Six-Year Follow-up of Preventive Interventions for Children of Divorce
A Randomized Controlled Trial

Sharlene A. Wolchik, PhD
Irwin N. Sandler, PhD
Roger E. Millsap, PhD
Brett A. Plummer, PhD
Shannon M. Greene, PhD
Edward R. Anderson, PhD
Spring R. Dawson-McClure, MA
Kathleen Hipke, PhD
Rachel A. Haine, MA

Parental divorce is experienced by 1.5 million children each year in the United States. It is well documented that divorce has significant negative effects. Children of divorce more frequently have mental health problems, lower academic achievement, and higher levels of drug use than children from nondivorced families. The negative impact of parental divorce during childhood and adolescence can persist into adulthood, with higher rates of mental health problems and mortality.

Given the high prevalence of divorce and its potential negative effects, the development of effective prevention programs has clear public health significance. Controlled randomized trials have demonstrated that prevention programs for children of divorce reduce mental health problems in the short-term. Although most of these programs work directly with children and/or early adolescents, one program for custodial mothers has demonstrated replicated reductions in mental health problems. Dual-component programs involving both mothers and children have consistently yielded effects comparable with those of child-only or mother-only programs.

Context
Compared with their peers with nondivorced parents, adolescents with divorced parents are more likely to have mental health problems, drop out of school, and become pregnant. The long-term effects of intervention programs for this population are unknown.

Objective
To evaluate the long-term effectiveness of 2 programs designed to prevent mental health problems in children with divorced parents.

Design and Setting
Six-year follow-up of a randomized controlled trial of 2 intervention programs (mother program: 11 group and 2 individual sessions; mother plus child program: mother program and 11 group sessions for children) and a control condition (books on postdivorce adjustment), which was conducted in a large metropolitan US city from April 1998 through March 2000.

Participants
A total of 218 families (91% of the original sample) with adolescents aged between 15 and 19 years were reinterviewed.

Main Outcome Measures
Externalizing and internalizing problems, diagnosed mental disorders, drug and alcohol use, and number of sexual partners.

Results
Eleven percent of adolescents in the mother plus child program (95% confidence interval [CI], 3.8%-18.2%) had a 1-year prevalence of diagnosed mental disorder compared with 23.5% (95% CI, 13.8%-33.2%) of adolescents in the control program (P = .007). Adolescents in the mother plus child program had fewer sexual partners (mean [SE], 0.68 [0.16]) compared with adolescents in the control program (1.65 [0.37]; P = .01). Adolescents with higher initial mental health problems whose families were in the mother plus child program had lower externalizing problems (P = .007) and fewer symptoms of mental disorder (P = .02) compared with those in the control program. Compared with controls, adolescents whose mothers participated in the mother program and who had higher initial mental health problems had lower levels of externalizing problems (P < .001); fewer symptoms of mental disorder (P = .005); and less alcohol (P = .005), marijuana (P = .02), and other drug use (P = .01).

Conclusions
In adolescents of divorced parents, the mother program and the mother plus child program reduced symptoms of mental disorder; rates of diagnoses of mental disorder; levels of externalizing problems; marijuana, alcohol, and other drug use; and number of sexual partners.

JAMA. 2002;288:1874-1881

©2002 American Medical Association. All rights reserved.
No studies have examined the long-term effects of programs for children of divorce but assessment of such effects is critical. Because participants in prevention programs are not yet experiencing clinically significant mental health problems, program effects on mental disorder can only be detected by following participants over time. Also, several socially significant negative outcomes associated with divorce, such as conduct disorder, school dropout, substance use, high-risk sexual behaviors, and depression, are rare during childhood. Given that children of divorce are at heightened risk for developing these problems, tracking the effects of programs into adolescence is essential. Furthermore, examining the durability of preventive effects has important implications for program design. If short-term effects dissipate over time, maintenance-promoting features may be needed.

The New Beginnings Program was a randomized controlled trial of 2 prevention programs, a program for custodial mothers, mother program (MP), and a dual-component program, mother plus child program (MPCP), for custodial mothers and their children, conducted between March 1, 1992, and December 31, 1993. Prior evaluation indicated positive effects of the MP on externalizing and internalizing problems at posttest and maintenance of positive effects of the MP on externalizing problems at 6-month follow-up. Children with higher initial externalizing problems benefited most from the MP and no additive effects of the MPCP were observed compared with the MP on internalizing or externalizing problems.

We assessed the effects of the MP and the MPCP compared with a literature control condition 6 years later. It was hypothesized that both the MP and MPCP would differ significantly from the control condition, and that program effects would differ depending on initial behavior problems.

METHODS

Sample

Potential participants were identified through computerized court records of randomly selected divorce decrees of families with children between the ages of 9 and 12 years granted in Maricopa County (metropolitan area of Phoenix, Ariz) within 2 years of the intervention. Participants were recruited through letters and telephone calls. When addresses were not correct, project staff used methods such as reverse telephone directories. A subset of individuals (n = 532) not found through these methods was randomly selected for intensive location efforts (eg, contacting neighbors). Current addresses and telephone numbers were obtained for 68% (n = 361) of this group. Supplemental recruitment methods (ie, media, referrals) were used to increase sample size.

All families meeting initial eligibility criteria were invited to participate in an in-home recruitment visit and subsequent pretest interview. Criteria were primary residential parent was female; neither mother nor any child was in treatment for mental health problems; mother had not remarried, had no live-in boyfriend or plans to remarry during the study; custody was expected to remain stable during the study; family resided within a 1-hour drive of program delivery site; mother and child were fluent in English; child was not mentally handicapped or learning disabled; and any child diagnosed with attention-deficit/hyperactivity disorder was taking medication. Families were excluded and referred for treatment if the child scored higher than 17 on the Children's Depression Inventory, endorsed an item about suicidal ideation, or scored higher than the 97th percentile on the Externalizing Subscale of the Child Behavior Checklist. Participants who remained eligible and interested after the pretest attended an orientation session where families were randomly assigned to condition. In families with multiple children in the age range, 1 was randomly selected to be interviewed, but all children aged 9 to 12 years were invited to participate in the intervention.

The pool of potential participants included 1816 families, of which 1718 were randomly selected from court records, including 361 that were found by intensive location efforts. A total of 98 were recruited through the media or referrals. Of these, 1331 families were contacted by telephone; 671 (50%) met the initial eligibility criteria. Of these, 453 completed the recruitment visit, 341 agreed to participate in the study, and 315 completed the pretest. Forty-nine families were found to be ineligible at the pretest and 26 refused between pretest and assignment to condition. A total of 240 families (36% of those eligible) were randomly assigned to 1 of 3 conditions: MP (n = 81), MPCP (n = 83), or control (n = 76). Twenty-six families (11%) assigned to condition dropped out of their intervention program. Reasons included insufficient time (n = 8), transportation problems (n = 5), dissatisfaction with program (n = 6), and other (n = 7) (eg, significant physical problems, life stressors, unknown). In accord with the intent-to-treat design, these 26 families were recruited for posttest and follow-up assessments and included in all analyses. The Figure shows the progress of participants through the stages of the trial.

Sample representativeness was assessed by comparing intervention acceptors vs those who refused the intervention but agreed to complete the pretest and met initial eligibility criteria, and acceptors assigned to condition vs acceptors who refused between the pretest and assignment. Acceptors reported significantly higher incomes (P = .03), higher maternal education (P = .01), and fewer children than refusers (P = .01). Acceptors assigned to condition had higher maternal education (P = .02) than acceptors who refused between the pretest and assignment. Children's mental health problem scores did not differ significantly across either comparison (P = .08 and P = .39, respectively).

Randomization occurred after the pretest interview, ensuring that assignment concealment was not compromised. Randomization was conducted within the evening availability pool (Tuesday vs Thursday) because some families could attend only 1 of the
PREVENTIVE INTERVENTIONS FOR CHILDREN OF DIVORCE

nights the groups were offered. Randomization software, developed by an individual not affiliated with the research project, was designed to avoid large differences across experimental conditions as families were sequentially enrolled. Restricted randomization procedures such as this are commonly used to minimize bias.  

At the 6-year follow-up, conducted from April 5, 1998, to March 10, 2000, 218 families (91% of the families assigned to condition) were reinterviewed. Of these, 180 had been recruited from the divorce decree records, 32 had responded to media announcements, 5 had been referred by friends, and 1 had been referred by a mental health professional. Families recruited through court records vs other methods did not differ on internalizing problems at baseline (P = .23), externalizing problems at baseline (P = .76), or number of intervention sessions attended (P = .70). Two hundred nine adolescents, 191 primary residential parents (174 mothers and 17 fathers), and 27 nonresidential parents (25 mothers and 2 fathers) completed the measures used in this study. Data from nonresidential parents were used in families where the residential parent refused or could not be contacted (n=8) or the adolescent lived independently (n=19).

Procedures
Participants were assessed at pretest (prior to assignment to condition), immediately following, 3 months, 6 months, and 6 years after the intervention. Results of the posttest and 6-month follow-up assessments are presented elsewhere. Several methods were used to maintain contact with the sample during follow-up (eg, sending newsletters). The mean (SD) length of time between posttest and 6-year follow-up assessments was 6.09 years (0.13); length of time did not differ across condition (P = .30). Parents and adolescents aged 18 years and older signed informed consent forms; children and younger adolescents (<18 years) signed assent forms. The study was approved by the institutional review board at Arizona State University.

To ensure validity, data collection was standardized across groups, and over the course of the study, interviewers received training in administration of measures and weekly meetings were held to reinforce assessment procedures. Furthermore, audiotapes of interviews were reviewed and an experienced interviewer intermittently conducted live observations of interviews and provided feedback.

In the original trial, mothers and children were informed prior to assignment to condition that they would participate in 1 of 3 programs. At follow-up, participants were told that they were being interviewed as a follow-up to participation in the study. Interviewers had no information about the family’s program condition. To reduce the likelihood that interviewers would learn the condition, families were asked not to discuss their program at the beginning of the interview.

Intervention Programs and Implementation
The manualized programs were implemented by 13 master’s degree–level clinicians in the program for mothers and 9 in the program for children. Leaders received extensive training (30 hours prior to the start of the program and 1.5 hours per week during delivery). Following each session, 1 of the program developers provided 1 hour of clinical supervision.

The MP focused on improving mother-child relationship quality and effective discipline, increasing father’s access to the child, and reducing interparental conflict. The clinical methods used were based on social learning and cognitive-behavioral principles of behavior change. Groups, which met for 11 sessions (1.75 hours per session), were coded by 2 clinicians. There were also 2 structured individual sessions to tailor the program activities to individual needs.

The MCPP also focused on improving effective coping, reducing nega-
tive thoughts about divorce stressors, and improving mother-child relationship quality. Clinical methods derived from social learning and social-cognitive theory included labeling feelings,23 problem solving,23 positive cognitive reframing,26 challenging negative appraisals about divorce stressors,25 and “I-messages.”23 Groups met for 11 sessions (1.75 hours per session) and were co-led by 2 clinicians. For more complete descriptions of these programs, see previous articles.12,27 The literature control condition consisted of distributing books on divorce adjustment to mothers and children as well as syllabi to guide the reading.

Several measures were taken to ensure high fidelity of implementation. Detailed manuals, extensive training, and intensive supervision were provided, and leaders were required to score more than 89% on quizzes prior to each session. The mean (SD) score was 97.0% (3.2%) and 89% on quizzes prior to each session. The leaders were required to score more than 98.3% (1.4%) for the mother and child group leaders, respectively. Independent raters scored each program segment using videotapes of sessions (1 = not at all complete to 3 = complete). Mean (SD) completion was 2.86 (0.39) and 3.00 (0.02) for mother and child sessions, respectively.

**Outcome Variables at 6-Year Follow-up**

**Disorder Diagnosis and Symptom Count.** Mental disorder and drug abuse or dependence were assessed at 6-year follow-up using the computer-assisted parent and adolescent versions of the Diagnostic Interview Schedule for Children (scoring algorithm version 1).28 Submodules/modules that are rare in adolescence were not administered (eg, selective mutism, tic). Diagnoses were derived separately for mental disorder and drug abuse or dependence and were based on meeting 2 conditions: according to either self or parent report, adolescents met symptom criteria for diagnosis of 1 or more disorders in the past year, and 2 or more of the impairment items for the disorder(s) were rated as intermediate or severe according to adolescent or parent report.29 Total symptom scores were derived separately for mental disorder and drug abuse or dependence, according to symptoms endorsed by either the parent or adolescent.

**Externalizing Problems.** Parents completed the Child Behavior Checklist,19 which includes a 33-item externalizing problems subscale. This subscale has adequate test-retest and internal consistency reliability and construct and predictive validity.30 Adolescents completed a 27-item self-report scale of externalizing problems. Aggression and hostility were assessed by items from the Divorce Adjustment Project Externalizing Scale (I.N.S., unpublished data, 1985); items were added to assess de-linquent behavior. The full 27-item scale has been found to be sensitive to detecting intervention-induced change and has acceptable internal consistency.30 To reduce the experiment-wise error rate and ease presentation, composite scores were constructed by standardizing the parent and adolescent report measures and then averaging.31

**Internalizing Problems.** Parents completed the Child Behavior Checklist,19 which includes a 31-item internalizing subscale. Adolescents completed the 27-item Child Depression Inventory18 and the 28-item revised Children’s Manifest Anxiety Scale.32 These measures have adequate test-retest and internal consistency reliability and construct and predictive validity.33,34 A composite of reports on both of these measures was formed as the mean of the standardized scores. Parent and adolescent measures were then standardized and averaged.

**Alcohol and Drug Use.** Items from the Monitoring the Future Scale34 were used at the 6-year follow-up. This scale has adequate reliability and construct validity.35 To maximize validity of responses, adolescents responded on a self-administered questionnaire. Alcohol and marijuana use were measured by a 7-point scale of times used (1 = 0 to 7 = ≥40) in the past year. Other drug use was computed as the sum of ratings on this scale for 13 other drugs (eg, heroin). Polydrug use was assessed by counting the number of different drugs, including alcohol, used in the past year.

**Number of Sexual Partners.** Adolescents responded to a self-administered question on the number of different sexual partners they had had since completion of the New Beginnings Program.

**Statistical Analysis**

With expected attrition, the projected sample size was 214, with approximately equal sample sizes across the 3 groups. Power analyses for the analysis of covariance (ANCOVA)36 assumed an α = .05, 2-tailed tests of significance, and a correlation of .60 between baseline and follow-up measures. For a medium effect size (increment to $R^2 = 0.13$) and small effect size (increment to $R^2 = 0.06$), the power of the test for group differences was above 99% and 97%, respectively. Power analyses conducted for dichotomous measures (ie, diagnoses) assumed a base rate of 30% in the control group and that the intervention would reduce this to 10%. A reduction of this magnitude constitutes a medium effect size according to Cohen.36 The power of the test for this difference in proportions was 86%.

Data were analyzed using SPSS version 10.0.5 (SPSS Inc, Chicago, Ill). Baseline equivalence of the 3 groups was tested using analysis of variance for continuous measures and $\chi^2$ tests for categorical variables. Rates of attrition were compared across the 3 groups. Those who were present at follow-up were compared with those who were not on baseline outcome measures. The interaction between attrition status at follow-up and group membership was also evaluated. These 2 effects were evaluated using a factorial (3 × 2) analysis of variance, with group and attrition status being the factors studied.

Intervention effects for continuous measures were tested with ANCOVA.37 For dichotomous measures, logistic regression was used; for ordinal measures, ordinal logistic regression was used. For externalizing problems and internalizing problems, the corresponding baseline measure was used as a co-
variables. Given that earlier levels of pathology predict a wide range of behavior problems in adolescence, the baseline covariate for all measures that were not assessed at baseline (e.g., alcohol use) was a composite of child and mother report of externalizing and internalizing problems. Of primary interest were the effects of group membership and the interaction between group and baseline covariates. In models where the interaction term was nonsignificant, the model was reassessed without the interaction term. If the interaction was significant, the form of the interaction was studied to determine how intervention effects varied with baseline status. Consistent with prior trials, it was expected that intervention effects would be greatest for those with higher levels of problems at baseline. In all analyses, an intent-to-treat approach was used; all participants’ data were included regardless of level of attendance at the intervention sessions.

Because the primary question was the long-term effects of either the MP or MPCP, all above analyses were conducted separately for each intervention group compared with control. Hypothesis tests were conducted using 2-tailed \( \alpha = .05 \); \( P \leq .05 \) was considered significant. Posthoc analyses comparing the MP and MPCP were conducted to test the differential long-term effects of these 2 programs.

### RESULTS

#### Sample Characteristics

At 6-year follow-up, 108 (49.5%) of the adolescents were female and mean (SD) age was 16.9 (1.1; range, 15.1-19.1) years. Eighty percent of the adolescents lived with their mothers; 11% lived with their fathers; and 9% lived independently. The mean (SD) age of the residential mothers and fathers was 43.2 years (4.7) and 48.4 years (5.9), respectively. Ethnicity for residential mothers/residential fathers interviewed at follow-up was 89.1%/82.4% white, non-Hispanic; 6.3%/17.6% Hispanic; 1.1%/0% black; 1.1%/0% Asian/Pacific Islander; and 2.3%/0% other. Of the residential mothers and residential fathers, 25.3% and 62.5% were remarried at follow-up, respectively. No differences occurred on remarriage across groups (\( P = .26 \) and \( P = .13 \), respectively). Mean (SD) annual household income, which included alimony and child support, for residential mothers and residential fathers at follow-up was $50,760 ($27,180) and $79,264 ($23,811), respectively. There were no significant differences in income across groups (\( P = .71 \) and \( P = .43 \), respectively). At follow-up, 52.9% of the families had sole maternal legal custody arrangements, 45.7% had joint legal custody, and 1.2% had sole paternal custody; no differences occurred across groups (\( P = .45 \)). Thirty-eight percent of adolescents received counseling (defined as having been seen by a professional psychologist, psychologist, social worker, counselor, or other mental health worker for emotional problems or difficulties) after the program was completed. Receipt of counseling did not differ by group (\( P = .50 \)).

Comparisons of MPCP, MP, and control on demographic variables revealed no significant group differences (Table 1). The groups did not differ significantly on baseline levels of externalizing or internalizing problems. No significant attrition or group \( \times \) attrition

### Table 1. Demographics and Outcome Variables at Baseline

<table>
<thead>
<tr>
<th></th>
<th>Mother Plus Child Program (n = 73)</th>
<th>Mother Program (n = 77)</th>
<th>Control (n = 68)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age, y</td>
<td>10.7 (1.1)</td>
<td>10.8 (1.1)</td>
<td>10.7 (1.1)</td>
</tr>
<tr>
<td>Male child, No. (%)</td>
<td>36 (49.3)</td>
<td>42 (54.5)</td>
<td>32 (47.1)</td>
</tr>
<tr>
<td>Sole maternal legal custody, No. (%)</td>
<td>44 (60.3)</td>
<td>51 (66.2)</td>
<td>41 (60.3)</td>
</tr>
<tr>
<td><strong>Mother</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity, No. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>65 (89.0)</td>
<td>69 (89.6)</td>
<td>60 (88.2)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3 (4.1)</td>
<td>6 (7.8)</td>
<td>6 (8.8)</td>
</tr>
<tr>
<td>Black</td>
<td>1 (1.4)</td>
<td>1 (1.3)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>Asian American</td>
<td>1 (1.4)</td>
<td>1 (1.3)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>3 (4.1)</td>
<td>0</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>Education, y</td>
<td>14.4 (1.8)</td>
<td>14.6 (1.8)</td>
<td>14.4 (1.6)</td>
</tr>
<tr>
<td>Gross income, US$</td>
<td>27,020 (14,998)</td>
<td>27,370 (18,330)</td>
<td>25,404 (12,068)</td>
</tr>
<tr>
<td>Age, y</td>
<td>36.1 (4.5)</td>
<td>37.5 (4.9)</td>
<td>36.3 (4.5)</td>
</tr>
<tr>
<td><strong>Father</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity, No. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>63 (86.3)</td>
<td>64 (83.1)</td>
<td>62 (91.2)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7 (9.6)</td>
<td>7 (9.1)</td>
<td>4 (5.9)</td>
</tr>
<tr>
<td>Black</td>
<td>2 (2.7)</td>
<td>2 (2.6)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>Asian American</td>
<td>0</td>
<td>2 (2.6)</td>
<td>0</td>
</tr>
<tr>
<td>American Indian</td>
<td>0</td>
<td>1 (1.3)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (1.4)</td>
<td>1 (1.3)</td>
<td>0</td>
</tr>
<tr>
<td>Education, y</td>
<td>13.9 (2.5)</td>
<td>14.1 (2.4)</td>
<td>13.9 (2.2)</td>
</tr>
<tr>
<td>Age, y</td>
<td>40.1 (5.5)</td>
<td>39.9 (5.8)</td>
<td>38.6 (5.3)</td>
</tr>
<tr>
<td>Remarried, No. (%)</td>
<td>13 (17.8)</td>
<td>7 (9.1)</td>
<td>10 (14.7)</td>
</tr>
<tr>
<td>Time since separation, y</td>
<td>2.3 (1.4)</td>
<td>2.1 (1.3)</td>
<td>2.3 (1.6)</td>
</tr>
<tr>
<td>Time since divorce, y</td>
<td>1.0 (0.6)</td>
<td>1.0 (0.5)</td>
<td>1.0 (0.5)</td>
</tr>
<tr>
<td>No. of children at home</td>
<td>2.2 (1.0)</td>
<td>2.3 (0.9)</td>
<td>2.1 (0.8)</td>
</tr>
<tr>
<td><strong>Outcome variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother/child report†</td>
<td>0 (0.93)</td>
<td>0.17 (1.18)</td>
<td>−0.19 (0.81)</td>
</tr>
<tr>
<td>Internalizing problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother/child report†</td>
<td>0.08 (1.09)</td>
<td>0.05 (1.08)</td>
<td>−0.14 (0.78)</td>
</tr>
</tbody>
</table>

*Includes only families that provided data at the 6-year follow-up. No baseline variables were significantly different by group.
†Standardized (mean = 0, SD = 1.0).
interaction effects were found on either baseline externalizing problems or internalizing problems. Given these results, only the 218 families who provided data at the 6-year follow-up were used in subsequent analyses.

**Comparison of MPCP and MP vs Control**

Logistic regression analyses indicated a significant group difference on diagnosis of any disorder (MPCP, 15.1%; 95% confidence interval [CI], 6.9%-23.3%; vs control, 23.5%; 95% CI, 13.8%-33.2%; \( P = .04 \)). The adjusted odds ratio (OR) indicated that the odds of any disorder were 2.83 (95% CI, 1.07-7.81) times higher in the control than MPCP. Logistic regression analyses on diagnosis of mental disorder alone indicated a significant group difference (MPCP, 11.0%; 95% CI, 3.8%-18.2%; vs control, 23.5%; 95% CI, 13.8%-33.2%; \( P = .007 \)), with an adjusted OR of 4.50 (95% CI, 1.53-13.70). No significant difference for diagnosis of drug abuse or dependence was found between the MPCP (4.1%; 95% CI, 0.8%-8.6%) and control (2.9%; 95% CI, 0.8%-6.9%). No significant differences for diagnosis of any disorder, mental disorder, and drug abuse or dependence were found between the MP and control. The percentages for the MP were diagnosis of any disorder, 19.7% (95% CI, 10.8%-28.6%); mental disorder, 18.4% (95% CI, 9.7%-27.1%); and drug abuse or dependence disorder, 5.3% (95% CI, 0.3%-10.3%). For all significant logistic models, model fit was supported and multicollinearity was not substantial.

**Table 2** shows the actual and adjusted means on continuous measures of externalizing and internalizing problems, mental disorder symptom count, drug dependence or abuse symptom count, polydrug use, and number of sexual partners by group. Adjusted means are presented separately based on the ANCOVAs for each comparison. The comparisons between the MPCP and control found a significant group difference and a significant group \( \times \) baseline interaction on externalizing problems. The form of the interaction indicates that the benefit of the MPCP was strongest for those with higher baseline externalizing problems. There was also a significant group \( \times \) baseline interaction for the mental disorder symptom count in the mental disorder symptom count vs control comparison; program benefit was strongest for those with higher baseline problems. Finally, there was a significant group effect for sexual partners (control=1.65 vs MPCP=0.68; \( P = .01 \); Cohen \( d = .49 \)).

In the MP vs control comparisons, the ANCOVAs showed significant group \( \times \) baseline interactions on externalizing problems and mental disorder symptom count. In both interactions, the program benefit was strongest for those with higher baseline problems.

There were no significant group or group \( \times \) baseline effects for the MPCP vs control comparisons for marijuana, alcohol, and other drug use. For the MP vs control comparisons, there were significant group \( \times \) baseline interaction effects for alcohol (\( P = .005 \)), marijuana (\( P = .02 \)), and other drug use (\( P = .01 \)). For each interaction, the program benefit was strongest for those with higher baseline problems.

**Comparison of MPCP and MP**

To address whether the MPCP produced additional benefit compared with the MP, all outcome analyses were conducted comparing these 2 groups. Because these analyses were not planned, comparisons were performed using multiple comparison procedures to adjust for error-rate inflation. No significant main or interaction effects were found for any outcome variable. The \( P \) values for analyses of the mental health outcomes and substance use outcomes ranged from .13 to .95 and .16 to .99, respectively. The \( P \) value for the analysis of number of sexual partners was .19.

**COMMENT**

To our knowledge, this is the only randomized controlled trial to document

**Table 2.** Actual and Adjusted Follow-up Means on Behavior Problems, Symptom Counts, Polydrug Use, and Number of Sexual Partners*

<table>
<thead>
<tr>
<th></th>
<th>MPCP vs Control Comparison</th>
<th>MP vs Control Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Follow-up</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjusted Mean (SE)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MPCP</td>
<td>MP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Externalizing problems</td>
<td>-0.11 (0.11)</td>
<td>0.04 (0.11)</td>
</tr>
<tr>
<td>Internalizing problems</td>
<td>-0.02 (0.12)</td>
<td>-0.02 (0.11)</td>
</tr>
<tr>
<td>Mental disorder symptom count</td>
<td>17.57 (1.07)</td>
<td>18.50 (1.12)</td>
</tr>
<tr>
<td>Drug dependence or abuse symptom count</td>
<td>1.47 (0.25)</td>
<td>1.82 (0.43)</td>
</tr>
<tr>
<td>Polydrug use</td>
<td>1.52 (0.25)</td>
<td>1.86 (0.28)</td>
</tr>
<tr>
<td>No. of sexual partners</td>
<td>0.68 (0.16)</td>
<td>1.09 (0.25)</td>
</tr>
</tbody>
</table>

*MPCP indicates mother plus child program; MP, mother program; ellipses, variables with significant interactions for which means are dependent on level of the covariate; and NA, the interaction term is not applicable because models with nonsignificant interaction effects were rerun without the interaction term.

©2002 American Medical Association. All rights reserved.
long-term benefits of preventive interventions for children whose parents have divorced. The internal validity of these findings is enhanced by exceptional levels of program fidelity and use of intent-to-treat analyses. Unlike previous evaluations of short-term maintenance, this study focused on adolescents. Whether the effects of preventive interventions provided in childhood endure into adolescence is critical given the marked increase in rate and severity of mental health problems during adolescence. In addition, these findings extend previous work on maintenance of the effects of divorce-related prevention programs by demonstrating that participation leads to reductions not only in externalizing problems but also diagnosis of mental disorder, drug and alcohol use, and number of sexual partners. These program benefits have significant public health implications.

The consistency of the findings across multiple outcomes provides evidence that the preventive effects are not specific to one domain of functioning. Both the MP and MPCP led to lower levels of externalizing problems for those who were at higher risk. The impact of the programs in reducing externalizing problems is noteworthy given that children of divorce are at high risk for these problems, the marked stability of externalizing problems, and their high individual and societal costs.40 The finding that the MPCP reduced the 1-year prevalence of diagnosed mental disorder contributes to prior findings that prevention programs reduce the rate of mental health symptoms in the short-term.12,13 The size of this reduction (adjusted OR, 4.50) is substantial. The MP led to significantly less alcohol, marijuana, and other drug use for those who were at higher risk when they entered the program. Finally, adolescents in the MPCP reported significantly fewer sexual partners than those in the control condition. Given that externalizing problems, mental disorder, substance use, and high-risk sexual behavior in adolescence are each associated with longer-term mental health and social adaptation problems,40,41 program-induced reductions on these outcomes may have important positive consequences into adulthood.

The finding that those at highest risk benefited most from the program on multiple measures is consistent with the posttest results in the 2 trials of these programs.11,12 as well as the findings of other preventive interventions for children.42 The occurrence of significant program effects for the high-risk subgroup needs to be viewed within the context of the larger literature, which finds that whereas most children adapt well following divorce, approximately 20% to 25% experience enduring significant adjustment problems.3 These findings suggest that the MP and MPCP may benefit the subgroup that is most at risk for long-term problems and preventive efforts should target this subgroup.

The finding that neither program reduced internalizing problems continues a pattern from the posttest and 6-month follow-up evaluations.11,12 It is notable that children of divorce are primarily at risk for externalizing problems,4 so the lack of benefit on internalizing problems may reflect the smaller risk children of divorce experience in this domain.

It is important to note that posthoc comparisons between the MP and MPCP revealed no significant differences on any outcome. Where there were significant benefits for 1 program but not the other compared with control, the direction of effects for the 2 conditions vs control was similar. For example, whereas the MPCP had a significant benefit on sexual partners compared with control, the MP had a marginally significant effect. The MPCP had a significant effect on diagnosis of mental disorder, and, although not significant, the adjusted OR of diagnosis of mental disorder in the MP vs control was 1.94. Similarly, although only the MP showed significant benefits on alcohol, marijuana, and other drug use compared with control, use of alcohol, marijuana, and other drugs was lower in the MPCP than control. Although we cannot explain why statistically significant benefits were found on selected problems for the MP or MPCP vs control, the clear pattern of superior outcomes for each intervention compared with the control condition is notable. However, the cost of the MPCP is considerably higher than the MP because of increased personnel, administrative, training, and space requirements. Future research should assess the cost-effectiveness of both programs.

In addition to the posthoc comparison of the intervention groups, 2 other limitations of this study should be noted. First, the sample may be biased in ways that limit generalizability. Although children in families who agreed to participate did not differ on mental health problems from children in families who refused, participating mothers were better educated, had higher incomes, and had fewer children. These demographic characteristics may predispose mothers to use the program skills effectively. Also, the participation rate was not high and the sample was almost exclusively middle-class and white. These sample characteristics limit the external validity in that the findings may not generalize to other populations. Furthermore, the sample size was not large. Attention should be given to developing more effective recruitment mechanisms.

Second, this study did not include an attention-placebo control, which could have ruled out the possibility that differences between the control and intervention groups were due to the greater amount of attention and effort provided to the intervention groups. However, mediational analyses indicate that the program reduces mental health problems through improving parenting (S.A.W., unpublished data, 2002), thus making it less likely that expectancy or placebo effects are the mechanisms underlying program effects. Furthermore, another group program for divorced mothers,9 which was similar in length and focused primarily on mothers’ own adjustment, should have provided equal attention to participants as that provided in the cur-
rent program; the lack of significant benefits of that program on children's mental health outcomes argues against expectancy or placebo effects as an explanation of the program effects in the current trial.

Program benefits were found in the context of a rigorous efficacy trial, which included numerous eligibility criteria, extensive evaluation, and exceptional fidelity of program implementation. Given the promising findings, large-scale trials in ethnically and economically diverse samples that test whether these programs can be delivered with fidelity and effectiveness in natural service delivery systems is a critical next step. Such large-scale trials should include a careful assessment of the cost-benefit ratio of the programs to provide guidance for the development of public policy for delivery of services for children of divorce.

Author Contributions: Study concept and design: Wolchik, Sandler, Greene, Anderson. Acquisition of data: Wolchik, Sandler, Greene, Anderson, Dawson-McClure, Hipke. Analysis and interpretation of data: Wolchik, Sandler, Millsap, Plummer, Dawson-McClure, Hipke, Haine. Drafting of the manuscript: Wolchik, Sandler, Millsap, Plummer. Critical revision of the manuscript for important intellectual content: Wolchik, Sandler, Millsap, Plummer, Greene, Anderson, Dawson-McClure, Hipke, Haine. Obtained funding: Wolchik, Sandler, Greene, Anderson.

Administrative, technical, or material support: Wolchik, Sandler, Plummer, Greene, Dawson-McClure, Hipke, Haine. Study supervision: Wolchik, Sandler, Greene.

Funding/Support: This work was supported by grants RO1-MH50753-01A1 and 2P30-MH39346 from the National Institute of Mental Health.

Acknowledgment: We thank Philip G. Poirier, MD, and Linda Sandler, MPA, for their support throughout this project; the mothers, fathers, and adolescents for their participation; David MacKinnon, PhD, and Xianchun Liu, MD, PhD, for their insightful comments on an earlier draft of this article; Sarah Harris, PhD, for providing training in working with parents; Toni Genalo, BS, Laura Legge, BA, Lorey Wheeler, MS, and Scott Proescho Lolli, MPH, for their assistance with data collection and management; Jenn-Yun Tein, PhD, for statistical consultation; Jennifer Fisher, PhD, Lilie Weiss, PhD, and Kathryn Doyle, PhD, for their assistance in the experimental trial; and Ernest Fairchild, AA, for his technical assistance. We also thank the group leaders and graduate students for their assistance with implementing the programs.

REFERENCES


©2002 American Medical Association. All rights reserved.