Treatment Alliance and Its Association with Family Functioning, Adherence, and Medical Outcome in Adolescents with Severe, Chronic Asthma

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Objective: **To examine the concept of treatment alliance in the care of adolescents with asthma.**

Methods: **Measures of treatment alliance were obtained from 60 adolescents with severe, chronic asthma admitted to a tertiary care facility, their parents, and their asthma specialists at the referral center. Associations were examined between the alliance measures and multimeasure, multiagent data concerning family functioning and asthma treatment adherence and outcome.**

Results: **Physicians' reports of treatment alliance were associated with concurrent family functioning and asthma medication adherence, as well as with asthma treatment adherence and outcome in the year after the stay at the asthma center.**

Conclusions: **As emphasized in the recently revised** *Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma* **(NHLBI, 1997), the ability of children with asthma, their parents, and their physician to create a positive partnership, or treatment alliance, appears to have an important role in optimal asthma management.**

Key words: **treatment alliance; partnership; asthma; adherence; clinical outcomes; family functioning.**

Treatment alliance, the ability of an individual and his or her physician to create a positive working relationship, is essential to optimal medical care. Treatment alliance affords a sense of shared goals and mutual positive regard, as well as a lack of negative behavior that potentially could undermine the relationship and the treatment. The treatment alliance concept is particularly important in severe, chronic illness, where regular contact, ongoing symptom assessment, and mutual decision making are necessary between the patient and his or her physician. Within asthma management, the central role of treatment alliance is emphasized in the recently revised *Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma* (NHLBI, 1997). Indeed, the need for an effective partnership between the patient and care provider is cited as one of the four primary components of optimal treat-

ment. Despite this emphasis on the importance of treatment alliance in asthma management, little work has been done to measure the concept of partnership or alliance within health care settings or to examine which individual and family characteristics promote a patient's ability to form a positive partnership with health care providers. In addition, few studies have established links between treatment alliance and medical treatment outcomes or adherence behavior. This study examines the associations among treatment alliance, family functioning, and asthma treatment adherence and outcome in a group of adolescents with severe, chronic asthma admitted to a tertiary care facility specializing in the treatment of respiratory, immune, and allergic disease.

The concept of treatment alliance has been most extensively studied within the field of psychotherapy (see Horvath & Luborsky, 1993, and Horvath & Symonds, 1991, for reviews). In this literature, stronger therapeutic alliance has been positively related to better outcomes across a variety of psychotherapeutic treatments (Krupnick et al., 1996; Luborsky, McLellan, Woody, O'Brien, & Auerbach, 1985). Studies have typically examined the alliance underlying the patient-therapist relationship by measuring the patient's and therapist's perceptions of mutual regard, agreement on goals, and level of motivation and change-related activity (Allen, Newsom, Gabbard, & Coyne, 1984).

Within the broader health care literature, study of treatment alliance has focused almost exclusively on aspects of physician-patient communication and their relation to variables such as patient satisfaction. Overall, positive physician communication behaviors (being affiliative, interested, concerned, and conveying positive regard for the patient) are associated with better patient satisfaction and greater perception of physician competence (Ben-Sira, 1976; Ben-Sira, 1982; Buller & Buller, 1987). There is also evidence that physician communication skills are related to better patient treatment adherence and fewer appointment cancellations (DiMatteo, Hays, & Prince, 1986), as well as increased recall of and adherence to physician advice (Heszen-Klemens & Lapinska, 1989). Although these physician behaviors without doubt are important components of a treatment alliance, they focus on the content of, and patient's reaction to, these interactions. We emphasize a broader relational concept of each partner's perception of being allied with the other in managing an illness, as also emphasized in the 1997 guidelines and as developed

more fully in the psychotherapy alliance literature. Furthermore, as a measure, patient satisfaction, although important, does not include the physician's perspective on the quality of the partnership.

Few studies have examined the association between treatment alliance and medical treatment outcomes. In one study, Kaplan, Greenfield, and Ware (1989) examined the effect of physician-patient interactions on outcome of chronic disease. This study found that patients demonstrated better objective health outcomes, such as blood sugar and blood pressure control, and experienced fewer functional limitations from their illnesses when their physicians provided them with more information and when their partnership with their physician was more emotionally expressive and allowed them more control.

Although not directly assessing treatment alliance and patient and physician behaviors, a number of studies in the pediatric asthma literature strongly suggest the importance of the treatment alliance between families and physicians. Sublett, Pollard, Kadlec, and Karibo (1979) found that parental perceptions of poor parent-physician relationships were a major factor underlying nonadherence in asthmatic children presenting to emergency departments. Other studies have demonstrated that conflict and communication difficulties between parents and physicians are associated with ineffective asthma management by the family (Wilson, Mitchell, Rolnick, & Fish, 1993) and increased risk for child asthma mortality (Strunk, Mrazek, Fuhrman, & LaBreque, 1985).

Given the highly personal nature of the patient-family-physician relationship, it is interesting to consider possible parallels between general family functioning and the family's ability to engage in a treatment alliance with a physician. In one article, Hahn, Feiner, and Bellin (1988) outline a theory of "compensatory alliance," in which patients might seek to create an alliance with their physician to compensate for problematic relationships within their own family. Alternatively, one might expect that individuals with more negative family functioning might repeat these negative interpersonal patterns with health professionals, a hypothesis supported in the mental health literature (Moore, Kuipers, & Ball, 1992; Vaughn & Leff, 1984). We explore which aspects of family functioning predict better alliance and whether treatment alliance predicts medical treatment outcome.

Accordingly, this study was designed to examine the associations between treatment alliance, family

functioning, and asthma treatment adherence and outcomes in a population of adolescents hospitalized for severe, chronic asthma at a national asthma referral center. We hypothesized that patients' ability to create a positive treatment alliance with their medical care provider would be related to better family functioning. In turn, we predicted that those patients rated as having formed better treatment alliance during the hospitalization would show better treatment adherence at admission to the hospital as well as better adherence and outcome one year after leaving the inpatient program.

Method

Participants

We recruited 60 adolescents with severe, chronic asthma, who were hospitalized in the adolescent inpatient service of the National Jewish Medical and Research Center, a tertiary care facility specializing in the treatment of respiratory, immune, and allergic disease, and their families. These adolescents were usually not admitted for an acute asthma attack; rather, most had persistently uncontrolled symptoms and had failed outpatient management. Typical reasons for admission included a combination of failure of outpatient management; oral prednisone equivalents >20 mg qd; repeated hospitalizations and emergency room visits for asthma; greater than 30 days of school missed secondary to asthma in past year; and recent respiratory arrest or intubation for respiratory failure.

During their hospitalization participants were treated by a multidisciplinary health care team composed of pulmonologists, allergists, psychiatrists, psychologists, nurses, and other allied health professionals. Patients were referred to the program from across the United States. This program emphasized improvement of long-term asthma management skills and rehabilitation. The mean age of participating adolescents was 14.6 years (range = 10.8–18.5 years), representing well the age span of the ward. Seventy-five percent were Caucasian, 13% African American, 10% Hispanic, and 2% were of other ethnic backgrounds. Half were female. On the Hollingshead 4-factor scale of socioeconomic status (Hollingshead, 1975), 73% of the families were in level II and III, reflecting a primarily middle-class sample. Twenty-seven percent of the adolescents were currently living in a single-parent family. Most of the parents involved in the study were mothers,

with 52 mothers and 8 fathers participating. The median length of stay in the program was 28 days. At the time of admission, pre-bronchodilator FEV_1 (mean $\pm$ SD) was 78.4 $\pm$ 16.6% predicted, FEV_1/FVC ratio was .73 $\pm$ .10, TGV was 120.3 $\pm$ 29.7% predicted, and prednisone (or equivalent) dose was 19.6 $\pm$ 23.2 mg/day. Furthermore, participants had a mean score on the Asthma Functional Severity Scale (Rosier et al., 1994) of 20.03, with a range of 10–24, demonstrating a significant degree of functional impairment due to asthma within this sample.

There were a total of 107 consecutive admissions to the adolescent inpatient unit during the 17-month recruitment period of this study. Of these, 21 were not asked to participate because they were sent to the hospital alone, were emancipated from parents, or were referred from an out-of-home placement (e.g., guardians, group home, or foster care). Of those approached, 70% participated. The most common reasons for refusing participation included unavailability of parents (42%); precipitous discharge, including discharge "against medical advice" (14%); and lack of interest in "psychological" studies (33%).

The ethnicity of those eligible who did not participate was 62% Caucasian, 21% African American, 7% Hispanic, and 10% of other ethnic backgrounds. The percentage of the ineligible group living in a two-parent household was 62%. These represent similar distributions in the participant group, suggesting that a serious participation bias did not exist.

Procedures

This protocol was approved by the National Jewish Institutional Review Board. Informed consent was obtained from all participating family members. The adolescents and their parents were brought to the National Jewish Family Assessment Laboratory during the first week of their hospitalization, when they participated in videotaped family interactions and completed questionnaires measuring family functioning. The adolescent, the parent, and the National Jewish physician also completed questionnaires about treatment alliance at discharge from the program.

One year following discharge, we attempted to collect follow-up data consisting of (1) medical records from all recent health care providers and (2) interviews and questionnaires assessing asthma outcome from parents and adolescents. We succeeded

Table I. Comparison of Follow-up Participants with Nonparticipants on Demographic, Child, Family, Admission Clinical, and Treatment Alliance Variables

	Participants ($n = 30$) M ± SD or %	Nonparticipants ($n = 30$) M ± SD or %	Statistic[a]
Demographic variables			
Child age (yrs)	14.5 ± 2.0	14.6 ± 1.6	0.28
Gender (% male)	46.7	53.3	0.27
Race (% Caucasian)	83.3	66.7	2.22
Child psychological variables			
CBCL total problem score	60.7 ± 9.7	58.5 ± 11.1	0.80
CBCL internalizing score	62.8 ± 9.0	61.4 ± 12.1	0.51
CBCL externalizing score	55.5 ± 11.1	52.1 ± 10.6	1.21
Family variables			
Bio. parents still married (%)	56.7	53.3	0.07
Mother alone (%)	26.7	26.7	0.00
Parent FAD total score	2.03 ± 0.30	1.98 ± 0.37	0.55
Teen FAD total score	2.02 ± 0.29	2.00 ± 0.33	0.29
Parent IQS total score	4.68 ± 0.87	4.29 ± 0.82	1.77
Teen IQS total score	3.95 ± 0.78	3.70 ± 0.87	1.21
Admission clinical variables			
Prednisone equiv. (mg/d)	26.7 ± 24.9	20.3 ± 21.3	1.06
Medication adherence score	1.94 ± 0.75	2.04 ± 0.79	0.45
Baseline FEV_1 (% predicted)	80.3 ± 16.1	76.5 ± 17.1	0.89
Baseline FEV_1/FVC	0.74 ± 0.12	0.72 ± 0.08	0.55
Functional severity score	20.1 ± 3.6	20.0 ± 3.1	0.08
Treatment alliance variables			
Teen goal alliance	4.52 ± 0.91	4.51 ± 0.63	0.07
Parent goal alliance	4.52 ± 0.47	4.38 ± 0.82	0.81
Physician goal alliance	3.75 ± 0.61	3.67 ± 0.71	0.52
Physician defeating alliance	4.21 ± 0.54	4.09 ± 0.62	0.81

The p value is nonsignificant.
The Student's t test and Pearson's chi-squared test were used for continuous and categorical variables, respectively.

in obtaining both medical record and self-report follow-up data from 30 of the original 60 participants (50%). The major reason for not obtaining such data was lack of response from either the physicians or family to our requests for information. As can be seen in Table I, there were no significant differences between follow-up participants and nonparticipants on demographic, child, family, or medical variables previously obtained during the hospitalization at our institution.

Measures
Demographic Information
Demographic data including socioeconomic status (Hollingshead, 1975), gender, race, age of the adolescent, and household composition were collected from each family at admission.

Child Psychological Functioning-The Child Behavior Checklist
The CBCL (Achenbach, 1991) provides a parent-reported assessment of the adolescent's functioning

across multiple domains. There are eight subscales available, as well as the broad band groupings of Internalizing symptoms, Externalizing symptoms, and Total Problem score. This widely used measure has been well standardized and has excellent reliability (test-retest $r = .93$, mother-father $r = .76$, Cronbach's $\alpha = .96$). The CBCL has well-established validity including the ability to discriminate clinical from nonclinical groups. The broad band CBCL Total Problem, Internalizing, and Externalizing scale scores were used in this study.

Treatment Alliance
1. Treatment Alliance Scale, Physician Version. This measure, based on work of Sarlin (1992), was developed to assess the treatment alliance between families of children with asthma and their physician. The questionnaire includes two subscales. The first, Goal Alliance, includes seven questions assessing the physician's sense of how well the patient was able to develop mutually agreed upon goals and mutual positive regard. Sample statements include

"This patient works with you to set clear and realistic treatment goals," and "I feel that the patient sees me as someone who is on their side." The second, Treatment Defeating, includes five items that measure how much the patient engages in behaviors that undermine the treatment relationship. This scale includes statements such as, "This patient distorts or misrepresents information to you," and "This patient is often late or misses appointments with you." Subjects responded to these statements using a 5-point, Likert-type scale with extremes labeled as "extremely true" and "extremely untrue." The scores for the Treatment Defeating subscale were transformed so that higher scores on both subscales indicate better alliance. The internal consistency reliability, as measured by Cronbach's α, was.95 and.77, respectively, for the two subscales.

2. Treatment Alliance Scale, Adolescent and Parent Version. This measure parallels the physician version. However, it includes only one 7-item scale, Goal Alliance, measuring the patient's and parent's sense of shared goals with their physician. Subjects again responded to these items using a 5-point, Likert-type scale with extremes labeled as on the physician version. The internal consistency reliability, as measured by Cronbach's α, was .95 for the adolescents and .93 for the parents.

Family Functioning
1. The Family Assessment Device (FAD; Epstein, Baldwin, & Bishop, 1983; Miller, Epstein, Bishop, & Keitner, 1985). The FAD is a 60-item multidimensional self-report measure of family functioning empirically derived from the McMaster Model of Family Functioning. Six dimensions of family functioning are measured: Problem Solving, Communication, Roles, Affective Responsiveness, Affective Involvement, and Behavior Control. These scales have shown good reliability (Cronbach's α ranging from .71 to .92; 1-week test-retest correlations from .66 to .76). Impressive validity has been seen in numerous studies, including samples with chronic medical illness (Bishop, Epstein, Keitner, et al., 1986) and a large epidemiological study of families with children (Byles, Byrne, Boyle, et al., 1988). The FAD was completed by the adolescents and parents separately at admission. For this report we used an overall total score summed across dimensions. The internal consistency reliability for this combined scale as measured by Cronbach's α was .86 for teens and .90 for parents. Unlike scores on the other scales used in this study, a high score on the FAD represents poor functioning.

2. Family Interactional Q-Sort Assessment. Families were asked to engage in two videotaped family discussions. In the first task, family members independently selected a family issue that had caused recent conflict among them and were then given 10 minutes to discuss a jointly named problem to a mutually satisfactory resolution. This first task provides a window into the family's emotional and behavioral regulatory processes, problem solving, and conflict resolution skills. The second task, the parental supportiveness procedure developed by Gavin and Furman (1996), asked the parent to discuss for 10 minutes with their child an issue from outside the family that is of current difficulty for the child. In prior studies this task has yielded data of particular relevance to the parent's ability to provide practical and emotional support to their child while also promoting his or her autonomy (Gavin & Furman, 1996).

The taped discussions were rated by trained coders using the Interactional Q-Sort (IQS; Gavin & Furman, 1996). The IQS allows the rater to generate a profile for each observed interactional sequence by arranging a deck of 58 cards that focus on (1) characteristics of the individual during the interaction (e.g., affect & mood) and (2) how each individual manages the relationship with their partner (e.g., social skills, ability to manage conflict, supportiveness, and perspective-taking ability). Raters sort the cards using a fixed 7-point distribution, with the poles representing items that are most and least characteristic of the individual being coded. The IQS yields eight factor scores for each participant, including cooperation, affect, self-esteem, psychological mindedness, problem solving, maintenance of interpersonal boundaries, self-centeredness, and attunement. The IQS has been demonstrated to discriminate between satisfied and dissatisfied adolescent-parent dyads, and initial validation was provided by relating factor scores to various self-report measures, including social skills (Gavin & Furman, 1996). Mean interrater reliability as measured by interclass correlation was .79. Again, for this report we used an overall total score summed across all dimensions.

Asthma Treatment Adherence
1. Admission Medication Adherence Score. Each adolescent's adherence with oral theophylline and steroid medication was rated on a 0 to 3 scale using blood chemistry data from the time of admission; higher scores indicate better adherence (Wamboldt, Wamboldt, Gavin, Roesler, & Brugman, 1995). Points

were assigned for evidence of theophylline adherence: 1 for serum theophylline level ≤5 meq/mL; 2 for serum theophylline level ≥5 but ≤10 meq/mL or ≥20 meq/mL; and 3 for serum theophylline level ≥10 and ≤20 meq/mL. Evidence of steroid adherence was assessed using the value of morning serum cortisol levels for those adolescents prescribed ≥10 mg prednisone equivalents daily, a dose of exogenous corticosteroid sufficient to suppress endogenous cortisol production. Points were assigned as follows: 1 for cortisol level >5 mcg/mL; 2 for cortisol level >1 and ≤5 mcg/mL; and 3 for cortisol level ≤1 mcg/mL. The overall adherence score was calculated as the mean of all nonmissing scores.

2. Follow-up Treatment Adherence Score. Adherence at follow-up was determined by a structured rating of data from the medical records for the 12 months subsequent to National Jewish discharge. All 30 medical records were coded by two raters to assess reliability, which was judged to be excellent, with interclass correlation coefficient equal to.93 (95% Confidence Interval [CI] = .77 to .98). Validity of this rating was established by significant associations with: (1) the medication adherence score collected at time of National Jewish admission and discussed above (Pearson $r = .41$; $p < .05$); (2) the Asthma Functional Severity Scale from follow-up (Pearson $r = -.38$; $p < .05$); and (3) the responses to the following adherence-related question from an interview with parents at the 12-month follow-up: "Was there a time in the past 6 months that your child stopped taking one or more of his/her asthma medications completely or almost completely for a period of time?" (Pearson $r = .41$, $p < .05$).

Asthma Treatment Outcome

1. Asthma Functional Severity Scale (Rosier et al., 1994). This 6-item scale was developed in a large Australian epidemiological study to measure functional asthma severity in children, ages 8 through 16 years, by means of the response of their parents to interview questions. Scale reliability was good (Cronbach's $\alpha = .89$) and validity was supported by moderate correlations with school days missed, resource utilization, and medication use. In this study, this scale was collected from parents during the hospitalization via face-to-face interview and via telephone interview during the follow-up. Despite collecting these data via telephone at follow-up, this scale continued to show good internal consistency (Cronbach's $\alpha = .83$).

2. Health Care Use. We collected comprehensive medical records for the year subsequent to the patient's discharge from the hospital for 30 of the original 60 subjects. All medical records were coded by at least two independent, blind raters using the detailed criteria from a standardized coding manual (Wamboldt et al., 1998). Data abstracted from the medical records included the number of glucocorticoid bursts, urgent or "sick" asthma-related physician office visits, emergency room (ER) visits, and hospital stays. Intraclass correlation coefficients were calculated to determine interrater reliability for each coded outcome variable. The interrater reliability was excellent, ranging from .85 (95% CI = .57 to .95) for number of asthma ER visits to .99 (95% CI = .98 to 1.0) for number of steroid bursts.

Results

We performed analyses using a correlational strategy to explore relations among variables. Preliminary analyses were performed to discover whether the demographic or child psychological variables were associated with the patients', parents', or physicians' ability to create effective treatment alliances. Next, treatment alliance variables were related to family variables, adherence variables, and then to treatment outcome variables. Finally, we performed multiple regression analyses. Power for this study, with $n = 60$ and $\alpha = .05$, two-tailed, is as follows: if the population $r = .40$, power equals .90; if population $r = .30$, power equals .65.

Treatment Alliance, Demographic Variables, and Child Psychological Functioning

Results indicated that physicians', parents', and adolescents' ratings of treatment alliance were unrelated to family socioeconomic status, race, patient gender, or family composition (single- vs. two-parent family). There was an effect for age, with older adolescents rated by the physicians as demonstrating better Goal Alliance ($r = .26$, $p < .05$).

We found no statistically significant associations between the treatment alliance ratings and the CBCL Total Problem, Internalizing, or Externalizing scores. Indeed, in all cases there was less than 3% shared variance between a CBCL measure and a treatment alliance rating. Given that there was good variability in the CBCL scores of this sample, these null results suggest that alliance ratings were not biased by child psychological status.

Table II. Associations of Alliance Ratings with Family, Adherence, and Outcome Variables at Hospital Discharge

	Physician Goal Alliance	Physician Defeat Alliance	Parent Goal Alliance	Teen Goal Alliance
Concurrent variables ($n = 60$)				
Parent FAD total score	.29*	.17	−.09	.04
Teen FAD total score	.07	.15	−.05	.08
Parent IQS total score	.27*	.17	.10	.07
Teen IQS total score	.18	.22	.17	.04
Medication adherence score	.28*	.34**	−.22	−.23
Follow-up variables ($n = 30$)				
Treatment adherence rating	.60***	.54**	−.18	.06
Functional severity score	−.23	−.34	−.17	−.24
Sick/urgent office visits	−.42*	−.40*	.20	−.33
Emergency room visits	−.08	−.09	−.03	.18
Hospitalizations	−.29	−.23	−.30	.02

*$p < .05$.
**$p < .01$.
***$p < .001$.

Treatment Alliance and Family Functioning

As displayed in Table II, better physician reported Goal Alliance with the family at discharge was associated with worse parental report of family functioning on the FAD ($r = .29$, $p < .05$). As the global FAD was significant, we analyzed the FAD subscales to better understand this finding. Analyses indicated that better physician's Goal Alliance ratings were associated with worse Behavior Control ($r = .42$, $p < .001$) and worse Affective Involvement in the family ($r = .35$, $p < .01$). Better physician Goal Alliance ratings were also associated with the observer's ratings of better parental functioning during the interactional tasks. Since this global Q-Sort rating was significant, we analyzed specific subscales to understand which dimensions appeared most salient. Physicians' ratings of Goal Alliance at discharge were related to parental self-esteem ($r = .38$, $p < .01$), with trends toward the parent being more psychologically minded and having better boundaries with their child.

Treatment Alliance and Adherence Behaviors

We performed correlational analyses to examine the relation between treatment alliance and adherence behaviors. The teen's adherence with asthma medications as measured by admission blood levels was related to the physician's Goal Alliance rating of the teen at discharge ($r = .28$, $p < .05$) as well as to the physician's Treatment Defeating rating of the teen at discharge ($r = .34$, $p < .01$).

Furthermore, the measure of treatment adherence obtained from ratings of the follow-up medical records was strongly and positively related to the physician's rating of the teen's Goal Alliance at discharge ($r = .60$, $p < .001$), as well as to the physician's Treatment Defeating rating of the teen at discharge ($r = .54$, $p < .01$).

Treatment Alliance and Health Care Use a Year after Hospitalization

The physician's ratings of the Goal Alliance and Treatment Defeating scales of the teen at discharge were both negatively related to the number of urgent office visits in the year after the hospitalization ($r = −.42$, $p < .05$, and $r = −.40$, $p < .05$, respectively). However, physician ratings of either aspect of treatment alliance were unrelated to emergency department visits or hospitalizations.

Multivariate Analyses

We performed hierarchical multiple regression analyses to examine whether the family functioning variables made independent contributions to treatment alliance beyond those explained by adherence behavior (see Table III). In order to reduce any effect of shared rater bias, these analyses were performed using the physician's ratings of treatment alliance with the teen as the dependent variables (i.e., both Goal Alliance and Treatment Defeating in separate regression equations) with the three variables from different sources exhibiting the strongest bivariate associations with the treatment alliance scales: an

Table III. Hierarchical Multiple Regression Analyses of Treatment Alliance Ratings on Family Functioning and Medication Adherence Variables

Dependent variable	Predictors (Step and Variable)	Cumulative R^2	Incremental R^2
Physician, goal alliance	Step 1. Age	0.07	0.07*
	Step 2. Medication adherence	0.15	0.08*
	Step 3. Parent IQS total	0.23	0.08*
	Step 4. Parent FAD total	0.30***	0.07*
Physician, goal alliance	Step 1. Age	0.07	0.07*
	Step 2. Medication adherence	0.15	0.08*
	Step 3. Parent IQS-Self-esteem scale	0.30	0.15***
	Step 4. Parent FAD-Behavior control scale	0.39***	0.09**
Physician, defeating alliance	Step 1. Age	0.01	0.01
	Step 2. Medication adherence	0.13	0.12**
	Step 3. Parent IQS total	0.16*	0.04
Physician, defeating alliance	Step 1. Age	0.01	0.01
	Step 2. Medication adherence	0.13	0.12**
	Step 3. Parent FAD-Behavior control scale	0.17*	0.05 ($p < .10$)

*$p < .05$.
**$p < .01$.
***$p < .001$.

observed rating of the parent during the interaction (both the total parent IQS score as well as the parent Self-Esteem score in separate equations), the parent's self-reported family functioning score from the FAD (again both the total parent FAD score as well as the parent Behavior Control scale score in separate equations), and the admission adherence score obtained from laboratory data. Accordingly, none of the variables used was obtained from the same rating source. Since the age of the adolescents was associated with the physician's Goal Alliance ratings, age was controlled in all regression equations by forced entry in step 1. Next, the admission adherence score was forced to enter in step 2. Finally, the remaining two family functioning variables were entered. As can be seen in Table III, all four regression equations were statistically significant, explaining 30% and 39% of the variance in the Goal Alliance and 16% and 17% of the variance in the Treatment Defeating ratings. Additionally, in the two equations involving Goal Alliance, entry of both family functioning variables (i.e., the observer rating from the IQS and the parental self-report measure from the FAD) resulted in statistically significant increases in the variance explained. Similarly, in one of the two regressions involving the Treatment Defeating scale, the incremental change in variance explained after addition of the parental FAD Behavior Control scale approached signifi-

cance (i.e., $p < .10$). Hence, these analyses suggest that the physicians' ratings of treatment alliance were not solely based on medication adherence alone; rather, aspects of family functioning also influenced these ratings.

Discussion

In the recent revision of the *Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma* (NHLBI, 1997), "patient education that fosters a partnership among the patient, his or her family and clinicians" remains one of the four key components of effective asthma management. This study was undertaken to investigate the degree to which measures of this partnership are concurrently associated with family functioning and treatment adherence behavior and are longitudinally predictive of asthma treatment adherence and outcome. The results of this preliminary study conducted with adolescents with severe, chronic asthma, their parents, and their treating physicians within a multidisciplinary inpatient program at a national asthma referral center suggest that characteristics of this partnership or treatment alliance are, indeed, important facets of successful asthma management. Specifically, aspects of treatment alliance, particularly as rated by the physician, were significantly as-

sociated with a measure of medication adherence at the time of admission to the program. In addition, they were also associated with a more multifaceted measure of asthma treatment adherence and the number of urgent or "sick" visits to their community physician for asthma at the 12-month follow-up. Patients with worse treatment alliances, as rated by the physicians at the referral center, went home and had more unscheduled office visits with their home physician. Although this did not translate into more hospitalizations, it does suggest a more crisis-oriented approach to health care, instead of the more planful, proactive approach, currently stressed in asthma education programs. This area deserves greater attention in the future.

This study provides some useful, albeit preliminary data concerning specific child and family characteristics associated with physicians' evaluations of better treatment alliance. To begin, physicians' ratings of treatment alliance in this study were not influenced by the gender, race, or socioeconomic status of the child, nor by whether the child lived in a single-parent family. Physicians rated older children as better able to form a treatment alliance. This may reflect the child being more developmentally ready to enter into the treatment relationship as a more full and mature partner. Furthermore, the level of the child's psychological functioning, as measured by parent ratings on the CBCL, was also not associated with treatment alliance ratings. This suggests that alliance ratings are not a simple function of the psychological status of the child, although future studies providing more varied and detailed measures of child psychological functioning are needed to more fully establish this assertion.

Some interesting patterns of associations emerged with variables involving parents. First, parents who were rated as showing better functioning during interaction with their children, specifically those who had higher observed ratings of self-esteem, had children whom physicians evaluated as forming better alliances. These parents may foster greater self-assurance and model for their children more confidence when interacting with professionals. This may result in the patient being more able to enter into a working alliance with the health care team.

Second, physicians reported better alliances with parents who reported worse overall family functioning. When more closely observed, the salient subscales on the FAD were Behavior Control and Affective Involvement. It may be that when physicians identify families with poor disciplinary structure as well as those with inadequate parental involvement, they feel they can intervene in a helpful way to improve illness management. As a consequence, they may feel positively allied with these families in treatment. Parents who report more family distress may also be more open and interested in the physician's aid, in line with Hahn et al.'s (1988) proposition of compensatory alliance. As an alternative explanation, some percentage of the parents who reported better family functioning may have done so out of a tendency to suppress, repress, or deny family problems, and thus provide distorted or false reports of good family functioning. In this case, the parent reports may be discordant with what the physician observes, and this lack of shared perception may impede the development of a positive alliance. Although we know of no direct existing support for this conjecture, adult asthmatic patients who tend to minimize and deny the severity and importance of their asthma tend to systematically underuse their asthma medication (Kleiger and Dirks, 1979).

It is interesting that more significant associations were found using physicians' evaluations of the treatment alliance than when the adolescents' and parents' ratings were used. This may be a finding idiosyncratic to our setting, where physicians work in close conjunction with a multidisciplinary team that includes mental health professionals and thus may be especially well attuned to issues of interpersonal dynamics. However, several other possibilities exist. First, adolescents may vary considerably in their ability to evaluate such relationships, due to developmental factors as well as to the fact that crucial aspects of treatment-related communication and planning often occur without them (i.e., between the physicians and their parents). Indeed, when Pantell, Stewart, Dias, Wells, and Ross (1982) analyzed audiotapes of primary care pediatric visits, they found that although the majority of all communication from the pediatrician was directed toward the child (54.6%), the vast majority of communication regarding treatment planning details (72.8%) was directed toward parents. Similarly, if parents were also excluded to some extent from aspects of the communication that occur between the physician and the adolescent, one can view the superior predictive ability of the physicians as reflecting the fact that they alone tend to have the "complete" set of information across both relationships.

Finally, in looking at the range of scores provided by the teen and parent, it is apparent that they had significantly higher (i.e., more positive) means on the Goal Alliance scale than physicians reporting about the families. It may be that the families, despite receiving assurances to the contrary, did not truly believe that any negative reports about their physician would remain confidential, and this led them to have some positivity bias. Further studies are needed to evaluate whether physicians truly are better raters of qualities of the treatment alliance that predict important health-related behaviors and outcomes. If this is so, treatment models could be more fully developed to improve physician training and to create interventions to improve weak or problematic partnerships.

As currently written, the revised 1997 guidelines offer only general recommendations about how to foster effective treatment alliances. For example, optimal asthma adherence and outcome are to "be encouraged by promoting open communication; individualizing, reviewing, and adjusting plans as needed; emphasizing goals and outcomes; and encouraging family involvement." The guidelines inadequately describe the specific behaviors from health care providers, patients, and their parents that foster such partnerships, almost certainly because of the lack of a well-developed and clear literature in this area. Accordingly, our measure of treatment alliance is seen as a major stimulus for further important research in this area.

This work does have limitations important to recognize. First, in this preliminary study we sought to explore patterns of relations among treatment alliance, family relationships, adherence, and treatment outcome. Future work could greatly improve this work with inclusion of comparison groups such as outpatient youths with asthma or youths with severe chronic illness of a different kind, such as diabetes or cystic fibrosis. An additional limitation is that this study included only physicians and not other valuable informants, such as nurses. Although data were collected from other informants, inconsistent staffing patterns made the data less reliable. Thus, we decided not to include it in this report. Finally, the potential role of the congruence between family and physician's ethnicity in alliance ratings, although beyond the scope of this study, is a very important issue for future work.

In conclusion, although these findings are from a preliminary study and require replication and extension before the complete story can be told,

treatment alliance appears to be a measurable concept that can be empirically evaluated in pediatric asthma care settings. In addition, it is rather strongly associated with asthma treatment adherence and outcome, as assumed in the current guidelines. Although much prior work has sought to understand the relation between family process and asthma treatment outcome, the precise mechanisms underlying any such association remain vague. This work suggests that treatment alliance and adherence behavior may mediate the link between family process and asthma outcome. If subsequent research supports this conjecture, psychologists and other mental health professionals may well have a much more prominent role in writing the asthma treatment guidelines of the future.

Acknowledgments

References

Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist/4-18 and 1991 Profile*. Burlington: University of Vermont Department of Psychiatry.

Allen, J. G., Newsom, G. E., Gabbard, G. O., & Coyne, L. (1984). Scales to assess the therapeutic alliance from a psychoanalytic perspective. *Bulletin of the Menninger Clinic, 48,* 383–400.

Ben-Sira, Z. (1976). The function of the professional's affective behavior in client satisfaction: A revised approach to social interaction theory. *Journal of Health and Social Behavior, 17,* 3–11.

Ben-Sira, Z. (1982). Lay evaluation of medical treatment and competence development of a model of the function of the physician's affective behavior. *Social Science Medicine, 16,* 1013–1019.

Bishop, D. S., Epstein, N. B., & Keitner, G. I. (1986). Stroke, morale, family functioning, health status and functional capacity. *Archives of Physical Medicine Rehabilitation, 67,* 84–87.

Buller, M. K., & Buller, D. B. (1987). Physician's communication style and patient satisfaction. *Journal of Health and Social Behavior, 28,* 375–378.

Byles, J., Byrne, C., Boyle, M. H., & Offord, D. R. (1988). Ontario child health study: reliability and validity of the general functioning subscale of the McMaster Family Assessment Device. *Family Process, 27,* 97–104.

DiMatteo, M. R., Hays, R. D., & Prince, L. M. (1986). Relationship of physicians' nonverbal communication skill to patient satisfaction, appointment noncompliance and physician work load. *Health Psychology, 5,* 581–594.

Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster Family Assessment Device. *Journal of Marital and Family Therapy, 9,* 171–180.

Gavin, L. A., & Furman, W. (1996). Adolescent girls' relationships with mother and best friends. *Child Development, 67,* 375–386.

Hahn, S. R., Feiner, J S., & Bellin, E. H. (1988). The doctor-patient-family relationship: A compensatory alliance. *Annals of Internal Medicine, 109,* 884–889.

Heszen-Klemens, I., & Lapinska, E. (1989). Doctor-patient interaction, patients' health behavior and effects of treatment. *Social Science Medicine, 19,* 9–18.

Hollingshead, A. B. (1975). *Four factor index of social status.* Unpublished manuscript, Yale University, New Haven, Connecticut.

Horvath, A. O., & Luborsky, L. (1993). The role of the therapeutic alliance in psychotherapy. *Journal of Clinical and Consulting Psychology, 61,* 561–573.

Horvath, A. O., & Symonds, D. B. (1991). Relation between working alliance and outcome in psychotherapy: A meta-analysis. *Journal of Consulting Psychology, 38,* 129–149.

Kaplan, S., Greenfield, S., & Ware, J. E. (1989). Assessing effects of physician-patient interactions on the outcomes of chronic disease. *Medical Care, 27,* S110-S127.

Kleiger, J. H., & Dirks, J. F. (1979). Medication compliance in chronic asthmatic patients. *Journal of Asthma Research, 16,* 93–96.

Krupnick, J. L., Sotsky, S. M., Simmens, S., Moyer, J., Elkin, I., Watkins, J., & Pilkonis, P. A. (1996). The role of the therapeutic alliance in psychotherapy and pharmocotherapy outcome: Findings in the National Institute of Mental Health treatment of depression collaborative research program. *Journal of Consulting and Clinical Psychology, 64,* 532–539.

Luborsky, L., McLellan, A. T., Woody, G. E., O'Brien, C. P., & Auerbach, A. (1985). Therapist success and its determinants. *Archives of General Psychiatry, 42(6),* 602–611.

Miller, I. W., Epstein, N. B., Bishop, D. S., & Keitner, G. (1985). The McMaster family assessment device: Reliability and validity. *Journal of Marital and Family Therapy, 11,* 345–356.

Moore, E., Kuipers, L., & Ball, R. (1992). Staff-patient relationships in the care of the long-term adult mentally ill. *Social Psychiatry and Epidemiology, 27,* 28–34.

National Institutes of Health, National Heart, Lung, and Blood Institute. (1997). *Expert panel report 2: Guidelines for the diagnosis and management of asthma.* Bethesda, MD: National Institutes of Health publication no. 97-4051.

Pantell, R. H., Stewart, T. J., Dias, J. K., Wells, P., & Ross, W. A. (1982). Physician communication with children and parents. *Pediatrics, 70,* 396–402.

Rosier, M. J., Bishop, J., Nolan, T., Robertson, C. F., Carlin, J. B., & Phelan, P. D. (1994). Measurement of functional severity of asthma in children. *American Journal of Respiratory and Critical Care Medicine, 149,* 311–318.

Sarlin, N. S. (1992). *Working relationships in the treatment of adolescent inpatients: Early treatment predictors and associations with outcome.* Dissertation Abstracts International.

Strunk, R. C., Mrazek, D. A., Fuhrman, G. S., & LaBrecque, J. F. (1985). Physiologic and psychological characteristics associated with deaths due to asthma in childhood. A case-controlled study. *Journal of the American Medical Association, 254,* 1193–1198.

Sublett, J. L, Pollard, S. J., Kadlec, F. J., & Karibo, J. M. (1979). Non-compliance in asthmatic children: A study of theophylline levels in a pediatric emergency room population. *Annals of Allergy, 43,* 95–97.

Vaughn, C., & Leff, J. (1976). The measurement of expressed emotion in the families of psychiatric patients. *British Journal of Social and Clinical Psychology, 15,* 157–165.

Wamboldt, F. S., Hume, L., Gavin, L., Wamboldt, M., Price, M., & Klinnert, M. (1998). Reliability and validity of a system for coding asthma outcomes from medical records. *American Journal of Respiratory and Critical Care Medicine, 157(3, part 2),* A750.

Wamboldt, F. S., Wamboldt, M. Z., Gavin, L. A., Roesler, T. A., & Brugman, S. M. (1995). Parental criticism and treatment outcome in adolescents hospitalized for severe, chronic asthma. *Journal of Psychosomatic Medicine, 39,* 995–1005.

Wilson, S. R., Mitchell, J. H., Rolnick, S., & Fish, L. (1993). Effective and ineffective management behaviors of parents of infants and young children with asthma. *Journal of Pediatric Psychology, 18,* 63–81.