CHAPTER 5
CLIENT FLOW ANALYSIS FOR EmOC

PURPOSE AND DESCRIPTION

The purpose of client flow analysis (CFA) for EmOC is to gather information about care for pregnant clients with complications in order to eliminate or reduce delays in receiving care. The aim is for **all** clients to be quickly evaluated to determine if they have an emergency, and, if an emergency is identified, to proceed to stabilize the client and provide definitive treatment as soon as possible. This exercise builds on the steps of care staff defined in the introductory workshop.

This tool enables you to track the time between arrival[1] (T1) and evaluation (T2) for all clients. For clients with complications (such as those who arrive in an unstable condition or need immediate treatment), this tool also tracks the times between evaluation and *initial treatment* (T3) and between initial treatment and *definitive treatment* (T4). See Figure 11 for a summary of the steps of care for an EmOC client and Figure 12 for a definition of initial and definitive treatment. The result for each client is analyzed. Staff can use information from the CFA to identify delays in care for clients with complications or emergencies. The CFA also helps identify the physical locations of any delays and times during the day when problems are most likely to occur.

The time between arrival (T1) and evaluation (T2) should be less than 15 minutes. For clients with complications, the time between evaluation (T2) and initial treatment (T3) should be within 30 minutes. The time between evaluation (T2) and definitive treatment (T4) should be within two hours.

Note: Depending both upon how comprehensive staff want this analysis to be and on what type of information your facility would like to gather, there are a number of ways that the CFA can be used. For instance, while it is recommended that staff track the time between all steps of care in order to best determine all delays, given time constraints or other factors, staff may choose to track the time between only certain steps of care (e.g., between clients' arrival (T1), evaluation (T2), and initial treatment (T3)). The CFA may be conducted on one particular day or spread out over the course of a week. In general, conducting this exercise may also help to reveal gaps in staff's recording of interventions, and may serve to improve case-record note taking.

Figure 11: Critical Steps in Caring for an EmOC Client

---
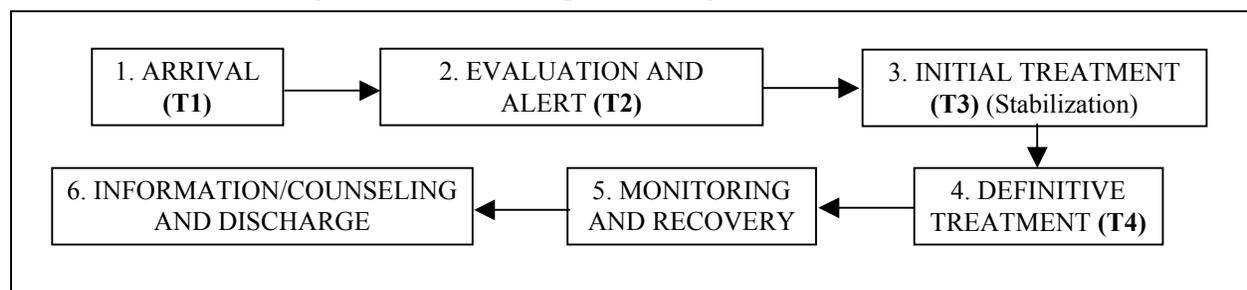
[1] For the purpose of the CFA, "arrival" refers to arrival at the reception/registration area for the emergency evaluation.

The tool includes a CFA Client Data Form, a CFA Summary Table, and CFA graphs to facilitate the collection and analysis of data regarding the times between arrival, evaluation, initial treatment, and definitive treatment. (The forms and sample graphs are at the end of this chapter.)

ESTIMATED TIME FRAME

The preparatory meeting should take about one hour. To do this exercise, you should be ready to monitor client flow over a 24-hour period, so you will need to plan well in advance to do this.[2] This is important to ensure that client flow is tracked at different times during the day because of the nature of the services. The action plan meeting should take about two hours.

Figure 12: Definitions of Initial Treatment and Definitive Treatment for EmOC Clients

INITIAL TREATMENT (T3) refers to stabilizing treatment, including:
- Asking/shouting for help
- Intravenous (IV) fluids
- Cardiopulmonary resuscitation (CPR)
- Administering drugs (oxytocin, magnesium sulfate, antibiotic dose)
- Sending lab tests (blood type and cross match, coagulation parameters, hematocrit)
- Alerting providers in labor and delivery
- Preparing for definitive treatment

DEFINITIVE TREATMENT (T4) includes:
- Cesarean section
- Vacuum/forceps delivery
- Hysterectomy
- Laparoscopy
- Uterine evacuation
- Manual placenta removal
- Nonroutine provision of antibiotics, or oxytocin or ergometrine
- Blood transfusion
- Provision of IV fluids
- Laceration repair
- Observation and determined treatment plan

PREPARING FOR THE CFA

The CFA can be a complex process to coordinate, especially over a 24-hour period. It is important, therefore, for the team leader to prepare staff in advance and to keep facility management well informed of the process. Suggested steps follow:
- *Select participants:* The participants for the CFA are primarily those who are providers for the clients' care during the first four steps outlined in Figure 11 (though all staff should be informed of the process). This includes staff from reception/registration areas, the emergency room or emergency-evaluation area, as well as staff who initially evaluate

---

[2] If it is difficult to coordinate the CFA through one consecutive 24-hour period, it is possible that this process could be carried out for each staff shift during a one-week period. For example, if there are three eight-hour shifts in a day, you might conduct CFA for the first shift on Monday, the second shift on Wednesday, and the third shift on Friday. You could conduct an action plan meeting on each shift.

clients, provide initial treatment to stabilize clients, and provide definitive treatment. Staff responsible for recovery and discharge may be included at your discretion.

- *Select CFA organizers:* In addition, the facility should appoint CFA organizers. You will need enough organizers to cover the periods when CFA will be done. These individuals should be people who are not involved in EmOC and can devote some time to ensure that blank copies of the CFA Client Data Form are available for staff, that staff are filling out the forms correctly, and that all staff are wearing synchronized watches.

- *Read* through the instructions on how to conduct the CFA and familiarize yourself with the tools.

- *Determine* what data will be collected. It is suggested that for the first CFA, you gather data only for all clients from the time of arrival at the reception/registration or the emergency evaluation area (T1) to the time evaluation begins (T2). After six months, perform a complete CFA. This includes T1 and T2 as above, and for clients with complications includes the time initial treatment begins (T3) and the time definitive treatment begins (T4).

- *Organize the materials required:* You will need the toolbook with these instructions on how to do the CFA, sufficient copies of the Client Data Form available for each client over a 24-hour period, the CFA Summary Table on large flipchart paper, and sample CFA graphs on large flipchart paper. You will also need pens or pencils, graphed flipchart paper or plain flipchart paper and a ruler, markers, and a calculator.

- *Review the general guidance* on how to facilitate meetings and the QI process in the QI Leadership Manual.

- *Decide on dates and times* to conduct the assessment by consulting with site management and selected clinical and support staff. The CFA should assess services over a full, consecutive 24-hour period.

- *Inform participants* of the time and place for the initial meeting and the amount of time they should expect to participate in this process.

- *Place a "drop box"* in each area needed for staff to place the completed CFA Client Data Forms.

- *Organize the following meetings:*
  - **A preparatory meeting** (two hours) to review the instructions on how to do this with staff. You can include more staff than will participate in the CFA in this meeting if you think it will be helpful for other staff to know what is happening. During this meeting, you will describe the purpose of the CFA to participants and explain how and when it is to be conducted, indicating which data are being collected in this particular activity (T1 and T2 only, or T1, T2, T3, and T4). Review with participants the definitions of "initial treatment" and "definitive treatment" (see Figure 12 above) for clients with complications. Review the forms to be completed, using the sample filled-in forms. Show staff the location of the "drop boxes." A group of volunteers should collect all forms, fill out a summary form, and draw a graph, to be presented at the action plan meeting.
  - **An action plan meeting** (two hours) to review the findings from the CFA and to prepare an action plan. This meeting should include the staff who participated in the CFA only.
  - **A debriefing** for the QI Committee or site management on the findings and the action plan developed.

USING THIS TOOL IN THE QI PROCESS

Using the Client Data Form: Information Gathering and Analysis

- Synchronize the watches of everyone participating in the CFA with the facility clock. Instruct participants that by the end of 24 hours, all clients who have been given a client number should have been followed to completion. Ask staff to note any difficulties they encounter in filling out the forms.

For All Clients:

- Data is collected for all clients in labor, with complaints, with complications, or with an emergency (e.g., hemorrhage, obstructed labor, infection, eclampsia). Pregnant clients coming for antenatal care or other services are excluded.
- T1: A designated person in the reception/registration area for emergency evaluation notes the date, client name and code letter, and time of arrival (T1) on a blank CFA Client Data Form (see end of this chapter). This is given to the client or included with the client's record if one is started.
- T2: The initial evaluator notes the start time of the evaluation (T2), complaint/ diagnosis using the client code (see Figure 13), any treatment, and staff initials. The comment section should be used to provide a brief explanation of any delays beyond the times noted at the beginning of these instructions (e.g., locked drug cabinet, missing on-call roster, unavailable staff, unavailable room, equipment).
- For clients in labor or without complication, Client Data Forms are completed for T1 and T2. The staff member completes these forms by writing "no" in the "Complications" column and "X" through all remaining spaces and then places the forms in the "drop box." Only clients with complications will be tracked for the initial treatment (T3) and/or definitive treatment (T4).

For Clients with Complications:

- *T3:* The provider in charge of initial treatment notes the *start time* (T3) of the initial treatment and the time of service completion. The provider also notes treatment provided and adds his or her initials (see Figure 13).
- *T4:* The provider in charge of definitive treatment notes the *start time* (T3) of the definitive treatment and the time of service completion. The provider also notes treatment provided and adds his or her initials (see Figure 13).
- The comment section should be used to provide a brief explanation of any delays beyond the standards noted at the beginning of these instructions (e.g., locked drug cabinet, missing on-call roster, unavailable staff, unavailable room, equipment).

Figure 13: Sample Client Data Form

CFA Client Data Form				
Client Code: L=Labor, H=Hemorrhage, O=Obstructed labor, I=Infection, E=Eclampsia, X=Other (please specify)				
Name: S. Polly				
Date: October 17, 2003 **Client Number (1, 2, 3, etc.)**: _____				
	Start Time	**Finish Time**	**Client Code/ Treatment**	**Staff Initials**
Arrival at Reception/Registration for Emergency Evaluation	**T1** 8:00 a.m.			SP
Initial Evaluation	**T2** 8:12 a.m.	8:20 a.m.	Client code: X-placenta retained	KB
Initial Treatment	*T3* 9:22 a.m.	9: 40 a.m.	Treatment: IV fluids	CC
Definitive Treatment	*T4* 9:52 a.m.	10:30 a.m.	Treatment: Manual placenta removal	AS
Comments: *IV fluids were delayed because there was no IV set in the area.*				

Preparing the CFA Summary Table: Information Gathering and Analysis

Preparing a CFA summary table will enable you to tabulate and calculate times between services (arrival, evaluation, initial treatment, definitive treatment).

- Once the CFA Client Data Forms (see Figure 13) for each client are collected, use them to calculate the times between service points by subtraction. (This activity may occur on the following day). This information is filled in the CFA Summary Table (see Figure 14).
- Once the information gathering is completed, staff prepares one master copy of the CFA Summary Table for the analysis and for the on-site supervisor/team leader to keep for future reference.

Figure 14: Sample CFA Summary Table

	Arrival	Evaluation		Complication Yes/No	Initial Treatment		Definitive Treatment	
	T1 Arrival Time	**T2** Start	**T2-T1**		**T3** Start	**T3-T2**	**T4** Start	**T4-T2**
Client 1	8 a.m.	8:12 a.m.	12 min	yes	9:22 a.m.	70 min	9:52 a.m.	100 min
Client 2	10:00 a.m.	10:20 a.m.	20 min	no	XX	XX	XX	XX
Client 3	1:00 p.m.	1:45 a.m.	45 min	no	XX	XX	XX	XX
Client 4	8:00 p.m.	8:30 p.m.	30 min	yes	9:50 p.m.	80 min	8:10 a.m.	11 hr, 40 min
Client 5	2:30 a.m.	3:30 a.m.	60 min	yes	3:45 a.m.	15 min	9:30 a.m.	6 hr

(Table heading: CFA Summary Table)

Preparing Graphs to Aid in Analysis of CFA EmOC Findings

There are three critical time intervals to analyze:
- Time from arrival to evaluation (should be within 15 minutes)
- Time from evaluation to initial treatment (should be within 30 minutes)
- Time from evaluation to definitive treatment (should be within 2 hours)

Use the CFA Summary Table and the Client Data Forms to prepare graphs to assist staff in analyzing the data. Chart client flow according to arrival time (T1). Some of the charts that may be used include:
- *Figure 15: Sample comparing time of arrival to evaluation (T2 – T1) (time from arrival to evaluation at different times of the day)*
- *Figure 16:* Time from evaluation to definitive treatment (T4 – T2) (time from evaluation to definitive treatment at different times of the day)
- *Figure 17:* Individual client flow (charting of the flow of each individual client from arrival to definitive treatment to compare what is happening to all clients at the same time)

Examples of the analysis of these graphs are contained under analysis of data. Blank graph forms for Figures 15, 16, and 17 should be prepared on flipchart paper for the actual analysis conducted at your site.

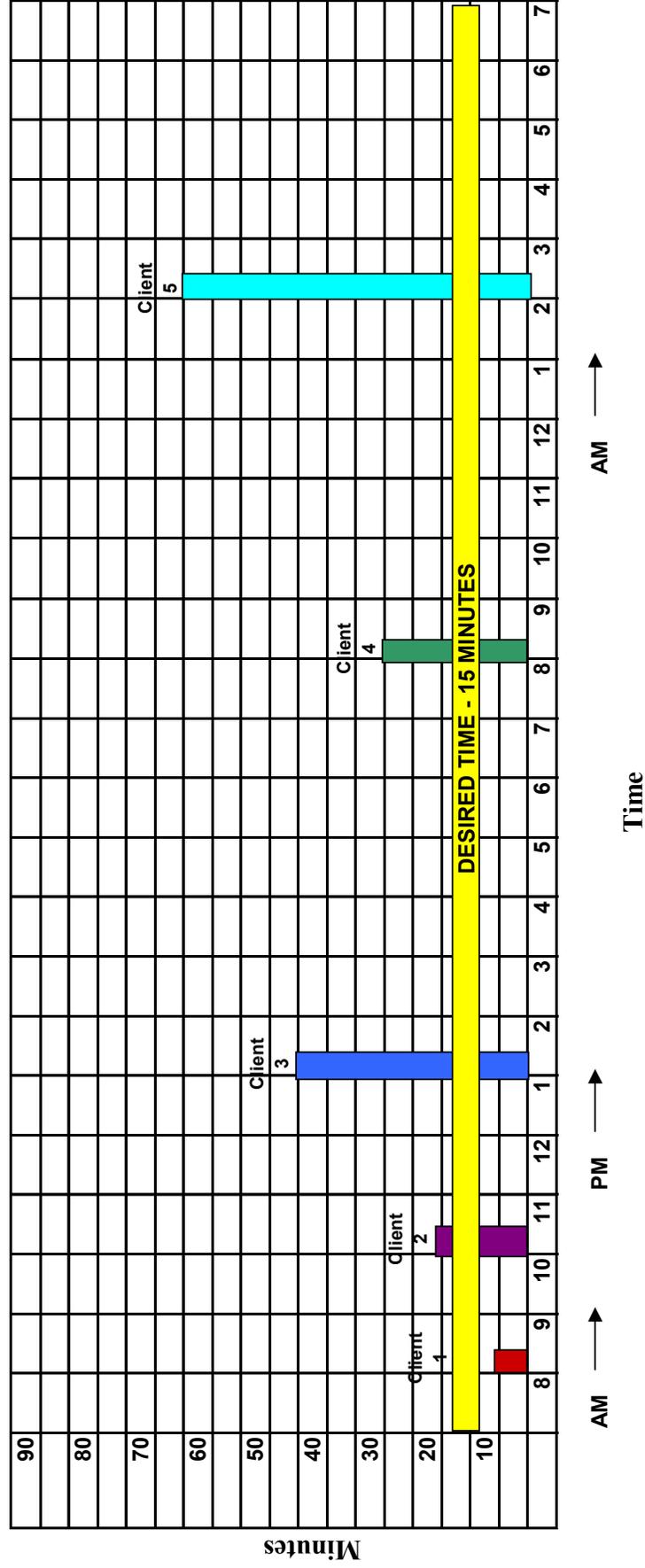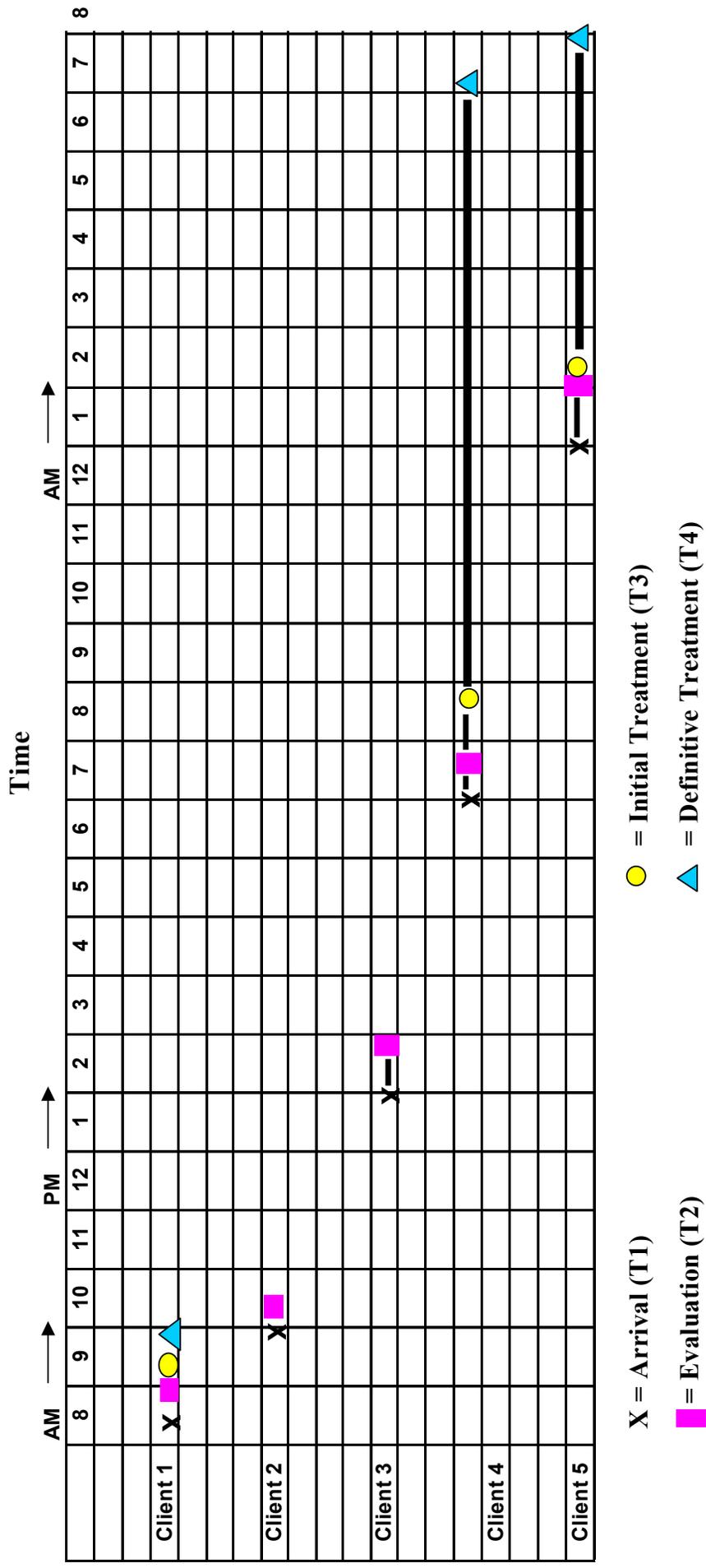## Figure 15: Sample Comparing Time of Arrival to Evaluation (T2 – T1)

Figure 16: Time from Evaluation to Definitive Treatment (T4 – T2)

Figure 17: Individual Client Flow

X = Arrival (T1)

⬛ = Evaluation (T2)

⬤ = Initial Treatment (T3)

▲ = Definitive Treatment (T4)

> **Options:**
> 1. Analyze without graphs. Although it may be visually easier to look at graph data, you may save time by analyzing the data from the Client Summary Table and Client Data Forms directly.
> 2. Graph clients with different diagnoses in different colors.

Analyzing Data

From the CFA Summary Table, CFA Client Data Forms and the CFA graphs, analyze the time elapsed, the variations between different shifts of the 24-hour period, and the time that is spent on evaluation or treatment.

For delays, the specific Client Data Form should be reviewed to discuss the root cause:
- Are specific procedures often delayed?
- What times of the day do delays occur: around lunch breaks, shift changes, at night?
- Use the "multiple whys" technique (see the introduction to the toolbook) to discuss the root cause of the delays. For example: Was the delay due to shortage of staff with specific skills, lack of clearly assigned duties during specific shifts, or locked equipment and supplies?

Specific data to analyze include

1. **Arrival to evaluation time (T2 – T1): This should be less than 15 minutes.**
   Example: Analysis of the sample CFA graph (see Figure 15) reveals that clients are evaluated within 15 minutes of arrival only in the morning (Client 1 and Client 2). The data for clients who exceed the 15-minute time limit should be analyzed individually. A discussion about why these delays occur could reveal that there are no staff at the reception or evaluation area during the lunch break (accounting for the delay with Client 3) and during the night (accounting for the delay with Client 4 and Client 5). A solution might be for staff to rotate breaks, instead of all staff taking breaks at the same time.

2. **Evaluation to initial treatment time (T3 – T2): This should be less than 30 minutes.**
   Example: Direct analysis of the CFA Summary Table (see Figure 14) shows that there is a delay of 80 minutes for Client 4 at 8 p.m. During the analysis of this CFA Client Data Form, it is found that a dose of antibiotic was delayed because of a locked drug cupboard. Direct analysis of the CFA Summary Table shows that there is a delay if 70 minutes for Client 1 due to the lack of IV infusion sets in the emergency-evaluation area.

3. **Evaluation to definitive treatment time (T4 – T2): This should be less than two hours.**
   Example: Analysis of the sample CFA graph (see Figure 16) or CFA Summary Table (see Figure 14) reveals that clients are not treated within two hours at night (Client 4 and Client 5). Discussion about the cause of this delay could reveal that for the 7 p.m. to 7 a.m. shift, the on-call staff are midwives who have not been trained to perform cesarean section or uterine evacuation. Solutions might include ensuring that on-call staff on the 7 p.m. to 7 a.m. shift have these skills, either by reassigning the duties or by training the midwives to perform cesarean section and uterine evacuation.

4. **Delays occurring due to many clients at one time.**
   Example: Analysis of the sample CFA graph (see Figure 17) shows that Client 4 and Client 5 overlapped while awaiting definitive treatment, creating the need to choose which client to care for first. This chart can be used to discuss how such decisions were made and how they should be made.

Develop a preliminary action plan to address any identified problems. Bring the identified problems to the action plan meeting.

Developing an Action Plan

- *Develop an action plan* to address the problems identified through the CFA. This can be done initially in the small assessment teams and then brought together in the final action plan meeting for presentation and discussion. The larger group may have useful suggestions or findings from other assessment tools to integrate into the action plan.

  Team members must find a solution for each root cause of a problem identified. They should prioritize solutions, taking into consideration such issues as client and/or staff safety and the ease with which a solution can be carried out using existing resources. The team would then assign a person responsible for implementation and completion dates that reflect each item's priority. These steps are described in detail in Chapter 3 of the QI Leadership Manual.

  Below is a sample action plan drawn from an EmOC assessment that team members would present to the larger group.

Figure 18: Sample Action Plan

Problem	Root Cause(s)	Solution	By Whom	By When	Status
There is a delay between occurrence of complications in delivery room and arrival of appropriate provider on the scene.	• Staff does not know who is on call. • No duty roster is posted in client-care areas.	Post duty roster in all client-care areas.	F. Castano, administrator	July 30, 2003 (today)	

Implementing Solutions

- *Implement solutions* as agreed upon in the action plan. Suggestions for facilitating implementation are in Chapters 3 and 4 of the QI Leadership Manual.
- The team leader can periodically *check in with staff* assigned to a particular intervention on the action plan to determine their progress and provide support as needed.

Evaluating Progress and Following Up

- *Review the action plan* during routine staff meetings to determine progress and to discuss any modifications or additional support needed.

CFA CLIENT DATA FORM

Client Code:	L=Labor, H=Hemorrhage, O=Obstructed labor, I=Infection, E=Eclampsia, X=Other (please specify)

Name: _____

Date: _____   **Client Number (1, 2, 3, etc.):**_____

	Start Time	Finish Time	Client Code/Treatment	Staff Initials
Arrival at Reception/Registration for Emergency Evaluation	T1			
Initial Evaluation	T2			
Initial Treatment	T3		Treatment	
Definitive Treatment	T4		Treatment	

Comments:

CFA Summary Table

	Arrival	Evaluation		Complication Yes/No	Initial Treatment		Definitive Treatment	
	T1 Arrival Time	T2 Start	T2 – T1 Elapsed		T3 Start	T3 – T2 Elapsed	T4 Start	T4 – T2 Elapsed
Client 1								
Client 2								
Client 3								
Client 4								
Client 5								
Client 6								
Client 7								
Client 8								
Client 9								
Client 10								
Client 11								
Client 12								
Client 13								
Client 14								
Client 15								
Client 16								
Client 17								
Client 18								
Client 19								
Client 20								
Client 21								
Client 22								
Client 23								
Client 24								
Client 25								