FROM: Zweben A, Barrett D, Carty K, McRee B, Morse P, Rice C. Strategies for Facilitating Protocol Compliance in Alcoholism Treatment Research. Project MATCH Monograph v. 7 (NIH Pub. No. 98-4144). Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism (NIAAA), 1998.

Project MATCH—A Case Study

The Role of a Coordinating Center in Facilitating Research Compliance in a Multisite Clinical Trial

Bonnie McRee, M.A.

Department of Psychiatry, University of Connecticut Health Center

A large number of coordinating center activities can influence participant adherence to the protocol. Because a coordinating center does not directly interact with research participants, the impact of its activities on participant compliance is often overlooked. It is clear, however, that external monitoring of recruitment and followup rates, preparation of protocols, and training and supervision of staff can play an important role in increasing participant compliance. This chapter draws on Project MATCH as an example of how a coordinating center can facilitate research compliance in a multisite clinical trial.

Role of the Center

A multisite clinical trial involves diverse sites often widely dispersed geographically. Accurate and timely communication about procedures, problems, and staff concerns is essential (Fuller et al. 1994). Coordinating centers are typical components of multisite efforts and, in addition to managing data and staff training, are also responsible for facilitating communication. Research sites in Project MATCH, as in similar cooperative studies, relied upon the coordinating center to provide technical and logistical support to maintain the integrity of the common research protocol. This entailed developing, implementing, and supporting trialwide procedures for tracking the enrollment and followup of study clients, monitoring and ensuring the quality and completeness of the data, and organizing the data base to conduct statistical analyses. Another function was to ensure that treatments were delivered in accordance with the study protocol. However, for purposes of this monograph, only the data gathering functions are discussed.

Although investigators have often emphasized participant behavior in understanding compliance, there is increasing recognition that treatment providers and research staff may play an important role in determining compliance levels. Even external agencies, such as funding organizations, outcome monitoring committees, and coordinating centers that are responsible for defining the clinical trial, may influence compliance levels (Spilker 1991*b*).

Project MATCH experienced several examples of poor compliance that were related to the research context as well as to the participant. These factors were frequently mitigated by coordinating center activities. For example, monitoring by the coordinating center can alert clinical sites when followup rates fall below norms. Similarly, the degree of training and supervision of research assistants by the coordinating center can influence staff adherence to the protocol, which, in turn, is likely to affect the quality of the data generated by participants.

Organizational Structure

An overview of the organizational structure of the Project MATCH trial is presented to provide a context for the remaining sections, which focus on specific MATCH Coordinating Center activities that directly and indirectly promoted compliance to the research protocol. Because the accuracy of research reports may be influenced by participants' perceptions regarding data confidentiality, Project MATCH established two coordinating centers. The research center was responsible for coordinating the data generation activities of the trial; the treatment coordinating center was responsible for the administration of the three study treatments. The separation of these functions minimized the possibility that research assistants might inadvertently bias their interviews as a result of preconceived notions regarding the status of particular participants or the effectiveness of specific therapies. The separation also enhanced the candor of participants, who could be confident that their responses would not be shared with treatment staff.

The activities of a research coordinating center vary not only by the stage of the trial but by the organizational structure of the trial as well (Meinert 1986). In some multisite trials, the coordinating center has the primary responsibility for protocol development and implementation. In other studies, direction and management are the function of the study chairperson, and various coordinating duties are localized in one or more of the collaborating sites. Project MATCH was unusual in that a Steering Committee, composed of the participating Investigators, an NIAAA staff person, and a statistician, supervised the study in close collaboration with the coordinating center (Fuller et al. 1994).

Selected Reasons for Poor Participant Compliance and Examples of Coordinating Center Activities to Enhance Compliance

Factor	*Reason*	*CC activities to enhance compliance (examples)*
Participant-related	• Severity of disease	• Oversee randomization procedure and monitor participant eligibility criteria for study
	• Mental illness (e.g.. suicidal intent or psychotic behavior)	• Same as above
	• Confidentiality risks	• Utilize staff certification procedures, conduct site visits, monitor data coding and storage procedures
	• Lack of belief in the value of the study or treatment	• Disseminate project description for participant handouts and pamphlets
	• Personal cost (e.g., time and inconvenience) in attending sessions	• Monitor facility settings through onsite visits, observe participant-staff relations and time spent in waiting area, etc., and give recommendations based on other sites visited
	• Forgetfulness	• Create sample form letters and reminder protocols
	• Incomplete understanding of how to be compliant with the protocol	• Disseminate participant information describing obligations and timeline, utilize staff certification and training, conduct onsite visits, query incomplete or incorrect data forms (questionnaires)
	• Anger or dissatisfaction with research staff	• Implement trialwide staff hiring protocol, certification procedures, and training; conduct onsite visits
Investigator/ research staff-related	• Long delay from screening, referral, or scheduling to appointment	• Monitor through trialwide participant tracking data base, report information to Steering Committee, make recommendations based on site visits
	• Long time kept in waiting room	• Make recommendations based on site visits/ successes of other sites
	• Failure of staff to keep appointments or to schedule appointments (especially with difficult participants)	• Monitor low followup rates using trialwide participant tracking data base, report information to Steering Committee, monitor staff morale, schedule conference calls to discuss problematic issues
	• Poor staff-participant relations	• See above
External agency-related	• Long duration of study or followup period	• Foster healthy competition between sites, report followup rates at Steering Committee meetings, monitor staff morale, schedule conference calls to problemsolve around difficult participants
	• Protocol requirements are extensive, demanding, or confusing	• Develop standardized data collection forms, query incomplete or incorrect interviews and questionnaires, problemsolve using conference calls between site staff
	• Unpleasant or invasive medical testing (e.g., blood/ urine samples)	• Monitor rates of biological testing through participant tracking data base, report rates to Steering Committee, schedule conference calls to discuss problematic participants

Source: Adapted from Spilker 1991b.

Project MATCH Coordinating Center Activities by Stage of Trial

Stage	*MATCH Coordinating Center Activities*
Protocol development stage	• Developed and pilot-tested data collection forms • Developed research protocol manual (MATCHBook) • Developed trialwide hiring, training, certifying, and monitoring procedures for research staff • Conducted two training sessions for research staff • Developed data entry programs for interviews and questionnaires
Participant recruitment (and treatment) stage	• Developed and conducted centralized treatment randomization program • Developed participant tracking data base and monitored recruitment of participants by reporting to funding agency and Steering Committee • Implemented data management procedures, including data transmission procedures, from sites to the coordinating center • Completed first round of site visits • Conducted across-site and within-site reliability study
Followup stage	• Monitored followup rates using participant tracking data base and reported on a regular basis to funding agency and Steering Committee • Conducted second round of site visits • Monitored research assistants through certification of new staff

Protocol Development Stage

By definition, a multisite trial employs a common protocol at more than one site. It is the role of the coordinating center to organize and implement procedures that will ensure uniformity or standardization among sites (Spilker 1984). The common implementation of a single protocol allows the coordinating center the opportunity to correct noncompliance by focusing on site differences when problems occur. For the MATCH trial, nonadherence to the protocol was often the cause of problems associated with data accuracy, data timeliness, and number of completed assessments. A major function of the coordinating center is to observe and correct these problems by data-cleaning efforts and data analysis, monitoring research staff at each site, and overseeing randomization procedures and participant selection.

Data Collection Forms and Research Protocol

After the initial design phase of a trial, it is the role of the research coordinating center to translate the selected interviews, questionnaires, and items into standardized data collection forms and to begin pilot testing before the main phase of the study begins. Carefully designed forms are necessary for checking the outline and practicality of the protocol, for quickly and accurately processing the data, and for checking the protocol compliance of both participant and research staff (Spilker and Schoenfelder 1991).

An extensive and complicated battery can be a reason for poor participant compliance in a trial. In the case of Project MATCH, the comprehensive protocol—spanning three baseline and six followup sessions—was indeed a challenge to simplify and standardize for use. In addition, a number of interviews and questionnaires were created expressly for Project MATCH or were used for the first time in a large-scale clinical trial. Pilot testing, using both staff and test participants, was essential for correcting the problems associated with the new assessments in order to prepare them for use in the main phase.

Guidelines for developing data collection forms to enhance compliance using lessons from MATCH appear on page 98. It should be noted that established or copyrighted assessments may be modified to fit the needs of a study for trialwide standardization purposes. It is necessary first, however, to obtain permission from the authors or companies involved. All those contacted by MATCH were willing to accept the changes.

MATCHBook, the protocol manual for the MATCH trial, was developed by the coordinating center to include specific study aims, rationale for study design, inclusion/exclusion criteria, randomization procedures, baseline diagnostic procedures, followup operations, all data collection forms, research-assistant training material, quality assurance instruction, data coding, transmission and management procedures, biological testing protocols, informed consent procedures, study information for participants, and participant confidentiality instruction. The protocol manual was essential in ensuring research consistency, which in turn influences participant compliance.

This juncture may be the best place to note that the time schedule for a trial in the design and development stages frequently proves to be unrealistic. Ambitious time schedules tend to exert pressure on investigators to begin data collection before the necessary forms and instruction manuals have been fully developed and tested. Doing so can lead to a chronic crisis atmosphere in the research coordinating center that spills over to the individual sites as staff struggle to develop better forms while trying to maintain existing procedures (Meinert 1986). Through the efforts of the MATCH Coordinating Center and site staff, exceptional data collection forms were designed; nevertheless, the demands on staff were great during early phases of the trial.

Staff Hiring Policy

Because the staffing configuration at each individual site directly influences staffing needs at the coordinating center, it is extremely valuable to develop trialwide policies for hiring research personnel prior to the beginning of the study. It is not adequate to simply specify the number of FTEs needed for each site; one site investi-

Guidelines for Developing and Pilot-Testing Data Collection Forms

Activity	*Guidelines*
Developing data collection forms, general	• Employ uniform style and coding options (0=no, 1=yes) on all interviews and questionnaires. Avoid change of response direction from question to question. Modify existing or copyrighted assessments to meet trial standards, if needed (obtain approval from authors or company). • Link forms only by participant ID number, avoiding client names or initials for trials of a confidential nature. • Develop data entry programs that follow the data collection forms as closely as possible to minimize entry errors. • Include a date and page number on every form so that when changes are made, staff at each site can be certain of using the most current form. • Avoid changing the forms once the main phase of the trial has begun. • Copy the forms onto colored paper, using a different color for each baseline or followup session. This practice can minimize using the wrong set of assessments for different data-gathering periods and is less tedious for staff and participants.
Developing interview forms	• For diagnostic assessments, list the diagnostic criteria on the interview form to minimize error by research staff. For vague diagnostic criteria (e.g., often or repeatedly), define for purposes of the research and list on the form (e.g., often=15 days out of the month; repeatedly=2 or more times). • Questions should be sufficiently detailed on the form so that the interviewer does not have to refer to the protocol manual to accurately code the answers.
Developing participant self-report forms	• Conduct a readability analysis to determine reading grade level on self-report questionnaires. Use a grade level that corresponds to the participant population. Use simple language and avoid slang words and phrases. • Avoid "skip" patterns by using forced responses for each question. If the battery is very time consuming, however, skip patterns on self-report questionnaires may keep the participant from becoming frustrated during the data collection process. • Include units of measurements that will be needed by the respondent to accurately answer the questions (e.g., 1 standard drink=1 bottle or can of beer, 1 glass of wine, or 1 mixed drink of gin, vodka, rum).
Pilot-testing data collection forms	• When forms are sent to each site, staff may conduct practice runs with each other to test for ease of administration, clarity, and time to complete. Suggestions for changes are then returned to the coordinating center so that alterations can be made. • Modified forms can then be tried with "real" test participants. This activity should be done in a formal manner, with each site completing a specified number of participants. If possible, practice sessions should be audiotaped and mailed with the completed forms to the coordinating center for final modifications. It is useful to administer the entire battery to examine overlap among instruments and to time the session. • It is also useful to data-enter the pilot-tested information to check for data entry problems and for logical inconsistencies within the assessments.

Project MATCH Hiring Protocol

Research Staff Qualifications

Project Coordinator

- 100-percent effort
- Master's or Ph.D. level with psychiatric clinical experience
- Responsible for supervising site, recruiting subjects, conducting diagnostic evaluations, and training staff
- Responsible for reporting to and working with the coordinating center

Senior research assistant

- 100-percent effort
- BS or Master's in behavioral science with clinical research experience and data management skills
- Responsible for conducting all assessments, taking blood and urine samples, checking errors on data forms, conducting followup sessions, and overall data management for the site
- Responsible for assisting in the training of new staff

Junior research assistant

- 100-percent effort
- BS degree with clinical research experience and data entry skills
- Responsible for participant screening and interviewing and for data entry, verification, and cleaning

gator may hire a single research assistant for one FTE while another may hire four research assistants at 25 percent time each for that same full-time equivalent! This pattern quadruples the amount of coordinating center responsibility for that site with regard to certifying and monitoring research staff.

Additionally, investigators in university settings often hire students as research personnel, making staff turnover another problem. These issues, as well as the education and experience levels of staff, should be determined as early as possible in the design phase of the trial so that the coordinating center is able to function effectively as a monitoring body.

Training and Certifying Research Staff

A trialwide research staff training procedure and certification process is necessary to ensure that new staff understand the goals of the research, are thoroughly familiar with the study procedures, are meticulous about data quality, and are skilled in the appropriate interviewing techniques. Onsite Principal Investigators, or Project Coordinators are responsible for the bulk of the training, under the supervision of the coordinating center personnel. The role of the coordinating center is to evaluate the performance, accuracy, and interrater reliability of research staff and to monitor procedures that will prevent interviewers from straying

from the study protocol. Certification requires consistent, adequate performance in major areas (i.e., adherence to interview format, probing skills, remaining in a research role, and following the instrument's coding scheme and decision rules).

The training and certification procedures used in Project MATCH were the most uniform methods of ensuring the accuracy of the data collected. In addition, two centralized training sessions were conducted prior to the beginning of the trial. These intensive sessions were conducted over 3 or 4 days and were taught by MATCH Coordinating Center staff and by the primary authors of the MATCH assessments. Finally, the coordinating center conducted a cross-site and within-site reliability study to evaluate the consistency of interview administration across participating sites. The most feasible approach for evaluating reliability in MATCH was the Test-Retest method. Please refer to Del Boca et al. (1994) for a discussion of reliability enhancement and estimation in multisite trials.

Table 6.5.—Project MATCH Training and Certification Protocol

Research Staff	*Site Procedure*	*Coordinating Center Procedure*
New research staff hired	• Notify the coordinating center of name and interviewer ID code.	• Send necessary training tapes and coding exercises to the site.
New research staff training and certification	• Apprentice new staff with most appropriate staff member. • Read and study protocol. • Observe participant sessions with staff member, code assessments, and discuss coding differences upon completion of session. • Practice the appropriate interviews with staff members. • Complete tape-coding exercise and return coded forms to coordinating center. • Complete interviewer-observer exercise by videotaping one session with a practice participant. The new staff member interviews the participant while the experienced trainer observes. Both code the assessments and send the tape and documents to the coordinating center. • Feedback is given to the new research staff member by the observer and is recorded. This is sent to the coordinating center.	• Review tape-coding exercise and provide written feedback to new research staff member. • Review videotape of interview • Review feedback of observer. • Send written feedback to Project Coordinator and staff member along with certification decision. • If certified, request random audiotapes of participant sessions. • If not certified, request another exercise.

Recruitment and Followup Stages

Monitoring participant recruitment, randomization into treatment condition, and followup rates is the most important role of the coordinating center and is the surest method of enhancing compliance across sites. Participant retention is high when staff-client relations are good and the facilities are pleasant and comfortable. Data accuracy and timeliness of completion are more likely when the protocol is followed and when staff members fulfill their responsibilities. Monitoring, both onsite and offsite, allows for poor performance in these areas to be identified and corrected.

Several factors determine which sites will need the most attention; not all sites will need to be monitored in the same way. During the beginning phases of the trial, enrollment rate is an important factor to be considered. If a site is recruiting at a slower rate than others, why is this occurring? When a site enrolls at a high rate, for example, it is important to monitor assessments at that site to determine if participants are meeting the inclusion criteria. Another reason for monitoring is staff size and turnover. A larger site with new research staff will need to be monitored more often than smaller, more stable sites. Sites that are well managed with motivated staff need less monitoring than others (Spilker 1991*a*).

Treatment Randomization Program

In comparative or matching research involving two or more treatments, the equivalence of the research groups is crucial. The presence of bias across treatment groups is a major threat to study validity (Stout et al. 1994). A centralized randomization procedure, based at the coordinating center, can minimize the bias that may occur with onsite randomization.

In Project MATCH, an urn randomization program, based on a probabilistic balancing procedure, was developed using a relational data base. A Randomization Form (appendix E) was completed onsite for each participant; it included values for all balancing variables as well as certification that the participant met eligibility criteria. The form was then faxed to the coordinating center, which entered the information into the randomization program. Once the participant was randomized to one of three treatments, the treatment assignment was faxed back to the site. This procedure not only ensured a balanced randomization procedure across the trial, but it also allowed the coordinating center to monitor potentially ineligible participant randomization.

There is, however, always the possibility that a participant who is randomly assigned to treatment will be found at a later date to have been ineligible for the trial from the start. Although instances of inappropriate enrollment are rare, a participant deletion procedure should be put into place. For Project MATCH, a Client

Deletion Form (appendix E) was completed by site staff to request derandomization. The form had to be approved by the local Principal Investigator and faxed to the MATCH Coordinating Center. Coordinating center staff removed the participant from the data base if the participant derandomization was approved.

Participant Tracking Data Base

A trialwide participant tracking data base is necessary for monitoring the recruitment process, participant accrual, compliance with treatment, and participation in followup evaluations. A relational data base was created by the Project MATCH Coordinating Center as a means of monitoring trial progress. Although individual sites were inclined to develop their own methods of following participants, the trialwide data base was an invaluable tool for monitoring participant compliance within the study.

Prior to the quarterly Project MATCH Steering Committee meetings, participant tracking reports were sent to the coordinating center. Compliance was reviewed during the meetings when trial progress was reported by the coordinating center. This practice fostered a healthy competition among sites, as they were compared to each other on a number of outcomes. Results from the participant tracking data base included enrollment rates; followup rates, including mean days overdue and percentage completed in person versus over the telephone; collateral rates; and biological testing rates.

Offsite Monitoring

In a large, multisite trial, especially one in which sites are dispersed around the country, onsite monitoring visits are expensive and time consuming. It is necessary to track the trial through data checks and telephone conversations with staff at individual sites as well as conference calls of combined staff at all sites. In Project MATCH, all assessments were audiotaped, providing an offsite means of monitoring diagnostic accuracy, eligibility, and protocol drift. The following are specific examples of offsite monitoring of protocol-related activities.

Completed Intake Sessions (Enrollment)

Site A enrolled participants at a lower rate compared to the other sites. Telephone conversations with staff indicated that there was little involvement of the Principal Investigator, and no regular staff meetings were held. Suggestions were made to the Investigator, who initiated weekly staffings with local reporting of problems and suggestions. Additionally, the coordinating center reported the low rates at the next Steering Committee. Enrollment at this site slowly improved over the next several months.

Completed Followup Sessions

Four sites consistently followed up participants at a lower rate than the other five. A conference call among Project Coordinators was initiated to discuss strategies for locating and completing

sessions with difficult participants. Staff at the more successful sites were able to give suggestions for locating and following participants. The conference calls were scheduled on a regular basis. The followup rates for the four sites gradually improved and even surpassed the more successful sites in some followup areas.

Eligibility Criteria Site B requested derandomization or withdrawal of participants after enrollment. Derandomization, an appeals process, was reserved for those participants who had been randomized through false means (e.g., lying to the research staff). The coordinating center requested the site's baseline assessment tapes and discovered that many participants were enrolled prior to meeting the average length of hospital stay required for the study protocol, a violation of eligibility criteria. Site B staff were forced to request withdrawal if the participant left the hospital earlier than expected. No other derandomization requests were made once this matter was corrected.

Diagnostic Criteria Site C recruited participants at a very rapid pace. The coordinating center staff requested the site's baseline assessment tapes and found that the diagnostic inclusion criteria were not met in all cases (i.e., minimum numbers of symptoms required for study eligibility). The coordinating center requested assessment tapes for questionable participants (i.e., those with few symptoms) and monitored the research interviewers. With the assistance of the Investigator at that site, this problem was immediately corrected.

Data Accuracy Site D was invariably late in sending participant tracking data prior to Steering Committee meetings. In order to meet the reporting deadlines, coordinating center staff hand-calculated rates for this site on numerous occasions. After discussions with the staff and Investigator did not improve the situation, this site was excluded from the next Steering Committee report. Although every attempt was made to avoid embarrassing the Investigator at the meeting, the coordinating center was left with no options. The problem was immediately resolved.

Onsite Monitoring

Although offsite monitoring is a convenient, relatively inexpensive, and necessary technique, excessive reliance on distant observations may lead to a false sense of security with regard to a trial's progress. Although there are times when policing the trial is necessary, this role is unpleasant, stressful, and occasionally ineffective. One opportunity for coordinating center staff to strengthen relations with site staff occurs during an onsite visit.

Whenever possible, the coordinating center staff should act as part of the team to promote interest in the trial and encourage good staff morale. Site visits provide an occasion to spend time with

staff members and Investigators in order to understand how the team administers the protocol at each location. Site visits also provide an opportunity to observe the facility and to understand what administrative issues may affect good or poor compliance.

Furthermore, a trip to the trial sites enables coordinating center staff to obtain firsthand knowledge of the similarities and differences among them. Without the knowledge provided by external observers, discrepancies or procedural differences might influence participant compliance in unpredictable ways. The goal of onsite monitoring is to gather careful descriptive information, check on the reliability of the data-gathering procedures, and become familiar enough with the workings and context of each site to make possible the most accurate interpretation of the findings, especially where site differences occur.

For Project MATCH, two members of the coordinating center as well as one member of the funding agency visited each of the nine sites on two different occasions, with several specific aims.

- To check the reliability (i.e., consistency) of research personnel both within and among centers in terms of their adherence to the established protocol
- To meet personally with trial staff at each site in order to communicate a uniform set of expectations concerning the purpose of the research and to evaluate staff roles and responsibilities according to specifications in the study protocol
- To obtain firsthand descriptions, including photographs, of each site in terms of physical setting, institutional context, and other possible sources of influence on the quality of the data collected
- To identify practical and methodological problems and provide consultation early in the process of data collection
- To review procedures for screening, recruitment, random assignment, interviewing, questionnaire completion, followup, data entry, and project monitoring

Some specific procedural and facility differences found at Site G can serve as an example of how a site visit may be used to understand the problems associated with one aspect of compliance, the number of completed baseline sessions. Although Site G was housed in an impressive facility with competent and committed staff, the enrollment rate was one of the lowest in the trial. The differences discovered during the site visit fell into three catego-

ries: (1) marketing the trial, (2) enrollment procedures, and (3) project visibility within the housing facility. The coordinating center members were able to make recommendations to Site G aimed at increasing their enrollment rate.

Marketing Site G differed from others in the frequency of advertising for participants as well as in the advertisement itself. Suggestions were made to increase the regularity with which the ad appeared in the paper as well as to modify the ad to appear more like other MATCH advertisements (e.g., "Free treatment" rather than "No charges") to emphasize the benefits of MATCH treatment.

Other marketing approaches, based on successful strategies used by other sites, were suggested by the coordinating center to increase the pool of potential participants. These included publicizing the project through a press release in the local newspaper, holding interviews with representatives from the print and broadcast media, and preparing public service announcements. These efforts provide an effective and inexpensive method of disseminating information about projects to the public as well as to the treatment community. During the site visit, samples of press releases and newspaper articles that worked to enhance recruitment at other sites were distributed to the staff at Site G.

Other strategies for increasing the visibility of MATCH within the local community were also presented.

- Revisiting area hotlines that include the MATCH number
- Conducting a workshop or inservice presentation for emergency room staff
- Investigating court mandates regarding DUI and DWI offenses with a view toward presenting MATCH treatment as a means of fulfilling court requirements for alcohol-related education and treatment
- Contacting local attorneys for MATCH referrals
- Placing a notice regarding Project MATCH in local church bulletins
- Presenting Project MATCH to Al Anon members or to other appropriate self-help groups
- Posting fliers at unemployment offices and local health clinics
- Presenting workshops at local health and mental health clinics

Enrollment Procedures

Site G also differed from the other sites in terms of initial contact with potential participants, attention to participant needs, length of time to complete all baseline enrollment assessments, and staff involvement. Collectively, these procedural differences may have a large impact on participant recruitment.

Initial contact.—Unlike the other sites, the newspaper advertisement for Project MATCH at Site G listed the telephone number of the facility in which MATCH was housed rather than a dedicated MATCH line. A clinic secretary answered the calls from the advertisement and scheduled appointments for participants to meet in person with a staff member who administered the initial screening questionnaire. Other sites administered the screening assessment immediately by telephone and scheduled a diagnostic appointment with the participant to minimize the number of inperson visits a participant would have to make. Additionally, it was noted that at Site G, calls could not be taken during the evening or on weekends, and there was no answering machine to record names and numbers for contact at a later time.

Recommendations were made to list a dedicated Project MATCH number in the ad and to purchase an answering machine to take calls when the line was busy and for coverage on evenings and weekends. It was also suggested that Site G personnel staff the MATCH telephone line for several days just after ads appear and that they screen potential participants over the telephone. Staff members were then able to schedule participants for the diagnostic appointment or refer them to the non-MATCH screening staff for other appropriate research projects or treatment. Telephone screening allows the staff to enter participants into the study in a timely manner and to screen a larger number of participants during a shorter period of time. This protocol worked very well in the other sites.

Attention to participant needs.—Mattson et al. (1985) described two major factors that affect willingness to participate in treatment studies—the ease of transportation to and from the clinic and the amount of time spent in the waiting room. Also, decreased participant compliance was noted with scheduling problems, lack of adequate communication, and blood draws. It was observed during the visit to Site G that potential participants had to invest a considerable amount of time in the project before they were enrolled in treatment. If they appeared eligible, participants were asked to provide blood and urine specimens following the screening, which was an alteration to the protocol (i.e., too early). They received little information about the initiation of therapy during the screening process. All in all, prior to enrollment, nothing pleasant happened to the participant.

The coordinating center staff recommended the following: Once screened and deemed appropriate for MATCH, the participant should be escorted to the MATCH offices and introduced to the Project Coordinator or research assistants, depending on who is available. The participant should be offered a cup of coffee or other beverage and shown the general location of the MATCH offices where assessment and treatment occurs. The diagnostic session should be scheduled, or even completed, if possible, at that time. Blood and urine specimens should be collected only after the diagnostic session is completed and participant eligibility is fully determined.

Duration of the intake assessment process.—Length of time to complete assessments is both a recruitment and client care issue. Site G participant-tracking data for 41 cases indicated that the length of time between completion of the initial screening questionnaire and the second screening session was approximately 6 days, while the average time between the initial screening and the first therapy session was 30 days! Other sites, in contrast, averaged 1 day between the two screening sessions with only 10 days between the initial screening and first therapy session. The coordinating center staff recommended that the Site G Project Coordinator talk to other Project Coordinators about attention to participant needs and about speeding up the enrollment assessment process.

Staff involvement.—Informal discussion during the site visit suggested that staff were generally unaware of the site's enrollment problem. At the other sites, Principal Investigators and Project Coordinators devoted considerable time to this issue during staff meetings and regularly brainstormed ideas for increasing participant intakes. The coordinating center recommendation was that the Site G Investigator and Project Coordinator spend more time with staff in an attempt to implement some of the recommendations suggested during the site visit and to generate additional ideas for enhancing accrual.

Project Visibility

Compared to the other trial sites, Project MATCH at Site G was relatively invisible within its institutional context. During the onsite visit, coordinating center staff found no "Project MATCH" signs within the building to assist in way-finding and no signs to distinguish this research project from other treatments or projects within the institution. If participants seemed appropriate for MATCH after the screening, they were seated in the building lobby where a secretary arranged yet another appointment for the diagnostic evaluation. No attempt was made to introduce the participant to the staff or to make the participant feel comfortable about the next step in the process. Very little was done to foster an identification with, or an attachment to, the project.

It was recommended that efforts be made to increase awareness of Project MATCH within the facility, beginning with a workshop to present the study. Project MATCH signs were another recommendation. Although these suggestions seem small and inconsequential, they have enhanced participants' willingness to participate at other sites in the trial.

The suggestions made to Site G were based on observations made by the coordinating center from previous visits to other sites. It was also recommended that the Investigator develop a written strategy for tackling the problem of low enrollment at the site and submit it to the Steering Committee by a certain date. A second site visit was also scheduled.

Data Entry and Data Management Procedures

Rigorous quality assurance procedures for the collection of data are integral to enhancing compliance. Through careful screening and monitoring, data entry and management procedures can affect all areas of compliance.

In Project MATCH, the data entry task was carried out by each individual site, while the coordinating center was responsible for overseeing the data entry and ensuring high, trialwide data quality standards. The coordinating center created each data entry program, complete with warning messages when out-of-range data were being entered. The MATCH policy also required double-entry verification for each case. These steps were implemented for premium data accuracy.

Data Timeliness

The coordinating center issued a timeline to each site requesting that a certain percentage of cases be entered, verified, and mailed to the coordinating center by a given due date. That percentage was determined both by a site's particular recruitment goal and the needs of investigators to review the data during the course of the trial. Upon receipt of a data shipment, the coordinating center reviewed the number of complete cases received. Sites were requested to send extensive documentation with each mailing that would detail missing cases, variables, and any anomalies.

The coordinating center reviewed the documentation in comparison with the data received. Any discrepancies between documentation and data or undocumented missing data was queried by the coordinating center for explanation by the sites in a weekly mailing. In many cases, missing data were simply a result of data entry error or misplacement of forms. When necessary, participants were queried by research staff to clarify their answers, or the audiotapes of interviews were reviewed to complete an assessment.

This careful scrutiny of missing data significantly increased the number of completed sessions, thereby enhancing compliance.

Another benefit of due dates is increased timeliness of data. That is, research staff working to fulfill a due date would hasten to complete followup visits with participants. The extent to which the sites met the deadlines was later reported to the Steering Committee, thereby providing an incentive to staff to collect and enter as much data as possible for the due date.

Data Accuracy

Perhaps the bulk of the activities by the data management staff at the coordinating center was devoted to data accuracy. They expended a considerable amount of energy conducting checks of out-of-range data, values that appeared to be outliers, and incongruent responses, as well as validating data by cross-checking different information sources. On a weekly basis, the coordinating center would circulate queries to each site concerning such anomalous responses and would request that an explanation be provided by a certain date. Not only did this system increase data cleanliness, but it enhanced compliance in another way. Namely, the types of incongruences the coordinating center probed demonstrated to the staff the types of problems they should look for and, consequently, taught them how to better gather information from the participants. Because they knew the coordinating center would query inconsistencies, they began to ask the questions of the participants themselves.

Careful review also assisted in identifying participants who did not meet the diagnostic criteria, that is, they were technically ineligible. Thus, Project MATCH analysts were able to identify and remove the very small number of such participants from the data base.

Data Coordination

Not surprisingly, the task of coordinating such a nationwide data management effort requires remarkable coordination among sites. Among the strategies found to be very helpful was identifying a person at each site to be a contact person regarding data quality. Whenever one site uncovered a problem with a data entry program, coding a form, or collecting an interview or had a helpful hint to offer, the information was distributed to all data quality persons. At the outset, it became clear that mistakes are commonly duplicated and that sharing information is critical to avoid this problem. It was also apparent that data quality personnel at the sites often found innovative ways of dealing with problems that should be shared with others. In retrospect, a monthly data quality conference call might have been very helpful for just these reasons.

The conference call could have also served another purpose. That is, a good relationship among data quality personnel at the sites is very important but sometimes difficult to maintain. To achieve the best possible results, it is important that the staff at each site feel that they are team members working in conjunction with the coordinating center toward the goal of data accuracy. It was clear in this study that the coordinating center encountered more data quality problems with sites who viewed the coordinating center as adversarial, where they felt that procedures were dictated to them. Maintaining a balance between implementing project procedures and facilitating a good team feeling is challenging. Allowing adequate input from site personnel is an important step; a monthly conference call would be one method of achieving that goal.