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EVALUATION OF THE PROJECT SANTE RURALE (PSR) -
REPORT OF THE PUBLIC HEALTH PHYSICIAN OF THE
EVALUATION TEAM - DR. MICHAEL K. WHITE.

I. INTRODUCTION

A. Objective

This report will respond specifically to the various points in the Public Health Physician's terms of reference contained in Annex I. It will ultimately be integrated into a final evaluation document to be synthesized from individual reports by the various team members.

B. Methodology

All observations result from conversations with Village Health Workers (VHW), project personnel and other interested parties or study of project documents during the two evaluation visits to Mali by the Public Health Physician - 29 March to 12 April, 1980 and 6 May to 17 May 1980. See Annex II for a detailed review of my activities and list of persons interviewed.

C. Use of information in the report

The data cited in this report comes almost exclusively from internal documents prepared by various members of the PSR Team. Copies of these documents were not centralized in Bamako. Because my field time was brief, I chose to concentrate on interviews with the interested parties rather to than study reports. Hence, only a small portion of the great wealth of information available in Koro, or to a lesser degree contained in the report of Dr. Dulaire and Mrs. Taylor, is alluded to here. What data is cited however is intended only for the use of the Malian Ministry of Health (MOH) and the USAID Mission in Bamako. Decision as to how this data should be diffused to a larger audience rest primarily with the government of Mali and secondarily with the individuals involved with the collection and analysis of that data. I, therefore, request that none of the data cited in this report be quoted by any reader without the express permission of the Malian MOH. ..

II. ASSESSMENT OF THE CLINICAL KNOWLEDGE HEALTH, PROMOTIONAL ACTIVITIES, AND RECORD KEEPING ABILITY OF THE VHW.

A. Yélimané

1. Clinical Ability

I made no effort to quantitatively access the clinical ability of the VHW because Dr. Dulaire did this in January 1980. He graded each VHW on his knowledge of the etiology, diagnosis, drug of choice and treatment schedule of the following conditions: a) malaria, b) diarrhea, c) wound infections, d) conjunctivitis, e) otitis and f) pain. The VHW could score a maximum of 20 points by responding correctly to each question. Forty two percent of the twenty VHW tested scored more than 16 points and 26% scored fewer than 14 points. They responded

best to questions relative to conjunctivitis, otitis and pain. They knew less about malaria and diarrhea. If this knowledge can be translated into effective action in the Tambacara arrondissement, one would expect to see a decrease in visual impairment and hearing loss but little reduction in childhood mortality due to diarrhea and malaria.

At the time of Dr. Dulaire's study only 21% of the VHW had an adequate knowledge of how to constitute and administer the salt and sugar solution to a dehydrated infant. On the other hand, 90% remembered that they were taught to give a sulfa drug to children with diarrhea. The use of this drug was emphasized during the training of the VHW because of the perceived need to treat diarrhea with some kind of modern medecine. Unfortunately. sulfa drugs have no effect on the viruses that cause a large percent of childhood diarrheas. Thus, if the VHW treats children with viral diarrheas with sulfa and forgets to instruct the mother in the use of the oral rehydration fluids, the child may become dehydrated and die. Happily, I found that more than half of the VHW with whom I talked could describe the preparation of the oral rehydration fluid. This relative better performance may have been because I talked to an atypical subset of the entire group. This is more likely to be due to the fact that the Dr. Dulaire spent a considerable amount of time with each VHW discussing the value of the salt and sugar solution during his evaluation in January.

Dr. Dulaire was critical of the ability of the VHW based on their performance on his test. Although my impression after talking with 11 of 21 VHW still working leads me to doubt that they can have any impact what so ever given their current knowledge, I am not necessarily pessimistic about their future. We have no established standards for how well a VHW should perform on such an exam given their brief training program and completely inadequate supervision. Only 15% of the VHW had been visited more than 3 times and 60% has been visited only once or not at all at the time Dr. Dulaire tested them. Dr. Dulaire demonstrated a strong positive correlation between positive performance on his test and the number of supervision visits that the VHW had received. I believe, therefore, that if properly retrained and supervised, the majority of the VHW in the Tambacara arrondissement will perform well.

The VHW in the Tambacara arrondissement are performing essentially no health promotional activities nor was a single VHW maintaining his notebook at the time of my visit.

B. Koro

No systematic analysis of the knowledge of the VHW in the Koro cercle has been done. However, the supervision teams from Koro visit each VHW once a month and review their notebooks in detail. The book contains the age, sex diagnosis, and drugs prescribed for each patient.

From the reveiw of the notebook, the supervision team is able to determine if the VHW is making any obvious mistakes like prescribing penicillin for arthritis or diagnosing headaches in children under one year of age. The VHW are engaged in a socratic dialoque about the various target conditions and misunderstandings about etiology, diagnosis or treatment are corrected.

The notebooks are maintained meticulously and provide the data for the monthly report on each VHW by the supervision team. Because it is reviewed monthly by the supervision teams, the VHW recognizes the value of his notebook. This is in dramatic contrast to the situation in Yélimané where even the most impressive VHW stopped keeping records 1-2 months prior to my visit. They saw no value in this activity.

I was extremely impressed with the understanding of the etiology, diagnosis and treatment of the target conditions which was demonstrated by the VHW in the Koro cercle. If allowed to refer to their technical manual, the six VHW that I interviewed could respond correctly to all of the type of questions that Dr. Dulaire posed to the Yélimané VHW. Most could respond correctly from memory alone.

Much more impressive was the fact the VHW in Koro understand the concept of prophylactic chloroquinization and most, with whom I talked, intend to mount such a program during the upcoming rainy season.

They also understand the concept of malnutrition and know that they can use the bandlette developed by the Koro Team to measure arm circumference to identify the malnourished children. There is considerable confusion however about exactly how this should be done. They do not understand that the bandlette is valid only for children from 1-5 years of age.

Some VHW give almost textbook-like description of Kwhes.iorker when asked about malnutrition. They seem to focus more on this relatively rare entity than on the more common situation - acutely malnourished children who are wasted. The preliminary medical surveys in the Koro cercle demonstrated that 10-15% of children 1-4 years of age were severely malnourished by Dr. David Morely's standards. The VHW understand that, if they identify one of these children, they must explain to the mother how to better nourish the child. They recognized that eggs and meat are good for malnourished children but don't easily remember to recommend legumes and green leafy vegetables. None of this should detract from the fact that they think about malnourished children and, with some further training during the supervision visits, will be able to use the arm circumference technique to identify these children.

The one consistent weakness I found among the small sample of VHW with whom I talked was that they are unsure how to correctly age children so as to give them the correct dose of medication. When the ear grabbing technique is mentioned most remember that the ability to grab one's ear denotes school age. The actual act of having the child go through

the process and making a decision seems to pose minor problems. Again their familiarity with the concept will result in their quickly mastering the technique if it is emphasized during the supervision sessions.

Five of the six VHW that I interviewed were literate in Dogon or French - many having recently been trained by DNAFLA, the functional literacy program. It is possible that some of the illiterate VHWs in the Koro cercle are less impressive than those whom I interviewed. However, in this regard I want to stress that the one illiterate VHW that I interviewed was particularly impressive. He had only recently returned from the Ivory Coast where he had gone "en exode" two months after finishing his training. Although he had no contact with the PSR for over 10 months, he exhibited a surprising recall of what he had been taught during his training and could interpret the meaning of entries he had made in the record keeping form used by the illiterate VHW.

In terms of health promotional activities, the sanitation agent is encouraging the VHW to set an example for the village by keeping his compound immaculately clean and by digging and using a pit latrine. The sanitation agent himself is encouraging villagers to disinfect their wells with a commercially available chlorine solution, l'Eau de Javel. He actually treats the well if the villagers buy the chlorine solution. This effort will progress more satisfactorily in the near future when the water testing kits now in Bamako arrive in Koro. These kits will allow identification of the most heavily contaminated wells and will allow measurements of residule chlorine in the wells at varying times after treatment.

If the chloriquinization campaigns are successfully undertaken and the VHW will take a more aggressive role using the bandlette to identify malnourished children, health promotional activities of the highest order will be underway in the Koro cercle.

C. Problems

1. Yélimané

a) In Yélimané, the VHWs have inadequate clinical skills and they do not keep records.

b) In Yélimané, the VHWs were not trained to identify malnourished children and if ever trained to do so have forgotten completely how to protect young children from malaria during the rainy seasons with prophylactic chloroquinization.

c) The VHW in Yélimané have not been trained or encouraged to engage in efforts to improve village sanitation like building latrines.

d) The VHW see their role as absolutely passive. If they see a child with conjunctivitis they will not take the initiative to suggest to the parents that the child needs treatment. Taking this type of initiative and its implied criticism of the child's parents might be poorly received by the VHW's peers in the village.

2. Koro

a) VHW are unsure of process for determining age of the children

b) VHW need more instruction in methods for identifying malnourished children.

D. Recommendations

1. Before any more new VHW are trained in Yélimané, those that have been trained should be systematically retrained, and supervised monthly until they achieve a predetermined level of clinical competence and understanding of prophylatic chloriquinization, identification of malnouriched children and counseling of mothers of malnourished children.

To standardize program content and to familiarize the team in Yélimané with the training and supervision techniques used in Koro, members of the Koro staff like Waraba Koné or Yaya Touré should work with the PSR staff in Yélimané or Tambacara for two to three weeks period of time.

2. Efforts should be made in both Koro and Yélimané to encourage the VHW to take a more activist role in his village, to identify sick or malnourished children and to treat them himself or to refer them.

3. Performance objectives should be established to monitor progress toward adequate performance of every task, or comprehension of every concept, taught the VHW during their training program. For instance, a goal of the VHW work is to lower the prevalence of visual impairment resulting from conjunctivitis caused by trachoma and other bacteria.

The behavioral objective on the part of the VHW necessary to attain that goal might be to treat at least 50% of all children under 5 years who have conjunctivitis with antibacterial eye drops. Surveys already completed allow estimates of how many children have purulent conjunctivitis at any given time. Therefore the performance objective would be to treat an increasing percent of the target population over time until 50% are under treatment.

If analysis of monthly reports demonstrate that a large number of health workers are treating less than the targeted number of children, the project personnel should identify the reason for the performance problem. Perhaps the VHW did not learn in his training program that purulent conjunctivitis leads to blindness and hence is lax about

educating parents as to the importance of treatment. Perhaps the VHW understands the importance of treating the children with pus in their eyes but when he sees such a child in the village, he is reluctant to discuss the matter with the parents. His reluctance might stem from the fact that the parents would react negatively to the suggestion that they were not properly caring for their children. Perhaps both the health worker and the parents understand the necessity to treat the child but the parents can't afford to pay seven hundred malian francs for the eye drops.

The important point is that performance objectives should be established and data should be regularly collected to see if they are being attained. In Koro data is being collected at this time that would allow one to estimate the number of children under five who are being treated with eye drops. However, no performance objectives exist and hence the personnel are unaware how well the VHW are doing in their fight to reduce visual impairment.

Another example of a performance objective might be to assure that over time an increasing percent of the VHW prescribe the correct dose of chloroquine for different age groups for the treatment of malaria. This implies that the VHW can differentiate a child less than one, from a child 1-5 years old, from one older than five. To test their ability to do so and thus the degree to which they are meeting their performance objectives, the supervisory team might ask a VHW to age 20 children during a monthly visit. If this were done for all VHW, perhaps once every three months, the team could see if a pattern of good or poor performance was developing. Again, if poor performance was noted, the reason would have to be identified and the proper corrective action taken. Poor performance might be due to lack of understanding of the methodology because little time was devoted to this issue during the training program. Conversly the methodology for determining age might be too difficult for an illiterate VHW to master regardless of the time devoted to it during training and supervision. Perhaps, the test to determine whether a child is over or under five years of age, i.e. reaching over the head with one hand and grabbing the opposite ear, is culturally unacceptable, perhaps distantly associated with negative gesture. This is an example of a performance objective implied by the content of the training program in Koro for which there is neither a performance objective established or data being collected which could lead to a decision about how well the task is being performed.

The VHW and the supervisory teams in Koro are both already being asked to keep and/or analyze a considerable amount of data. One might easily argue that more demands cannot be placed on either at the present time. If such is the situation, all possibly desirable approaches to monitoring and data collection should be described, and their advantages compared. Those monitoring activities which will allow the medecin-chef at the cercle level to make periodic decisions as to how to best allocate his training and personnel resources should be perserved, the others rejected.

III. PSR ACTIVITIES AT THE REGION, CERCLE, AND ARRONDISSEMENT LEVELS

A. Yélimané

Dr. Keita, the Regional Director of Medical Services in Kayes reports that, until very recently when he was given a budget for the PSR activities in the Kayes region, he had had very little contact with the PSR personnel or knowledge about the work being done in Tambacara. At one point in our conversation Dr. Keita remarked that the radios have made a real difference in his understanding of the project since even if not directly consulted, he can follow activities by listening when the Yélimané staff talks to Bamako or Koro. He has very little full time staff at the regional level and believes that he would need a public health physician and a full time management person to adequately plan the extension of a VHW based service delivery system to other cercles.

The cercle level personnel, the medecin-chef and his staff, have been involved with the PSR activities in the Tambacara arrondissement from the beginning but to an inadequate degree. Apparently Dr. Desole, the first Harvard advisor who lived in Kayes would spend a brief period of time briefing Dr. Pleah, the medecin-chef in Yélimané, of his intentions but would then continue to Tambacara to work with the dispensary level personnel in the villages. He reputedly devoted little time to the development of a team, as such, based in Yélimané or to the strengthening of the cercle level health care system. Dr. Dulaire and Mrs. Taylor were unable in their brief time in Yélimané to develop a fruitful, collegial relationship with the medecin-chef or other members of his health team. This is particularly unfortunate because the malian MOH has decided that the cercle - not the arrondissement will be the central function unit in the delivery system.

The medecin-chef himself has been unimpressed with the PSR activities in his cercle and especially with the technical assistance (TA) component. He frankly says that he sees no particular need for TA personnel, that Malians themselves are training VHW in other parts of the country and that given the proper support he could manage the program himself. He estimates that to extend the VHW based system to other cercles, he would eventually need at least an additional senior level, experienced infirmier d'Etat, to whom he could delegate some of his clinical responsabilities. He also believes that he would need a person with management skills in his office. It is difficult to tell when talking with Dr. Pleah to what degree he perceives the need for a manager in the sense of someone who will assume responsibility for medium term planning and resource allocation or whether he wants only an accountant-office manager who will assume primary responsibility for his reporting functions.

The PSR has provided training for the mid-wife based in Yélimané in the U.S. Her training program stressed maternal and child health/ family planning program development techniques. To date she hasn't

been encouraged to or help to develop a model MCH program at the cercle level. She will likely request a transfer in the not too distant future.

The one activity undertaken in the field of MCH was the very brief training of a number of traditional birth attendants (TBA) from villages in the Tambacara arrondissement. This was not apparently a particularly successful effort and did not involve the matron at the Tambacara dispensary. She reported to me that the PSR team's only request to her was to assure that meals were prepared for the trainees. Dr. Dulaire was unaware of where the TBAs are at this time or what they are doing. The Tambacara staff does not believe a man could supervise the activities of these TBAs. The matron based at the Tambacara dispensary hasn't been willing or able to go to villages by mobylette to supervise the TBAs. Hence this training effort has come to nothing.

Dr. Pleah believes that the PSR's most important contribution to reinforcing the cercle health services would be to construct and equip a modest operating room where he could do emergency surgery such as cesarian sections and repair of strangulated hernias. Unfortunately he has no data on the number of patients that he sees who require surgery and must now be evacuated to Kayes. He is confident however that if people realized that surgery was possible at the cercle level the demand would be much greater. The VHW keep no records at all and the records at the Tambacara dispensary do not identify patients evacuated to or from Tambacara. Hence it is impossible to get an accurate feeling for the number or type of medical evacuations occuring at this time. While in the villages, however, I got the distinct impression that the VHW themselves saw no advantage to evacuating a truely sick person to Tambacara or even to Yélimané. If transport could be found it was often just as easy to send the person directly to Kayes especially if that person would likely need surgery. I therefore suspect that Dr. Pleah is right when he says that even if current demand for surgery or evacuation could be measured it would not reflect the real need. In this regard I should note anecdotally that during my eight days in the Yélimané cercle one woman died at the dispensary in Yélimané from complications of childbirth and another, who labored almost 18 hours after the birth of a first twin to deliver a second dead twin, was lucky that she didn't die also. Had surgical facilities existed both the mother and the second twin might have been saved.

The two nurses in the Tambacara dispensary are clearly the personnel most involved with the "animation" of the villages and the training and supervision of the VHW in their arrondissement. They appear to be dedicated, competent people who have learned a great deal from associating with the PSR. Even they, however, are unaware of how oral rehydration solution should be administered. They vastly underestimate the potential needs of a child with significant diarrhea.

They deny that any PSR staff have worked with them to upgrade their clinical or diagnostic skills. They have no stethoscope, no blood-pressure cuff or other diagnostic facilities at their dispensary. The dispensary itself is an ancient banco brick, two room building whose dilapidated wooden examining table and other furnishings - a desk and a metal chair with no back - antidated the arrival of M. Diallo, the present infirmier d'état, 15 years ago. Because the roof leaks, the building is practically useless during much of the rainy season.

The dispensary had just received a supply of drugs from Yélimané two weeks before the evaluation team's visit. Mr. Diallo says that, although he often has no chloroquine or antibiotics, that he has been relatively well-supplied with medicines this year. This was his third consignment since the last rainy season. Unfortunately he has no role what-so - ever in ordering medecines. Dr. Pleah likewise complains that, although he goes through the motions of ordering medicines from the Pharmapro in Bamako, what he actually receives and is billed for bears little resemblance to what he orders.

M. Diallo and M. Diawara, the nurse with the Service des Grandes Endemies based at the Tambacara dispensary, agree that they will be unable to supervise all the VHW in the arrondissement at monthly intervals using mobylettes. They point out that the thorny, sandy terrain results in at least one if not three flat tires per supervision trip. They believe that they should be provided with a small motorcycle which would better withstand such vicissitudes. If provided with their motorcycle, they are still unsure if they, alone, could supervise a team of VHW in each village at monthly intervals. To what degree the nurses in Tambacara will need to be supported by personnel from Yélimané to maintain the necessary supervision is not clear at this time.

B. Koro

Although Dr. Brière, the Regional Director of Medical Services in Mopti, is better informed about the activities of the PSR than is his counterpart in Kayes, he also reports that he has had no substantive association with the project. In order to rationally coordinate the expansion of health services based on the VHW such as the PSR is developing in Koro, to the other cercles of the fifth region Dr. Brière believes that he will need as a minimum a deputy who can oversee the necessary planning and management activities. This person would ideally be a physician with management skills although a non-physician manager would be preferable to a physician without considerable management experience. Dr. Brière also mentioned the desirability of having a planning unit at the regional level which would correspond to the new planning division being created at the MOH in Bamako.

Dr. Brière believes that the PSR should have trained more VHW during its first two years. He hopes that the pace of training can be

picked up, that new elements can be added (he specifically mentioned leprosy control) and PSR activities extended into a new cercle.

PSR activities at the cercle level in Koro are much more impressive in terms of personnel training than those in Yélimané. A heterogenous group composed of a community development agent, a sanitation agent, various levels of male nurses and a matron. 3 Peace Corps Volunteers and the Harvard advisor constitute a team with impressive esprit de corps under the direction of the medecin-chef. Although all members of the team have specific areas of technical expertise and responsibility, they are polyvalent and participate in all phases of village sensitization and the training and supervision of the VHW.

The team trained a woman from each of the Chef-Lieu d'Arrondissement of the Koro cercle for six months to provide basic ante, intra and post partum care. These women (matrons) will return to their villages to work with the dispensary nurses and hopefully will eventually be able to supervise female health workers or traditional midwives at the village level. Although the Koro team has tried to encourage villages to choose a female VHW to be trained, to date none have done so. The team is planning a training program for TBAs in June. All efforts to train female health workers at the level of the Koro cercle have suffered from the absence of a sage-femme. No one with whom I discussed this issue seemed particularly optimistic about the chances of a dynamic immaginative sage-femme arriving in Koro in the near future.

The need for female health workers, either VHW or TBA, at the village level is attested to by the high rate of severely undernourished children and by the fact that one staff member estimated that at least one half of the 10-15 cases of adult tetanos case treated each year at the Koro dispensary are post-partum women. Male VHW can and should try to identify malnourished children and convince their mothers to change their feeding practices. They should also identify pregnant women and see they receive a tetanos vaccination during pregnancy when vaccine becomes available as part of the program. Although these tasks can be accomplished by a particularly agressive yet sensitive male VHW, they could be accomplished much more easily by a female village level health worker.

As in Yélimané the PSR has done little to improve the infrastructure or better equip the cercle level health facilities. A new maternity is under construction in Koro and a head tax was levied on each eligible citizen to build an operating room at the dispensary. An ex-Peace Corps volunteer raised almost two million FM for the construction of the operating room. In spite of all these fundraising activities there is still not enough money to build and equip the operating room.

When discussing how the PSR could best support activities at the cercle level, the medecin-chef stressed that the first thing that needs to be done is to insure a year round water supply easily accessible to the dispensary personnel. For many months each year the present well is dry. Often water is so scarce in Koro that there is no water to clean

wounds or with which the personnel can wash their hands between patients. Since the time of Dr. Semmelweiss we have understood that medical personnel with dirty hands cause fatal epidemics of post partum sepsis. This is truely an unacceptable situation for a "model" cercle level health facility.

The medecin-chef also mentioned the desirability of the PSR constructing maternities in the chef-lieu of the various arrondissements where the matrones that the project has trained will be working.

One of the PSR's major successes in Koro has been the integration of its activities with these of other development services in the cercle. M. Diallo, the Director of the Cooperative organization in Koro, was effusive in his praise of collaboration his organization, the CAC, had had with the PSR. The CAC installs consumer cooperatives which sell salt, sugar, soap, batteries etc, in the villages in much the same way that the PSR installs pharmacies. In the two villages in which they have both worked their activities seem to complement each other. For instance, the same management and accounting principals apply to both the cooperative and the pharmacy. Therefore the supervisory personnel of the two services can help either the pharmacist of the cooperative manager should they encounter a problem while on a supervision visit.

The representative of "Opération Puit" thinks highly of the personnel of the PSR and is excited about future collaborative actions. He is however frustrated because two wells that the PSR promised to build have not yet been built. Unfortunately the representative of "Opération Mils" was not in Koro at the time the team visited.

The chief of the UDPM in Koro spoke highly of the work of the PSR. He assured me that the political party will do everything in its power to encourage the villagers to support their VHW. The Governor of fifth region also told the evaluation team that traditional leaders in the Toroli arrondissement indicated to him that they valued their VHW and their pharmacies highly.

The two nurses in the Toroli dispensary, although heavily involved in PSR activities, are not as essential to the continuation of these activities as are their counterparts in Yelimané. As the team at the cercle level becomes more involved with the animation of new villages in the other arrondissements and the training and supervision of their personnel, more responsibility for the supervision of the VHW in the Toroli arrondissement will devolve on these nurses. The nursing assistant with whom the evaluation team talked at the Toroli dispensary, M. Kawaloum, seemed confident that he and his superior can assume the additional responsibility and can manage supervision trips on their mobylettes.

The dispensary in Toroli is in slightly better shape than the one in Tambacara, but none-the-less would profit from some minor improvements

like the construction of shelving. The nurses have a stethoscope, which the nurses aid incorrectly reported to me was broken, and a blood pressure cuff which, although not now working, could be easily repaired. The major difference between the Toroli and the Tambacara dispensaries is their drug supply.

The Toroli dispensary has had no drugs for months. The nurses report that they have received only one shipment of drugs since the last rainy season i.e. in the last year. I found no adequate explanation for this difference. Because he was not in Toroli when we visited, I was unable to talk with the chief nurse at the dispensary.

The Peace Corps Volunteers in Koro appear to be considerably more appreciated than their counterparts in Yélimané. One is currently developing detailed maps of the Koro cercle which will include information of interest not only to the PSR personnel but to those of other services such as "hydraulique" or the CAC as well. Another PCV is responsible, with the matron for organizing the training program for the Traditional Birth Attendants (TBA). The third PCV, a laboratory technician, is responsible for developing a lab at the Koro dispensary. The equipping of the lab and the provision of the technician is the only substantive contribution of the PSR to improving the facilities at the Koro dispensary.

C. Problems at the Cercle and Arrondissement Level

1. Problems common to Yélimané and Koro

a. The project director in Bamako gave USAID an order for medical equipment months ago. Some of this has been ordered and some hasn't. Apparently some of the equipment requested requires electrical power. Some of the equipment is relatively sophisticated. Questions exist at USAID as to whether less expensive, more easily repaired equipment might pose fewer recurrent cost and maintenance problems. These issues will be particularly important if Mali intends to similarly equip all its cercle level dispensaries.

b. The physical facilities in both cercles require modest refurbishing.

c. Both cercles and the arrondissement dispensaries receive medecines in a disjointed poorly organized fashion.

d. The cercle level health team as now constituted will not be able to train new and replacement VHW, periodically retrain those now inplace, and provide monthly supervision once there are VHW throughout the cercle. Little has been done in terms of personnel planning for the steady state situation.

2. Yélimané specific problems

a. The technical assistance team has left definitively.

b. The nurses at the Tambacara dispensary believe they will be unable to supervise all of their VHW with mobylettes.

c. The Peace Corps Volunteer in Yélimané has no job.

3. Koro specific problems

a. Koro has no midwife to supervise the training of female village health workers.

b. Koro has no year round water supply.

c. The leaders of the present Koro based PSR team have recently left i.e. doctors Sissoki and Kelly.

d. Wells for two villages promised by the community development expert on the PSR have not been funded. The Chief de Secteur d'Opération Puits reports that the project risks losing credibility if these wells are not approved in the near future.

D. Recommendations

1. The problem holding up procurement of supplies needs to be defined and resolved. If questions exist about the recurrent cost to the MOH of generators and air conditioners, these costs should be estimated by the technical assistance team. If sophisticated general anesthesia equipment is considered unduly fragile, or unessential for the cercle level, serious discussions about the alternatives should ensue. The possibilities of limiting surgical procedures to those which can be accomplished under regional or local anesthesia alone should be considered. Should regional or local anesthesia be found to be a reasonable alternative, an increased emphasis on these techniques may be necessary in the medical school curriculum.

If general anesthesia is necessary, the utility, cost, and maintenance advantages of a simple ether machine should be compared with those of more sophisticated machines requiring oxygen and/or bottled anesthetic gasses.

2. An immediate priority of the new technical assistance personnel in both the fifth region and in Bamako should be to engage in the detailed and difficult planning for staffing patterns that will be necessary in the future. If VHW training is to continue in Yélimané the MOH will most likely have to post a senior, experienced manager to the cercle to help the medecin-chef with his planning functions. Once it becomes obvious that those VHW already trained are functioning

adequately and are being supervised regularly, training in other arrondissements should begin. At this time, one should consider posting a second medecin to the cercle. At the current rate of production of physicians - there were 29 physicians in the 1978 graduating class - Mali will soon have enough young physicians to post two each of the 46 cercles. If this is a policy that the MOH finds reasonable, beginning in Yélimané and Koro to define the different roles of the two physicians would be useful. Will one physician do only curative work and the other supervise the trainers and supervisers of the VHW? Or will each do both, switching roles at some frequency?

The need for additional personnel will probably become obvious in Koro much quicker. If the MOH accepts the estimates of the Koro PSR team that adequate coverage will result from the training of VHW for approximately twenty villages per arrondissement, coverage of the Koro cercle will be nearly complete by the end of the project. This supposes that the team can manage 3-4 training programs each year. Each training program will train VHW from approximately 10 villages.

As training proceeds at this pace supervision is bound to suffer unless more personnel are added to the Koro level and greater responsibility for supervision is delegated to the nurses at the arrondissement level. What the ultimate personnel requirements will be depend to some significant degree on the purpose and frequency of supervisory visits deemed desirable and affordable. Perhaps supervision every 2-3 months will be adequate once the program is working well. Perhaps the dispensary nurse should take advantage of his presence in the village to give vaccinations. All possibilities should be considered and the necessary human and financial resources estimated.

3. The PSR team at all levels should attempt to improve the supply of medecines to the cercle. This does not mean that the PSR should attempt to address the ultimate problem of how the GRM procurs drugs from foreign suppliers. This is much too complex and politically sensitive issue.

The supply system should be analyzed, however. I suspect it does not confirm to existing Malian policies. The reasons why this is true should be identified and recommandations made to improve the system. For instance, both the GRM and the WHO have lists of drugs considered to be appropriate for the cercle and arrondissement level dispensaries. Are drugs not on those lists ordered? Even if not ordered are they some times supplied?

4. USAID should find a way to modify its current rules to allow moderate, appropriate amounts of dispensary repair and construction to be done with PSR funds. What kind of physical infrastructure is appropriate, i.e. meets minimal demands and is affordable, is controversial. In any case, the Tambacara dispensary should not be a quagmire in the rainy season, and the Koro dispensary should have water. If these cercles are to serve as models, USAID should be willing to support

minimal construction cost to see that in fact the cercles do become models. Having done what all parties agree is appropriate, the GRM may well discover that the capital cost are too high for this particular model to be replicated at the covernments expense. At this point expectations will have to be scaled down. The project funded construction will then have served a useful purpose.

In this context someone suggested that USAID assist with the construction of maternities at the arrondissement level in the Koro cercle for use by the recently trained matrones. If a maternity can be constructed for six million FM and the local population can raise half of that amount, the possibility of USAID financing the other half should be considered, Obsiously the future implications of such an undertaking should be weighed. If an external donor is not available to provide such matching funds in other cercles, would the GRM be able and willing to do so. If not, perhaps construction of rural maternities is not a good way to provide maternal and child health (MCH) services.

Discussions of infrastructure development based on cost estimates developed by the technical assistance team would be useful. USAID should have the flexibility in its funding mechanisms to respond if these discussions identify appropriate interventions.

5. No technical assistance personnel should be permanently assigned to the Kayes region. The medecin-chef and his assistant (see above) should be assisted as needed by members of the Koro PSR team, the Bamako team, other Malian personnel and finally consultants from outside Mali. If, for instance, the medecin-chef should desire, as did Dr. Dulaire to repeat the disease prevalence studies (enquête medicale) and desires assistance developing a study protocol or training his encadreurs, the director of the PSR should try to make available, as a consultant, one of the personnel in Koro who was involved with the studies there. If, however, a study design significantly different than that used in Koro is desirable, epidemiological expertise from Bamako or outside Mali may be required.

6. The cost of providing a 125 cc motorcycles to the Tambacara nurses should be estimated.

If the recurrent cost of using motorcycles doesn't appear completely out of reason, this option should be field tested to determine its real time and labor saving advantages, as well as its real recurrent cost. I seriously doubt that motorcycles offer enough of an advantage over mobylettes to justify their higher capital cost, but this is the type of question the PSR was designed to answer.

7. The Peace Corps Volunteer in Yélimané should probably be reassigned. The current medecin-chef sees no value in generalist volunteers and hence the PCV 's presence in Yélimané is a waste of a potentially valuable resource.

8. The wisdom of developping a village based health system which depends even minimally on the presence of an active, enthusiastic midwife at the Koro level should be examined. If it is, as a highly placed Malian health official told me, practically impossible to find a midwife who will willingly spend two or three years at the cercle level while her husband is posted elsewhere, alternative solutions must be found to train and supervise the critically important female members of the rural health team. Perhaps the role of the matron should be upgraded. The obvious risk of doing so is that she will begin to look for an assignment outside her own village. The problem needs to be fully discussed before more matrons or TBAs are trained in the Koro cercle.

9. The departure of Dr. Sissoko and Kelly will temporarily lessen the effectiveness of the Koro team. The new medecin-chef will naturally require a few months to become thoroughly familiar with all of his clinical and normal administrative responsibilities. I will be amazed if the new HIID advisor for the fifth region arrives in Mali definitively and is installed and ready to work seriously before the end of July. There will be therefore at least two months when the Koro team will receive less supervision than it has in the past. The Bamako team should be especially supportive during this time. A site visit to assure that the new medecin-chef understand the resources available to him should be undertaken in the immediate future.

Apparently the HIID advisor may well be assigned to Mopti. This will be an advantage in that he will be able to work closely with the regional director of Medical Services to plan the extension of the VHW training program to other cercles. Great care must be taken, however, to see that he spends at least 9-12 months in Koro developing a personal, in-depth knowledge of the problems attendant to VHW training. This will pose problems because he will often be away from home or will have to install himself in two different houses during this two year term of service.

The pros and cons of assigning the new HIID advisor to Mopti rather than Koro should be fully discussed with Dr. Brière, the new medecin-chef in Koro as well as with the advisor himself before a final decision is made.

10. The PSR should construct a well at the dispensary in Koro and in the two villages where one has been promised as soon as possible. I will say more about well construction as a part of the PSR in the next section.

III. Additional Activities which could be included in the PSR

A. Possibilities

The possibilities are numerous and include:

1) Vaccination of children and pregnant women.

2) Cooperation with the Institute of Traditional Medecine and African Pharmacopea in Bamako to define the role that traditional medical practioners, their techniques and medicines should have in a village level health care system based on the VHW.

3) Classical maternal and child health (MCH) activities such as weighing babies and pre and post natal counselling of mothers including advice on the importance of child spacing.

4) Increased emphasis on village sanitation and the protection of water supplies. This implies an important health education component.

5) Greater emphasis on community development activities especially the construction of wells.

6) Participation in the identification and treatment of people with such endemic diseases as shistosomiasis, tuberculosis and leprosy.

B. General Comments

I cannot overemphasize how important I believe that it is for the PSR to assure that the current and future VHW have mastered the skills that they have already been taught and that the whole system is viable before new elements are added. The PSR in Koro is off to an excellent start but there is considerable work to be done to assure that the VHW can initiate and maintain a prophylactic chloroquinization program and can properly use the bandelette to identify severely malnourished children. Until these important tasks are mastered no new activities should be added to those performed by the VHW or his supervisors. The program as it is now constituted offers an important service which I believe the community will recognize and support. If too many tasks are added too quickly and the performance of the VHW or that of his supervisors suffers, the value of such a system may not be obvious to the community. Without community support such a system will fail completely.

C. Priorities among possible new activities

1. Vaccination program - The former chief of party for the HIID team, Dr. Nilson, submitted a proposal for an immunization program in December 1979. To my knowledge this proposal has not yet been seriously discussed by the various parties in the PSR. I agree with Dr. Nilson that, if a new activity is to be added, vaccination of children and pregnant women should be the first. More lives will be saved at lower cost by providing vaccines to these high risk groups than by any other activity.

When asked what disease they would like to learn more about, or be able to treat, the VHW in Yelimané almost universally responded that measles and whooping cough were their biggest problems. An earlier discussion noted that many maternal deaths in the Koro cercle could be prevented by vaccinating pregnant women against tetanos.

Dr. Nilson's technical proposal should be carefully reviewed by those Malians and their WHO counterparts responsible for developping Mali's Expanded Program for Immunization. This report is not the place to discuss the details of his proposal but I would like to emphasize that

a) including polio vaccine in such a program greatly complicates the the cold chain problem if injectible vaccine is used. If oral vaccine is used, it greatly increases the cost of a program. I saw few crippled children and health personnel told me that polio was not particularly common. Studies have already demonstrated that intestinal worms which, like the polio virus, are spread by the fecal-oral route, are relatively uncommon. The World Health Organization has developed excellent techniques for estimating the overall incidence of paralytic polio from surveys of lame children. Unless such surveys demonstrate that polio is a significant problem, the vaccine should not be included in the program.

b) evaluation of such an activity should be based on coverage rates established by surveys and decreasing morbidity and mortality rates established by routine surveillance. The check list proposed by Dr. Nilson as an evaluation methodology is useful but inadequate.

The newer measles vaccine and the combined vaccine against tetanos, diptheria and whooping cough are relatively thermo-stable. They could be delivered to the target groups during supervision visits to the villages by the PSR team members using small easily portable thermos bottles to transport them from the dispensary to the village. Storing the vaccine in Bamako, the regional capital or the cercle will pose significantly greater obstacles. No system for maintaining the cold chain should be instituted using PSR resources which cannot ultimately be replicated and maintained by the MOH in other cercles. For instance, the frequent travel of PSR personnel from Bamako to Yélimané or Koro should not be exploited as the method for delivering vaccines to the periphery.

The possibility of beginning a vaccination effort only at the level of the cercle and arrondissement dispensaries should be considered. Although only a small percent of the population would be served initially by such a program, vaccine would be available to those willing to come to the dispensary and dispensary personnel would gain experience using the vaccine. When everyone agreed that the VHW was adequately performing his other tasks, vaccination could begin in the villages.

2. Increase collaboration with the Institute of Traditional Medecine and African Pharmacopea (ITMAP). Mali recognized much earlier than most of its neighboring states the need to integrate the best traditional medical practices into a modern rural health care delivery system. Although, in the years since the ITMAP was created, much lip service has been paid to the desirability of this type of integration,

little progress has been made, in Mali or elsewhere, defining the role of traditional medecine in a primary care system.

A relationship between the personnel of the ITMAP and those of the PSR has already developed. The director of the ITMAP is particularly anxious to see a greater degree of collaboration develop between the two organisations. His deputy has participated in several PSR activities. In Koro investigation into traditional medical practices in the area has already begun. In Yélimané some of the VHW were chosen because they had a traditional role in the village - a few opened abcesses and one was a bone setter.

These beginning should be built upon. Any health care system which counts primarily on village support for its survival must valorize the safe and effective treatments that are already being used. Professor Koumaré and Dr. Koné should be asked to submit a research proposal to the MOH and the PSR team. The proposal should detail the way the ITMAP could use the present PSR structure to gain the necessary knowledge about traditional practices in the area. The proposal should then present a detailed research protocol to test different approaches to integrating the most useful of the traditional techniques with the others that the VHW is now employing.

Once all parties agree that the ITMAP's proposal is appropriate, the PSR should provide money from its budget to the ITMAP to execute the work in the field. If consultants from outside Mali are needed, either to help design or implement the field work, they could be paid by the PSR.

Unlike the addition of vaccines to the project, the addition of a traditional medecine component to the program will not immediately save lives. It will certainly, in the long term, save both the villagers and the GRM considerable amounts of money. Much more importantly it will demonstrate to the villagers, that the PSR and theMOH are sensitive to and appreciate the value of their traditional system.

3. MCH/FP

When the newly trained matrones become reinstalled in their villages and decisions are made as to how, and by whom, they will be supervised, they should be encouraged to develop ante and post natal and infant monitoring programs. Important services to be provided in such a context would include:

a) immunization of pregnant women and children;
b) monitoring of clinical signs of impending eclampsia in pregnant women by observing for edema or rising blood pressure;
c) nutrition education and iron supplementation to pregnant women;
d) education as to the importance of delivering at the dispensary or at home with the matrone in attendance;

e) weighing and charting of the weight on a "Road to Health" type card of all children under three years of age.

None of these activities require the physical presence of a maternity. In fact, if the matrones could be incorporated into the supervision teams, many of these activities could better be carried out in the villages. The PSR should consider the support of the matrones it has already trained a priority. If they are unable to work in the village initially, as a minimum the PSR should see that they have the equipment and supervision necessary to begin a program at the level of the arrondissement dispensaries.

The addition of a child spacing emphasis and the provision of contraceptive products should be undertaken only after these activities have the support of the politically influential people in the area. The MOH has a clear policy of promoting child spacing and PSR personnel should develop a strategy for winning political acceptance for the concept at the cercle level. However, the excellent start of the PSR should not be jeopardized by appearing to prematurely devote too many human and financial resources to an unpopular intervention.

4. Improvement of Village Sanitation and Provision of Safe Drinking Water

Although certainly important, changing excreta disposal habits in a village is an extremely difficult task. In very hot, dry areas like Yélimané and Koro where studies have already demonstrated a relatively low worm burden in young children, I doubt that this is a high priority. In this respect I believe the current PSR approach in Koro is a good one. The VHW is encouraged to set a good example but valuable credibility is not lost trying to convince everyone else to dig a latrine. Once the stature of the VHW has risen sufficiently because of his demonstrated knowledge and effectiveness, he will more easily be able to attack this problem.

If heavily infected water sources, especially those harboring guinea worm, can be identified, filtering or chlorinating the water will be very useful. However, I should emphasize that recent studies have cast considerable doubt upon the efficacy of protecting water sources in the control of childhood diarrheas. Many people think water becomes contaminated long after it leaved the well. In any case, effectively and affordably chlorinating a well known to be contaminated is clearly a desirable public health intervention.

The question then becomes what chlorinating techniques will result in effective levels of chlorine residual for the longest time for the least money. If a decision to disinfect wells is made, some of the inexpensive devices that release chlorine slowly over many weeks should be tried.

I agree with those who say that assuring an adequate water supply is the single most important priority for the people of the Yélimané and Koro cercles. I am also convinced that having enough water to bathe and properly wash clothes and cooking utensils will significantly reduce morbidity from gastro-intestinal and skin infections.

However, I also strongly believe that the rather limited financial resources of the PSR should be concentrated on perfecting a mix of health interventions which are effective and affordable. The emphasis should be on trying new approaches and evaluating their effectiveness and cost so that, at the end of the project, the GRM will know what works, at what price. I do not believe that providing services per se, should be considered the short term goal of the PSR. The long term goal is obviously to replicate the ideas that work and to provide services to the entire population.

In this light, spending three to four million FM to construct a well in a village doesn't seem like the best use of project funds. Doing so on anything but a very selective basis would rapidly deplete the project funds.

A more important consideration is the precedent that would be established. If the MOH and the PSR adopt policy that no health activities can reasonably take place wihtout a modern, dependable well, the MOH will constantly be stymied in its efforts to provide some minimal level of health care to rural Malians. The MOH will be unable to undertake any village level initiatives until a service dependent upon another ministry has mobilized the capital and human resources necessary to build the well. Parenthetically, in this respect, it is important to note that it is often the human and not the financial resources which are unavailable. The community development agent in Yélimané assured me that many Soninké villages which desperately want a well, and can pay to have it constructed, cannot find the necessary technical expertise.

For all these reasons, although I agree that the villagers in the Yélimané and Koro cercles need water more than they need medecines, I don't believe that funds from the PSR should be used for this purpose except in exceptional circumstances. Conversly I believe that having a full time community development agent on the HIID staff to help the communities mobilize their own resources or to put them in touch with possible external funding sourced is a good idea.

5. Control of Major Endemic Diseases

The VHW in the Koro cercle already understand that chronic coughers, especially those who cough up blood have a serious disease and should be referred to the supervision team for definitive diagnosis and treatment. Recent evidence from WHO sponsored studies in India questions the efficacy of BGG vaccine in preventing tuberculosis.

Hence, identifying the active cases and treating them becomes even more important as a method of controlling transmission. This task will have to be emphasized and the VHW encouraged during the supervision visits if the VHW is to have any effect on diminishing the prevalence of tuberculosis. There is no point in emphasizing the importance of identifying chronic coughers, however, if the supervision team is not prepared to follow-up with a definitive diagnostic test - sputum smears- and treatment for the sputum positive cases.

Control of shistosomiasis is probably too expensive and too complicated to be considered a goal of the PSR or of a VHW. As newer, less toxic, less expensive drugs become available for mass treatment of populations in highly endemic areas, the VHW will have a very valuable organization role to play.

Given enough time there is no reason that a supervisory team could not examine and periodically provide medecines for previously identified lepers in the villages with VHW.

6. Summary

All of the possible additional activities discussed above are technically rather simple. They could easily be accomplished in the village, by the supervision team during its monthly visit. However each additional activity requires some additional time. If many additional demands are made on the supervision teams one of two things will happen. They might spend less time with the VHW and the work of the VHW would certainly suffer. Conversely they could continue to spend the same amount of time with the VHW and do the additional tasks but only work in one rather than two villages per day. This would obviously double the supervision cost and would undoubtedly greatly increase the personnel requirements. Again I would urge all PSR and MOH personnel to carefully consider the VHW and their supervisor's ability to adequately execute any of the above tasks before adding one to their current load. Having decided that additional activities are desirable, the PSR must carefully formulate the behavioral objectives that will be measured and monitor progress toward those objectives. Only by doing so will the PSR personnel realize when the absorptive capacity of the system has been exeeded.

IV. The Health Surveillance System, the Informative System of the PSR and Measuring Impact.

The surveillance form currently in use (see Annex IV) at the dispensary level is much too complicated. Dispensary nurses are asked to differentiate between conditions such as amoebic dysentary and other diarrheal diseases. This is impossible to do reliably without laboratory facilities. They are asked to differentiate pneumonia from bronchitis, emphysema or asthma without having a stethoscope available.

Most importantly the majority of diseases listed on the surveillance form are not ones for which the MOH now has or is planning to have an intervention program. No reports are solicited for cases of fever and jaundice with gastrointestinal hemorrhage that might indicate yellow fever or lassa fever, extremely infectious diseases of tremendous public health importance. Diseases preventable by vaccination such as measles, whooping cough and polio are not specifically reported. Cases of malnutrition are not currently reported. Three important principals involved with designing a surveillance system are:

1) Report only diseases for which something can and will be done in the short or medium term;

2) Report only diseases or conditions for which reliable diagnosis can be made or those which are so important that even a suspicion requires a follow-up;

3) Provide feedback to the person doing the reporting.

The current form should be redesigned and simplified to emphasize information about conditions the VHW is expected to treat. In this way the information now in his notebook could eventually be incorporated into periodic reports that would demonstrate trends in disease incidence or prevalence. These reports will ultimately serve as an indicator of the success of a health care system based on VHW.

A surveillance system alone should not be counted upon to monitor the success of the VHW system. The PSR team in Koro has already demonstrated an ability to do field surveys which will produce invaluable information with which to monitor the impact of the VHW. As the size of the population to be covered by the VHW increases, more sophisticated means of sample selection will have to be developed. The PSR team should study the applicability of the randomized cluster sampling methodology used by the Center for Disease Control of Atlanta, Georgia to do nutrition surveys in the Sahel in 1973 and 1974. The same methodology is currently being recommended by WHO to assess vaccine coverage in EPI programs. Using this methodology one can accurately determine the prevalence of any condition expected to have a prevalence of 1/1000 or greater. The advantage of this method is that only seven randomly selected individuals in each of 30 randomly selected clusters must be evaluated in a population of up to one million persons.

The PSR in Koro has already taught the VHW to maintain birth and death registers. Deaths are listed by age, sex and major symptom. This is an extremely important activity which the VHW seem to be doing relatively well given that they have only recently started. A preliminary analysis shows the reported birth rate to be almost exactly what one would expect it to be. The death rate is lower that expected especially

for younger children. This probably reflects under-reporting. The VHW can be expected to continue this rather difficult task and to improve the accurateness of the death register only if the supervision team constantly encourages them and impresses upon them the importance of the activity.

Using the vital registers and the consultation records kept by the VHW and periodic surveys, supervision teams will truely be able to monitor changes in disease morbidity and mortality.

I cannnot overemphasize that this kind of monitoring is not an academic exercise to provide data for people interested in writing papers. Only by methodically collecting and analyzing such data will the MOH be able to determine whether this new system, which extremely poor Malian villagers are being asked to support to a considerable extent themselves, is truely influencing their health status.

Having said this I would also like to stress that this new approach to health care will not make obvious dramatic impacts in short periods of time. A minimum of ten years will be required to demonstrate the effectiveness of such a system. It is important that the donor community understands this basic fact and does not prematurely retreat from supporting various approaches to the selection, training, supervision and compensation of VHW. If the system is to prove itself, external support to African governments will be required for most of the next decade.

Because I do not believe that important changes in health status will result in the short term from VHW programs, I do not think the comparison arrondissement concept as proposed in the project paper was a good idea. Drugs should be supplied as widely as possible as a service that the project can provide. How those drugs are used should be monitored. However, establishing valid comparison groups and attempting to measure difference in health impact of two such approaches over a relatively brief period of time is extremely complex. I do not believe that the value of this effort would justify the resources the team would have to invest in it.

In their final evaluation of their work, Drs. Sissoko and Kelly present data that address the question of current and projected population coverage, and utilization. Their in-depth analysis of the activities of the VHW in the village Anakaga-Dogon from April until December 1979 provides invaluable insights into the way the system is being used at this time, Such analysis should be done for longer periods of time for other villages and the information pooled. To do so will require a tremendous amount of clerical work. A full time, trained statistician should be assigned to Koro to the PSR team. The objectives of his work would be two fold:

1) to assure that a maximum amount of data is collected and ready for analysis by the end of the project.

2) work with the members of the team to determine what kinds of data will be useful to collect and practical to analyse once the PSR resources are no longer available.

Because a copy of Dr. Sissoko's and Dr. Kelly's report was not available to me after our brief field visit in Koro, I will site little information relative to current coverage and utilization rates. Briefly, the VHW in Anakaga-Dogon, a village of 575 population, had 493 consultations during the nine month period of April-December 1979. This is a gross rate of 54 consultations per month. I am unsure how many person months of VHW service took place in Anakaga-Dogon during the nine months. Seventy-seven percent (380) of those consultations were for people from Anakaga-Dogon for a rate of 73 consultations per 1000 population per month. The 380 consultations represented 293 different individuals for a penetration rate of 293/575 = 51%. At this rate each inhabitant of Anakaga-Dogon will visit the VHW 1.73 times in one year. The data from Anakaga-Dogon indicates that children under fifteen are under represented and women from 20-24 are over represented among the consultants. Among the consultations for children under five, 51.4% were for fever and 40.3% for conjunctivitis. The average per capita expense for medicine in Anakaga-Dogon was 74 FM. I quote these data only to indicate extensive data collection and analysis effort that the PSR team undertook in Koro. It is much too early in the life of the project to know if these rates will be typical of other villages or even of Anakaga-Dogon once people gain more experience with the VHW.

V. Diverse Issues

A. Should the Project open a New Cercle?

I believe that a third cercle should be opened only as a third priority. Clearly the first priority is to assure that in Koro the ongoing activities and any new ones are well executed. The personnel and financial cost of extending coverage to the entire Koro cercle must be determined. In my mind this was the service that the PSR was intended to provide the GRM. Because the GRM views the cercle as the basic functional unit in the health system, the PSR must concentrate its resources to see that all the required information is available for at least one cercle.

I believe the second priority should be to continue the efforts started in Yélimané. I believe that the current state of affairs in Yélimané is due to the inability of the Harvard technical assistance personnel to function in the Yélimané cercle. This view is not necessarily shared by Dr. Cissé, the sociologist on the evaluation team, He believes, if I understand him correctly, that the PSR would have had problems selecting, training and supervising VHW, regardless of the PSR personnel, because of the particular nature of the Soninké villages. The female to male ratio in the Tambacara arrondissement has been estimated to be 6/1 for the 15-44 year old age group. Dr. Cissé believes that the most resourceful

of the men in this age group who would make the best VHW are "en exode" in France.

I agree that this problem is important but don't believe that it should pose an insurmountable hurdle. The problem of emmigration of young men, if not to France and if not as serious, is present in all areas of Mali.

If one excepts my contention that the current problems in the Yélimané cercle stem from the inability of the Harvard personnel to function in Yélimané, then I believe attempting to continue the work underway using the local personnel, reinforced as need by consultants, makes more sense than opening a third cercle. Before the latest training program began in Yélimané, in mid May, 26 VHW had been trained in nine villages. The infirmier nurses in Tambacara are familiar with the project. These are valuable resources in which the PSR has already invested considerably. They should be maximized, not abandoned.

If the PSR continues in Yélimané without TA personnel, very important lessons will be learned as to what kind of consultant resources the GRM will have to supply to other cercles where VHW training and supervision will have to begin without TA personnel.

My suspicion is that the start-up problems in Yélimané - to the degree that they are not tied to the TA issue - will prove to be rather typical. Selecting, training and supervising VHW to the point where they do such good work that they are willingly supported by their fellow villagers is very difficult work about which no one is particularly knowledgeable at this time. If the concept is to succeed, donors such as USAID will have to be willing to provide long term assistance to African States and should not be discouraged at a temporary set back as has been suffered Yélimané.

For the above reasons I believe PSR resources should first assure that all reasonable efforts have been made to see that work similar to that which is ongoing in Koro takes place in Yélimané.

If, and only if , careful analysis of the situation by the PSR staff and the MOH personnel indicate that the project has enough resources to support Yélimané would I recommend beginning work in a third cercle.

B. Implications of the PSR and other VHW Based Programs for Medical Education in Mali.

If a national system based on the VHW becomes a reality in Mali, physicians and nurses will have to become very skillful managers and supervisors as well clinicians. Management concepts as well as other public health skills should be introduced in the first year and built upon and emphasized throughout the medical and nursing school curriculum. I agree with the regional director of medical services in Mopti who told me that he doubts the value of short term training programs in public health for physicians once they have developed a clinical orientation in medical school. Physicians and nurses must realize even from the earliest phases of their training that their skill at supervising personnel or at analyzing the epidemiologist situation in their area or at comparing the cost and benefits of two possible lists of dispensary drugs will be much more important to the functioning of the system than will their ability to do Cesarian sections or auscultate heart murmurs.

Therefore, I believe that the new chief of party should make an effort to share the experiences gained in Koro with those responsable for curriculum design at the schools of medecine and nursing. Dr. Sissoko's presence at Point G hospital will be a huge advantage in this respect.

C. Motivation of Personnel

Much discussion goes on about the importance of finding the appropriate type of remuneration for the VHW. My instinct is that if he does his job well his services will be valued and his peers in the village will find the proper way to remunerate him. I doubt that this is the biggest problem for the MOH.

He will not do his job well and therefore will not be appreciated and remunerated if he is not well supervised. How does the GRM encourage the brightest, most creative and enthusiastic of its young nurses and physicians to view service at the cercle level and the management of a VHW based health care system as desirable? Clearly two ways to do this are to establish differential pay scales and differential promotional practices for those who serve in rural areas and excell at "public heath" versus those who prefer service in urban areas and excell at "clinical medicine". Even keeping in mind the higher cost of living in the urban areas, I suspect that higher salaries will have to be paid to personnel serving at the cercle level than those paid to personnel serving urban areas, if rural service is to be encouraged. If a VHW based system is to flourish, service at the cercle level must not be viewed as what one does immediately following initial training before one can qualify for specialized clinical training.

D. Technical Assistance in Rural Areas.

I believe one important lesson that the GRM, USAID and Harvard should learn from this project is that it is extremely difficult to

highly skilled U.S. technicians who will perform well in rural Mali. Dr. Kelly proved the exception to this rule but his extensive previous African, even Malian, experience undoubtedly was an important factor. In the future, projects requiring that highly skilled U.S. technicians live at the cercle level should be very carefully reviewed in light of the Yélimané experience.

E. Acknowledgement.

I want to express my sincere appreciation to all of the MOH and PSR personnel as well as to all of the other patient individuals who helped the evaluation team during its time in Mali.