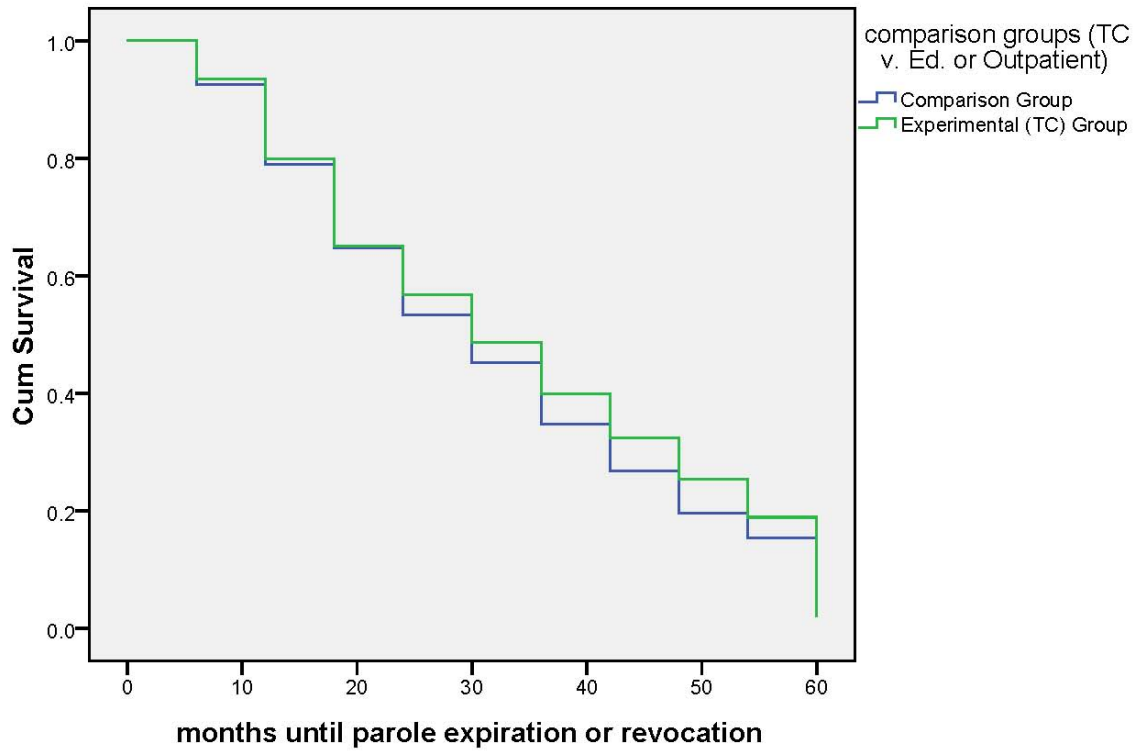
**Figure 8.** *Estimated Probabilities of Relapse for Comparison and TC Groups (Adjusted for Control Variables)*



Note. Estimated probabilities are adjusted for all control variables, using logistic regression coefficients reported in Table 17, Model 1. Based on stepwise logistic regression results (Forward conditional) where N = 1481 (TC = 531; Comp = 950). Criteria: p-in (.10); p-out (.10). Means with different subscripts are significantly different from each other ( $p < .05$ ).

**Figure 9.** *Estimated Probabilities of Relapse by Post-Release Employment Status (Adjusted for Control Variables)*

### Survival Function



Note. Wilcoxon Statistic = 1.056, 1 d.f.,  $p < .304$

**Figure 10. Drug Relapse Survival Function by TC v. Comparison Group**

## Effects of Psychosocial Variables and Perceptions of Treatment on Relapse

As with reincarceration and rearrest, we also wished to examine the impact on drug relapse of inmate psychosocial characteristics and perceptions of treatment (as measured by REST and CRC scales). These analyses were conducted for exploratory purposes only, to examine during-treatment variables as possible predictors of rearrest. The maximum sample size available for regression analyses (prior to entering REST and CRC variables) was thus  $n = 531$  (the number of TC inmates for whom there was no missing data on the predictors previously entered in Table 15).

The three factor scores representing *negative affect*, *self confrontation*, and *motivation* were then entered into stepwise logistic regressions along with the first block of predictors previously examined: age, OGS (prior and current), TCU Drug Screen II, time at risk in community, time remaining until minimum release date, institutional setting, successful treatment completion, and post-release employment status (see Table 17, Model 2). Inspections for possible multicollinearity revealed no difficulties (e.g., no paired correlations exceeded .30), and the Hosmer-Lemeshow goodness of fit statistic indicated an excellent model fit ( $\chi^2 = 8.81$ , 8 d.f.,  $p < .359$ ). After listwise deletion, the final sample available for analyses included 341 TC inmates.

The only significant predictors of relapse in Model 2 (Table 15) were prior offense gravity score (those who had been incarcerated for a more serious prior offense were more likely to relapse) and post-release employment status (inmates employed full-time or part-time had a lower rate of relapse). None of the other predictors were statistically significant. None of the three psychosocial variables reached a high enough level of significance to enter the regression equation.

## Conclusions and Recommendations

### Major Findings

Previous studies examining the effectiveness of prison-based TC drug treatment have been vulnerable to criticisms of inadequate research design, unknown or compromised program implementation, and inadequate measures of treatment processes and outcomes (Austin, 1998; Fletcher & Tims, 1992; Gaes et al., 1999; Mitchell et al., 2006, 2007; Pearson and Lipton, 1999). The current study attempted to address these gaps in the literature. In this study, we examined prison-based TC across multiple sites while controlling for individual, programmatic, and contextual variations in analyses of outcome. Three main research questions were addressed:

1. *How effective are in-prison TC programs in reducing drug relapse and recidivism rates (rearrest and reincarceration), and do in-prison therapeutic community programs improve long term outcomes of released offenders (i.e., length of time without drug relapse, rearrest or reincarceration)?*
2. *Which kinds of inmates benefit most from in-prison TC programs?*
3. *How do inmate v. programmatic factors independently and interactively influence long term outcomes?*

### ***Effectiveness of Prison-Based TC Drug Treatment***

Prison-based TC drug treatment had lasting and significant effects over the five-year post-release follow-up period, lowering recidivism rates compared to the control group. However, the patterns of results varied depending upon which outcome measure was examined. No prior studies have simultaneously examined or reported all three outcomes used in this study. Three different outcomes (reincarceration, rearrest, and drug relapse) were tracked for the experimental (TC) and

control groups for up to five years or more, making these results comparable to the longest followup studies on prison TC conducted to date. In addition, this study had a much larger sample than previous studies, and was better able to account for individual and programmatic differences across multiple sites.

TC had a strong, significant impact on reducing the probability of reincarceration over the five year follow-up period (**Table 17**). The effect on rearrest was marginally significant ( $p < .09$ ); the effect on drug relapse was minimal. Possible explanations for findings are discussed below.

Table 17

*Effects of TC and Other Predictors on Three Measures of Outcome*

<b>Outcome</b>	<b>Comparison Group</b>	<b>TC Group</b>	<b>Was TC Effective?</b>	<b>Other Significant Predictors (+ or – indicates direction of effect on outcome)</b>
Reincarceration Rate	59.3%	50.5%	Yes ( $p < .05$ )	Time remaining until minimum release date (-); Successful completion of TC (-); Post-release employment (-); Time at risk in the community (-).
Rearrest Rate	59.3%	52.3%	Marginally ( $p < .09$ )	Time remaining until minimum release date (-); Age (-); Current Offense Severity (-); Prior Offense Severity (+); Post-release employment (-); Time at risk in the community (-).
Drug Relapse Rate	51.2%	50.8%	No ( $p > .10$ )	Time remaining until minimum release date (-); Post-release employment (-); Need for treatment (+);

The non-significant finding for drug relapse accords with mixed findings from prior research. Only one of the three major prison TC studies (Delaware) examined drug urinalysis as an outcome and found significant treatment effects. In the Amity study, treatment had no significant effect on self-reported drug use (Prendergast et al., 2004). In Texas, results for drug relapse were not reported. While prison TC addresses both addiction and criminal behavior, it is clear that the two types of behavior can exist independently, and drug using behavior appears more resistant to change.

Indeed, a recent meta-analysis of prison-based drug treatment (boot camp, narcotic maintenance, group counseling, and TC programs) found a nonsignificant mean effect size for drug relapse in contrast to rearrest, reconviction, or reincarceration (Mitchell, MacKenzie & Wilson, 2006). Interestingly, drug relapse was also the only outcome examined where prison TC alone (without mandatory aftercare) did *not* result in a significant mean effect size. In other words, prison TC alone *did* result in a significant mean effect size for reincarceration and rearrest (as in this study), but did so for drug relapse *only* when mandatory aftercare was provided. Mandatory aftercare may thus be more important for reducing drug relapse than criminal recidivism.

Interestingly, the inmate's need for drug treatment (as assessed by the TCU Drug Screen instrument) significantly predicted drug relapse only, but not rearrest nor reincarceration. Again, these findings suggest that the overlap between criminality and drug using behavior may be less than commonly assumed.

Consistent with previous research, younger offenders had higher rates of rearrest. However, older (rather than younger) offenders had slightly higher rates of drug relapse. These results are consistent with the findings of Laub and Sampson (2003), who examined relationships between age and offense type (property, violence, and alcohol/drug offenses) in a longitudinal analysis of 500

male delinquents up to age 70. In contrast to other offense types, the peak age for drug offending was later and the rate of decline in drug offending over time was slower. The highest incidence rate of alcohol and drug arrests occurred between the ages of 32 and 39, whereas the highest incidence of arrests for other offenses occurred between the ages of 17-24. In the present study, the high rate of drug relapse may be related to the fact that many men had not yet reached the peak age of drug and alcohol use.

Results supported arguments that both recovery and desistance are gradual processes, rather “all or none” events (Maruna, 2001; Laub & Sampson, 2000; Prochaska & DiClemente, 2002). For most ex-offenders, there are likely to be intermittent periods of no crime (or drug abuse) following release from prison, punctuated by occasional returns to either (or both).

Other interesting findings included a higher rate of reincarceration than rearrest – most inmates who were reincarcerated in our sample returned to prison for a parole violation rather than a new conviction. Increases in parole violations (especially for technical parole violations such as drug or alcohol use), rather than increases in crime per se, have helped fuel rapidly increasing rates of incarceration observed over recent years.

From 1980-2001, the U.S. incarceration rate increased 240%, far surpassing any growth in crime rates for the same period (which actually decreased from 1993-2001). Indeed, the major driver of incarceration rates was a 10-fold increase in incarceration rates for drug offenses (Blumstein & Beck, 2005). Other important drivers of incarceration rates included an increase in prison commitments per arrest, an increase in time served in prison, and a dramatic increase in parole recommitments, facilitated by the availability of increasingly sensitive, improved drug testing technology. Although parole recommitment rates vary substantially across states, the number of parole violators doubled from 1980-2001 (from 17% of prison admissions to 36%). Our

results, therefore, support arguments that changes in crime control *policies*, rather than crime rates per se, are the major drivers of incarceration rates (Blumstein & Beck, 2005).

Results also confirmed previous findings that the first twelve months following release from prison are a particularly critical period of reentry (Travis & Visser, 2005). Survival analyses over a five year period showed that the highest risk for recidivism or relapse was within the first 12-18 months following release from prison. A very high short-term failure rate was observed for relapse in particular, suggesting that much greater efforts are needed to improve successful reintegration for drug-involved offenders. Much more comprehensive and coordinated efforts are needed to address both risk and protective factors during the first year back from prison.

Finally, we note that patterns of results observed for the three outcomes (reincarceration, rearrest, drug relapse) were consistent across different analytical techniques (logistic regression v. survival analyses). Logistic regression is useful for examining dichotomous outcomes, including analyses of factors influencing successful treatment completion (or not), reincarceration (or not), rearrest (or not), parole violation (or not), and so on. Survival analysis allows the researcher to examine outcomes in richer detail over time, and controls for right hand censored cases (i.e., cases that have recidivated during a given time interval, such as 6 months, are removed from analyses of subsequent time periods). Recidivism is thus conceptualized as dynamic behavior; requiring consideration of how much time has elapsed between release and specific behavior such as drug relapse or rearrest. This consideration is important, since multiple relapses almost inevitably precede long-term recovery, especially for seriously addicted inmates.

Survival analyses supplement rather than replace logistic regression results; the two techniques ask different questions. Logistic regression allows the researcher to examine the probability of reincarceration and potential predictors for different experimental groups. The

dichotomous outcome of reincarceration is one of considerable practical interest and importance to policymakers. The simple binary probability of returning to prison within a given time frame has enormous implications for housing and meeting the treatment, medical, educational, vocational and security needs of their population. The number of inmates that return to prison, therefore, has huge practical significance.

In contrast, survival analysis examines differential *rates* of recidivism over time for experimental v. comparison groups. This technique allows researchers and policymakers to estimate *how long* inmates remain drug free, for example, a question relevant to calculating the cost effectiveness of different interventions. If the experimental treatment increases the time spent away from prison or away from drugs, for example, then policy significance is gained from asking which variables can significantly prolong desistance.

### ***Inmate Characteristics Predictive of Long Term Success***

*Prior Criminal Behavior.* One of the most consistent empirical findings in criminology is that previous criminality predicts future criminality. Indeed, some (Gottfredson & Hirschi, 1999) have suggested that the propensity for criminal behavior is shaped early in life, and remains relatively stable within individuals, although criminal behavior tends to decrease as a person ages, regardless of differences in propensity. We do not pick up that debate here (see Laub & Sampson, 2005), as we do not have longitudinal data over subjects' entire life courses. Such arguments suggest, however, that prior offense severity should be a consistently strong predictor of recidivism. It was not.

Indeed, for two out of three outcomes examined (reincarceration and drug relapse), prior offense severity had *no effect* at all. Only for rearrest did we find a significant (positive) relationship. Even then, prior offense severity dropped out of the equation and became

nonsignificant *after* all control variables were entered, including inmate personality characteristics (Table 13, Model 2). Although we lacked specific measures of self control, results question the argument that criminal propensity remains stable throughout the life course (Gottfredson & Hirschi, 1999). Rather, criminal propensity appears to be changeable in response to intensive, well-structured treatment (i.e., prison based TC).

Although we do not have measures of policing behavior in this study, the lack of influence of prior criminality on all outcomes except rearrest (Table 13, Model 1) suggests some unique effect. For example, police may be more likely to investigate or question prior offenders, a possibility which seems likely. Police may also be more likely to find probable cause justifying an investigation of a suspect and/or an arrest, although such suspects were no more likely to return to prison. Further research should more closely examine the roles of law enforcement in reentry (Council of State Governments, 2003; International Association of Chiefs of Police, 2005; LaVigne, 2008; Urban Institute, 2004; Wall & Poole, 2008).

It is worth noting that current offense severity actually predicted lower rates of rearrest (even after entering all control variables in Table 13, Model 2), lending further ambiguity to the idea that prior criminal behavior is a stable predictor of future criminal behavior. Again, absent life course data and analyses, we can only speculate that the effect of current offense severity appears to be relatively weak as a predictor of future offending.

Results supported the argument that dynamic rather than static predictors are better predictors of recidivism (Andrews et al. 1990), and that criminal “propensity,” if such a thing even exists independently of an individual’s social context and experience, may actually be malleable in response to well-implemented, intensive criminal justice interventions, as well as other turning

points (Maruna, 2001). There is a glaring gap in life course criminology (so far) to consider the potential effects of such interventions (Laub & Sampson, 2005).

*Time Remaining Until Minimum Release Date.* Inmates who had more time remaining in their minimum sentence upon admission to prison drug treatment had lower reincarceration, rearrest, and drug relapse rates upon release from prison (see Tables 11, 15, and 17, model 1). At least two major explanations are possible.

First, it is possible that inmates with more time remaining took their treatment programs more seriously. There was some evidence for such an effect. For two of the three outcomes, rearrest and drug relapse, the effect of time remaining became non-significant when motivation was entered in model 2. However, for reincarceration only, the effect of time remaining in minimum sentence remained significant after motivation was entered in model 2, and actually increased slightly. Levels of motivation may thus interact with time remaining in the inmate's sentence to influence treatment outcomes, though better measures of *changes* in motivation over time are needed to properly examine such effects.<sup>29</sup>

Although more evidence is needed to address this critical question, we find it likely that those inmates who were motivated to participate in drug treatment may have benefited from receiving treatment somewhat earlier in their sentence. It is also likely that such inmates would benefit from greater participation in transitional programs (both in prison and in community correctional settings) once they have successfully completed treatment.

*Retention.* Results confirmed findings from previous studies (Hiller et al., 1998, 1999, 2002; Joe, Simpson & Broome, 1997; Simpson et al., 1997; Zhang et al., 2003) that inmates who successfully completed treatment had lower reincarceration and rearrest rates than those who did

not (see Tables 11 and 15, Model 1). Simply entering treatment is not sufficient; those who complete the entire program tend to do better over the long term.

Once again, however, when personality characteristics (motivation, negative affect, and self confrontation) were entered into regression equations (see Tables 11 and 15, model 2), the effects of treatment retention became nonsignificant. It is likely, therefore, that dynamic individual characteristics such as motivation influence one's likelihood of both entering and completing treatment.

*Time at risk in community.* Inmates who were at risk in the community for longer periods of time did better on the post-release outcomes of reincarceration and rearrest (although time at risk was examined mainly as a variable to control for the passage of time). This effect remained after controlling for baseline individual characteristics (Tables 11 and 15, Model 2).

Although we did not have longitudinal measures of dynamic risk factors (e.g., levels of personal motivation, opportunity, social supports etc.) following release from prison, it appears that inmates who did not recidivate during the first two years of their release from prison had a higher likelihood of desisting from crime. Conversely, survival analyses for all outcomes showed that the first 12-18 months following release from prison is critical, and the majority of recidivists failed within this time period.

*Employment.* Although stronger measures of post-release employment and opportunity over time are still needed, those inmates who were employed full-time or part-time did much better than those who were unemployed and/or unable to work (confirming results of prior studies). In fact, the magnitude of effect of post-release employment was stronger than that of treatment (i.e.,

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<sup>29</sup> Recall that we used baseline motivation (time 1) in regression equations due to large amounts of missing data in time 2 and time 3 measures of motivation (see *Methods*).

participation in TC). Inmates employed full-time showed the lowest rates of reincarceration and drug relapse. For rearrest, however, only older inmates benefited from fulltime employment.

Few previous studies of prison TC have examined employment as an outcome. In this study, post-release employment significantly reduced reincarceration, rearrest, and drug relapse. While further studies of the reciprocal relationship between employment and incarceration are still needed, it is likely that employment helps ex-offenders to rebuild human and social capital following incarceration, resources that reduce the risk of reoffending (Hagan & Dinovitzer, 1999; Petersilia, 2003; Travis & Visher, 2005; Western, Kling, & Weiman, 2001).

Employment may reduce relapse and recidivism in several ways. First, to maintain full-time employment, the ex-offender's daily routine activities must be structured around work to a considerable degree rather than drug use or a criminal lifestyle. Second, full-time employment changes the nature of one's peers. One might find positive role models to emulate at work, rather than (or in addition to) some of the negative ones present in his/her neighborhood (Clear et al., 2001). Third, full-time employment can be rewarding, in that it offers highly desired freedom and independence. Finally, full-time employment is often emphasized as part of an offender's release plan and recovery from substance abuse. Many ex-offenders, especially older ones, may see employment as a critical tool to help achieve meaningful goals (e.g., food and shelter; the potential for rebuilding meaningful relationships with friends and family) (Shover, 1985; 1986).

Like Uggen (2000), we conclude that work is more likely to be a turning point for older than younger offenders. Using event history models to analyze participation in a national work program for criminal offenders, Uggen found that age interacted with employment to affect self-reported recidivism. Older offenders (27+) were less likely to report crime and rearrest when

provided with employment opportunities. For younger offenders, the job program had little effect on crime or rearrest.

In the present study, however, an age effect was found for rearrest only, and was based on official records rather than offender self-reports. Further research should explore relationships between age, treatment participation, post-release employment, and recidivism, using multiple measures and methods. While employment appears to be critical for older ex-offenders, other individual and environmental variables may take precedence for younger offenders (Laub & Sampson, 2003).

### ***Influence of Individual and Programmatic Factors on Long Term Success***

Multivariate regression results showed that psychosocial characteristics of inmates *at baseline* were not strong predictors of post-release outcomes; post-release employment remained the strongest predictor. Univariate ANOVA results (Table 11) had shown that significant predictors of reincarceration included depression, social efficacy, hostility, risk taking, social conformity, treatment readiness, and program satisfaction. However, univariate results were used only to narrow the range of potential predictors (i.e., three factor scores) entered into more meaningful multivariate analyses.

No significant interactions between TC and inmate characteristics predicted rearrest, reincarceration, or drug relapse. These results hint that *post-release contextual variables* (e.g., human and social capital) rather than *individual* factors are more predictive of successful reentry. However, individual inmate “traits” may also change over time in response to treatment, as well as in response to post-release factors such as social supports, opportunities, peer associations, etc. The present study is limited in its ability to test such effects; again, more fine-tuned longitudinal studies are needed.

Treatment effects were invariant across the five institutions, although variance in outcomes was greatest for drug relapse. This finding was extremely useful in the present study, because it suggested that pooling results across the five different prison sites did not significantly influence the results. Weak institutional effects might be expected, since policies governing TC programs at all five institutions were set by the same state correctional agency, all five programs previously evidenced implementation fidelity, and all five programs were of similar duration. Programs did vary somewhat on dropout rate and other contextual factors, however (see *Methods* section). However, this finding also raises questions about whether significant institutional variance on both independent and dependent measures could potentially be found in a larger sample of prisons: such studies are extremely expensive and rare (e.g., Simpson et al., 1997; Welsh, 2006).

There is little doubt that assessing programmatic and institutional variation in independent (e.g., treatment) and dependent (e.g., recidivism) measures can be a useful exercise both for theoretical and policy purposes (Welsh, 2006). However, the relatively small number of programs assessed remains a substantial challenge for researchers that seek to examine between-program characteristics. How can we achieve adequate statistical power, given that we rarely have large samples of programs?

While multilevel research offers exciting possibilities to examine the relative contribution to outcomes of programs v. individuals, there are difficulties in conducting such research on a large scale. For example, how many individuals (level 1) and programs (level 2) are needed to conduct an appropriate 2-level study of correctional treatment (Welsh, Jenkins & Greene, 2000)? What measures are needed for distinct program and/or offender types? What trade-offs (especially resource considerations) are involved in sampling units at each level of analysis? How similar (or dissimilar) do the programs need to be to justify their inclusion in the analyses, and how complete

do programs need to be on the array of dimensions assessed? How much elapsed time is allowable between assessment of program characteristics and measurement of individual outcomes?

How many programs should be assessed within specific program types (e.g., different types of halfway houses, reentry programs, or drug treatment programs)? It would be expensive for local, county, and state correctional systems to assess every offender program they administer: such programs could easily number in the hundreds or thousands. Although tools such as the Correctional Program Assessment Inventory (CPAI) and the more recently developed Correctional Program Checklist (CPC) offer relatively efficient tools (Lowenkamp, 2003; Lowenkamp et al., 2006), they are proprietary, they cost real money, and they rely heavily upon the expertise of those administering the tool. There are other tools to consider – including evaluability assessment and process evaluation - but these also require expenditures of resources. Funding constraints in corrections remain a concern, and security often trumps treatment (Welsh, 2006).

### **Implications and Recommendations for Policy**

It is generally agreed that a multistage therapeutic community treatment continuum (TCTC) for drug dependent offenders (e.g., TC treatment in prison, followed by transitional TC in a work-release setting, followed by supervision and aftercare treatment in the community) is associated with significant reductions in drug use and crime for up to 5 years after prison release (Hiller, Knight, & Simpson, 1999; Inciardi, Martin, & Butzin, 2004; Pearson & Lipton, 1999; Wexler, Melnick, & Cao, 2004). This evidence-based intervention has become the dominant paradigm for treating drug dependent inmates (Grella et al., 2007; Rockholz, 2004). Our results support evidence regarding the efficacy of this approach, but also highlight some pressing needs for further research.

Encouraged by NIDA-funded research, and supported through funding under the federal Residential Substance Abuse Treatment (RSAT) program, the majority of state correctional agencies chose to implement TC programs in their prisons. By the end of 2002, the total number of prison TCs was estimated at 289, and the total inmate capacity was 40,362 (Rockholz, 2004). In awarding RSAT grants, the Bureau of Justice Assistance required states to give preference to programs that also provided aftercare services (Pelissier et al., 2007). Treatment in prison or jail can begin a process of therapeutic change, resulting in reduced drug use and criminal behavior. Continuing drug treatment in the community, however, is essential to sustaining these gains. The Office of National Drug Control Policy's standard of care for TCs specifies that community-based aftercare must continue for at least 6 months following prison release (Re-Entry Policy Council, 2003). Similarly, Principle #9 of NIDA's (2006) *Principles of Drug Abuse Treatment for Criminal Justice Populations* states: "Continuity of care is essential for drug abusers re-entering the community (p. 5)."

The primary goals of aftercare treatment are to provide a continuity of care that helps maintain behavioral changes made in the prison phase of drug treatment, and to reduce the costs associated with more intensive services (McKay, 2001). Researchers argue that the effects of aftercare are additive and supplementary to the benefits of in-prison treatment (Simpson, Wexler, & Inciardi, 1999), and aftercare services are a crucial element in reducing substance abuse and recidivism (De Leon, Melnick, Thomas, Kressel, & Wexler, 2000; Harrison & Martin, 2003). However, general research on community aftercare programs for released offenders is limited, and there is no standardized conceptualization of what constitutes aftercare (McKay, 2001). Overall, neither the core intervention components nor the core implementation components associated with the aftercare phase of the continuum of care are well understood. Haggerty et al. (2003) note: "Policy

reports and charters worldwide urge a concerted effort to enhance continuity, but efforts to describe the problem or formulate solutions are complicated by the lack of consensus on the definition of continuity” (p. 1219).

Aftercare programs vary greatly in modality (e.g., residential, outpatient, support groups), theoretical approach (TC, cognitive-behavioral therapy, 12-step approach), setting (work release facility, community correctional center [CCC], halfway house, contractor-provided aftercare), and duration (3, 6, 9, or 12 months). Pelissier et al. (2007) conclude that claims about aftercare effectiveness are not well substantiated and that the precise nature of aftercare services needed is not well understood. There is a need to address self-selection bias and to disentangle offender behavior from the effects of CJ policies (e.g., parole supervision and revocation), and to identify the most effective types of aftercare for different offenders.

Unexamined variations in TCTC implementation practices (e.g., staff selection, training, and evaluation) and implementation outcomes (e.g., fidelity) are likely to influence client outcomes, especially when multiple programs, institutions, agencies, and measures are examined (Chou et al., 1998; Etheridge & Hubbard, 2000; Etheridge et al., 1997; Farabee et al., 1999; Hiller et al., 1998; Inciardi et al., 1992; Linhorst, et al., 2001; Melnick, 2000; Melnick et al., 2004; Schildhaus, et al., 2000; Strauss & Falkin, 2000; Simpson, Joe, Broome, et al., 1997; Wexler et al., 1999). Despite recommendations that treatment researchers need to more systematically measure implementation processes as predictors of treatment outcomes, researchers have been relatively slow to assess such factors (Palmer, 1992; 1995; Welsh & Zajac, 2004a,b). Evidence from meta-analyses and systematic literature reviews suggests that many unique implementation practices (alone and in combination with one another) influence implementation outcomes (Andrews et al., 1990, Fixsen et al., 2005; Lowenkamp, Latessa & Smith, 2006; Pearson & Lipton, 1999; Prendergast et al., 2000;

Welsh, 2006). Between-program, between-unit, and between-agency differences in implementation practices and outcomes may seriously threaten the internal validity of many multisite outcome studies (Prendergast et al., 2000).

Policy-relevant research would thus benefit greatly from careful attention to mapping critical dimensions of implementation associated with TCTC, and examining how diverse implementation practices (including core implementation components, organizational factors, and external influences) influence outcomes.

Several other policy-relevant questions about prison TC remain unanswered. Perhaps most important among these are “*How long does prison-based TC need to be in order to be effective?*” Studies are needed to address questions about the stability and generalizability of prison TC effectiveness, given that the definitive studies were all based on treatment durations of 12 months or more, while the *majority* of prison drug treatment programs (61%) now last 6 months or less (Grella et al., 2007). Nearly 25% of segregated prison TC programs are now less than 90 days in duration; while 33% of non-segregated prison TC programs are less than 90 days in duration (Taxman et al., 2007). Would prior evidence of TC effectiveness based on program durations of 12 months (or greater) generalize to TC programs of much shorter durations (3, 6, and 9 months)?

Almost no research has specifically sought to identify the minimum length of treatment needed to realize significant reductions in post-release criminal behavior and drug abuse. This is especially surprising because a large body of research with community-based therapeutic communities shows that although minimum stays of *at least* 90 days are needed to produce significant treatment effects, *the longer one stays in treatment, the more likely one is to show long-term benefits* (De Leon, 1984, Simpson 1979, 1981; Hubbard et al., 1997). For TCs, the few quasi-experimental studies that have examined this issue suggest that longer stays are related to improved outcomes, but stays beyond

160 days are not related significantly to better outcomes (Burdon, Dang, Prendergast et al., 2007; Wexler et al., 2002). This contrasts with recent research (Welsh, 2006; Welsh & McGrain, 2008) that suggests that inmate responsiveness to treatment varies over time (e.g., 1, 6, and 12 months during treatment).

Providing an empirical, objective answer to this question has clear policy implications for the manner in which therapeutic communities are structured within prison environments. With burgeoning numbers of drug-involved prisoners in correctional systems nationwide, it is clear that the majority will not receive drug abuse treatment while they are incarcerated (Welsh & Zajac, 2004a,b). Having a fundamental understanding of how long is “long enough” could substantially improve program planning, increase capacity for treating more offenders, and improve client care.

If future research shows that relatively short stays in prison-based TC can produce lasting treatment effects, then prison systems could shorten the time-in-treatment threshold to achieve comparable reductions in recidivism and drug relapse. Conversely, if findings show that longer stays produce significantly better outcomes, policies enacted to shorten the length of stay in prison-based TCs may have *iatrogenic effects*, resulting in shorter programs with a reduced potency for reducing drug abuse and crime. At present, the answers to such questions remain unknown.

## **Limitations**

Missing data on the instruments measuring inmate responsiveness to treatment (REST and CRC) at Time 2 (6 months) and Time 3 (12 months) limited our ability to examine inmate responsiveness to treatment over time, or examine relationships between during-treatment change and recidivism. More research is definitely needed to assess to what degree dynamic risk factors change over time in response to prison-based TC drug treatment, and what kinds of individuals may be most likely to benefit from well-implemented TC treatment.

In the current study, major variables predictive of recidivism were statistically controlled, constituting a strong alternative to a randomized experiment (Mitchell et al., 2006; Pearson & Lipton, 1999). It is still possible, however, that unmeasured sources of bias could have influenced the results. The well-crafted experimental and longitudinal studies needed to more thoroughly examine inmate responsiveness to treatment and long term outcomes are in short supply.

In the current study, prison TC significantly reduced recidivism on two out of three outcome measures even though no mandatory community aftercare treatment was provided. Researchers in Delaware, California and Texas have argued that a continuum of care including community aftercare is necessary for prison TC treatment effects to emerge (Inciardi et al., 2004; Knight et al., 1999; Prendergast et al., 2004). While we cannot rule out the possibility that some inmates may have received some kind of post-release aftercare treatment (parole was unable to provide us with such data), the lack of mandatory aftercare treatment for released offenders in PA and the scarcity (and expense) of residential beds available for ex-offenders seriously restrict the likelihood that such services were provided on any meaningful scale to inmates in our sample. *It is possible, therefore, that previous studies may have overstated the effects of community aftercare, and understated the independent effects of prison TC treatment on long term outcomes.*

Glaring differences in definitions and implementation of aftercare services across jurisdictions have inhibited advances in this area of research (Lynch, 2006). More research on how prison-based drug treatment interfaces with critical post-release mechanisms such as parole supervision, employment and aftercare treatment would be invaluable. Interest in prisoner re-entry has been heightened by historical levels of growth in imprisonment rates and the concentrated return of drug involved offenders to disadvantaged communities (Belenko, 2006; Clear, Rose, & Ryder, 2001; Petersilia, 2003; Travis & Visher, 2005).

Although the measurement of employment preceded the measurement of recidivism in the present study, more detailed, longitudinal data on pre- and post-release employment (e.g., type of employment, employee performance, earnings) are needed to examine how non-relapsing or non-recidivating parolees differ from others. None of the control variables examined in this study substantially weakened the observed relationships between post-release employment and three different measures of recidivism, however, leading us to conclude that the effect of post-release employment is likely robust.

Although institutional effects were nonsignificant across the five prison sites, it is possible that larger samples of programs and institutions may yield different findings. Two of the five TC units studied were quite large (100+ inmates), potentially making it difficult to properly supervise and monitor inmate behavior (ONDCP, 1999). Staffing ratios (inmates per counselor) ranged from 9:1 to 26:1. Although overall program dropout rates were low, two programs evidenced lower rates than the others. Program duration and intensity also varied slightly.

One rarely finds discussion of programmatic variations or their influence on treatment outcomes in studies of prison-based TC. Programs and individuals interact in complex ways that researchers have barely begun to assess. To do so, however, more systematic assessments of programs as well as individuals are needed, as are larger samples of programs (Lowenkamp, Latessa & Smith, 2006; Welsh, 2006).

In general, policy-relevant research should further explore more detailed interactions between inmate characteristics, treatment process, and post-release outcomes. There is good reason to believe that prison TC can be a life altering experience for many drug involved offenders, but future research should incorporate a longitudinal perspective that includes more detailed assessments of the diverse individual, programmatic and environmental influences of offender

behavior pre-, during-, and post-prison (Prendergast et al., 2004; Welsh, 2006). Need measures of responsiveness to TC over time; long term follow-ups, multiple outcomes, multiple sites.

## **Conclusion**

Results supported previous findings that participation in intensive prison-based TC drug treatment produces significant, long term reductions in recidivism. However, in contrast to previous studies, prison TC exerted strong, significant treatment effects *independently* of community aftercare, and did so across five different prison sites.

The effects of prison TC drug treatment varied depending upon the outcome examined. TC significantly lowered the likelihood of reincarceration and rearrest, but not drug relapse. Post release employment emerged as the strongest predictor of all three outcomes.

Further research should explore how both individual and programmatic variations influence offender behavior and treatment outcomes *over time (pre-, during, and post-prison)*, and explore why prison-based drug treatment seems to have stronger effects on reducing criminal behavior than drug using behavior. The effects of prison TC and aftercare (both independent v. cumulative and short-term v. long-term) remain ripe areas for future research.

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