Using Quality Assessment to Improve Maternal Care in Nicaragua: Summary

This case study describes the work of quality improvement (QI) teams working in four municipalities in Hurricane Mitch-damaged areas of Nicaragua. The teams monitored the quality of care by gathering data relating to seven indicators, such as the number of prenatal care visits and applying emergency obstetric care. To the extent the monitoring indicated that standards of care were not being met, the QI teams applied rapid team problem solving to redirect the healthcare providers toward achieving performance according to standards.

Performance improved in all indicators during the year of monitoring, and maternal mortality rates improved during that same period. This work led to insights finding that QI teams can set goals for themselves and monitor their progress in reaching those goals, that many improvements can be made with the investment of few resources, and that provider attitudes will change with information about client needs and expectations.

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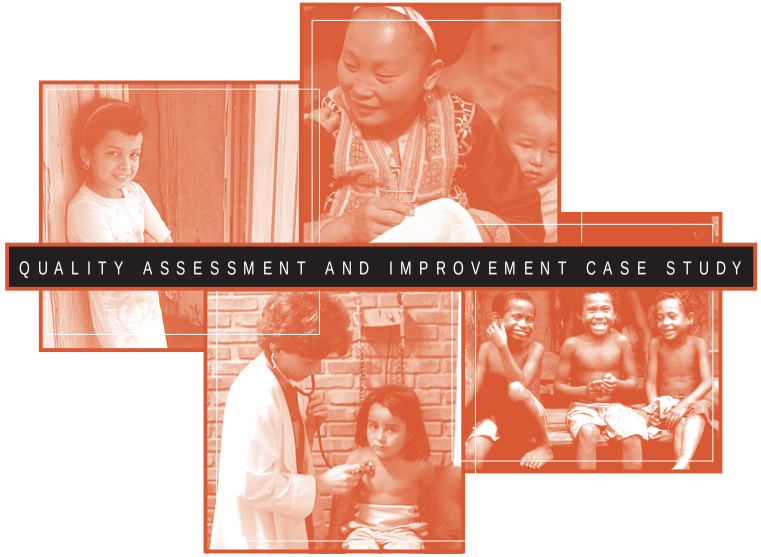

Using Quality Assessment to Improve Maternal Care in Nicaragua

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QA

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Endnotes

[1] "Maternal mortality ratio" refers to the number of maternal deaths per 100,000 live births. "Maternal death" is the death of a woman, while pregnant or within 42 days of termination of pregnancy, from any cause related to the pregnancy but not from accidental causes.

[2] Ministerio de Salud de Nicaragua y UNICEF. 1998. Mortalidad Materna. Un análisis de las muertes ocurridas en Nicaragua en 1998.

[3] Ministerio de Salud de Nicaragua y UNICEF. 1998.

[4] Client perception about maternal healthcare services at the health unit level was assessed at 675 households, 4 health centers, and 14 health posts in the four selected municipalities.

[5] See Nuñez, O. and Hernández F. 2000. *Satisfacción, demandas y requerimientos de beneficiarias de los servicios de salud maternal en centros y puestos de salud de Río Blanco, Waslala, El Cua y Bocay. Una investigación social cualitativa.* Bethesda, MD: Quality Assurance Project.

[6] Some of the funds to cover costs for these repairs and other improvements were provided by the QA Project and other local nongovernmental organizations, such as PROSALUD and CARE.

[7] *Centro Latinoamericano de Perinatología y Desarrollo Humano* (Latin American Center for Perinatology and Human Development).

[8] The QA Project has developed a problem-solving methodology over the course of its work in developing countries. The methodology is described in many QA Project publications, particularly "A Modern Paradigm for Improving Healthcare Quality," available in English, French, Russian, and Spanish from <www.qaproject.org>.

[9] Other simultaneous projects with similar goals make it impossible to attribute all the decrease in maternal deaths to the quality assessment and improvement.

[10] Text was modified slightly to facilitate comprehension.

statistics department. The clerk and the health center director would then cross-check the information collected from the prenatal care medical staff with the information consolidated by the statistics department. From this the values for the construction of the indicator will be obtained.

With this exercise, the team implemented the changes in data collection and consolidation, and in the following meetings, the team noted that the indicator had improved.

About this series

The Case Study Series presents real applications of quality assurance (QA) methodologies in developing countries at various health system levels, from national to community. The series describes QA applications in maternal and reproductive health, child survival, and infectious diseases. Each case study focuses on one or more major QA activity areas, such as quality design, quality improvement, the development and communication of standards, and quality assessment. This case study focuses on quality assessment and improvement.

Quality assessment is the measurement of the quality of healthcare services: it measures the difference between expected and actual performance. Information gained from an assessment can be used to identify opportunities for improvement. Performance standards can be established for most dimensions of quality, such as technical competence, effectiveness, efficiency, safety, and coverage. Where standards are established, a quality assessment measures the level of compliance with standards. Where standards are more difficult to articulate, such as the quality dimensions of continuity of care and accessibility, a quality assessment describes the current level of performance with the objective of improving it. A quality assessment can use various data collection methods to overcome the intrinsic biases of any method alone. These methods include direct observation of patient-provider encounters, staff interviews, patient focus groups, record reviews, and facility inspections. The assessment is often the initial step in a larger process that may include providing feedback to health workers on performance, training and motivating staff to undertake quality improvements, and designing solutions to bridge the quality gap.

Quality improvement is a systematic process of addressing the gaps between current practices and desired standards. Effective approaches to quality improvement include individual problem solving, rapid team problem solving, systematic team problem solving, and process improvement. These methods vary in the time and resources required and the number of

continued on next page

people who participate. Regardless of the rigor and intensity of the method used, quality improvement approaches usually share four basic steps: identification of opportunity for quality improvement, analysis of improvement area, development of possible interventions to address a need for improvement, and testing and implementing interventions. Sometimes, when the potential solutions to a problem are clearly defined, a shorter quality improvement activity focused on testing the alternatives is used.

This case study describes how healthcare providers in Nicaragua worked together to improve the quality of obstetric care at their health centers and posts. They began by measuring the extent to which staff performed according to standards. Once aware of the quality gaps, they formed QI teams and used rapid team problem solving to implement quality improvements so that healthcare providers could perform according to obstetric standards. Continuous monitoring shows their success in meeting the standards and improving health outcomes.

Acknowledgments

The Nicaraguan Ministry of Health implemented the QA efforts described in this case study. Jorge Hermida (QA Project Regional Director), Filiberto Hernández (QA Project/Central America), Oscar Nuñez (QA Project/Nicaragua), and Luis Urbina (QA Project/Nicaragua) collaborated with Ya-Shin Lin (QA Project Communication and Research Specialist) to write this case study. They wish to express their appreciation to members of the QI teams who assessed and monitored quality at their health centers and posts to improve maternal care: Javier Alfaro, Julio Barba, César Rodríguez, Gelmi García Martínez, Paula López, Ernesto Marenco, and Suhey Rodríguez. Filiberto Hernández and Diana Silimperi (QA Project Deputy Director) provided technical review.

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Appendix 3. Example of Rapid Team Problem Solving at Río Blanco Health Center

The Río Blanco team meets once a month at the health center. The members consist of the medical director, the training doctor, the assistant doctor, assistant nurses, the medical record administrator, and the QA Project facilitator.

Step 1: Identify problem: During one of its early meetings, the Río Blanco team examined the health center performance in the area of the six indicators they monitored every month. The team found that not only had the number of prenatal care visits per pregnant woman not improved, but it was actually *decreasing*. Consequently, they gave high priority to this problem.

Step 2: Analyze: In this step, a team usually selects an indicator that will measure an improvement in the problem area, so that they will know if their quality improvement effort was successful by monitoring the indicator. However, in this case, the problem was identified from the indicator, which had already been defined as: the total number of prenatal care visits in a month divided by the number of first-time prenatal care visits during same period.

The Río Blanco team met to investigate why there was a reduction in the prenatal care visits indicator. First, the team brainstormed a list of reasons that could have caused this reduction and grouped related ideas. Next, for each reason, the team asked the question *why*, probing for a root cause by using a tree diagram as a guide.

The team quickly decided that among the possible causes identified, a main problem seemed to be that doctors and nurses did not have the appropriate forms for registering prenatal care visits. Since they had run out of forms, they were registering prenatal care visits on any type of paper, which made it difficult for the statistics department to consolidate the information. On the other hand, even when they had the forms, they were often simply filed away and not sent to statistics for consolidation.

Steps 3 and 4: Develop, Test and Implement Solution: Since the team agreed that the cause of the problem was obvious, it requested that the QA Project provide prenatal care visit forms. Once the forms were obtained, the team distributed them to all staff providing prenatal care services.

The team also decided that the archives clerk would collect the forms, check whether they were filled out correctly, and deliver them to the

Appendix 2. Quality Improvement Team Meeting Log (Translated Excerpt)[10]

El Cua, August 8th, 2000

Meeting to review points brought up in opinion survey and to evaluate health personnel in management of standards

1) Lack of prioritization

Agreements: Statistics manager will conduct orientation session for admissions officers so that pregnant women and children are prioritized for care. The statistics manager should review the data on integrated care for women every day and enter the data in the computer between 11:00 and 12:30 (time allotment to be increased if necessary). The OB/GYN should prioritize first-time clients, those who are on their last prenatal visit, and the health problems that they present. All doctors should follow IMCI standards for children younger than 5 years old.

2) Deficiency in the management of standards

Agreements: Monitoring and supervision at the health units should involve all doctors who received training in monitoring the use of perinatal technologies. All records of women who gave birth at the health unit and those who were admitted for any health reason during pregnancy were identified. Standards will be given to health personnel before training on management of standards so that they can be discussed during training. On Monday, staff will be notified of the date to discuss these standards. The schedule for using the computer for entering data on standards will be put in writing. This afternoon the memo regarding the priority admission of pregnant women and children will be circulated. The lab manager should register routine examinations of each pregnant woman in a notebook. Childhood immunization cards should be assured at labor and delivery so that birth data are recorded and children are referred for BCG vaccination.

El Cua, August 16th, 2000

Using the monitoring sheet, the basic perinatal clinical history and the partograph of 10 obstetric records were reviewed. Using the calculation parameters listed on the monitoring sheet, the records scored 71 percent compliance with standards.

Exit interviews are being conducted. About 10 to 15 out of 50 interviews remain to be conducted.

General doctor, nurse, and OB/GYN need to complete the EOC analysis and record it in this notebook. Monitoring of newborn care needs to be done.

Using Quality Assessment to Improve Maternal Care in Nicaragua

Background

Nicaragua's maternal mortality ratio climbed steadily in the 1990s, jumping from 87 maternal deaths per 100,000 live births in 1994 to 156 in 1998.[1] Hurricane Mitch exacerbated problems related to healthcare delivery in 1998 by increasing poverty, damaging health units, and reducing access. The profile of maternal deaths in Nicaragua suggested that improving the quality of maternal care services at government health centers and posts (referred to here as "health units") could help to reverse the climbing maternal mortality rates. For instance, "institutional deficiencies" had caused 82 percent of the country's deaths in 1998 from direct obstetric causes.[2]

The Ministry of Health (MOH) had published *National Standards for Prenatal, Low-Risk and Puerperal Healthcare,* establishing standards for quality care in maternal and child health, but the standards had not been systematically implemented. To restore and improve maternal health services in Hurricane Mitch-affected areas, the U.S. Agency for International Development (USAID) invited the Quality Assurance (QA) Project to collaborate with the MOH at the health unit level. The strategy was to prioritize selected quality areas, then to have local quality improvement teams monitor those areas to identify and address problems. The overarching goal was to work with local

healthcare providers to establish a sustainable system of improved maternal and neonatal care.

Two departments were selected for the collaboration: Matagalpa and Jinotega, which had among the highest maternal mortality ratios in the country: 260 and 382, respectively.[3] Two municipalities were selected in each department: El Cua and Bocay in Jinotega, and Waslala and Río Blanco in Matagalpa. Each municipality had five to eight health units serving between 30,000 and 40,000 people.

Deciding What to Assess

Nicaragua's MOH had previously issued standards in the *Standards* publication mentioned above, but they had not been systematically implemented, and indicators to measure performance according to those standards had not been developed. Since the MOH standards were so numerous, MOH and QA Project staff first defined the scope of their effort by helping staff at each health unit to identify a smaller number of standards to implement. They wanted to identify those standards that, if implemented correctly, would have the greatest impact on maternal care. They started by visiting the health units, reviewing medical records, learning about the current system, interviewing staff from the *Sistema Local de Atención Integral en Salud* (SILAIS), and talking with staff and clients.

Visiting health units. To assess current practices, MOH and QA Project staff toured health units in the four municipalities. Observations and informal interviews revealed that the health units had deteriorated physically: furniture was in disrepair, supplies were lacking, and protocols for patient care were not available. They saw that the obstetric care process had not been given a high priority: no special attention was given to pregnant women, who were simply treated along with all other patients. These conditions appeared to diminish staff motivation, which undermined client-provider relationships.

Appendix 1: Quality Indicator Monitoring Form

The following is a translated segment of a form used by the quality improvement team in Rio Blanco to record the percentage of Basic Prenatal Clinical History forms that were correctly completed (see Table 1, Indicator 1).

Republic of Nicaragua
Ministry of Health

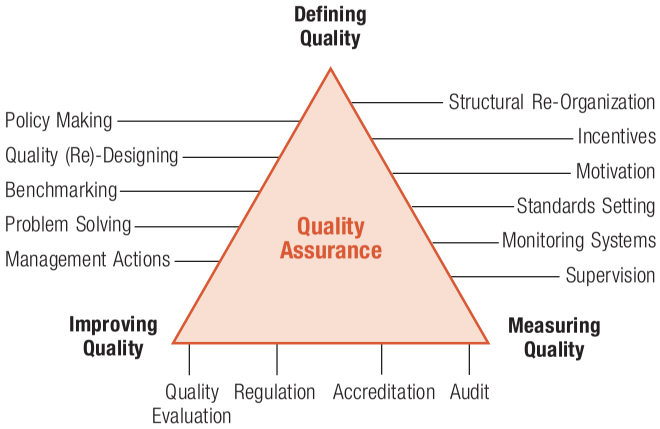
Monitoring of the Basic Prenatal Clinical History Form
Department: Matagalpa City: Rio Blanco Year 2000

ITEMS CORRECTLY COMPLETED	MONTH			
	September (Percentage)	October (Percentage)	November (Percentage)	December (Percentage)
1. IDENTIFICATION				
City	80	100	80	70
State	80	100	100	70
Education	80	90	90	100
SUBTOTAL	80	97	90	80
2. MEDICAL HISTORY				
Family History	100	100	100	100
Personal History	100	100	100	100
Obstetric History	53	100	90	100
Previous Pregnancies	60	100	100	100
SUBTOTAL	78	100	98	100
3. CURRENT PREGNANCY				
Weight	40	100	80	90
Rh Factor	0	60	30	20
Clinical exam	80	90	90	80
Cervix	20	70	50	30
Hemoglobin	0	60	70	0
General Exam	0	60	50	0

Conclusion

While this case study essentially describes how health unit teams monitored the performance at their facilities, all three core quality assurance activities played a role in Nicaragua. First, MOH and QA Project staff defined quality by selecting standards and defining indicators. Then, after staff training to increase clinical capacity in the areas of the selected indicators, QI teams monitored the quality of care according to those indicators. Finally, when the indicators showed that staff were not performing according to standards, the teams applied rapid team problem solving to identify, test, and implement solutions.

Figure 4. Defining, Measuring, and Improving Quality: The Three Core Activities of Quality Assurance



QAP, Nicaragua

Healthcare facilities and furnishings were in disrepair.

Reviewing medical records. MOH and QA Project staff also performed a rapid medical record review to assess the quality of obstetric care from the clinical perspective. Several records from the birth register were randomly selected for each month in 1999. The examination revealed that most basic neonatal and obstetric care was poorly documented, so that the quality of care could not be accurately assessed or monitored from the records. Staff gave numerous reasons why documentation was lacking:

- The forms were not available
- They had not been taught how to complete the forms or had forgotten how to do so
- No importance was given to this activity during supervision sessions
- The forms were too difficult to fill out

Assessing client satisfaction, demands, and requirements. While performing according to standards is critical in improving health outcomes, client satisfaction is also important. No one had analyzed what pregnant women want when they seek prenatal care—or why they don't seek such care. To understand client needs and barriers at each health unit, MOH and QA Project staff collected information using: (a) key informant interviews with community leaders, (b) interviews and structured focus

groups with both clients at the health unit and women in the community, (c) an opinion survey, and (d) observations of patient flow.[4]

These efforts revealed opportunities for improvement in the flow of obstetric care, waiting times, interpersonal relations, and the availability of medications. Clients asked that:

- They be identified to receive priority care upon entering the waiting area
- The waiting room be physically improved
- Clinics for integrated care for women have better visual and auditory privacy
- A separate postpartum room be created
- Midwives accompanying pregnant women be accommodated[5]

Several causes for the low number of prenatal care visits became apparent: poor treatment, long distances to the clinic, lack of privacy, and lack of confidence that they would be seen, due to busy schedules or doctor absences.

Compiling standards. MOH and QA Project staff compiled a short list of standards for the health units that were derived from the review of MOH priorities, the client needs assessment, health unit visits, and medical record review. For each standard, they defined at least one indicator that could be used both to assess the current level of care and, later, to monitor care as quality improvements were implemented.

The list of standards and indicators was presented to each of the four municipalities. In a two-stage process, staff at each municipality prioritized the indicators that they were most interested in and that seemed most achievable based on their understanding of their situation. Target thresholds for each indicator were determined using a similar participative process. The general director of each departmental health system approved the selected standards and indicators. Table 1 presents the standards and their indicators, the targets for those indicators, and the source of information to measure the indicators.

team, the team could quickly problem solve to find ways to address any problems that arose. Teams also closely monitored maternal deaths; members knew how many had occurred and whether they had decreased.

> *Many people believe that to make change happen, money is necessary. This is not true. What is needed is a change in attitude in management and in the staff who see clients. Two things are necessary to generate change: a motivated staff and basic conditions.*
>
> *Deputy Director, El Cua Health Center*

Consistent coaching. Coaches helped to set up teams and served as resource guides as they accompanied the teams' work. By attending meetings, coaches motivated teams, increased the teams' legitimacy, and reinforced the importance of increasing compliance with standards.

Linking training in the use of technology and quality assurance. As healthcare providers learned how to use technology and implement the new standards of care, they also learned how those features were linked to the data that would be collected for various indicators. The linkage helped them to see how their individual behavior had an impact not only on the level of care, but also on the indicator measurement results and, ultimately, the maternal mortality rate outcome. A clear understanding of cause-and-effect relationship brought a sense of importance to the quality improvement efforts.

Sustaining QA. As teams gained experience, they learned how to apply QA methods more effectively, knowledge that can benefit future efforts in Nicaragua. For instance, teams can identify what factors have successfully motivated teams, such as inter-team competition, public recognition, and opportunities for training at a different site. From this experience, teams intend to incorporate innovations, such as involving more people in QI at the outset and using primary school teachers to do exit surveys to reduce bias.

obstetric care. In the long run, the health units will have to find alternative methods of funding QA Project support for basic supplies (e.g., medical record forms). However, the external support allowed the health units to focus on improving maternal care during the 14-month project.

Goal setting. Setting goals that were specific and achievable helped to focus the direction of staff's efforts. First, this involved prioritization of standards by identifying and prioritizing a limited number of standards from the MOH obstetric standards. Second, staff had to define how these standards would be measured, identifying precise indicators and targets, including where data would be obtained and how indicators would be calculated.

> *Before, even though there were standards we were supposed be following, no one talked about them. . . . So the impression was that they weren't that important.*
>
> *Health center quality improvement team member*

Client focus. Work such as undertaking client surveys and developing community-based standards stimulated healthcare providers to change their attitudes, which improved provider-client interactions, technical competency, and other dimensions of quality.

> *The community outreach work sensitized staff to understand the issues of poverty and difficult access that clients face, . . . which was emphasized during the first staff training on self-esteem and human relations. The training led staff to reflect on how they treat clients. This training, in turn, conditioned them to receive technical training.*
>
> *Deputy Director, El Cua Health Center*

Frequent feedback. Monthly sessions to calculate and discuss the indicators provided a forum for feedback, which, like scorekeeping, motivated staff to improve their performance. Since indicator measurements were collected by different QI team members and reviewed by the entire

Table 1. List of Standards Monitored in 2000 and Corresponding Indicators (Matagalpa and Jinotega)

Standard	Indicator	Numerator/ Denominator	Target	Source	Periodicity of Collection
1. All pregnant women will receive care in which the perinatal technology tools* are correctly applied.	1) Percentage of pregnant women cared for who have a correctly completed Basic Perinatal Clinical History (BPCH) form	Number of correctly completed BPCHs/ Total number of pregnant women attended	60%	Clinical files of pregnant women attended	Monthly
	2) Percentage of clients in labor who receive a correctly interpreted partograph with alert curve	Number of partographs with alert curves filled out and correctly interpreted/ Number of births attended	60%	Obstetric files	Monthly
2. Each pregnant woman will receive at least 4 prenatal care visits.	3) Average number of prenatal care visits per pregnant woman seen at the health unit	Total number of prenatal care visits for all pregnant women seen at the health unit/ Total number of pregnant women seen for prenatal care for the first time	3 prenatal care visits per pregnant woman	Consolidated registry for integrated maternal care	Monthly
3. Prenatal care clients will be 20% more satisfied with the care they received, compared to baseline.	4) Percentage of prenatal care clients who report satisfaction with the care they received	Number of prenatal clients who report satisfaction with the care they received/ Total number of prenatal care clients	Bocay: 61% Rio Blanco: 75% Waslala: 68% El Cua: 75%	Exit interviews and suggestion boxes	Quarterly

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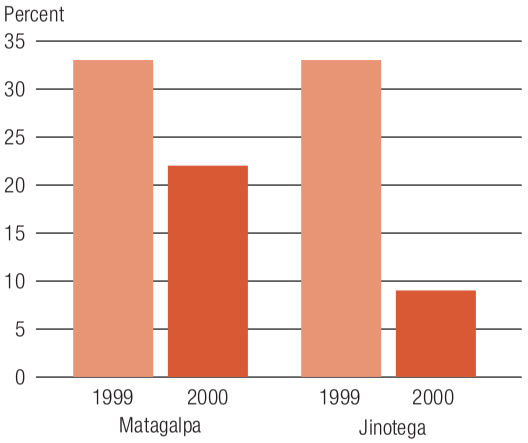
* Perinatal technologies, such as the partograph with alert curve and the basic perinatal clinical history (BPCH), are low-cost tools of proven effectiveness that are included in the *National Standards for Prenatal, Low-Risk and Puerperal Healthcare*. The adequate and complete interpretation of the BPCH requires the correct use and interpretation of other perinatal tools, such as the gestogram, the fundal height measuring tape, the perinatal card, and the table of maternal weight and height.

Table 1. List of Standards Monitored in 2000 and Corresponding Indicators (Matagalpa and Jinotega) *continued*

Standard	Indicator	Numerator/ Denominator	Target	Source	Periodicity of Collection
4. Obstetric emergencies referred to the second level of care will be analyzed by the advising physician, with special emphasis on the causes of transfer and adequate care.	5) Percentage of emergency obstetric cases referred to the second level of care that are analyzed by the advising physician	Number of obstetric emergency cases referred to the second level of care that are analyzed by the advising physician/ Total number of obstetric emergencies referred to the second level of care	80%	Registry of transfers to second level of care and minute book of analysis of obstetric emergencies referred to second level of care	Monthly
5. Emergency obstetric standards will be correctly applied by the end of 2000.	6) Percentage of emergency obstetric clients who receive care according to standards for the diagnosis and treatment of obstetric emergencies	Number of emergency obstetric clients who receive care according to standards for the diagnosis and treatment of obstetric emergencies/ Total number of obstetric emergencies	60%	Clinical records of patients with obstetric emergencies	Monthly
6. Standards for the immediate care of newborns will be correctly applied.	7) Percentage of babies born in the health center who receive care according to the standards for immediate newborn care	Number of babies born in the health center who receive care according to the standards for immediate newborn care/ Total number of newborns who receive care	60%	Clinical records of neonates	Monthly

Figure 3. Reduction of Maternal Deaths



quality gaps. They used their measurements to identify opportunities for improvement, applied rapid team problem solving, and significantly improved the health outcomes in their communities.

Evidence-based standards provided by the Ministry of Health ensured positive health outcomes, while a focus on client satisfaction increased utilization of health services, such as prenatal visits. Several processes and factors contributed to these gains:

Team building. Monitoring and problem solving in teams forced all involved staff to think about and seek solutions at a systems level, rather than through the lenses of their individual roles. In addition, the team meetings helped members sustain their focus and motivation. The teams' sense of ownership of the monitoring and QI functions contributed to the health units' institutional memory. Such ownership minimized the negative effects of staff turnover.

Resources. The quick fixes to repair furniture and facilities and ensure stocks of basic supplies ignited staff motivation for the more significant changes that would come later. Such changes are concrete and visual, reminding both staff and the public of the new effort to improve

Figure 1. Percentage of Clients in Labor Who Received a Correctly Interpreted Partograph with Alert Curve

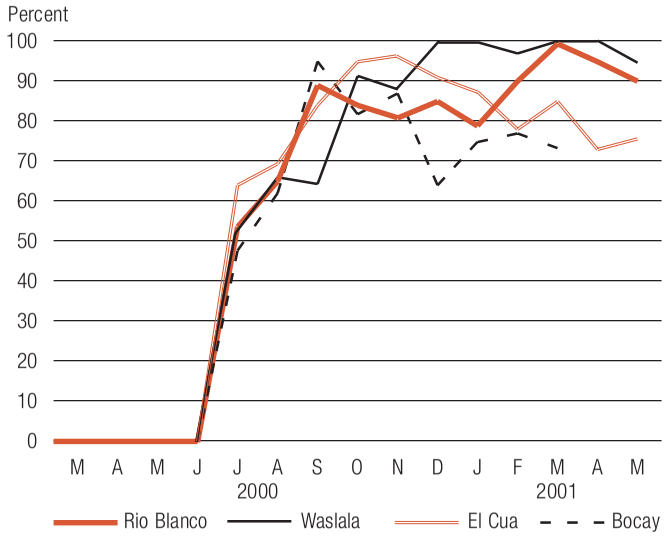
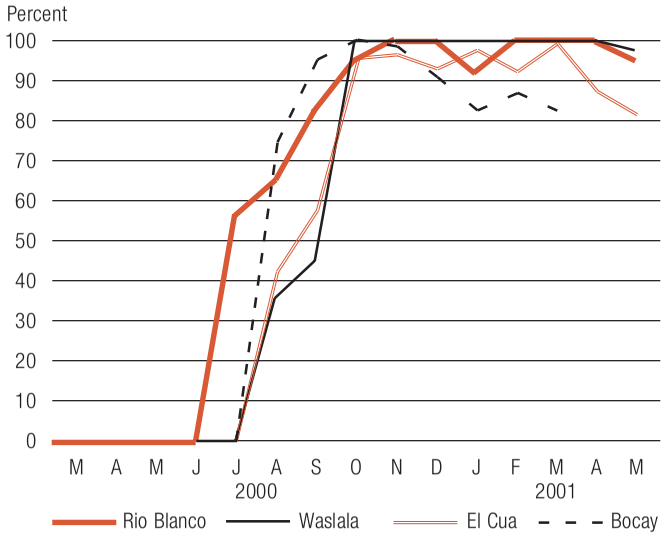


Figure 2. Percentage of Babies Born in the Health Center Who Received Care According to the Standards for the Immediate Care of Newborns



Training in Standards and Quality Assurance

Once standards were identified, defined, and approved, staff at the health units needed knowledge and skills to perform according to those standards. The MOH and QA Project staff conducted workshops on the clinical standards (perinatal tools, essential obstetric care [EOC], and immediate care of newborns) and on quality awareness.

All health unit staff—from the director to the janitor—were introduced to quality principles during a quality awareness seminar. Basic quality concepts were explained: defining quality, the purpose of indicators and how they are monitored, client satisfaction, human relations, empathy for clients, increasing client and institutional self-esteem, teamwork, and rapid team problem solving. Formally introducing quality assurance to staff helped them realize that improving quality was within their power; allowing them to discuss quality-related issues and make decisions about their processes motivated them to try to achieve the standards.

During the training, each municipal health unit incorporated quality concepts into its vision and mission statements. Upon returning to their work places, they were ready to start building quality improvement (QI) teams that would implement QI projects at each health unit. Teams had approximately five members: all staff interested in participating in QI efforts. Members were usually from the health centers (sometimes from health posts) and could include the health center director, doctors and nurses, health

The mission statement from Rio Blanco

Ya-Shin Lin

education specialist, gynecologist (one team), and admissions personnel. To share responsibilities, teams formed subcommittees, with each subcommittee taking responsibility for monitoring a different indicator.

Implementing Quality Improvement

Addressing client demands for improved facilities. The QI teams determined which of the main client needs could be implemented rapidly. They instituted immediate changes to improve the patient flow and ambiance at the health centers: the client satisfaction survey had called attention to the need for efficiency and comfort for pregnant women. The teams also arranged for signs identifying different clinical departments to help orient clients; to paint waiting rooms, wards, and beds; and to supply mattresses, sheets, screens, fans, and patient gowns.[6]

The teams worked rapidly to improve healthcare facilities and furniture, including this bed.

QAP, Nicaragua

Increasing skills in using perinatal technology. Lack of obstetric care documentation makes it difficult to assess the quality of care and identify areas for improvement. The importance of having such documentation is reflected in the first standard in Table 1: *All pregnant women will receive care in which the perinatal care tools are correctly applied.*

Table 3. Monitoring Indicators for All Health Units

Indicator*	Baseline: May 2000	Target	Results: May 2001
1) Percentage of pregnant women cared for at the facility for whom a BPCH form was correctly completed	May: <3%	60%	88%
2) Percentage of clients in labor who received a correctly interpreted partograph with alert curve	May: 0%	60%	70%
3) Average number of prenatal care visits per woman	May: 1.9	3	2.5
4) Percentage of clients who reported satisfaction with the prenatal care they received	Río Blanco: 63% Waslala: 57% El Cua: 62% Bocay: 51%	Rio Blanco: 76% Waslala: 68% El Cua: 74% Bocay: 61%	93%
5) Percentage of obstetric emergency cases referred to the second level of care that were analyzed by the advising physician	0	80%	NA
6) Percentage of emergency obstetric clients who received care according to the standards for the diagnosis and treatment of obstetric emergencies	0	60%	NA
7) Percentage of babies born in the health center who receive care according to the standards for immediate newborn care	May: <3%	60%	82%

Note: "NA" indicates results were not available.
* Numerators and denominators are defined in Table 1.

delivered according to standards, the ultimate goal was to decrease maternal mortality. Figure 3 shows the reduction in maternal deaths during 1999 and 2000.[9]

Monitoring and Improving Quality: Insights

The Nicaraguan health units made great strides in their efforts to monitor standards to improve health outcomes. Once the standards were in place—whether promulgated by the Ministry of Health or developed by the healthcare providers—these facilities showed that they could implement monitoring systems to measure their efforts to close

Table 2. Selected Results of Baseline Medical Record Review (February 2000; N=120 Medical Records)

Indicator*	Baseline
1) Percentage of pregnant women cared for at the facility for whom a BPCH form was correctly completed	3%
2) Percentage of mothers in labor who received a correctly interpreted partograph with alert curve	0%
3) Average number of prenatal care visits per pregnant woman seen at the health unit	1.9
4) Percentage of clients who report satisfaction with the prenatal care they received	Río Blanco: 63% Waslala: 57% El Cua: 62% Bocay: 51%
5) Percentage of emergency obstetric cases referred to the second level of care that are examined by the advising physician	0%
6) Percentage of emergency obstetric patients who received care according to the standards for the diagnosis and treatment of obstetric emergencies	0%
7) Percentage of babies born in the health center who received care according to the standard for immediate newborn care	<3%

* Numerators and denominators are defined in Table 1.

Results

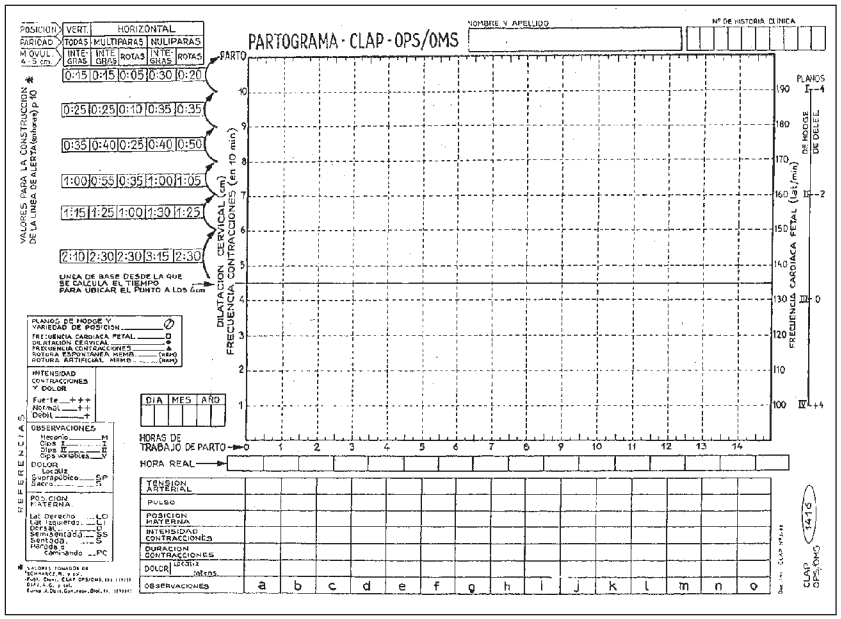
Eight months after training, the teams found significant improvements in the seven indicators that were monitored to assess performance according to the six standards (see Table 3).

Information was posted to inform staff and clients of the progress that had been achieved toward reaching the targets shown in Table 3. As data developed over time, the teams displayed run charts at the health units for both staff and the public to see. The charts showed the progress being made each month toward meeting the goal for each indicator. Figures 1 and 2 are compilation run charts: they show monthly data from all four sites.

Reduction of maternal deaths. While the seven indicators measure the degree to which healthcare is

A workshop for first-line service providers explained the use and interpretation of the perinatal care tools required by the first standard. This session also covered prenatal care and risk detection. Most importantly, the training taught staff how the indicators would be monitored and linked the indicators to the standards. Participants learned how quality monitors would be applied: that staff compliance with standards would be monitored and that staff could contribute to the quality of care by performing according to the standards.

To maximize learning, participants received CLAP[7] literature on the use of perinatal tools a month before the workshop so they could study the material beforehand. During the workshop, participants measured their knowledge of the tools in a pretest and worked in groups on hypothetical cases. At the end of the workshop, staff from each municipality received a supply of the tools presented during the workshop.



Completing the partograph (partograma) was one aspect of assuring quality care for women in delivery.

Building capacity in immediate care of newborns. To increase staff competence in standards for the immediate care of the newborn (standard number 6), clinical training was offered to staff from each municipality. The curriculum covered the main conditions that cause newborn morbidity and mortality, early identification of intrapartum risk factors, and neonatal resuscitation. Staff learned to follow and interpret algorithms to reinforce the standards. Staff also learned about the parameters of the indicator for newborn baby care: heart rate, respiratory rate, gestational age, etc.

Healthcare providers use a baby mannequin during training on the immediate care of newborns.

QAP, Nicaragua

Building staff capacity in emergency obstetric care. To address standard number 5 relating to emergency obstetric care, the teams had to wait for the MOH to release standards for obstetric care, the result of a collaborative effort with international agencies such as the Pan American Health Organization. Once this work was completed, the QA Project and MOH developed obstetric care algorithms and job aids.

Staff from each municipality attended a workshop and learned to use the algorithms. Topics included the management of abortion and its complications, hemorrhage during pregnancy, pre-eclampsia and eclampsia, obstructed or prolonged labor, etc. Once again, information linking the obstetric standards and the monitoring of the obstetric care indicators was stressed. A sample monitoring form is presented in Appendix 1.

Monitoring Compliance with Standards

While training workshops can impart information and skills to perform a task, they cannot sustain change in provider practices. The QI teams would fill this gap by monitoring results from those changes and applying problem solving to the standards where results were unsatisfactory.

Role of the QI teams. Each team had the assignment of monitoring performance according to standards by using the selected indicators. If standards were not met, the teams would address the causes using the problem-solving methodology.[8] To monitor compliance with standards, each team met monthly to review the source records (noted in the "Source" column of Table 1) and assess how its health center performed against the indicators. During these meetings, teams would tabulate, present, review, and discuss the results of the monitoring. They also discussed the results of exit surveys, which were conducted quarterly at some facilities. Appendix 2 is an example of a meeting log.

The first set of monitoring data (Table 2) served as the baseline for the teams to measure their progress. Standard number 1 was initially modified to reflect only whether forms had been filled out or not. Once forms were being completed regularly, accuracy was also monitored.

Increasing compliance with standards using rapid team-based problem solving. Continuous monitoring started about a month after training. Wherever standards were not met, the QI team was responsible for problem solving and implementing measures to meet standards. An example of the rapid problem-solving cycle is in Appendix 3.