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Cost Control, Access and Quality Of Care:The Impact of IUD Revisit Norms in Ecuador

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A signal detection paradigm modeled the effect of changing IUD revisit norms on detection of problems and costs in Ecuadorian family planning clinics. The study compared the current norm of four required revisits in the year following insertion with two alternatives requiring fewer revisits.

Key words : Ecuador; cost control; access and quality of care; IUD revisits

Introduction

Quality of care, costs, and access are dominant issues for family planning programs in Latin America. While the topic of quality of care is fairly new to family planning (Bruce 1990: 61-69), its application in medicine goes back 80 years (Brook 1988). Historically, most approaches to assessing quality focused on the *process* of providing care (Donobedian 1969). The process approach still characterizes the family planning field[1]. However, in medicine, the assessment of *outcome* has become equally important, and increasingly, health care analysts are insisting that quality of care be linked to measurable outcomes. Seen in this way, *quality of care consists of program interventions or elements which increase the probability of positive client outcomes.*

Subsidized resources are growing more slowly than demand for family planning goods and services (Janowitz et al. 1990). As a result, family planning programs have been forced to pay closer attention to costs. At the same time, they are under pressure to improve quality of care, which may involve investment of resources in new interventions or in correcting program deficiencies. Managers are concerned that quality improvement will increase service cost at the same time when they are attempting to become more cost efficient.

Access to family planning is also affected by costs. Increasing costs to clients, such as prices charged, time and transportation, may put family planning out of the reach of many potential users. In addition, if program resources are limited and costs per service increase as a result of quality improvement, programs will be able to serve fewer clients, and access will suffer.

In summary, quality of care, costs, and access are integrally related to one another. Any change in one will necessarily affect the other two (Chelminsky 1993:525-528). However, it is not inevitable that this interaction be negative. The challenge to program managers is to identify those operational parameters which can be manipulated to maintain or improve quality and access while eliminating unnecessary costs.

This paper reports the results of an operations research study to balance the costs, quality of care, and access to the Centro Medico de Planificacion Familiar (CEMOPLAF) of Quito, Ecuador. Client follow-up is considered an essential element of quality of care (Bruce 1990:61-69). CEMOPLAF schedules routine revisits for new IUD acceptors (a program

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process) to detect and resolve medical problems arising from IUD use (a program outcome). These revisits represent real and opportunity costs for providers and clients, and revisits by users who have no problems add to clinic overcrowding and reduce access for new acceptors. Management felt the number of required revisits exceeded the optimal needed for a quality service. They wanted to reduce the number of revisits while avoiding an unacceptable number of undetected and untreated contraceptive use-related problems.

Program setting: CEMOPLAF provides family planning and other reproductive and child health services. Throughout Ecuador the agency operates 20 clinics. CEMOPLAF's goals are to be 87 percent self-sufficient by 1997, to increase new family planning clients by 10 percent per year, and to expand pre-natal services. To meet these goals, the organization will have to increase productivity and efficiency. Eleven of its clinics are operating at or above capacity, and six more will reach capacity within the next two years.

IUD revisits are the most pressing clinic utilization problem. In 1991, they accounted for 74 percent of all visits and 68 percent of all costs. Despite the recommendations of international groups, norms requiring frequent IUD revisits remain commonplace throughout Latin America. The CEMOPLAF norm specified four revisits during the first year of use: the first at eight days post-insertion, the second thirty five days later, the third three months after the second, and a final revisit nine months after insertion. At each visit, the client is weighed, has her blood pressure taken, receives a pelvic exam and is asked if she has any questions or problems with her method.

The study compared the current norm of four required revisits with two simulations: (1) a norm of one required revisit with other revisits optional for clients with problems or questions, as recommended by international organizations such as WHO and IPPF (Adrian et al. 1992); and (2) an all revisits optional norm, which maximizes cost-control. To determine the most clinically-acceptable and cost-effective norm, the study modeled detection of medical problems, cost savings, and increased new client capacity.

Methodology

Theoretical framework: Routine revisits would be unnecessary if all family planning clients knew when they had problems and returned for consultation. However, some problems are unnoticed by the user or are not seen as important enough to warrant a clinic visit. The ideal revisit norm would capture all users with problems while avoiding revisits by clients without problems or questions. Signal Detection Theory (Coombs et al. 1970), demonstrates that such an ideal revisit norm is impossible to attain.

Signal detection predicts the probability of identifying a weak stimulus (signal) in the midst of noise. In the typical experiment, an observer is presented segments of noise alone or noise plus a signal and responds whenever she believes the signal is present. If the observer waits to respond until she is *absolutely sure* that she hears the signal, she will fail to detect the weaker signals. If she reacts every time she thinks she *might* have heard the signal, she will detect all the signals but will also raise many false alarms. Inevitably, the observer will make errors no matter what strategy she adopts. The observer's strategy will be based on her judgment as to whether it is worse to miss a signal or raise a false alarm (Coombs et al. 1970; Marx and Hillix 1979).

In the context of IUD services, the presence of a method-related medical problem is analogous to a signal; a revisit is analogous to the response. Counseling at the time of insertion should instruct the client to recognize problems. The probability of making a revisit is conditioned by the "pay-offs" (perceived costs and benefits to both the client and the institution) of the four logically possible outcomes: (1) The client has a problem and makes a revisit to the clinic; (2) she has a problem and does not make a revisit; (3) she does not have a problem and makes a revisit; and (4) she does not have a problem and does not make a revisit. In signal detection terminology, the first outcome is a "hit", the second a "miss", the third a "false alarm" and the fourth a "correct rejection" as shown in Figure 1.

Figure 1 *Pay-off Matrix for Problems and Revisits*

		Revisit Yes (Y)	No (N)
Problem	yes (y)	Hit (Y/y)	Miss (N/y)
	no (n)	False Alarm (Y/y)	Correct Rejection (N/y)

Clients and services benefit when clients revisit when they have problems (Y|y) and stay away when they do not have problems (N|n). Clients and services incur unnecessary costs when clients revisit when they do not have problems (Y|n). Finally, clients suffer when they have problems and do not revisit (N|y). The probability of a problem is independent of the revisiting norm, but programs can raise or lower the probability of revisiting by setting different norms. Increasing routine revisits will increase both detection of problems and false alarms. Eliminating routine revisits will reduce false alarms and increase missed problems. The optimal schedule depends on the probabilities and costs and benefits of the four outcomes[2].

Filling in the pay-off matrix requires independent estimates of the probability of making a revisit and the incidence of medical problems. We directly observed the frequency of revisiting, but were unable to observe directly the likelihood of a problem because we did not have access to clients who did not return to the clinic. Therefore, we measured problem rates among clients who did return and asked them if they would have revisited without a routinely scheduled appointment. We used this information to infer underlying method-related problem rates and to model the impact of different norms on the probability of making revisits and on rates of hits, misses and false alarms.

Design: Ten clinics were randomly selected for study, including four in Quito and six in other locations. A record search of IUD acceptors who had completed one year after insertion provided information on first year revisit rates. The search included the medical histories of all 3356 clients who had received an IUD in the study clinics between January 1 and May 31, 1991. The number of revisits made in the twelve months following insertion was recorded for each client.

Client interviews and medical examinations provided information on problem rates among IUD users revisiting in the first year. The likelihood of returning without a routine appointment was obtained from the client interview. All clients making IUD revisits in the study clinics between January 1 and May 31, 1992, and who had received their IUD within 12 months of the revisit date were interviewed. A total of 4985 interviews were conducted. Clients were asked if they had any questions to discuss with the service provider, if they had side-effects or problems, the reason for revisiting, and in the case of routine appointments, if they would have revisited without having been told to do so. Attending physicians and nurse-midwives recorded the presence of IUD related problems on clinical trial forms.

Estimation of costs: The study also examined client and agency revisit costs. Client costs included payments for transportation (including persons accompanying the client), clinic fees, and the opportunity cost of time spent traveling and in the facility itself. Clients were asked how much they had spent on transportation, and how much time they spent traveling. Patient Flow Analysis (PFA) measured time spent in clinic. Opportunity costs were calculated for the client only.

Agency costs included staff time, materials, furniture and equipment, infrastructure and overhead. Net cost was the average agency cost of an IUD revisit, less the price paid by the client. Costs were estimated at six of the study clinics. PFA estimated staff time. Use of materials and equipment was observed directly. Overhead was assigned on a pro-rated basis.

Results

Current Patterns of Revisits and Problems Detected

Revisits: According to the record search, under the four revisit norm, IUD acceptors made an average of 2.31 revisits during the twelve months following insertion. Approximately 19 percent made no revisits, 16 percent made exactly four revisits, and 14 percent exceeded the norm and made five or more revisits. According to the client interviews, 66 percent of all revisits were made because of a previously-scheduled appointment; the remaining were made because the client had a problem or wished to talk with a service provider.

Timing of revisits was obtained from the client interview. Revisits were classified on the basis of whether or not they were within an acceptable range of the time specified by the norm: visit #1 at 8 days (1-15 days after insertion); visit #2 at 43 days (30 - 59); visit #3 at 133 days (120 -150); and visit #4 at 270 days (240 - 364). Clients who said they were returning for a problem were defined as returning if the revisits were optional. Clients keeping a routine appointment who said that they would have returned even if they had

not been told to do so were also defined as returning if the revisit were optional. Clients with routine revisits who answered that they would not have returned or expressed weak motivations for returning were defined as not returning for an optional revisit[3].

Table 1 combines the results of the record search and client interviews. It shows the percent of revisiting acceptors, revisits made at the time specified by the norm, and the percent of clients who stated that they would have made the revisit without a routine appointment.

Table 1 *Four Revisits Norm Percent of Clients Marking Revisits and Percent of Revists Made at Time Specified by Norm*

	Record Search	Client Interviews	
Revisit	% Acceptors Making Revisit	% Revisits Made at Specified Time	% Would Return Without Appintment
1	81.3	69.6	31.3
2	61.6	33.4	63.9
3	44.5	23.7	63.7
4	29.6	16.8	61.1
Number of cases	3356		

Compliance with the norm was limited. Most clients made a first revisit at about the time indicated but subsequent revisits declined rapidly after the first appointment, as did the probability of returning at the time specified by the norm. The large proportion of revisits outside the prescribed periods appears due to lack of provider knowledge as well as lack of patient compliance. Approximately 66 percent of all revisits were made in response to a routine appointment, and about 81 percent of these were kept at the scheduled time. Discussions with providers revealed that many were not aware of the correct timing of revisits and that they gave routine appointments at times not prescribed by the norm.

Client questions: The interview found that in approximately 35 percent of revisits clients had questions they wished to discuss with providers. CEMOPLAF medical staff reviewed the questions and concluded that approximately 70 percent could have been avoided by better client education at insertion (for example, "Does the IUD cause cancer?" or, "Can I get pregnant if my IUD is in place?").

Medical Problems: Three IUD-related medical problems were studied: expulsion, suspected Pelvic Inflammatory Disease (PID), and suspected pregnancy. Expulsions were found at 4.3 percent of revisits, suspected pregnancies at 2.5 percent, and suspected PID at 3.1 percent.

Table 2 shows the proportion of revisits with diagnosed medical problems at each of the first four revisits, both within and outside of the prescribed interval. First revisits made less than 15 days after insertion diagnosed the fewest problems. This is probably because the period since insertion was not long enough for most problems to develop. First revisits made after 15 days had diagnosis rates over twice as great as those made earlier, suggesting that a change in the timing of the first revisit would improve the effectiveness of the norm[4].

Table 2 *Proportion of Revisits with Medical Problems by Number and Timing of Revisit*

	Timing	
Revisit	Conforming to Norm	Outside Norm
1	.022	.045
2	.054	.061
3	.072	.061
4	.037	.068

Three-fourths of returning clients with diagnosed medical problems reported they would have returned without a routine appointment. Probability of returning varied by type of problem, with suspected PID showing the highest probability and expulsion the lowest. Table 3 shows the probability that women with diagnosed problems would have returned without an appointment.

Table 3 *Probability of a Client with a Medical Problem Having Returned without an Appointment, by Interval, since Insertion*

	Probability Of Revisit		
Problem	0 - 3 Months	4 - 12 Months	First 12 Months
Expulsion	0.500	0.786	0.646
Suspected Pregnancy	0.786	0.727	0.750
Suspected PID	0.882	0.893	0.889

Modeling Revisits and Problems Detected Under Alternative Norms

One Required Revisit: When four revisits were required, 81 percent of new IUD clients returned at least once. We would expect the same to obtain if only one revisit were required. However, second and subsequent revisits would no longer

be routinely scheduled, and the overall frequency of revisiting should decline. We calculated transitional probabilities of making optional higher-order revisits from the observed transitional probabilities under the four revisit norm and client reports as to whether or not they would have returned without an appointment. This allowed us to project the frequency distribution of total revisits and the expected mean.

All Revisits Optional: Modeling this norm follows the same logic as the one required revisit norm. However, since all revisits are now optional, we must calculate the probability of making a first revisit. Once the first revisit is made, we can use the same higher order transitional probabilities from the one revisit norm. Thus, the probability of making the first revisit was calculated as the sum of the probabilities of making exactly one (or two, or three, etc.) revisits under the old norm multiplied by the probability that at least one of these revisits would have been made without a routine appointment.

Table 4 presents projected frequencies of revisiting for the three norms. Requiring one revisit with others optional would produce an average of 1.48 revisits in the first year (a 36 percent reduction from current levels), and making all revisits optional would result in 0.83 revisits (a 64 percent reduction).

Table 4 *Revisit Patterns for Three Different Norms*

Frequency of Revisting	Observed	Norm Projected	
	4 Required Revisits	1 Required Revisit	All Revisits Optional
1	19.7% (M)	42.0% (M)	23.8% (O)
2	17.1% (M)	21.2% (O)	12.0% (O)
3	14.9% (M)	10.8% (O)	7.1% (O)
4	15.6% (M)	5.0% (O)	2.2% (O)
5+	14.0% (O)	2.3% (O)	1.0% (O)
Mean Revisits	2.31	1.48	0.83

M = Mandatory Revisit; O = Optional Revisit

Problem Detection: To estimate the rate of detection of method-related problems (hits) under the alternative norms, we need to know the problem rate among all new acceptors, whether or not they returned for a revisit. The client interview and medical examination provided information on problems for the clients who returned for a revisit. We assumed that the problem rate among clients who did not return was greater than zero but less than that observed at the clinics.[5] As an estimate, we used the problem rate among clients making a first revisit within three months of insertion who stated they would *not* have returned if they had not been given a routine appointment.

Probabilities of making at least one revisit (Y) and not making any revisit (N) were taken from the record search. The probabilities of hits (Y|y) and false alarms (Y|n) correspond to the proportions of revisits with and without diagnosed problems, multiplied by the probability of making at least one revisit. The probabilities of misses (N|y) and correct rejections (N|n) were estimated from the diagnosis rates among those clients who would not have returned for a revisit, multiplied by the probability of not making any revisit. The estimated underlying problem rate is the sum of hits and misses. The underlying rate for all problems was slightly less than 8 percent during the year after insertion. Estimated annual expulsion was 3.7 percent, and suspected pregnancy and PID 2.1 percent, each. There was little variation in rates by time since insertion[6].

Effectiveness of problem detection was calculated by dividing the probability of a hit by the underlying problem rate. We estimated that the current norm detects approximately 71 percent of expulsions, 67 percent of suspected pregnancies, and 83 percent of suspected PID[7]. Projected hit rates under the alternative norms are lower, reflecting the lower probabilities of making a revisit 0-3 months after insertion (all visits optional) and 4-12 months after insertion (one revisit required; all others optional). Table 5 shows underlying problem rates and detection levels for all norms.

Table 5 *Estimated Annual Problem and Detection Rate Under Three Different Norms*

Indicator			Problem			
			Expulsion	Suspected Pregnancy	Suspected PID	Total
Annual Problem Rate			**.0372**	**.0213**	**.0213**	**.0798**
Problem Detection	**N**	**4 Revisits**	71%	67%	83%	73%
	O	**1 Revisit**	65%	57%	78%	66%
	R	**All Optional**	43%	50%	74%	53%
	M					

The lower the frequency of revisiting, the greater the decline in percentage of medical problems detected. Therefore, the four revisit norm detects the most problems and the optional revisit norm the least. However, most clients with these problems reported that they would have returned without a routine appointment. Therefore, reducing the number of required revisits from four to one would capture only 7 percent fewer problems, or 55/10,000 insertions (roughly the CEMOPLAF annual caseload); while making all revisits optional would capture 20 percent fewer problems, or 159/10,000 insertions. Since clients appear to be better able to detect some problems than others and/or are more likely to seek treatment, changing the norms would have different impacts on the detection of different problems. Detection of expulsions and suspected pregnancy would be most affected and detection of suspected PID least affected.

Client and Program Costs: Client costs included cash payments for transportation and clinic fees, and opportunity costs included time spent traveling and in the clinic. Opportunity costs were monetized by multiplying time by the official minimum wage (US $0.56 per hour). Travel time averaged two hours and fifteen minutes, and waiting time forty-five minutes. Almost half of clients were accompanied which contributed to transportation costs and clinic crowding. Transportation costs averaged US $0.34 for clients and their companions, and fees paid to CEMOPLAF averaged US $0.76. Table 6 presents the breakdown of client costs.

Table 6 *Costs to the Client for an IUD Revisit*

Type of Cost	Amount
Monetary Costs	
Fee Paid to CEMOPLAF	$0.76
Fares for Transportation	$0.34
Total Money Costs	$1.10
Opportunity Costs	
Transit Time	$1.26
Clinic Waiting Time	$0.42
Total Opportunity Costs	$1.68
Total Client Cost	$2.78

Opportunity costs comprise about 60 percent of costs, and cash payments the remaining 40 percent. The total estimated client cost of an IUD revisit is US $ 2.78, the equivalent of five hours' pay at the minimum wage. Multiplying this by 2.31 visits a year yields US $6.39 in client costs under the current norm, or almost 13 working hours. The one revisit norm would have an estimated yearly cost per client of $4.11 (or about seven working hours), and the all revisits optional norm would reduce annual per client costs to $2.30 (or about four working hours).

The net cost of an IUD revisit to CEMOPLAF ranged from a low of $1.11 to a high of $2.25 over the six clinics studied. When the average client payment of $0.76 was subtracted, the net cost to CEMOPLAF ranged from $0.35 - $1.49, with an average net cost in all clinics of $1.21.

We also calculated total annual client and program costs for each norm. Table 7 shows estimated problems detected in the first year, revisits, and costs per 10,000 insertions[8]. Besides producing financial savings for both program and users, the alternative norms would also improve access. Requiring only one revisit could save 8,300 first year revisits (36 percent) a year at current levels of attention. This reduction in revisits would create openings for the equivalent of 3,000 new IUD clients without expanding clinic infrastructure. Making all revisits optional could save 14,800 first year revisits (64 percent) and create room for 8,000 additional new clients[9].

Table 7 *Comparison of Three Norms: Revisits, Problems Detected and Costs*

			Outcomes		
Norm	**Revisits**	**Problems Detected**	**Annual Costs**		
			Agency	**Client**	**Total**
4 Required Revisits	23,100	582	$28,000	$64,000	$92,000
1 Required Revisit	14,800	527	$18,000	$41,000	$59,000
All Revisits Optional	8,300	423	$10,000	$23,000	$33,000

The impact of changing the norm on *total* IUD revisits should be less than that shown in Table 7, for two reasons: First, some women make revisits during their second, third, and subsequent years of IUD use. They would be unaffected by the change in the first year norms. Second, some women who reported that they would not have made the revisit were it not for the norm, could be expected to make a revisit anyway (the reverse is less likely, that women who were not revisiting despite the norm, would begin to make

additional visits if the norm were changed). We did not collect information on volume of IUD revisits made by women who had used the method for more than one year, and we have no way of assessing propensity to revisit beyond the clients' declared intentions in the interview.

Program impact: CEMOPLAF adopted a new norm of one required IUD revisit to be made no sooner than fifteen days after insertion. The new norm was implemented in all CEMOPLAF clinics during the first quarter of 1993. We evaluated the impact on total volume of revisits by comparing service statistics for the four quarters of 1992 with the four quarters of 1993. IUD consultations were classified as insertions or revisits.

The impact on the volume of revisits was almost immediate. Mean insertions per quarter remained the same between 1992 and 1993 ($F < 1.0$). Mean quarterly IUD revisits declined by 29 percent from 778 per clinic to 553 per clinic after changing the norm ($F=13.41$, df 1,18, $p<.01$). Data on motivation for client revisits post-intervention (i.e., problems vs. routine check-ups) were not collected. Since revisits included women in their second and higher years of IUD use, the percent decline in IUD revisiting was less than predicted for women in their first year of use alone.

Discussion

As the present study illustrates, quality, cost and access are interrelated. We have defined quality by outcomes to clients (i.e. detection of IUD related medical problems), costs in terms of costs to both providers and clients (i.e. unnecessary visits), and access as provider capacity to serve and client capacity to pay in time and money. Program decisions necessarily involve trade-offs, so that when administrators seek to improve one aspect, they must also consider potential impacts on the other two. This study was motivated by cost and access concerns. We found that changing the norm would result in a small decrease in quality (problems detected), but major cost savings and improvement in access.

Any norm specifying a routine revisit for all new acceptors will necessarily require clients who have no medical problems to come back. Regardless of their rarity, expulsion, PID, and pregnancy require prompt medical attention. Since most clients with these problems would return without a routine appointment, reducing the number of required revisits from four to one would capture only 7 percent fewer problems but reduce first year revisits by 36 percent.

Quality of care depends not only on the validity of the norm, but also on client compliance. Client compliance is conditioned both by anticipated benefits of detecting and resolving problems and by the costs incurred by unnecessary revisits. Thus, the original four revisit norm was fairly successful in ensuring compliance in making the first revisit, but was less successful in motivating subsequent revisits. Therefore, reducing routine revisits to a minimum and improving their timing not only improves program efficiency, it may also enhance client compliance.

This study suggests some methodological refinements for research on quality, costs, and access in family planning programs. While CEMOPLAF focused on IUD revisit norms, other factors may be equally important for cost containment, access and quality. Programs should examine all operational procedures, beginning by asking why they were adopted in the first place. Some may be based on outmoded technology or reasons other than ensuring quality. The four revisit norm examined in this study, for example, was originally designed to gather data for clinical trials rather than to optimize client care.

Both managers and service providers must participate in identifying dysfunctional procedures and suggesting solutions. Preference should be given to data collection techniques that minimize program disruption. Research variables should include cost, access, and quality, and should not be limited to only one of the three factors as is usually the case in current family planning program research. Finally, in the study of quality, program processes need to be linked to client outcomes such as detection of medical problems, contraceptive acceptance and continuation, prevalence, and fertility impact.

This study relied on modeling, record review, and the collection of a small amount of interview data. It meets the criteria of staff involvement and unobtrusive design. It produced savings for program and users with minimal impact on problem detection, and created room for new users. More important, CEMOPLAF demonstrated that cost-control is compatible with quality, and that improvements in efficiency can improve rather than sacrifice access.

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Notes

1. Two typical recent examples of family planning quality of care research are Miller, et al 1991, and Simmons, R. and Elias, C. 1993.
2. Cell probabilities are obtained by cross multiplying the probability of a problem with the probability of a revisit. Cell probabilities are multiplied by their relative benefits or costs to obtain the over-all pay-off.
3. Clients who stated they had returned for a "check-up" were classified as weakly motivated.
4. Some clinical trials have found differential rates of problems by time since insertion (WHO, 1987). The constant rate found in the present study may reflect client self-selection, with women experiencing problems more likely to return than women not experiencing problems.
5. It is also possible that women who did not revisit the clinic had more problems than those who did, and that their non-visiting was motivated by discontinuation of the method. However, the method under study was the IUD, which requires removal of the device for discontinuation. If women who did not revisit had higher discontinuation rates than those who returned to the clinic, this would mean that they had to have visited a different clinic for the removal, which seems less plausible than the assumption made in the simulation.
6. Problem rates were estimated for two periods, 0-3 and 4-12 months after insertion to control for the possibility that problems, like revisits, varied over time. The probability of returning within three months of insertion was .732, and the probability of returning at least once between 4-12 months was .478. Detection of medical problems was cross tabulated by period and by whether or not the woman would have returned without a routine appointment. We assumed that problem rates among clients who did not return were equal to the problem rates among clients who did return but who said they would not have returned if they had not had an appointment. Cross-multiplying probabilities of having or not having a problem provides cell estimates in the matrix. The estimated total expulsion rate is the sum of the rates in the first row of table 1N.

Table 1N *Observed Revisit Rates and Estimated Expulsion Rates, 3 Mos. Post-Insertion*

Problem	Revisit		Total
	Yes	No	
Yes	(.732*.023) = .0168	(.268*.017) = .0046	.0214
No	(.732*.977) = .7152	(.268*.983) = .2634	.9786
Total	.732	.268	1.000

The TCU 380A was used by approximately 90 percent of the women interviewed. Estimated problem rates are within the range of published reports for 12 months of copper-bearing IUDs (see Tremaine and Liskin, 1988, Table 1, pp. 4-5). Table 2N presents problem detection rates and estimated underlying problem rates by period.

Table 2N *Probability of a Problem in the First Year After Insertion*

Problem	Detected			Estimated		
	0-3 Months	4-12 Months	Total	0-3 Months	4-12 Months	Total
Expulsion	.0168	.0096	.0264	.0214	.0158	.0372
Suspected Pregancy	.0066	.0076	.0142	.0074	.0139	.0213
Suspected PID	.0081	.0096	.0177	.0086	.0127	.0213
Total Problems	.0315	.0268	.0583	.0374	.0424	.0798

7. The hit rate when all revisits are optional is the probability of detecting a given problem under the four revisit norm (Table 2N) x the probability that women with the problem would revisit without a routine appointment (Table 3). The hit rate under the norm of one required revisit is estimated as the sum of the hit rate at 0-3 months under the current norm plus the estimated hit rate at 4-12 months when all revisits are optional.
8. We calculated neither client or social costs resulting from misses nor client or social benefits resulting from greater access.
9. Capacity for additional users is calculated by dividing revisits saved by the estimated total visits per new acceptor (insertion visit + revisits) under the new norm.