COST-BENEFIT ANALYSIS OF MULTISYSTEMIC THERAPY

WITH SERIOUS AND VIOLENT JUVENILE OFFENDERS

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by

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The undersigned, appointed by the dean of the Graduate School, have examined the

thesis entitled

COST-BENEFIT ANALYSIS OF MULTISYSTEMIC THERAPY

WITH SERIOUS AND VIOLENT OFFENDERS

presented by Stephanie J. Klietz,

a candidate for the degree of Master of Arts,

and hereby certify that, in their opinion, it is worthy of acceptance.

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TABLE OF CONTENTS

LIST OF TABLES

COST-BENEFIT ANALYSIS OF MULTISYSTEMIC THERAPY

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ABSTRACT

This study investigated the economics of multisystemic therapy (MST) vs.

individual therapy (IT) using longitudinal rearrest data from a 13.7-year follow-up

(Schaeffer & Borduin, 2005) of a randomized clinical trial with serious juvenile offenders

(Borduin et al., 1995). Two types of benefits of MST were evaluated: (1) the tangible

value to taxpayers was derived from measures of criminal justice system costs (e.g.,

police and sheriff's offices, court processing, jails and community supervision), and (2)

the value to crime victims was derived in terms of both tangible (e.g., property damage

and loss, health care, police and fire services, lost productivity) and intangible (e.g., pain,

suffering, reduced quality of life) losses. The results indicated that reductions in the

rearrest rate (i.e., by 38%) and average number of posttreatment offenses per recidivist

(i.e., by 24%) in the MST vs. IT conditions were associated with substantial reductions in

costs to taxpayers (i.e., $40,671.63) and crime victims (i.e., tangible = $53,134.05;

intangible = $93,167.13), with a cumulative benefit of $202,461.73 per MST participant.

Moreover, it was estimated that every dollar spent on MST today will provide $6.25 to

$27.14 in savings to taxpayers and crime victims in the years ahead. The economic

benefits of MST, as well as its clinical effectiveness, should be considered by

policymakers and the public at large in the selection of interventions for serious juvenile

offenders.

INTRODUCTION

Treatment of violent and chronic juvenile offenders has become an important issue on the nation's social policy agenda, largely because of the considerable social and economic costs exacted by these youths. For example, chronic juvenile offenders are at high risk for mental and physical health problems, substance abuse, low educational and vocational achievement, and interpersonal difficulties (Laub & Sampson, 1994; Lyons, Baerger, Quigley, Erlich, & Griffin, 2001). Likewise, the financial impact of violent crime is staggering, with costs pertaining to victimization (i.e., health related injuries, lost productivity, reduced quality of life), law enforcement, and the maintenance and expansion of the correctional system (Cohen & Miller, 1998; Miller, Fisher, & Cohen, 2001). In fact, the total economic cost imposed by a single lifetime of crime is estimated to range from $1.3 to $1.5 million (Cohen, 1998; Foster, Jones, & the Conduct Problems Prevention Research Group, 2006; Snyder & Sickmund, 1999).

Compounding the problems posed by violent and chronic juvenile offenders is the general lack of success that mental health and juvenile justice services have had in ameliorating the serious antisocial behavior of youth (Kazdin, 2000; Ogden & Halliday-Boykins, 2004). Indeed, services for juvenile offenders have traditionally been provided in the form of inaccessible, expensive, and ineffective out-of-home placements (i.e., residential treatment centers, psychiatric hospitalization, incarceration) (Schoenwald, Ward, Henggeler, Pickrel, & Patel, 1996). Recently, however, an intensive family- and home-based treatment (multisystemic therapy [MST]; Borduin & Henggeler, 1990; Henggeler & Borduin, 1990) has demonstrated long-term reductions in the criminal

activity of serious and violent juvenile offenders. Specifically, in a 4-year follow-up of a sample of chronic juvenile offenders who had been randomly assigned to MST or individual therapy, Borduin et al. (1995) showed that MST produced a 63% reduction in rearrests for violent and other serious crimes. More recently, in a 13.7-year follow-up of the juvenile offenders (now in their 20s and early 30s) who had participated in the Borduin et al. (1995) clinical trial, results showed that participants treated with MST evidenced 54% fewer arrests and 57% fewer days incarcerated than did participants treated with individual therapy (Schaeffer & Borduin, 2005). These and other randomized clinical trials (e.g., Borduin, Henggeler, Blaske, & Stein, 1990; Henggeler, Melton, & Smith, 1992; Henggeler, Pickrel, & Brondino, 1999) suggest that MST is a promising approach to the treatment of serious antisocial behavior in adolescents.

Although clinical trials of MST have demonstrated significant reductions in criminal activity during adolescence and adulthood, the long-term economic impact of MST has not been evaluated. In order for MST to compete in the mental health treatment marketplace with other types of interventions for serious juvenile offenders (e.g., individual counseling, group therapy, pharmacotherapy), it is important to determine the potential cost advantages of MST. Information regarding the economics of empirically supported treatments such as MST could greatly assist government funding agencies in selecting and administering clinically effective mental health programs for serious juvenile offenders (Barnett, 2000; Weisz, Hawley, Pilkonis, Woody, & Follette, 2000). Furthermore, if the benefits of MST to society do not exceed the costs, then such findings might provide an impetus to examine whether MST could be further refined and improved, such as providing posttreatment booster sessions or ongoing support services

in late adolescence and early adulthood (Weisz & Hawley, 1998; Yates, Haven, & Thoresen, 1979). Ultimately, the collection and analysis of data on clinical effectiveness, as well as economic costs and benefits, should help us provide the best possible treatment to serious juvenile offenders at the lowest possible cost.

In the next section of this paper, several areas of research pertaining to economic analysis in the mental health care and juvenile justice fields will be discussed. Initially, research guidelines for conducting cost-benefit analyses of mental health treatments will be reviewed. Next, research literature on the economics of treatment programs for juvenile offenders will be discussed. Finally, the results of a study examining the long-term costs and benefits of MST with serious and violent juvenile offenders will be presented.

LITERATURE REVIEW

Economic Analysis in Mental Health Care Research

Economic analysis offers objective methods to integrate clinical and economic outcome data in order to compare different mental health interventions and services (Fals-Stewart, Yates, & Klostermann, 2005). The results of well-conducted economic evaluations can assist decision-makers at the mental health policy level to determine which interventions are beneficial uses of scarce government resources (Chisholm, 1998). In contrast to the abundance of studies evaluating clinical outcomes of mental health interventions, however, few studies have performed economic analyses to determine the costs and/or benefits of such interventions (French, Salome, Sindelar, & McLellan, 2002). Furthermore, of the economic evaluations that do exist in the mental health care

literature, many are poor in quality and are limited by a lack of randomization, short follow-up periods, and small or unspecified sample sizes (for reviews, see Byford, McCrone, & Barrett, 2003; Evers, Van Wijk, & Ament, 1997).

Of the various methods used by economists to evaluate mental health care programs, the most powerful is cost-benefit analysis (French et al., 2002; Kenkel, 1997). This technique compares the costs of an intervention to its economic benefits, with all costs and benefits measured on the same metric (e.g., dollars) (Barnett, 2000; Singh, Hawthorne, & Vos, 2001; Yates & Taub, 2003). In cost-benefit analysis, costs are defined as the monetary value of resources consumed or otherwise lost as a consequence of providing an intervention (e.g., time, transportation, space, materials, equipment, overhead), whereas benefits are the monetary gains that can be attributed to the intervention (Fals-Stewart et al., 2005). Unlike cost-benefit analysis, other economic evaluation methods (e.g., cost-effectiveness analysis, cost-utility analysis) tend to rely on idiosyncratic measures of costs and outcomes (e.g., quality adjusted life years, improved marital satisfaction, reductions in partner violence), making between-study comparisons of different interventions difficult (Fals-Stewart et al., 2005).

In cost-benefit analyses of mental health care interventions, a comparison of the simple sums of costs versus benefits is inadequate because most of the costs are early ones, while many of the benefits may accrue over a time span extending for decades. Thus, initial costs and benefits should be adjusted to account for the passage of time using standard inflation indices (e.g., Consumer Price Index; Bureau of Labor Statistics, 2007), and future costs and benefits should be adjusted to their present value using the economic principle of discounting. Discounting assumes that the present value of a

4

resource is always greater than the future value of the same resource because the opportunity to use the resource is forgone, as is the chance to earn additional income by investing the resource (Cohen, 1998; Hargreaves, Shumway, Hu, & Cuffel, 1998). In an effort to standardize the discount rate used in health care studies, the Panel on Cost-Effectiveness in Health and Medicine recommended a 3% annual discount rate (Gold et al., 1996), which researchers continue to use today.

Results of cost-benefit analyses are expressed in terms of a benefit-cost ratio (i.e., benefits divided by costs) or net benefit estimate (i.e., benefits minus costs). An intervention is considered cost beneficial if the benefit-cost ratio exceeds one or if the net benefit estimate is positive. Therefore, cost-benefit analyses can be used to compare several different interventions, with the assumption that the most efficient intervention (i.e., as determined by the greatest benefit per dollar of cost) is also the most desirable one (Singh et al., 2001).

In summary, economic analysis is a useful way to extend the evaluation of program effectiveness by addressing the relation between the economic costs and clinical outcomes of an intervention. Findings from economic analyses can be used to influence decision-making processes for clinicians, treatment purchasers and providers, and government/society in order to appropriately allocate scarce public resources and effectively treat as many people as possible. Among the various approaches to economic analysis, cost-benefit analysis is optimal because all costs and outcomes are valued in monetary units and can be meaningfully integrated using standard mathematical operations. However, little research has directly examined the economics of mental health care interventions. It seems likely that federal, state, and local governments;

insurance companies; and managed care systems would have a strong interest in such research because they are currently the major stakeholders in the provision of mental health treatment services. In the next section of this review, the economics of interventions for juvenile offenders will be considered.

Economic Analysis of Treatments for Juvenile Offenders

Juvenile offenders consume much of the resources of the juvenile and adult criminal justice systems (Cocozza, 1992; Melton, Lyons, & Spaulding, 1998) and create considerable expense for crime victims and taxpayers. Thus, the incentive to identify successful intervention programs for juvenile offenders is high. From a public policy perspective, such intervention programs would reduce recidivism and thereby lower future criminal justice system expenditures because participants would experience fewer court referrals and court-ordered days of detention. For a given program to be cost-beneficial, the savings to the criminal justice system and crime victims would need to be greater than the increased expenditures necessary to implement and maintain the program.

Few studies have conducted cost-benefit analyses of intervention programs designed for juvenile offenders. Of the studies that do exist, program costs are typically calculated from an operations perspective (i.e., the amount of funds consumed to operate the program). These costs include all monetary expenditures (e.g., costs of facilities, equipment, materials, therapists' salaries, services purchased from other programs) and depreciation of facilities and equipment over time (e.g., Yates et al., 1979). Benefits of programs that target juvenile crime are often measured as (a) reductions in criminal justice system costs and (b) reductions in costs to crime victims (e.g., Cohen, 1988;

6

Ehrlich, 1974). Criminal justice system costs include government expenditures for police, prosecutors, public defenders, courts, prisons, and other nonincarcerative sanctions; these costs also include private expenditures on criminal defense lawyers and time spent (i.e., opportunity costs for the time involved) by victims, juries, and witnesses during the course of a trial (Cohen, Miller, & Rossman, 1994). Although many of the costs to crime victims include tangible losses such as reduced labor productivity, property damage, or medical and mental health care expenses, a significant portion are intangible costs associated with pain, suffering, and lost quality of life (Cohen, 1988). These intangible costs can be monetized using jury award data (i.e., compensatory damage awards, medical care, productivity losses), an economic technique that has become widely accepted for cost-benefit analysis (Cohen, 1998).

Several cost-benefit analysis studies have been conducted on early childhood intervention programs that had previously demonstrated effectiveness in reducing long-term criminal behavior (e.g., Elmira Prenatal/Early Infancy Project [Olds et al., 1997]; Perry Preschool Program [Barnett, 1996]; Title I Chicago Child-Parent Centers [Reynolds, Temple, Robertson, & Mann, 2002]). These studies typically examined benefits related to reducing expenditures for school remedial services (i.e., special education, grade retention), reducing juvenile and adult criminal justice system expenditures, reducing child welfare system expenditures, averting tangible costs to victims of crime or child maltreatment, or increasing earnings capacity and tax revenues. Although these early intervention (i.e., primary prevention) programs have proven to be cost-beneficial in the long term, benefits related to reducing criminal activity have accounted for a relatively small proportion of each program's total benefits. The likely

reason for the modest benefits in reduced criminal activity is that benefits were often measured conservatively (i.e., assessing only tangible savings to crime victims and not intangible savings related to pain, suffering, or lost quality of life), while costs were measured more expansively. Moreover, the programs targeted at-risk preschoolers rather than youths already involved in criminal activity. There has been little research directly examining the economics of interventions targeting juvenile offenders.

In one of the few studies to conduct a cost-benefit analysis of interventions for juvenile offenders, Robertson, Grimes, and Rogers (2001) compared (a) intensive supervision and monitoring (i.e., small caseloads, frequent contact with youths, group supervision, routine curfew checks) and (b) intensive outpatient counseling involving cognitive-behavioral therapy (i.e., cognitive skills training, group therapy for youths, group therapy for parents/guardians) to (c) traditional probation and parole. Costs were defined as increases in spending necessary to support and maintain the first two (i.e., intensive) interventions, and benefits were defined as short-term (i.e., 12 months after treatment completion) reductions in juvenile justice system expenditures due to the interventions. The researchers reported that the intensive supervision and monitoring condition was not cost-beneficial and actually increased juvenile justice system expenses by $927 per participant. On the other hand, the cognitive-behavioral intervention produced a net benefit of approximately $1,435 per participant, which was equivalent to a benefit-cost ratio of $1.96 for every dollar spent. Major limitations of this study included its design (i.e., participants were not randomly assigned to treatment conditions) and measures (i.e., costs did not include a wide range of governmental or crime victim expenditures). In addition, the cost-benefit analysis was limited to 12-month cost

savings. It seems likely that the net benefit would be reduced, or even disappear, if the treatment effect was only temporary and recidivism increased after the first year.

In the only large-scale cost-benefit analysis of research-based interventions for juvenile offenders, the Washington State Institute for Public Policy (WSIPP; 2004) examined results from 15 different programs. The WSIPP used meta-analysis to calculate mean difference effect sizes for each program and made several adjustments to account for the quality of research design, the quality of outcome measures, and the extent to which the studies were conducted in "real world" administrative structures (i.e., rather than in highly controlled efficacy trials). The net benefit to taxpayers and crime victims per program participant ranged from $31,243 for dialectical behavior therapy to a deficit of $12,478 for regular parole. In their evaluation of MST (i.e., based on 6 effect sizes), the WSIPP reported a net benefit of approximately $9,316 for each program participant, which was equivalent to a benefit-cost ratio of $2.64 for every dollar spent. Although the WSIPP (2004) study was extremely rigorous in examining a wide range of intervention programs, it was limited because long-term clinical outcomes were estimated (i.e., short-term effect sizes were extended based on probability distributions for future felony offenses) and then used to determine long-term costs and benefits. In addition, the cost of implementing intervention programs was estimated based on market rates for labor and services.

In sum, there is some evidence that interventions with proven effectiveness in reducing crime are cost-beneficial by reducing criminal justice system and tangible victim costs. Although some research has examined the costs and benefits of early childhood education programs, most of this research has targeted young, non-clinical

9

samples and has used conservative measures of program benefits. Other research has conducted cost-benefit analyses of interventions for juvenile offenders but has done so with flawed study designs (i.e., non-random assignment, incomplete assessment of costs and/or benefits, short-term follow-up periods) or has estimated long-term costs and benefits based on short-term effect sizes. Cost-benefit analyses of interventions whose clinical effectiveness has been demonstrated in rigorous studies that included long-term follow-up data on criminal recidivism are needed to better understand the economics of treatments for serious juvenile offenders.

Summary of Literature Review

Several conclusions can be drawn from this literature review. First, juvenile justice research presently lags far behind other areas of mental health care research in evaluating program economics and is at a distinct disadvantage when competing with other types of interventions for governmental funding. Second, the perceived dichotomy between economic and clinical outcomes is a false one: economic evaluation is specifically concerned with addressing the relation between the economic costs and clinical outcomes of an intervention. Moreover, by definition, successful interventions for juvenile offenders reduce criminal activity, thereby reducing costs to the criminal justice system and society at large. Although there is already some evidence that MST is cost-beneficial in the short term, less is known about the long-term costs and benefits of MST. Conducting economic analyses of rigorously evaluated treatments such as MST is one way to provide objective information that decision makers can use to evaluate various interventions.

OVERVIEW OF PRESENT STUDY

Over the past two decades, rigorous evaluation of MST outcomes has been a high priority. MST is now widely regarded as a clinically effective treatment for serious antisocial behavior in adolescents (see e.g., Kazdin & Weisz, 1998; National Institutes of Health, 2006; Ogden & Halliday-Boykins, 2004; Timmons-Mitchell, Bender, Kishna, & Mitchell, 2006). Given this evidence of clinical effectiveness, it seems logical to evaluate the economics of MST. The present study evaluated the long-term costs and benefits of MST based on a model created by the WSIPP (2004).

This study meets current standards in the field of economics for cost-benefit analysis (Gold et al., 1996) and provides improvements over the WSIPP (2004) cost-benefit analysis of MST. Unlike the WSIPP (2004) study, in which long-term arrest rates were estimated, the present study determined the costs and benefits of MST using actual rearrest data from a 13.7-year follow-up of an earlier clinical trial. More specifically, this study investigated the benefits of MST in (a) reducing criminal justice system expenditures associated with arrest and adjudication for both juvenile and adult crime and (b) averting tangible and intangible costs to victims of crime. The present study also calculated the actual cost of providing program services rather than estimating program costs based on market rates for labor and services. Three hypotheses were developed for this study based on the empirical findings discussed earlier.

HYPOTHESES

Taxpayer Tangible Benefit

1. It was expected that the net benefit to taxpayers, and the benefit-cost ratio, would be greater for participants in MST than for participants in an alternate treatment condition (i.e., individual therapy). This prediction was based on a previous cost-benefit analysis showing that MST provided a large net benefit to taxpayers (WSIPP, 2004).

Crime Victim Tangible Benefit

2. It was expected that the tangible benefit to victims, and the benefit-cost ratio, would be greater for participants in MST than for participants in an alternate treatment condition. Again, this hypothesis was based on prior findings (WSIPP, 2004) indicating that MST provided a large cumulative benefit to taxpayers and crime victims.

Crime Victim Intangible Benefit

3. It was expected that the intangible benefit to victims, and the benefit-cost ratio, would be greater for participants in MST than for participants in an alternate treatment condition (cf. WSIPP, 2004).

METHOD

Participants

Participants were 176 individuals who originally participated in a randomized clinical trial (Borduin et al., 1995) and were tracked 13.7 years later in a long-term

12

follow-up of criminal activity (Schaeffer & Borduin, 2005). In the original study, serious and violent juvenile offenders and their families were referred by juvenile court personnel and randomly assigned (using a coin toss) to receive either MST ($n = 92$) or individual therapy (IT; $n = 84$). Referrals to the project were made consecutively and included all families in which the youth (a) had at least two prior arrests for criminal offenses (e.g., burglary, physical assault, grand larceny), (b) was currently living with at least one parental figure, and (c) showed no evidence of psychosis or dementia. Furthermore, all youths had been previously detained for at least four weeks. Of the 176 youths and their families, 140 (79.5%) completed treatment (hereafter referred to as "completers") and 36 (21.5%) dropped out (hereafter referred to as "dropouts"), defined as unilaterally terminating after the first session and before the seventh. Of the 36 dropouts, 15 were from the MST condition and 21 were from the IT condition (dropout rates for MST [16.3%] and IT [25.0%] were not significantly different). In the present study, treatment completers and dropouts were collapsed in each condition to provide a conservative test of MST effects.

The arrest histories of the youths in the original sample attest to their serious criminal involvement. The youths averaged 3.9 previous arrests for felonies ($SD = 1.9$), and 47.8% of the youths had at least one arrest for a violent crime (e.g., sexual assault, assault and battery with intent to kill, aggravated assault). The mean age of the youths at the time of treatment was 14.5 years; 69.3% were male; 76.1% were White and 22.2% were African-American; and 56.8% lived with two parental figures (biological parents, stepparents, foster parents, grandparents). In addition, families averaged 3.2 children ($SD = 1.9$), and 63.4% were of lower socioeconomic status (Class IV or V; Hollingshead,

1975). At the time of the 13.7-year follow-up, the average age of participants was 28.8 years (SD = 1.78).

<div align="center">Treatment Conditions</div>

The mean numbers of treatment hours provided in the original clinical trial (Borduin et al., 1995) were 20.7 (SD = 7.4) for the MST group and 22.5 (SD = 10.6) for the IT group. These means were not significantly different, F (1, 175) = 1.85, p = .176.

<div align="center">*Multisystemic Therapy*</div>

Therapeutic interventions in Borduin et al. (1995) were based on the multisystemic approach to the treatment and prevention of behavior problems in children and adolescents (Henggeler & Borduin, 1990). The treatment and prevention emphases of MST fit closely with findings on the causes and correlates of serious delinquent behavior (for a review, see Loeber & Farrington, 1998). Using interventions that are present-focused and action-oriented, MST directly addresses intrapersonal (e.g., cognitive) and systemic (i.e., family, peer, school) factors that are known to be associated with adolescent antisocial behavior. Moreover, because different combinations of these factors are relevant for different adolescents, MST interventions are individualized and highly flexible. Guidelines for designing and implementing MST interventions with antisocial adolescents and their families are described in detail elsewhere (Henggeler & Borduin, 1990; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998).

The provision of MST is consistent with family preservation models of service delivery (Nelson, 1991; Wells, 1995). To promote cooperation and enhance generalization, sessions were usually held in the family's home or in community locations (e.g., school, recreation center) at a convenient time. In addition, services were

time limited, with the overarching goal of empowering parents with the skills and resources needed to independently address the inevitable difficulties that arise in raising adolescents.

Individual Therapy

The therapy provided in this condition was selected to represent the usual community treatment for juvenile offenders in the local judicial district, and perhaps in many other judicial districts as well (see Loeber & Farrington, 1998; Office of Juvenile Justice and Delinquency Prevention, 1993). All of the juvenile offenders in this condition received individual therapy that focused on personal, family, and academic issues. The therapists offered support, feedback, and encouragement for behavior change. Therapists' theoretical orientations were an eclectic blend of psychodynamic (e.g., promoting insight and expression of feelings), client-centered (e.g., building a close relationship, providing empathy and warmth), and behavioral (e.g., providing social approval for school attendance and other positive behaviors) approaches. Although there were some variations in the treatment strategies used by therapists (e.g., some therapists provided less empathy or were more directive than other therapists), the common theme was that interventions focused on the individual youth rather than on the systems in which the youth was embedded.

Therapists

MST was provided by three female and three male graduate students (ages ranged from 23 to 31 years; $M = 26$) in clinical psychology. Each had approximately 1.5 years of direct clinical experience with children or adolescents prior to the Borduin et al. (1995) study. Therapist supervision was provided by Charles M. Borduin in a 3-hour weekly

group meeting that continued throughout the course of the investigation. During these meetings, the therapists and supervisor reviewed the goals and progress of each case, observed and discussed selected videotaped or audiotaped therapy sessions, and made decisions about how to best facilitate the family's progress.

Interventions in the IT group were provided by three female and three male therapists (ages ranged from 25 to 33 years; $M = 28$) at local mental health outpatient agencies. Each therapist had a master's degree (or equivalent training) in counseling psychology, social work, or another mental health-related field, and had approximately 4 years of direct clinical experience with adolescents. These therapists attended 2.5-hour weekly case reviews with the treatment coordinator from the juvenile court to discuss the goals and progress of each case.

Procedure

Original Outcome Study

Families of juvenile offenders were asked to voluntarily participate in a 1.5-hour research assessment approximately one week before the beginning of treatment and again approximately one week after the end of treatment. It was emphasized that refusing to participate, or discontinuing participation at any time, would not jeopardize the receipt of treatment services provided by the court. The youths remained under the jurisdiction of the court regardless of their families' decisions about participating in the research assessments or in treatment.

All families completed extensive pre- and posttreatment assessment batteries consisting of self-report instruments, behavior rating inventories, and observational tasks measuring individual, family, peer, and school functioning (see Borduin et al., 1995). The

present study did not examine those measures. Only those procedures and measures relevant to the present study will be described in detail below.

Follow-up Study

Both juvenile and adult criminal records were obtained for the follow-up study. Youths' criminal arrest data were obtained yearly through county juvenile office records, and adult criminal arrest data were obtained from Missouri State Police records at the time of the original outcome study and again for the follow-up study. The average length of the follow-up period was 13.7 years (range = 11.8-15.2 years; SD = 1.2 years) (Schaeffer & Borduin, 2005). An arrest was classified as having taken place during the follow-up period if it occurred after the date of the posttreatment assessment. If a posttreatment assessment was not completed, then the follow-up period began after the date of termination from MST or IT. Juvenile and adult arrest data were combined to provide a complete record of all arrests (i.e., number and type of arrests) during the follow-up period.

A search of criminal records in other states was not possible because participants' fingerprints would have been required to conduct a national criminal records check, and these were not obtained at the time of the original study. Nevertheless, it was assumed that arrest rates for participants residing outside of Missouri were not systematically different from those remaining in the state. It was also assumed that variation in arrest rates between treatment groups would be consistent for participants residing within or outside of Missouri.

Several steps were taken to determine whether each participant had lived in Missouri during the follow-up period and, thus, whether he or she was available to have

an arrest record during that time. First, state arrest records were searched, and crimes committed during the follow-up period were noted. Next, a search of state driver's license records was conducted for those individuals whose names did not appear in the state criminal registry. An individual was considered to have resided in the state during the follow-up period if he or she held a Missouri driver's license. Finally, original phone numbers and addresses of parents were used to confirm residence in the state of several additional individuals who were not arrested during the follow-up period or did not have a driver's license record. Overall, 93.8% ($n = 165$) of the sample was located and determined to have lived in Missouri during the follow-up period. The number and percentage of participants found in each treatment condition were as follows: MST ($n = 87$, or 94.6%), IT ($n = 78$, or 92.9%). The remaining participants ($n = 11$) could not be verified as residents of Missouri and were considered lost to long-term follow-up.

Present Study

The cost-benefit analysis of MST was based on the interrelationship of three major sets of dependent measures: (a) effectiveness (i.e., clinical outcomes of MST vs. IT), (b) costs (i.e., resources used in order to provide MST or IT), and (c) benefits to taxpayers and crime victims (i.e., of MST over IT). MST effectiveness was calculated using posttreatment arrest records obtained in the 13.7-year follow-up study (Schaeffer & Borduin, 2005). Costs were obtained from two sources: (1) the cost of MST as it is typically provided in the community (rather than as provided by graduate students in the original outcome study) was obtained by contacting the executive director of the agency that provides MST in St. Louis, MO and requesting a copy of the annual budget, and (2) the cost of providing IT was obtained by contacting the executive director of a local

mental health outpatient agency and requesting the annual program budget; therapists

from the latter agency had provided treatment to most of the youths in the IT condition

during the original clinical trial. Benefits to taxpayers were estimated from the WSIPP

(2004) cost-benefit analysis and adjusted for the difference in cost of living between

Washington and Missouri using the American Chamber of Commerce Researchers

Association (ACCRA) Cost of Living Index (ACCRA, n.d.). Benefits to crime victims

were estimated from a national study (Miller, Cohen, & Wiersema, 1996) of the costs and

consequences of victimization. All dollar values were converted to 2006 dollars to adjust

for inflation using the Consumer Price Index (Bureau of Labor Statistics, 2007), and the

present values of future costs and benefits were computed in 2006 dollars using an annual

discount rate of 3 percent (Gold et al., 1996).

Dependent Measures

Costs

Multisystemic Therapy

Treatment costs for MST were derived from the annual budget of the MST team

at the Community Alternatives agency in St. Louis, MO and included personnel (e.g.,

therapist salaries, supervisor salaries, payroll taxes, employee health insurance,

professional fees) and non-personnel expenditures (e.g., supplies, rent, utilities,

maintenance, parking, depreciation), mileage reimbursement to therapists for travel to

families' homes and other treatment sites (e.g., schools, recreational facilities) in the

community, and MST training and licensing costs (from MST Services in Charleston,

SC). These costs were summed and divided by the average number of youths receiving

MST in any given year at the agency (i.e., Community Alternatives did not have a record

19

of the number of treatment hours per case) to calculate the cost of MST per youth (i.e.,

$9,851.73). This latter cost was then converted to base year 2006 dollars using the

Consumer Price Index (Bureau of Labor Statistics, 2007) and adjusted for the difference

in cost of living between St. Louis, MO and Columbia, MO using the ACCRA Cost of

Living Index (ACCRA, n.d.). The resulting treatment cost was $9,547.26 per MST

participant.

Individual Therapy

The cost of providing IT was evaluated using the annual budget from the Family

Counseling Center in Columbia, MO. This agency delivered the largest proportion of

services to youths randomly assigned to receive IT in the original study (Borduin et al.,

1995). Moreover, evaluating the cost of providing services for all agencies (or individual

therapists) involved in the original study was impractical (i.e., some of the agencies no

longer existed and some of the therapists no longer resided in Columbia, MO).

The cost per treatment session was based on personnel (e.g., therapist salaries,

payroll taxes, employee health insurance, professional fees, training and travel expenses)

and non-personnel (e.g., supplies, rent, utilities, maintenance, parking, depreciation)

expenditures and was multiplied by the average number of treatment sessions received by

participants in IT (Borduin et al., 1995) to calculate the cost of IT per youth (i.e.,

$1,772.63). This cost was then adjusted to reflect base year 2006 dollars using the

Consumer Price Index (Bureau of Labor Statistics, 2007). The resulting treatment cost

was $1,802.80 per IT participant.

Taxpayer Tangible Benefit

The tangible value of one criminal offense to taxpayers was estimated from the WSIPP (2004) model and included measures of criminal justice system costs for juvenile and adult offenders. These measures were a function of the estimated annual marginal capital and operating costs of the criminal justice system and of the probability and severity of sentencing for juvenile and adult offenders. All measures were adjusted to reflect base year 2006 dollars as well as for the difference in cost of living between Washington and Missouri.

Police and Sheriff's Offices

Two sets of data were used to calculate the annual operating costs of sheriff's offices and police departments. The first set, expenditure data, was obtained from the state auditor. The second set, arrest data, was obtained from the Association of Sheriffs and Police Chiefs; each arrest was classified as a (a) violent felony, (b) non-violent felony, or (c) misdemeanor offense. Both sets of data were entered in a log-log regression model to provide an estimate of police and sheriff marginal operating costs. Police and sheriff costs that were not associated with the felony cases modeled in this analysis were excluded (e.g., gambling enforcement, Drug Abuse Resistance Education program [D.A.R.E. America, 1996]).

Superior Courts and County Prosecutors

The annual marginal operating costs for juvenile and adult court processing were estimated by using a log-log regression model with (a) expenditure data obtained from the state auditor and (b) felony conviction data (i.e., number of convictions for homicide, robbery, sex offenses, aggravated assault, or non-violent felonies; number of non-

criminal superior court filings) obtained from the State Administrative Office of the

Courts. Superior court expenditures (e.g., district courts, municipal courts, family court

fees, law libraries) and county prosecutor expenditures (e.g., civil division, consumer

affairs, child support enforcement) that were not associated with the felony cases

modeled in this analysis were excluded.

Jail and Community Supervision for Adult Felons

Annual marginal operating costs for jails were estimated for convicted adult

felons who served (a) both pre-sentence and post-sentence time in jails or (b) pre-

sentence time in jails and post-sentence time at state institutions. A log-log regression

was conducted with (a) expenditure data obtained from the state auditor and (b)

corrections data obtained from the Association of Sheriffs and Police Chiefs. Capital

costs for new beds were estimated with expenditure data obtained from a new 288-bed

jail facility for adults; total construction costs per bed were converted to an annual capital

charge. The annual operating costs for community supervision were obtained from the

State Sentencing Guidelines Commission to represent the average costs for community

supervision, custody, and placement of adult felons.

Detention and Supervision for Juveniles

Annual marginal operating costs for detention and community supervision

services for juveniles were estimated by conducting a log-log regression model with

expenditure and detention (i.e., average daily population, length of stay) data. Capital

costs for new beds were estimated with expenses obtained from a new 80-bed juvenile

detention facility; total construction costs per bed were converted to an annual capital

charge. The average cost of probation for juvenile offenders was estimated with data obtained from juvenile courts across the state.

State Juvenile Rehabilitation Administration

The annual marginal operating costs for juvenile rehabilitation institutions were estimated by conducting a time-series regression model with expenditure and average daily population data obtained from the State Juvenile Rehabilitation Administration (SJRA). Capital costs for new institutional beds were estimated with expenditure data obtained from the State House Appropriations Committee; total construction costs per bed were converted to an annual capital charge. The average cost for parole services was obtained from the State Senate Ways and Means Committee.

State Department of Corrections

As with SJRA operating costs, a time-series regression model was conducted with annual expenditure and average daily population data obtained from the State Department of Corrections. Capital costs for new institutional beds were estimated with expenditure data obtained from the Joint Legislative Audit and Review Committee; total construction costs per bed were converted to an annual capital charge. The average annual cost for post-prison community supervision was also obtained from the State Department of Corrections.

Crime Victim Benefit

Two types of costs borne by crime victims (i.e., tangible losses, intangible losses) were estimated in a manner consistent with the WSIPP (2004) model and adjusted to reflect base year 2006 dollars. Estimates from a U.S. Department of Justice study (Miller et al., 1996) were used to represent per-unit victim costs.

Benefits to crime victims were calculated using two different assumptions. First, the benefit to crime victims was calculated assuming one victimization per arrest. Thus, this analysis was based on the number of arrests made by the police and assumed that "official" crime statistics were an accurate representation of the number of offenses committed by the offenders in the present sample. Second, the benefit to crime victims was calculated assuming multiple victimizations per arrest. This analysis was based on a large body of evidence suggesting that the number of offenses that are committed across various criminal behaviors is much greater than the actual number of arrests for such offenses (e.g., Bureau of Justice Statistics, 2006; Elliott, 1995); therefore, there are likely to be multiple offenses (and thus multiple victims) for every arrest that is actually made. Thus, we included both conservative (i.e., assuming one victimization) and expansive (i.e., assuming multiple victimizations) estimates of the net benefit and benefit-cost ratio of MST to crime victims. In each case, MST was considered cost-beneficial if the net benefit was positive and the benefit-cost ratio exceeded 1.0.

Tangible Losses

Tangible losses were defined in terms of victim monetary expenses (i.e., property damage and loss, medical and mental health care, police and fire services, victim service agencies, lost productivity). Such losses provide a more conservative estimate of the cost of crime to victims than do intangible losses (i.e., pain, suffering, and reduced quality of life; Miller et al., 1996).

Property damage and loss. Costs related to the value of damaged property, stolen property not recovered, and insurance claims administration were taken directly from the National Crime Victimization Survey (NCVS; Bureau of Justice Statistics, 2006). In

cases of insured losses, 16% of property losses (i.e., a published loss adjustment expense ratio; Best, 2006) were added to the total value of damaged or lost property to account for insurance claim processing costs.

Medical care. Medical costs included those related to hospital and physician care, emergency medical transport, rehabilitation, prescriptions, allied health services, medical devices, coroner costs, premature funeral expenses, insurance claims processing, and legal expenses in recovering medical costs. NCVS estimates of lifetime (i.e., based on hospitalization costs per day for various injury categories) and short-term medical care expenses were used to calculate costs for hospitalized and nonhospitalized injuries, respectively (Miller, Pindus, Douglass, & Rossman, 1995). Furthermore, insurance administrative costs for health insurance policies and workers' compensation-related cases were also estimated and included as part of medical costs (Miller, 1992).

Mental health care. Costs for services provided to crime victims by psychiatrists, psychologists, social workers, and pastoral counselors, and associated insurance claim processing costs were estimated based on (a) the percentage of mental health care clients who are treated primarily as a result of victimization and (b) the average number of treatment sessions provided to crime victims (Cohen & Miller, 1998).

Police and fire services. Initial police response costs, follow-up police investigation costs, and fire service costs related to arson and drunk driving accidents were derived from data on police and emergency response costs (Cohen et al., 1994).

Victim services. Costs for specialized services for victims (e.g., crisis hotlines, legal advocacy, shelters and safe houses) were calculated based on the dollar value of

federal and non-federal grants provided to victim service agencies for the crimes of rape, robbery, and assault (Cohen et al., 1994).

Productivity. Productivity costs included wages, fringe benefits, housework, and school days lost by victims and their families; productivity lost by co-workers and supervisors; insurance claim processing costs; and victim legal expenses. NCVS estimates were used for short-term costs; long-term costs were estimated based on expected lifetime earnings (absent an injury) and permanent disability probabilities from workers' compensation claims.

Intangible Losses

Intangible (i.e., quality of life) cost estimates provided a more expansive assessment of crime victim expenses and placed a dollar value on the pain and suffering of crime victims. For nonfatal injuries, monetary estimates of lost quality of life were calculated by subtracting the out-of-pocket expenses associated with an injury from the amount of compensatory damages awarded by a jury. This technique for estimating intangible losses to crime victims has been used in more than 50 technically sound "willingness to pay" studies and continues to gain credibility (Miller et al., 2001).

RESULTS

Effectiveness

Each posttreatment arrest identified in the 13.7-year follow-up was classified using the following six categories of felony offenses: murder/manslaughter, sexual (e.g., assault, molestation), robbery, aggravated assault (e.g., with intent to kill, with a deadly weapon, unlawful use of a weapon), property (e.g., auto theft, arson, auto tampering,

26

forgery, felony larceny), and drug (e.g., driving under the influence, distribution of a controlled substance). As shown in Table 1, the expected number of offenses per participant was calculated for the MST condition by multiplying the MST recidivism rate (i.e., the percent of MST participants who reoffended during the posttreatment period; 50%) by the average number of posttreatment offenses per MST recidivist (i.e., 3.43). A similar calculation was performed for individuals in the IT condition. The expected number of offenses per MST participant (i.e., 1.72) was subtracted from the expected number of offenses per IT participant (i.e., 3.68) for the purpose of calculating the expected change in the number of posttreatment offenses (i.e., 1.96) as a result of providing MST.

<center>Taxpayer Tangible Benefit</center>

We tested the hypothesis that MST would provide a greater tangible benefit to taxpayers than IT. As a first step, we calculated the distributions of posttreatment offenses for recidivists in the MST and IT conditions, respectively. As shown in Table 2, the distributions of posttreatment offenses were different for recidivists in the two treatment conditions. The percentage of each type of felony offense (i.e., murder/ manslaughter, sexual, robbery, aggravated assault, property, drug) was then multiplied by the present value cost of that felony offense to taxpayers (i.e., the total expense to taxpayers for each felony offense converted to base year 2006 dollars), and the products were summed across offense types to calculate the present value cost of one offense for MST and IT recidivists, respectively. The analyses showed that the present value cost of one offense was $24,304.59 for MST recidivists and $25,963.46 for IT recidivists.

<center>27</center>

As a next step, the present value cost of one felony offense was multiplied by the expected number of posttreatment offenses per participant in each treatment group. Consistent with the procedures used in the WSIPP (2001, 2004) cost-benefit analyses, each product was then multiplied by the constant 0.9 (i.e., an arbitrary percentage reduction in the taxpayer value of reducing crime to avoid the chance that taxpayer benefits could be overstated) to yield expected criminal justice system costs to taxpayers for each participant in MST and IT, respectively (i.e., based on the distribution of posttreatment offenses for each treatment group). The analyses revealed that the expected criminal justice system costs to taxpayers were $37,514.13 per participant in MST and $85,930.22 per participant in IT. The expected criminal justice system cost for each MST participant was then subtracted from the expected criminal justice system cost for each IT participant, indicating that $48,416.09 in criminal justice system costs were avoided per participant by providing MST rather than IT.

The cost of providing IT per participant (i.e., $1,802.80) was then subtracted from the cost of providing MST per participant (i.e., $9,547.26) to calculate an incremental treatment cost of $7,744.46. This cost was subtracted from the criminal justice system costs avoided for each participant in MST (i.e., $48,416.09) to calculate the net present value (i.e., benefits minus costs) of MST to taxpayers (i.e., $40,671.63; see Table 7). Finally, the criminal justice system costs avoided for each participant in MST was divided by the incremental treatment cost to calculate the benefit-cost ratio (i.e., benefits divided by costs; $6.25). In other words, $1.00 spent on MST today can be expected to return $6.25 to taxpayers over the 13.7-year follow-up period.

28

Crime Victim Tangible Benefit

Assuming One Victimization

The present value tangible cost to victims for each type of felony crime (i.e.,

excluding drug crimes) was calculated using data from Miller et al. (1996). As shown in

Table 3, the percentage of each type of posttreatment felony offense was multiplied by

the tangible cost of that felony offense to crime victims, and the products were summed

across offense types to calculate the present value tangible cost of one offense for MST

and IT recidivists, respectively. The results showed that the present value cost of one

offense was $788.45 for MST recidivists and $765.85 for IT recidivists.

The present value tangible cost of one offense to crime victims was then

multiplied by the expected number of posttreatment offenses per participant in each

treatment group. The analyses revealed that the expected tangible cost to crime victims

was $1,352.19 per participant in MST and $2,816.34 per participant in IT. Next, the

expected tangible cost to crime victims for each MST participant was subtracted from the

tangible cost to crime victims for each IT participant, indicating that $1,464.15 in

tangible costs to crime victims were avoided per MST participant.

The incremental treatment cost of MST over IT (i.e., $7,744.46) was subtracted

from the avoided tangible cost to crime victims (i.e., $1,464.15) to calculate the net

present value of MST crime victims. As shown in Table 7, the net present value of MST

to crime victims (i.e., in tangible benefits and assuming one victimization per arrest)

averaged a loss of $6,280.31. The avoided tangible cost to crime victims was then

divided by the incremental treatment cost to calculate the benefit-cost ratio; the benefit

per dollar of cost was negative $0.81.

29

Assuming Multiple Victimizations

To provide a more realistic estimate of how many victimizations occurred per actual arrest, data on unreported crimes (Bureau of Justice Statistics, 2006) were used in conjunction with posttreatment arrest data (Schaeffer & Borduin, 2005) to estimate the total number of felony crimes committed during the follow-up period. Consistent with procedures used in the WSIPP (2001, 2004) cost-benefit analyses, the average number of posttreatment offenses per MST recidivist was divided by the percentage of crimes reported to the police (Bureau of Justice Statistics) for each type of felony crime. The adjusted percentage was then multiplied by (a) the tangible cost of the respective felony offense to crime victims, (b) lambda (i.e., the number of crimes per arrest; 168.91), and (c) the expected change in the number of posttreatment offenses per recidivist by providing MST (i.e., 1.96). The products were then summed across offense types to calculate the tangible cost to crime victims avoided per MST participant (i.e., assuming multiple victimizations; see Table 4). At this point, the procedure was the same as that used when assuming one victimization per arrest to calculate the net present value and benefit-cost ratio of MST to crime victims (i.e., in tangible benefits). As shown in Table 7, the net present value of MST was $53,134.05 per participant, and the benefit of MST per dollar of cost was $6.86.

Crime Victim Intangible Benefit

The hypothesis that MST would provide greater intangible benefits to crime victims than IT was tested using procedures like those used to test the hypothesis for tangible benefits, with two sets of assumptions (i.e., one victimization per conviction, multiple victimizations per conviction).

Assuming One Victimization

The present value of victim intangible costs for each type of felony crime (i.e., excluding nonviolent property and drug crimes) was calculated using data from Miller et al. (1996). As shown in Table 5, the percentage of each type of posttreatment felony offense was multiplied by the intangible cost of that felony offense to crime victims, and the products were summed across offense types to calculate the present value cost of one offense for MST and IT recidivists, respectively. The analyses showed that the present value intangible cost of one offense to crime victims was $2,708.73 for MST recidivists and $3,527.95 for IT recidivists.

The present value intangible cost of one felony offense to crime victims was multiplied by the expected number of posttreatment offenses per participant in each treatment group. The analyses revealed that the expected intangible cost to crime victims was $4,645.47 per participant in MST and $12,973.67 per participant in IT. Next, the expected intangible cost to crime victims for each MST participant was subtracted from the intangible cost to crime victims for each IT participant, indicating that an average of $8,328.21 in intangible costs to crime victims were avoided per MST participant.

The incremental treatment cost of MST over IT (i.e., $7,744.46) was subtracted from the avoided intangible cost to crime victims (i.e., $8,328.21) to calculate the net present value of MST to crime victims. As shown in Table 7, the net present value of MST to crime victims (i.e., in intangible benefits and assuming one victimization per arrest) was $583.75 per participant. The avoided intangible cost to crime victims was then divided by the incremental treatment cost to calculate the benefit-cost ratio; the benefit per dollar of cost was $0.08.

The average number of posttreatment offenses per MST recidivist was divided by the percentage of crimes reported to the police for each type of felony crime. The adjusted percentage was then multiplied by (a) the intangible cost to crime victims, (b) lambda, and (c) the expected change in the number of posttreatment offenses. The products were then summed across offense types to calculate the intangible cost to crime victims avoided per MST participant (see Table 6). The procedures used to calculate the net present value and benefit-cost ratio were the same as those used when assuming one victimization per arrest. As shown in Table 7, the net present value of MST was $93,167.13 per participant, and the benefit of MST per dollar of cost was $12.03.

Cumulative Benefit

Finally, taxpayer and crime victim benefits (i.e., tangible and intangible) were combined to calculate the cumulative net benefit and benefit-cost ratio of MST.

Assuming One Victimization

Criminal justice system costs avoided, tangible victim costs avoided (i.e., assuming one victimization per arrest), and intangible victim costs avoided (i.e., assuming one victimization per arrest) were summed, and the incremental treatment cost was subtracted from the resulting sum, to calculate the cumulative net present value of MST to taxpayers and crime victims. The cumulative costs avoided (i.e., assuming one victimization per arrest) was then divided by the incremental treatment cost to calculate the cumulative benefit-cost ratio. As shown in Table 7, the cumulative net present value of MST to taxpayers and crime victims was $50,463.99 per participant, and the benefit of MST per dollar of cost was $7.52.

Assuming Multiple Victimizations

The procedure for calculating the cumulative net present value and benefit-cost ratio of MST to taxpayers and crime victims (i.e., in tangible and intangible benefits) assuming multiple victimizations per arrest was the same as above. The results showed that the cumulative net present value of MST was $202,461.73 per participant, and the benefit of MST per dollar of cost was $27.14 (see Table 7).

DISCUSSION

This study examined the costs and benefits of MST with serious and violent juvenile offenders 13.7 years following treatment. To meet current standards in the field of economics for cost-benefit analysis (Gold et al., 1996; Kaplan & Groessl, 2002), we covered a wide range of criminal justice system costs to taxpayers as well as tangible (e.g., property damage, medical and mental health, productivity) and intangible (e.g., pain, suffering) losses to crime victims. In addition, we calculated the actual cost of providing program services (i.e., rather than estimating costs from market rates for labor and services). The findings clearly demonstrate that MST is a cost-beneficial treatment for serious juvenile offenders. Indeed, cumulative taxpayer and crime victim benefits revealed substantial cost savings, ranging from $50,463.99 (i.e., assuming one victimization per conviction) to $202,461.73 (i.e., assuming multiple victimizations) in net present values and from $7.52 to $27.14 in cost-benefit ratios. In other words, the reductions in crime associated with MST provided taxpayers and crime victims with a combined monetary benefit that ranged from roughly $50,000 to $202,000 per participant

receiving MST. Furthermore, $1 spent on MST returned $8 to $27 to taxpayers and crime victims over the 13.7-year follow-up period.

The results supported the first hypothesis and demonstrated that reductions in criminal behavior for MST participants produced cost savings to taxpayers. Specifically, the benefits that MST produced in terms of reductions in crime, less the costs of MST, averaged $40,671.63 per MST participant. In addition, every dollar spent on MST returned $6.25 to taxpayers over the 13.7-year follow-up period. These cost savings are important because taxpayers are spending a larger proportion of available tax dollars on the juvenile justice system today than in years past, and the increase in spending over the past 15 years reflects a rise in confinement of juvenile offenders in secure county and state facilities (WSIPP, 2002). Unfortunately, the reason for this increase is that state policymakers are often faced with the unenviable task of allocating scarce financial resources to interventions for serious juvenile offenders and are often persuaded by initial program costs rather than by long-term clinical effectiveness or cost savings. As the present study demonstrates, however, the initial cost of providing services can be a poor measure of the long-term impact of interventions on serious juvenile offenders and society at large.

The results also supported the second and third hypotheses and indicated that decreases in recidivism for MST participants produced both tangible and intangible cost savings to crime victims. Indeed, assuming multiple victimizations per arrest, the tangible and intangible benefits per participant receiving MST were $53,134.05 and $93,167.13, respectively. Only under very restrictive assumptions (i.e., measuring monetary crime victim benefits only and assuming one victimization per arrest) does the

34

net benefit become negative (i.e., -$6,280.31). However, it seems clear that the overall

cost savings provided by MST are important for both crime victims and society at large.

In fact, crime victims often suffer physical trauma (e.g., injury, disability, death) and/or

psychological distress, and face costs associated with medical and mental health care,

time off from work, and diminished quality of life (Miller et al., 2001). Moreover, at the

societal level, neighborhoods that are high in crime often have fewer businesses, higher

consumer prices to cover increased insurance costs and wage premiums for businesses

(i.e., to encourage employees to work there), fewer employment opportunities and higher

unemployment rates, and extra taxation to fund criminal justice system, crime prevention,

health service, and victim support services (Research, Development, & Statistics

Directorate, 2005). Thus, it seems likely that reductions in recidivism for MST

participants can have wide ranging positive effects on citizens and the communities in

which they live.

It should be noted that the present study has several methodological limitations.

First, posttreatment criminal activity was assessed using arrest records, which are

believed to underestimate the actual number of crimes committed by serious offenders

(Loeber & Farrington, 1998). Nevertheless, arrest records are one useful index of

criminal involvement and likely provided an accurate estimate of the relative

effectiveness of MST versus IT in reducing serious criminal activity. Moreover, although

we were unable to obtain participants' self-reports of criminal activity, benefits to crime

victims were assessed assuming multiple victimizations per arrest to account for crimes

not reported to the police or adjudicated through the court system. Second, we were

unable to confirm that individuals maintained continuous residence in Missouri

throughout the follow-up period. As a result, we cannot rule out the possibility that a portion of the sample may have committed crimes in other states. However, it seems unlikely that length of residency in Missouri would vary systematically across treatment conditions. Moreover, at least partial recidivism data were available for the entire sample, and complete follow-up data were available for the vast majority (i.e., 91.5%) of the sample. Third, in the absence of a comprehensive analysis of marginal capital and operating costs for the criminal justice system in Missouri, we relied on some cost estimates from Washington (WSIPP, 2004) in the present study. Nevertheless, given that we adjusted for between-state differences in cost of living in our estimates, we believe that the results provide a reasonably accurate appraisal of costs and benefits for our sample. Finally, although a broad range of costs and benefits were covered in the present study, it is possible that some were missed. An examination of service utilization across different sectors (e.g., social welfare, mental health, juvenile justice, primary care) is needed to more fully explicate the types of services received by the participants and to explore the possibility of cost shifting.

In summary, the results from the present study demonstrate substantial cost savings for crime victims and society almost 14 years following the completion of MST with serious juvenile offenders and provide an impetus for reconsidering how juvenile justice services are typically selected and funded. Moreover, the results create a persuasive argument for greater use of MST with serious juvenile offenders and reduced use of individually-focused treatments such as those used in the alternate treatment condition. This shift in funding (i.e., from traditional services to evidence-based interventions such as MST) would result in further reductions in juvenile crime, increases

in the efficiency of how taxpayer dollars are spent, and decreases in social problems

associated with victimization (e.g., fear of crime, private security expenditures, lifestyle

changes) (Cohen, 1998). Nevertheless, funding for provision of evidence-based

treatments must be competitive to ensure penetration into the provider community (i.e.,

treatments of no or unknown effectiveness may be more profitable to treatment

providers) (Schoenwald & Henggeler, 2004). Furthermore, significant funding must be

provided for training and maintaining treatment fidelity so as to safeguard taxpayers'

investments and assure cost-beneficial reductions in recidivism. Future evaluations of

treatment and service delivery models for juvenile offenders should investigate not only

the clinical effectiveness of those models but also their costs and benefits for the

communities in which they are delivered.

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Table 1

Likelihood of Posttreatment Arrest by Therapy Condition

Therapy condition	Rearrest rate	Average number of offenses per recidivist	Expected number of offenses per participant
Multisystemic therapy	50.00 %	3.43	1.72
Individual therapy	81.00 %	4.54	3.68

Note. Sample sizes for therapy conditions are as follows: multisystemic therapy ($n = 92$),

individual therapy ($n = 84$).

Table 2

Expected Tangible Cost (in 2006 Dollars) to Taxpayers for One Felony Offense by

Therapy Condition

Offense category	Taxpayer cost ($)	Therapy condition			
		Multisystemic therapy (MST)		Individual therapy (IT)	
		Offense distribution (%)	Expected cost ($) (taxpayer cost x offense distribution)	Offense distribution (%)	Expected cost ($) (taxpayer cost x offense distribution)
Murder/ manslaughter	377,437.00	0.00	0.00	0.00	0.00
Sexual	96,296.00	0.99	953.33	1.83	1,762.21
Robbery	98,540.00	0.99	975.55	0.61	601.10
Aggravated assault	60,365.00	20.79	12,549.83	21.95	13,250.06
Property	11,584.00	61.39	7,111.41	46.95	5,438.68
Drug	17,137.00	15.84	2,714.47	28.66	4,911.41
Total	--------------	100.00	24,304.59	100.00	25,963.46

Note. Sample sizes for therapy conditions are: MST (*n* = 92); IT (*n* = 84).

Table 3

Expected Tangible Cost (in 2006 Dollars) to Crime Victims for One Felony Offense by

Therapy Condition (Assuming One Victimization per Arrest)

| Offense category | Tangible cost ($) | Therapy condition | | | |
| | | Multisystemic therapy (MST) | | Individual therapy (IT) | |
		Offense distribution (%)	Expected cost ($) (tangible cost x offense distribution)	Offense distribution (%)	Expected cost ($) (tangible cost x offense distribution)
Murder/ manslaughter	1,104,769.00	0.00	0.00	0.00	0.00
Sexual	6,685.00	0.99	66.18	1.83	122.33
Robbery	2,527.00	0.99	25.01	0.61	15.41
Aggravated assault	1,568.00	20.79	325.96	21.95	344.14
Property	605.00	61.39	371.30	46.95	283.96
Drug	0.00	15.84	0.00	28.66	0.00
Total	--------------	100.00	788.45	100.00	765.85

Note. Sample sizes for therapy conditions are: MST ($n = 92$); IT ($n = 84$).

Table 4

Expected Tangible Cost (in 2006 Dollars) to Crime Victims for One Felony Offense

(Assuming Multiple Victimizations per Arrest) Per MST Participant

Offense category	Tangible cost ($)	Distribution of multiple victimizations (%)	Expected cost ($) (lambda x expected change in offenses x tangible cost x distribution of multiple victimizations)
Murder/ manslaughter	1,104,769.00	0.01	29,295.74
Sexual	6,685.00	0.07	1,551.08
Robbery	2,527.00	0.41	3,433.73
Aggravated assault	1,568.00	0.62	3,222.10
Property	605.00	11.66	23,375.86
Drug	0.00	87.23	0.00
Total	-------------------	100.00	60,878.51

Note. Lambda = 168.91. Expected change in number of posttreatment offenses = 1.96.

Table 5

Expected Intangible Cost (in 2006 Dollars) to Crime Victims for One Felony Offense by

Therapy Condition (Assuming One Victimization per Arrest)

| | | Therapy condition | | | |
| | | Multisystemic therapy (MST) | | Individual therapy (IT) | |
Offense category	Intangible cost ($)	Offense distribution (%)	Expected cost ($) (intangible cost x offense distribution)	Offense distribution (%)	Expected cost ($) (intangible cost x offense distribution)
Murder/ manslaughter	2,049,989.00	0.00	0.00	0.00	0.00
Sexual	88,601.00	0.99	877.15	1.83	1,621.40
Robbery	6,254.00	0.99	61.92	0.61	38.15
Aggravated assault	8,512.00	20.79	1,769.66	21.95	1,868.40
Property	0.00	61.39	0.00	46.95	0.00
Drug	0.00	15.84	0.00	28.66	0.00
Total	--------------	100.00	2,708.73	100.00	3,527.95

Note. Sample sizes for therapy conditions are: MST ($n = 92$); IT ($n = 84$).

Table 6

Expected Intangible Cost (in 2006 Dollars) to Crime Victims for One Felony Offense

(Assuming Multiple Victimizations per Arrest) Per MST Participant

Offense category	Intangible cost ($)	Distribution of multiple victimizations (%)	Expected cost ($) (lambda x expected change in offenses x intangible cost x distribution of multiple victimizations)
Murder/ manslaughter	2,049,989.00	0.01	54,360.62
Sexual	88,601.00	0.07	20,557.90
Robbery	6,254.00	0.41	8,499.85
Aggravated assault	8,512.00	0.62	17,493.22
Property	0.00	11.66	0.00
Drug	0.00	87.23	0.00
Total	-----------------	100.00	100,911.59

Note. Lambda = 168.91. Expected change in number of posttreatment offenses = 1.96.

Table 7

Cumulative Benefit of Multisystemic Therapy to Taxpayers and Crime Victims in 2006

Dollars

Benefit	Analyses	
	Net present value ($)	Benefit-cost ratio ($)
Taxpayer tangible	40,671.63	6.25
Tangible crime victim		
One victimization	(6,280.31)	(0.81)
Multiple victimizations	53,134.05	6.86
Intangible crime victim		
One victimization	583.75	0.08
Multiple victimizations	93,167.13	12.03
Cumulative		
One victimization	50,463.99	7.52
Multiple victimizations	202,461.73	27.14

Note. Sample sizes for therapy conditions are: MST ($n = 92$); IT ($n = 84$). Dollar amounts in

parentheses indicate negative savings.