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FINAL REPORT

Health Systems Vitalization Project
(VISISA)
AID Project No 519-0291

Submitted to.

Office of Human Resources and Humanitarian Assistance
U S Agency for International Development
San Salvador, El Salvador

Submitted by

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and
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San Salvador
30 April 1987

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Health Systems Vitalization Project
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Section 1 Introduction and Overview of VISISA

The large variety and volume of technical assistance provided under the VISISA Project to the Salvadoran Ministry of Health (MOH) is summarized all too briefly in the following sections of this report. Support was provided at the basic operational, administrative, and planning levels, and even the list of reports provided under the Project (Appendix A) fails to reflect the full extent of this involvement. Substantial additional supporting materials describing other accomplishments and contributions under VISISA are available in the AID and DISA/Kraus computer and hard-copy archives, and interested parties are invited to request any further materials which could be provided from these sources.

This report will not provide a blow-by-blow account of the 32 calendar months of technical assistance (TA) provided the MOH since the original contract was signed. Rather, it will concentrate (1) on activities and accomplishments in the latter half of this period, dating from January 1986 to April 1987, (2) on providing a clear picture of the status of this TA effort at the close of the VISISA Project, and (3) on providing recommendations concerning the direction future TA projects should take.

Nevertheless, some sense of the political, economic, administrative, and technical chronology of the Project is necessary to objectively evaluate its accomplishments and recommendations. This background material is provided in the following section.

1.1 History of the VISISA Project

Unstable and declining economic conditions in recent years, coupled with the effects of the ongoing civil war, created a situation of crisis proportions in the Salvadoran public health care sector early in this decade. Steady erosion in the purchasing power of the MOH budget produced critical shortages of basic drugs and medical supplies, forced the postponement of biomedical equipment and vehicle acquisitions, and diminished the amounts devoted to basic preventive and corrective maintenance activities. The conflict has taken the lives of many public health care workers and either destroyed or forced the closure of numerous outlying, lower level health units and posts. Many of the facilities that remained open in conflictive areas were understaffed and undersupplied because of the restrictions

imposed by the war.

In meeting its mandate to provide health care services for some 85 percent of the Salvadoran population, the Ministry was increasingly dependent on a deteriorating physical infrastructure and a reduced supply of basic health care inputs. Increasingly, patients responded by bypassing lower level facilities in favor of hospitals and centers, or by forgoing treatment altogether. This produced further pressures and inefficiencies in the overall MOH health care system, and marked declines in the health status of the Salvadoran population. A clear emergency was at hand, and the VISISA Project came about as a response to these conditions.

VISISA was conceived in the early years of the Reagan Administration. The original Project Implementation Document (PID) was completed over four years ago, in March of 1983. More than a year passed before the request for technical proposals (RFTP), soliciting a wide variety of short- and long-term technical assistance, was issued in April of 1984, but this was a year filled with activities and milestones.

Given the political situation in Central America, interest levels on both sides of the United States Congress were high over a foreign aid project that would provide such significant levels of direct financial and technical support in a strategically sensitive and turbulent region. Evaluation and assessment teams regularly visited El Salvador during 1983 and 1984, and the latter part of 1983 was peppered by a Congressional hold on VISISA funds until certain political and administrative conditions were met by the Government of El Salvador (GOES) and the MOH.

Prior to imposition of this hold, estimated Project funding requirements had almost trebled in the period from April to July 1983, increasing from \$9 million to \$25 million. Following receipt of sufficient assurances from GOES, the hold was lifted and the higher Project funding level was approved in September 1983. AID prepared and issued its RFTP the following April, and awarded the technical assistance contract to Westinghouse four months later in August 1984.

Orientations and briefings for the arriving technical assistance team uniformly stressed the emergency nature of the problem, and advisors were urged to take those actions required to get the MOH back on its feet before turning to systemic, management development programs. At the expiration of the Westinghouse contract in September 1985, the DISA/Kraus technical assistance team took over the reins and began to emphasize these kinds of aspects more strongly. Over the next two and a half years there were several disruptive changes in administration and the composition of the technical assistance team, but important strides were made in developing MOH management and operations capabilities.

1.2: Summary of Accomplishments

A basic premise of VISISA has been that an increased availability of supplies will improve both the access to public health care and the health status of the Salvadoran population. In keeping with this emphasis, the VISISA Project has been relatively unique in having involved such a large amount of direct purchasing or financing of purchases of basic medications, medical supplies, insecticides, and support equipment for the MOH. To partially offset the decline in the physical infrastructure of MOH systems, vehicles and biomedical equipment have been directly provided, and significant warehousing renovation and construction efforts have also been undertaken and completed. Justifiable on the basis of the special economic and political conditions of El Salvador, this emphasis has nevertheless created several potential problems at the operational, managerial, and planning levels. Technical assistance efforts under VISISA have sought to counteract these potential problems as well as reduce long-standing MOH organizational and operational problems in a variety of ways:

- elaboration of general decision-making criteria for different substantive and operational levels of the MOH system,
- establishment of one-time and on-going training programs to transfer knowledge to MOH personnel,
- recommendation of operational and procedural changes to improve the delivery of health care services, and
- preliminary design, development, and implementation of management information systems to consolidate and institutionalize organizational changes

The sections of this report which follow address specific areas of the technical assistance effort of the DISA/Kraus Project group under VISISA, but there are at least two integrating themes to all of these areas: the desire to improve the quality of public health care in El Salvador, and the need to improve the efficiency with which this service is provided. Each section describes specific accomplishments under the Project, obstacles to maintaining these accomplishments, and, where appropriate, recommendations for future technical support requirements.

Section 2 considers activities and accomplishments under Component I technical assistance in overall supply administration and in the design and implementation of the Ministry's malaria control program. Support in the area of supply administration embraced the entire

logistics cycle, from the original determination of requirements, to the acquisitions program, to the handling and storage of supplies, to their final distribution to users. Assistance in the malaria control program was also comprehensive, ranging from acquisition of pesticides and monitoring their use to producing quantitative estimates of the success of the program in reducing the malaria incidence rate.

Section 3 is concerned with VISISA efforts to upgrade and maintain the MOH physical infrastructure under Component II. The Ministry's transport division benefited from the direct infusion of new vehicles and spare parts, design of vehicle-specific preventive maintenance programs, training in preventive maintenance and appropriate repair procedures, and the successful implementation of a computerized inventory control and reporting system. Similar, although somewhat more modest advances were made in the area of biomedical equipment monitoring and maintenance. Substantial direct financing and supervision of the construction and renovation of MOH facilities is also described in this section.

Section 4 reviews progress and prospects under Component III of the VISISA project: Management Information Systems. Here again a broad spectrum of activities is summarized: design and implementation of a "turn-key" hardware configuration, software development and installation to meet the particular needs of the MOH, adoption and integration of planning norms and methodologies, incorporation of biostatistical and epidemiological data into the planning process, and training programs -- formal and informal -- in each of these areas. Some of the more significant technical assistance efforts under Component III cannot be easily reduced to hard-copy reports, including in particular the substantial efforts made to forge and institutionalize a functional Users Committee charged with elaborating overall MOH MIS priorities and policies.

In one way or another, directly or indirectly, the earthquake of October 10, 1986, greatly affected efforts under all components of the Project. Some tasks were unquestionably set back -- the construction of the drug quality control lab, for example. On the other hand, some technical assistance efforts may have serendipitously benefited from this disaster. In effect, the flood of medicines and supplies entering the country from donors provided an excellent, if unwanted, opportunity to put planning and supply management principles into practice. VISISA Project personnel participated in the post-earthquake response program in all ways:

- developing specific lists of emergency medical requirements for the affected population, enabling donor agencies and countries, if they so elected, to better coordinate and target their contributions,
- developing a set of forms used to better track and control donations by source and destination,

- physically unloading arriving shipments, categorizing and counting them, and assembling shipments of medications and supplies to field medical facilities, and
- performing daily checks of field conditions in the affected area, including conditions of facilities and equipment as well as the most urgent medical requirements of health care centers

In the process, the VISISA Project team was exposed to the invaluable experience of working hand-in-hand with Ministry and AID personnel in responding to the catastrophe. A better understanding, appreciation, and working relationship evolved for all parties involved in this process, as well as a firmer commitment to eliminating administrative and technical barriers to improving the MOH response capabilities -- not just to disasters, but also to the day-to-day demand for basic public health care services in El Salvador.

Section 2: Supply Management

The problems of acquisition, handling, storage, and distribution of basic medications were addressed in several ways. Physical reorganization of MOH warehouses was accompanied by the development of training programs for warehouse personnel and the provision of reports from the field about the actual state of supplies and requirements at all levels of the MOH system. Central headquarters assistance included, among other things, technical needs determinations for 1986 and 1987, as well as the elaboration of bidding documents for 1987 procurements. Quality control programs and procedures were developed, and the personnel, facilities, and equipment requirements for a functional quality control laboratory were developed. Section 4 provides selected illustrations of how these activities were coordinated with and integrated into the computerized management information system under development for the Ministry.

2.1 Logistics

Major activities and products can be grouped into four broad categories involving the design and implementation of:

- physical reorganization plans at MOH storage facilities required to improve the efficiency of warehousing and distribution functions,
- improved distribution procedures at all levels of the MOH health system, including emergency distribution programs associated with the earthquake and the subsequent flood of international donations,
- monitoring programs to assure the continued compliance with these procedures and to provide timely information about field operations to central planners, and
- training programs to transfer required skills and capabilities to MOH personnel.

2.1.1 Accomplishments Under VISISA

Major physical modifications of the Santa Tecla (Report 1, Annex 1) and El Matazano warehouses facilitated grouping of medical products in accordance with the Cuadro Basico. In addition to remodeling of selected facilities, the central MOH warehouse was transferred from IVU to the new El Matazano complex (Report 1, Annex 2.) Similar but less ambitious programs have been implemented at each of the remaining regional warehouses. (Report 1, Annex 3) The basic

objective of these efforts has been to assure better control of inventories, enabling warehouse managers to more rapidly locate supplies on hand, minimize losses and errors, and dispatch those products with the earliest expiration dates

Working with the MOH and its newly organized Unidad Tecnica de Medicamentos e Insumos Medicos (UTMIM), distribution schedules were developed and used for medications provided by AID through PIO/Cs 50242, 50284, 50289, 50290, 30166, 30191, and 50293. Separate programs were developed for (a) distribution from the central warehouse to the five regional warehouses and the fourteen hospitals, and (b) distribution from the regional warehouses to the remaining MOH health care facilities involved with primary care services -- health centers, units, and posts (Report 1, Annex 4.) The basic objective of these efforts was to assure an adequate supply of drugs at health units and posts, thus offsetting the trend towards overutilization of higher level health care facilities

During January through April of 1987, continued direct assistance was provided at El Matazano to help relocate the stream of donations following the earthquake in October of 1986. Donations have continued to arrive from such sources as Italy, Germany, Mexico, China, Spain, the Red Cross, and UNICEF. DISA/Kraus identified and contracted 20 individuals with prior experience in this kind of work and they began to provide assistance in early April.

Beginning in April of 1985, four Salvadoran health monitors were hired and trained to perform audits and analyses of pharmaceutical and medical supply stocks at MOH facilities. These individuals have effectively served as the eyes and ears of the Ministry and AID in the field. They have provided considerable technical support to the VISISA distribution advisor, and their duties and activities have expanded far beyond the simple monitoring and reporting functions originally envisioned for them. Indeed, virtually every one of the accomplishments under VISISA described in this section benefited from the participation of these professionals. Their familiarity with local technical, administrative, and cultural conditions has been important ingredient in the design and implementation of effective supply management policies

The monitors made 166 inspection visits to establishments of the MOH during 1986 and 1987. These visits provided primary information about actual supply availability, use, and indicators of unmet needs. They were also used to check compliance with the distribution program elaborated by the UTMIM, medical requirements during the emergency period, and the physical and operating conditions of warehouses and pharmacies throughout the MOH system (Report 1, Annex 5.)

During the period of January through April 1987, the following specific monitoring activities were accomplished:

- January. 38 establishments (5 hospitals, 5 centers, 12 units, and 16 posts)
- February. 4 establishments (San Francisco Gotera Health Center, Sesori Health Unit, and Sonsonate Hospital, Suchitoto Health Center)
- March 32 establishments (8 hospitals, 9 centers, 11 units, and 4 posts)

In the case of the last monitoring program, the set of facilities to be visited was selected by a weighted random sampling procedure, using estimated utilization rates for the weights. In addition, the list of medicines monitored was selected because they were expected to cover at least 80% of the outpatient cases treated in the country. (This is described more thoroughly in Section 2.2.)

In addition, the monitors worked closely with central and regional supply managers, providing informal training and advice on the appropriate use of management tools developed at the central level, such as the basic drug list described in a later section. They participated directly in the transfer of the MOH central warehouse to El Matazano, physical reorganization and remodeling of El Matazano and the regional warehouses, and the taking of physical inventories of drugs and medical supplies at these facilities. In short, the health monitoring system has been an extremely effective and valuable component of the VISISA project.

Numerous unscheduled activities were accomplished at the special request of AID. At times, these activities interfered with and delayed the delivery of products detailed in the approved scopes of work for involved consultants. Examples of these kinds of activities that affected the Logistics Component include:

- Use of the Health Monitors to investigate the treatment being provided to particular individuals at MOH facilities, and to locate and obtain needed medicines and supplies for these persons
- Redistribution and relocation of X-ray products (film, developing and fixing liquids and chemicals, etc.).
- Determination of the shelving requirements for UNISPAN-type warehouses to be used by PLANSABAR (the National Plan for Basic Rural Sanitation), the Unidad de Ingenieria, and the Departamento Materno-Infantil of the MOH.

Several training programs for supply and warehouse managers have been conducted throughout the contract. The session conducted in July of 1986 (Report 1, Annex 6) served as the basis for development of course materials for a decentralized training program for approximately 950 persons originally scheduled for September 1986.

Factors related to the financing of this program that were beyond the control of the technical assistance team resulted in postponements and rescheduling on five separate occasions. Finally, funds were made available in March of 1987. A nationwide paró on transportation took effect early in April, however, with the result that travel and security restrictions for both MOH and DISA/Kraus personnel reduced the number of individuals who actually received this training to 729. (Report 2)

A matrix of the actual functions of health monitors was developed to facilitate the eventual transfer of this role to Ministry personnel. The team also recommended the creation of regional drug and supply committees and provided a description of how such committees could contribute to the overall supply management process. (Report 1, Annex 8.) Transfer of technical knowledge to MOH counterparts has also been accomplished informally and on an ad_hoc basis -- for example, through the extensive interactions with MOH personnel involved in developing plans for warehouse reorganization.

A basic document concerned with the control of external donations was prepared during the extension period. (Report 3) Likewise, manuals were developed for the monitoring function, warehouse procedures, and the functions and responsibilities of different warehouse personnel. (Reports 4, 5, and 6.)

As a result of DISA/Kraus technical assistance efforts, the MOH cold chain is in place, operable, and working efficiently. Finally, significant redistributions of pharmaceuticals within the MOH system have been accomplished using information provided by the DISA/Kraus health monitors.

2.1.2 Obstacles to Maintaining/Extending Beneficial Results

The remodeling efforts at El Matazano and Santa Tecla (Central Region) were critical for continued progress under VISISA. The physical reorganization plans developed for these and other regional warehouses were designed to rationalize both the storage and dispatching of medicines and supplies. Additional remodeling at El Matazano and the rapid installation of needed shelving in regional warehouses are required.

As of April 1987, there has been no solution to the serious problem of high ambient temperatures in all MOH warehouses, about which the DISA/Kraus team has formulated numerous specific recommendations. The Ministry has, however, requested bids for the shelving required

in the five regions, and has received four offers to this point in time. Followup on both of these crucial issues will have to be an activity under the scheduled APSISA Project.

With the expected increase in volume of drugs in the MOH system, the question of the adequacy of MOH warehousing capacity has to be examined very carefully. Improved supply management and procurement policies should, of course, enable the Ministry to handle a larger volume of drugs with its present facilities, but the possibility of additional storage capacity requirements is realistic. In any event, the ventilation capacity of several warehouses certainly must be upgraded to reduce losses attributable to excessive heat. Effective integration of these changes in supply management practices and policies with the overall MIS requires the identification and modification of appropriate spaces for the computers in the regional warehouses and at El Matazano.

Speaking only from the logistics perspective, the AID/MOH decision to locate the Drug Quality Control Laboratory in one of the warehouse buildings at the El Matazano complex has resulted in a loss of storage space. To offset this, a UNISPAN module is being erected, but appropriate measures need to be taken to assure that it has adequate air conditioning so that it will be able to store perishable medicines and supplies.

Major problems in the distribution of drugs and supplies derive from the lack of sufficient numbers of vehicles for transport and inadequacies in scheduling procedures. Further improvements in both central and regional dispatching and vehicle control procedures will be required to ensure regular movement of supplies and reduce the heavy monitoring requirement needed under VISISA. In addition, communications protocols must be reviewed and revised to assure that (1) accurate representations of stocks on hand from all sources are provided, (2) requisitions for supplies are submitted in a timely fashion and, (3) facilities that are to receive shipments are notified in advance of their arrival. Lack of adequate inventory information threatens already achieved improvements in the distribution system, but these can be expected to be reduced with the introduction and use of automated inventory control and management at the regional warehouses.

To assure its continued effectiveness, the health monitoring system must establish a visible presence throughout the MOH health system. It must also be re-oriented from its present emphasis on policing external contributions to an emphasis on the in-house administrative requirements of the Ministry. This, of course, implies a continued program of involvement at the local level. In addition, further efforts must be made to enlist the aid of local level medical professionals in the monitoring system.

Budget limitations and hiring constraints have restricted MOH ability to provide these services in-house, so that the viability of this

program remains dependent on sources of external funding. In the future, emphasis in this program will shift from the actual determination of inventory levels to the spot verification of those inventory levels, especially as the previously mentioned automated supply management programs take root at the regional and local levels. This has implications for the long run location of these functions within the MOH organizational structure that should be addressed now.

Interest in supply management training programs within MOH remains high, so that, despite the setback caused by the earthquake, the only problems anticipated for implementing these training programs are of a logistic nature.

2.1.3 Recommended Future Activities

Although most observers recognize that the overall level of drugs in the MOH system is substantially less than that required to meet basic health care needs, the MOH storage and distribution systems are currently operating at or above capacity. Therefore, an assessment of required additional warehousing capacity, as well as associated supporting resources (personnel, equipment, administrative space, etc.) is needed to assist in planning. Similarly, the additional burdens on the vehicle acquisition, maintenance, and scheduling systems need to be determined at all levels.

The current efforts to develop standardized procedures for handling and warehousing medical supplies should be supplemented by the continued development of manuals and additional training materials for MOH personnel. This effort should be based in the thorough review and redesign of standardized forms used throughout the supply management system already accomplished by the DISA/Kraus under this contract. However, continued review and development will be required, especially as the computerized MIS begins to play a larger role in MOH planning and operations.

Improved communications between different levels of the distribution system are an obvious necessity. This implies continued extensive involvement with the MIS group as the decentralization process progresses and the precise description of present and projected relationships and obligations between different MOH operating groups. Institutionalization within MOH of the supply monitoring system is a prerequisite for accomplishing these tasks.

2.2 Drug Formulary and Therapeutic Guidelines Development

The efforts described in the preceding subsection have served to increase the efficiency with which a given volume of drugs in the MOH system can be handled. The efforts and accomplishments described in this subsection are directed more at the rationalization of the processes of drug selection, procurement planning, supplier selection, distribution, and prescription and end use. Under the VISISA project several major advances towards standardization of drug use at all levels of the MOH system were obtained. A pilot study of precoded prescriptions provided valuable information about prescription practices for particular diagnoses.

2.2.1 Accomplishments Under VISISA

A simplified basic drug list -- the "Cuadro Basico" -- was developed, approved, and adopted by the MOH. (Report 7.) Based in part on the prevalent morbidity pattern in El Salvador, this served to focus MOH attention on a reduced set of purchasing/acquisition options, simultaneously creating the opportunity for service improvements and cost savings. The number of products included on the revised basic drug list is less than 400, representing a reduction of more than 50% from the list that had been used previously. Each product also was assigned an appropriate level of use within the health system and an indicator of its relative priority.

The process of developing a basic drug list involved formation of a Therapeutic Committee composed of physician specialists and pharmacists (Ministerial Resolution No. 387). The internal rules of operation for this committee were prepared, and the technical assistance team held orientation and review sessions with the Therapeutic Committee on appropriate mechanisms for establishing and modifying the Cuadro Basico.

Following Ministerial approval of the basic drug list, a Therapeutic Formulary was developed for all the drugs included on this list. A preliminary draft of the information was presented in May 1986, reviewed extensively by the Therapeutic Committee, and re-edited twice by the technical advisors. It was then printed and enclosed in a loose-leaf binder to permit easy future modifications, deletions, or additions. The final version was presented to the Ministry in December. This formulary provides basic information on indications for use, recommended dosages and durations of treatment, alternatives, contraindications, precautions, adverse effects, drug interactions, overdose treatment, and patient instructions, as well as level of use and priority.

A detailed training plan for MOH personnel and distribution schedule for the Formulario were prepared by the technical assistance team in conjunction with the UTMIM. This plan provided for eight regional

seminars for the directors of MOH health care establishments and mobile clinics. The estimated number of professional medical personnel in need of training was 235. (Report 8.)

These seminars were scheduled to take place during the second and fourth weeks of April 1987, following delays precipitated by tardy staffing of the UTMIM and difficulties in finalizing the 1987 MOH drug purchase program. The first four were to have been directed by the DISA/Kraus Drug Advisor, the remaining four were to have been the responsibility of the Director of the UTMIM. The previously mentioned April paro struck here as well, however, so that this activity was suspended.

An intermediate solution was obtained early in April by means of a training session for UTMIM personnel and for regional medical directors responsible for supplies. This training session was held in the DISA/Kraus office and conducted by the DISA/Kraus Drug Advisor and the Director of the UTMIM. Its objective was to prepare these individuals to provide similar training for regional and local personnel in the use of the Cuadro Basico and Formulario Terapeutico. This contributed to achieving the basic goal of transferring the basic functions of training, review, and updating to the MOH.

An important secondary outcome of the development of the Cuadro Basico and the Therapeutic Formulary was the establishment of a codification system for describing and/or representing drugs in the MOH system. The coding system differentiates drugs on the basis of their therapeutic group, generic name, concentration/presentation, and form. This standardization process greatly assisted the development of computerized drug inventory control systems and the coding scheme has been applied to a total of 728 separate medications or presentations within the MOH system, including both Cuadro Basico drugs and drugs being phased out of use. With further refinements, it will facilitate the Ministry's acquisition and distribution processes as well.

The first reviews of the Cuadro Basico and the Formulario were completed by the technical assistance team in April of 1987. (Report 9. Since DISA/Kraus had had to replace its Drug Advisor from 1986 for the extension, these amounted to independent reviews.) These analyses were forwarded to the UTMIM for subsequent consideration by the MOH Comite Terapeutico. The primary changes suggested and observations made in this review were.

- elimination of 23 of the 398 presentations on the basic drug list, for reasons ranging from the availability of superior alternatives on that list to changing accepted treatment norms,
- the need to specify the salts or esters of certain medicines and the complete formulation of others, and

- the need to reconcile generic names in the Cuadro Basico with those international nonproprietary names accepted by the World Health Organization

The technical assistance advisors worked closely with the Ministry to develop a management office -- the Unidad Tecnica de Medicamentos e Insumos Medicamentos (UTMIM) -- to coordinate each component of the pharmaceutical logistics process. This office has as its goal the improvement of the efficiency and effectiveness of medical therapy in the MOH through integration of technical and administrative functions. For the first time in El Salvador, the decisions regarding procurement, warehousing, distribution, and use will be based on a sharing of technical, pharmacological, and administrative information. In the creation of the UTMIM, AID obtained significant expressions of commitment from the MOH to rationalizing its health supply resources. The importance of this office cannot be overemphasized.

The DISA/Kraus consultant team provided assistance to the MOH on the functions and organizational structure of the UTMIM which was approved by SETEFE in October 1986. (Report 10) Specific functions outlined the responsibility for analyzing requests for medications and supplies from decentralized MOH administrative units, elaborating an appropriate central purchasing program, and determining how these drugs and supplies should then be distributed, representing a potential major advance in rationalizing the overall logistics cycle. The project assistance team has forged an excellent working relationship with the Director of the UTMIM and has provided continual support for the development of the 1987 proposed purchase program for the MOH and AID, described in more detail below.

An innovative program to use precoded prescription forms to collect data on prescription practices and quantities actually dispensed was pilot-tested at the San Bartolo Health Center. This approach has several objectives. The prescription form precoded the top 20 to 25 drugs, thus facilitating their prescription and data capture. The diagnosis is included on each prescription and provides a cross-check on the appropriateness on the drug and treatment prescribed. Prescribed and dispensed quantities are included on the form, allowing quantification of amounts dispensed and unmet demand. The prescriptions can be analysed by patient, physician, diagnosis, and drug to identify therapy patterns. The results suggested that, with additional modifications in the precoded forms and training in their use, great strides could be made in standardizing prescription practices and reducing waste and inappropriate use of MOH drugs. (Report 11)

Based on the results of and experience with this study, the technical assistance team designed a new and more extensive study to be undertaken in five health care establishments at different levels in the Western Region.

This study involves the following changes and additions to the approach used at San Bartolo:

- selection of new medicines and presentations for the precoded form which are expected to cover at least 80% of the prevailing pathologies,
- development and application of therapeutic guidelines for the 28 most frequent pathologies encountered in El Salvador,
- procedural changes to promote the acceptance and use of the precoded form by doctors, nurses, and pharmacy personnel, and
- design and delivery of computer programs for capturing and processing data at the regional level.

During the month of April 1987 DISA/Kraus advisors trained personnel at the regional and establishment level in the use of these forms and communicated the basic motivations for this study. A starting date of May 11 was set for the study. This program will be directly carried out by regional personnel under the direction of the UTMIM.

The list of 32 medicines included on the precoded forms has been adopted as the list of medicines to be monitored in MOH health care establishments. The most recent monitoring project (March-April) used this basic list.

2.2.2 Obstacles to Maintaining/Extending Beneficial Results

Now that the updated version of the Cuadro Basico and first edition of the Therapeutic Formulary have been developed, they must be used. Health facilities should adhere to the level of use designations and not acquire drugs not included in the Formulary or Cuadro Basico. Further refinement of the basic drug list is necessary to delete drugs of less importance and to add new products with significant advantages. In addition, the process of standardizing the Cuadro Basico needs to be continued, especially with respect to the presentation, concentration, and measurement unit parameters. These changes are required to take full advantage of the computerized MIS under development.

Ministry personnel need to be more aware of the fact that both the Cuadro Basico and Therapeutic Formulary should be reviewed and revised at regular intervals. At present, there may be too great of a tendency to treat these products as "the final word", when both are dependent on changing environmental variables, including, importantly, the morbidity and epidemiological profiles of El Salvador.

Effective integration of the planning, epidemiology, and logistics service departments with the management information system is a prerequisite

The extension of the precoded prescriptions study is threatened by the withdrawal of technical assistance. The UTMIM may not be able to provide the required central supervision and coordination of this program because of personnel shortages, a high work load (particularly as the DQC lab comes on line), and the lack of funds to cover travel and other expenses to the region and the establishments participating in the study

In addition, there are potential problems in the capture and analysis of the valuable data to be produced by this study. The five health care establishments are expected to produce 4000 to 5000 prescriptions every month. Each of these must be reviewed and entered into the computer, and these entries must then be validated before any analysis takes place. Neither the UTMIM nor the regional computer personnel have experience in handling this volume of information by computer, and they will require support from the MOH Information Unit. Additional technical assistance -- and perhaps even an additional microcomputer -- will be required under APSISA to permit this study to proceed effectively.

Ultimately, the efforts to improve prescribing practices by medical personnel requires the cooperation of those persons. An improved basic drug list and therapeutic guidelines are of no value whatsoever if they are not used, and most of the required changes in behaviors to take full advantage of these tools are being asked of the doctors and nurses actually providing basic services. And many of the changes being asked of them may also be interpreted as threatening.

Failure to obtain cooperation at the front lines of the MOH health care system through a well-planned communications program on the objectives of the UTMIM could greatly threaten or limit the changes wrought under the VISISA project

2.2.3 Recommended Future Activities

Effective use of the Cuadro Basico and Therapeutic Formulary requires an extensive training, public relations, and implementation effort at the local, regional, and national levels. This training should cover not just how to use these documents, but also how and when to change them. The Cuadro Basico, for example, was a response to the built-in organizational tendency over time to add names to the basic drug list much more readily than they are deleted. If it is to serve its fundamental purpose -- focusing attention on basic, morbidity-based medical requirements, the Cuadro Basico must be kept "lean" and additions to the list scrutinized carefully. On the other hand, the drugs included in the Cuadro Basico must be responsive to changing morbidity patterns. Arguably, the present Cuadro Basico can be fur-

ther reduced, and efforts should be made to determine whether an even smaller basic drugs list would serve the needs of the MOH even better.

Similarly, criteria and procedures for making revisions in the Therapeutic Formulary that have already been developed and reviewed by the Therapeutic Committee must be institutionalized. While the format of the Formulary (in a loose-leaf binder) makes the physical process of changing that document quite simple, such changes should not be taken lightly. Standards need to be implemented in this area.

Precoded prescriptions appear to be a promising mechanism for easing doctors' and nurses' workloads, standardizing treatment practices, and improving the overall capability of the MOH to estimate drug needs in conjunction with morbidity and epidemiological data. A revised form, drawing on the lessons learned in the pilot studies, should be developed and tested at all levels of the health care system.

2.3 Procurement Programs and Policies

Further assistance was provided the MOH in answering the questions of what to buy and how to go about buying it. This is perhaps the most complicated phase of the overall logistics cycle, involving the formal and informal participation of numerous groups within and without of the Ministry

2.3.1 Accomplishments Under VISISA

As mentioned above, the actual procurement program for the MOH in 1987 received substantial support from VISISA project personnel, just as it had during the development of the purchase program for 1986. Estimates of inventory levels and purchases in transit were combined with historic annual consumption figures to estimate drug requirements for 1987.

The Drug Advisor assisted the Director of the UTMIM in adjusting these implied requirements based on pharmacologic and epidemiologic considerations and provide a proposed allocation of these revised needs between the Ministry and AID. (Report 12) Subsequent analyses revealed some inconsistencies and policy differences that needed to be resolved between AID and the Ministry before the final program was adopted in April of 1987

A manual describing appropriate procurement policies and procedures for the Ministry was developed (Report 13) To assist in soliciting and evaluating offers, a suppliers registry was established, together with a set of rules and regulations governing suppliers (Report 14) A model format for licitations of medical supplies was presented, and an actual solicitation of offers for medicines was developed (Report 15.) Finally, a document describing general conditions and criteria for public solicitations and suppliers was also developed for the Ministry (Report 16.)

2.3.2 Obstacles to Maintaining/Extending Beneficial Results

One major problem in implementing improved procurement policies is the Ministry's present fiscal condition and the resulting vulnerability of funds budgeted for purchase of medicines. Purchasing programs must be backed up by the money to pay for them in order to assure that the quality of the supplier pool willing to bid on Ministry purchase contract offers is not diminished. Without establishing a stable, predictable, and, hopefully, growing budgetary base for purchase of medicines, the Ministry cannot hope to encourage investment and development in the local pharmaceutical industry which could, over the long run, substantially reduce the cost of basic medications

The lack of clear purchasing priorities adds to the problem of budgetary limitations. To improve the acquisitions system, MOH and AID officials responsible for their respective purchasing programs need to establish clear agreements on objectives, constraints, and contingency plans. The process continues to be more reactive than proactive on both sides, with concomitant delays and inconsistencies.

The Providers Registry could prove to be a very controversial issue, depending on how the MOH chooses to institutionalize this information. The registry could be a valuable management tool if it incorporates performance-based measures, enabling MOH planners to trade off price and quality of service considerations in making purchasing decisions, for example. However, considerable debate about just what these performance measures should be, and who has access to them, can be expected.

2 3 3 Recommended Future Activities

Consensus-building over the operating parameters which should govern the MOH acquisitions process must continue. At present, the acquisitions process is largely geared to a one-year cycle, a result of the overall MOH/GOES budgetary cycle and the fiscal/organizational pressures to "use it or lose it". Efforts must be made to effectively integrate the acquisitions process into the computerized MIS so that acquisitions can be viewed as more of a continuous process, responsive to service requirements rather than budgetary cycles. Additionally, the development of pharmaceutical requirements estimates should begin to be based more on morbidity statistics. At the same time, efforts should be directed at improving MOH fiscal management policies so that funds budgeted for purchase of medicines are afforded a measure of protection not currently available.

2.4 Drug Quality Control

Substantial progress was made in establishing quality control procedures for the Ministry, but the effort to implement these procedures was set back severely by the earthquake. The DQC lab, technically an appendage of the UTMIM, will have a significant position in the acquisitions process, ruling on the initial acceptability of drugs from suppliers under contract to the MOH. In addition, it will also check quality control rejections made by the regions and, eventually, provide spot-checks of the quality of medicines stored in MOH facilities. However, the DQC lab does not yet have a functional home, and further progress in this area is accordingly restricted until that situation is corrected. Current plans are to place the DQC lab in space adjacent to the central warehouse at El Matazano.

2.4.1 Accomplishments Under VISISA

Many procedural changes were accepted in principle by the Ministry that should lead to an improvement in its overall quality control capabilities. Following the routine practice of the MOH, attention was directed at major acquisitions programs, and a two-stage quality control program was developed. The first stage essentially serves as a screen for rejecting obviously suspect drug shipments before they ever formally enter the MOH supply system (Report 17), the second stage applies scientific sampling and testing methodologies to those drugs which passed the original entry tests. (Report 18)

In addition to specific sampling and testing procedures, recommendations were provided for the physical layout and equipment and personnel requirements for the drug quality control lab, before and after the earthquake. (Report 19.) A DQC manual elaborating procedures and policies for the operation of the laboratory was developed (Report 20), and another manual detailing standardized generic testing procedures based on international practice was also provided (Report 21) Detailed procedures for a subset of the most important drugs included in the Cuadro Basico were developed for use by the Ministry (Report 22)

2.4.2 Obstacles to Maintaining/Extending Beneficial Results

As a result of the earthquake, the DQC laboratory could not be constructed at the site originally designated, and it became necessary to locate a new location for the laboratory. During the month of December 1986, AID and the MOH -- without consulting the technical assistance team -- decided to relocate the DQC laboratory to one of the warehouses in the El Matazano complex.

Unfortunately, in the opinion of the technical assistance team, this decision is less than adequate. The designated site in the warehouse complex will be exposed to excessive amounts of dust and the vermin that habitually occupy storage areas. There is little room for expansion of the laboratory as its role and activity increase. In addition, ventilation and direct lighting problems are anticipated. Taken together or individually, these conditions make the selected site quite problematic, and it is recommended that this be considered a temporary solution and that the search for a permanent site for the DQC laboratory continue.

Problems may also be encountered with some of the electrical equipment destined for use by the laboratory. Because of the delays and changes resulting from the earthquake, much of this equipment has now spent more than a year in storage, and there is ample cause for concern about the state of electrical circuits.

2.4.3 Recommended Future Activities

Training activities are a prerequisite. As-yet-unidentified DQC personnel must be acquainted with the DQC policies and procedures that have already been developed, and they should be given the opportunity to modify and adapt these policies and procedures as the lab begins to function.

Development of testing procedures for drugs on the Cuadro Basico should continue. At present, just 18 medicines included in the Cuadro Basico have specific quality control procedures associated with them, but this number should increase rapidly once the lab is functioning. Since all AID procurements must meet U.S. Food and Drug Administration requirements, the Ministry should consider giving priority to development of quality control procedures for those drugs not normally acquired by AID.

Finally, although the DQC laboratory appears destined to be located at El Matazano, it must be recognized that this is a temporary solution. Technical assistance efforts under the APSISA Project should be directed at assuring that a more appropriate long-term location for the laboratory is located. It is basically impossible to conduct the required analyses in the environment of a warehouse

2.5 Malaria Control

VISISA project efforts in the area of malaria control included the provision of medicines, equipment, and insecticides, methodologies for the evaluation of program effects, and training programs for malaria personnel. The technical assistance advisor attacked this problem from several directions, seeking not only to improve the way in which malaria cases are detected and treated, but also to reduce the incidence rate through source reduction programs. Parallel training programs sought to institutionalize these capabilities within the MOH. Report 25 summarizes the results of these activities.

2.5.1 Accomplishments Under VISISA

CONTROL MEASURES: Two of the three planned cycles of residual intradomestic spray with Propoxur insecticide were carried out from March to November 1986 in areas where Anopheles albimanus still shows susceptibility to this insecticide. Each cycle was programmed to spray 33,343 houses in a 90 day period. First cycle results showed 32,179 houses sprayed, or 96.5% of the target figure. Results for the second cycle were less impressive; only 13,199 houses were sprayed, or 39.5% of the objective. The low coverage during the second cycle may have been the result of a defective shipment of insecticide, which also resulted in complete cancellation of the third cycle. Summary results for 1986 show a total of 47,674 houses sprayed, or just under half the goal. Three cycles have also been scheduled for 1987, each with the target of 33,035 houses. The first of these was initiated on March 23.

Spray operations at ultra low volume (ULV) utilizing a pyrethroid insecticide were done selectively during the rainy season, after the appearance of high vector densities within the highly malarious areas. Larvicide was applied to approximately 300 previously identified breeding places during the dry season in highly endemic areas. Additional as-needed larvicide applications were carried out under the supervision of the Malaria Department in coordination with other malaria control agencies. All applications were initiated upon the finding of an unacceptably high larval density in each of the sites, illustrating the value of the in-place monitoring program.

EPIDEMIOLOGICAL PARAMETERS The number of reported cases and specific malarionometric indices showed significant improvements in 1986. The absolute number of reported cases of malaria for the year was 23,953 -- a reduction of 46.2% over the preceding year. The annual parasite incidence rate was calculated to be 4.9 per 1000 persons -- the lowest rate reported in 24 years.

The index of positive blood samples was 13.1%, showing a decline of 40.7% over the preceding year. Analysis of the number of cases reported by species offers promising results, especially with P. falciparum. El Salvador traditionally has had one of the worst problems with this species of parasite among all Central American countries. During 1986, however, the incidence of malaria from P. falciparum continued the downward trend observed in 1985 and amounted to just 0.49 cases per 1000 inhabitants -- a very promising value. Similar decreases in the rate of malaria cases from P. vivax were also observed, and the proportion of cases from one species or the other exhibited little change from 1985.

Partly as a result of the beneficial results described above the total number of blood samples collected in the same period decreased by 9.3%, contrary to the programmed 10% increase. One possible explanation is that sample collection in the present program depends only upon passive case detection by the voluntary collaborators. Assuming the validity of significantly reduced malaria transmission levels in the country for 1986, and accepting the premise that the passive detection system is working appropriately, one could expect a decrease in sample collection.

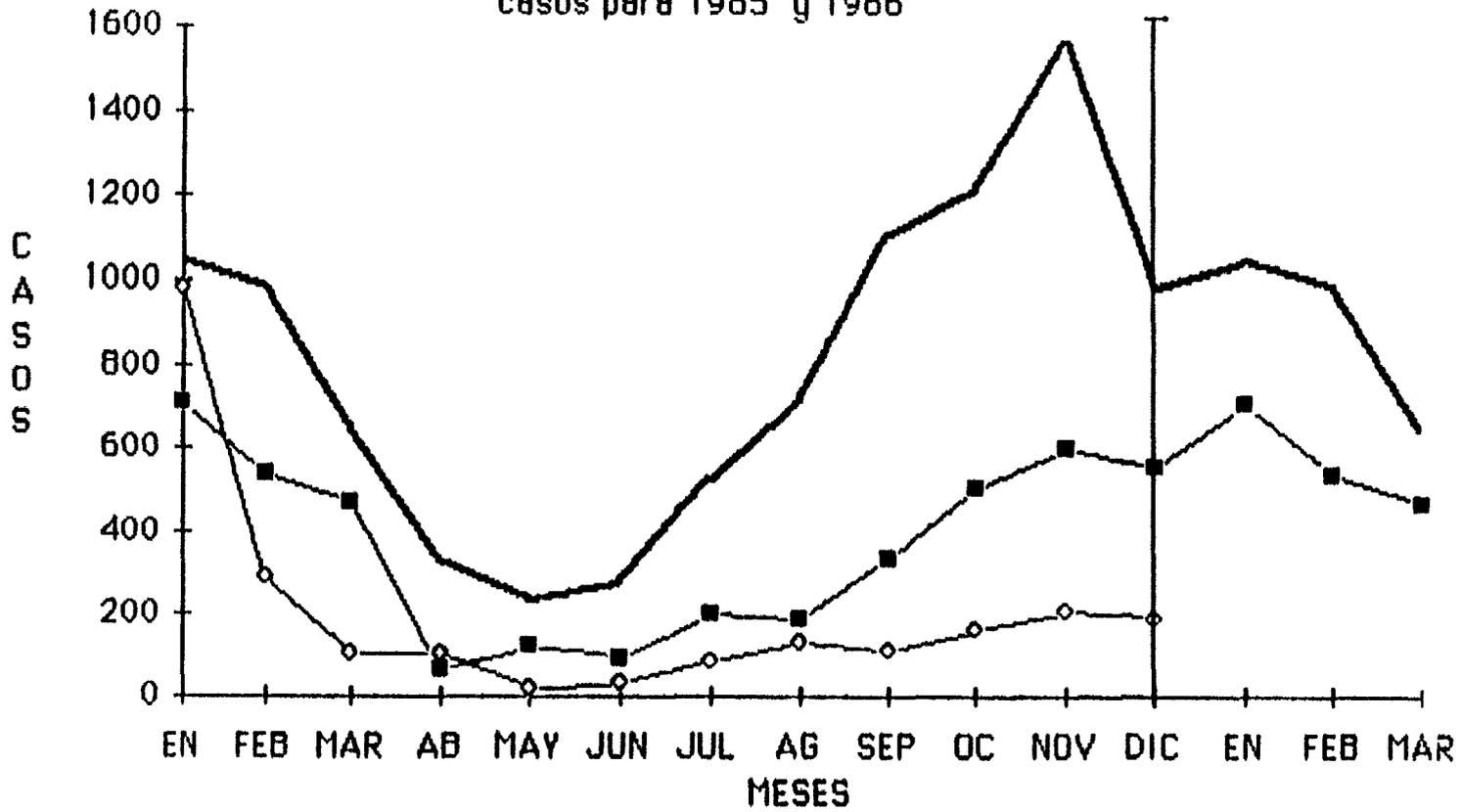
Nevertheless, plans have been made and put into action for 1987 to increase technical and administrative support for the voluntary collaborators with the objective of increasing the number of blood samples taken and analyzed. During the first two months of the year these efforts produced an increase of almost 20% over the same period in 1986, and this was accompanied by a 58.6% reduction in the number of reported cases during that period. The evidence available at this date, then, indicates that the malaria program continues to be effective and that no leveling off has yet begun.

Figures 1 and 2 reflect reported cases by month for each of the species and show their epidemiological behavior during 1985 and 1986. At the same time, the epidemiological curves for each species based on monthly averages for the period 1977-85 clearly demonstrate, in both cases, the ongoing decline in this illness.

Finally, Figure 3 shows, beginning with 1977, the profile of malaria in El Salvador reflected by the annual resurgence percentage. This presentation clearly shows the tendency for reductions beginning in 1981, after considerable resurgence in 1977-80. The 1986 levels are the lowest observed during this entire period.

TRAINING Two main courses were offered during the year, and periodic ad hoc training for small groups and organizations was provided. From May 12-23, Malaria Supervisors from all health regions (a total of 25 persons) received training in Vector Control, emphasizing insecticide safeguards, applications, and handling of spraying equipment. Teaching staff consisted of the VISISA consultant and a

Curva de P. falciparum por mes basado en promedios de 1977 a 1985 y curvas de numero de casos para 1985 y 1986

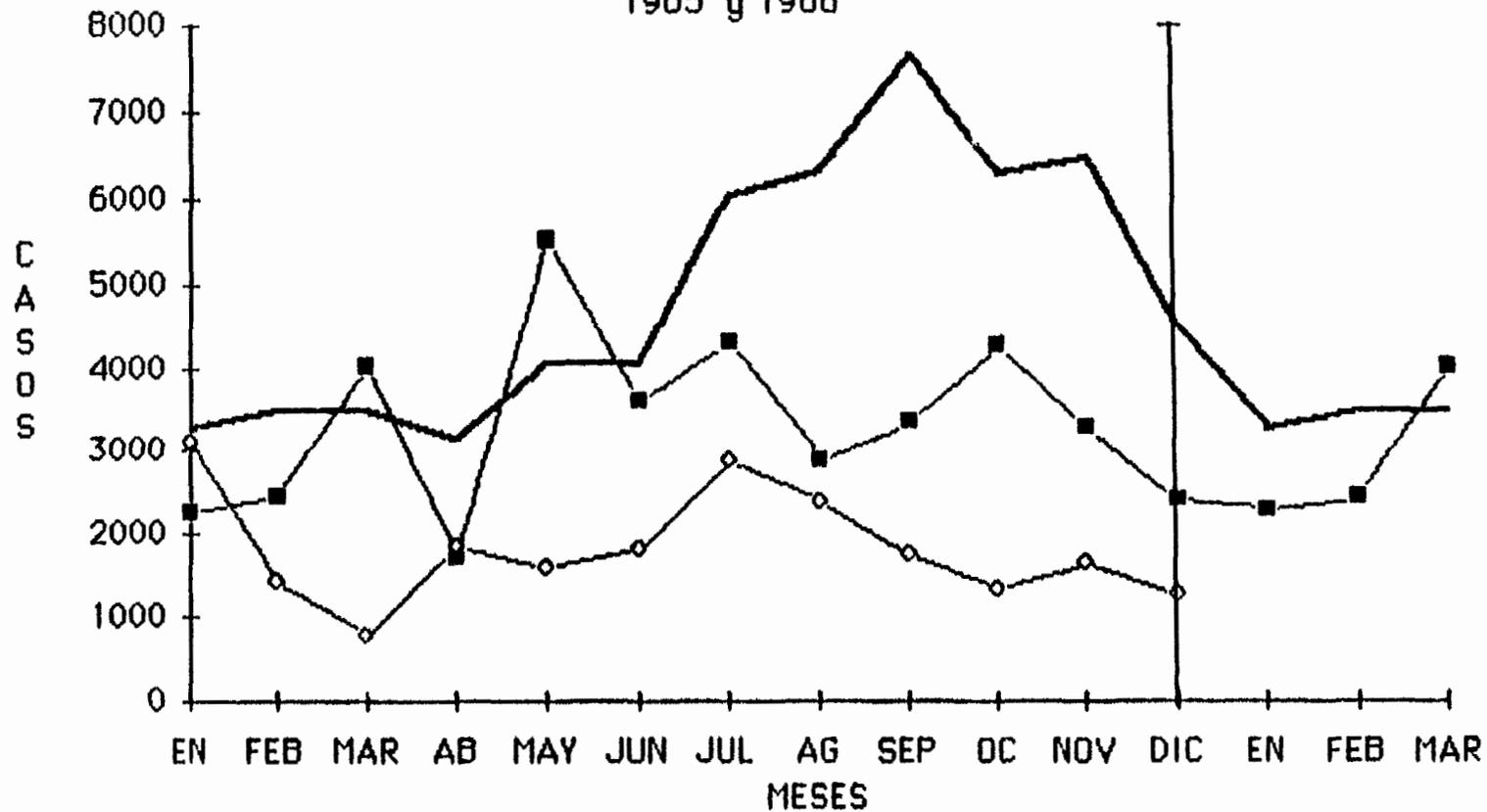


— PROMEDIO ■- 1985 -o- 1986

FUENTE Division de Malaria, Ministerio de Salud Publica, El Salvador

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Curva de *P. vivax* por mes basado en promedios de 1977 a 1985 y curvas de numero de casos para 1985 y 1986

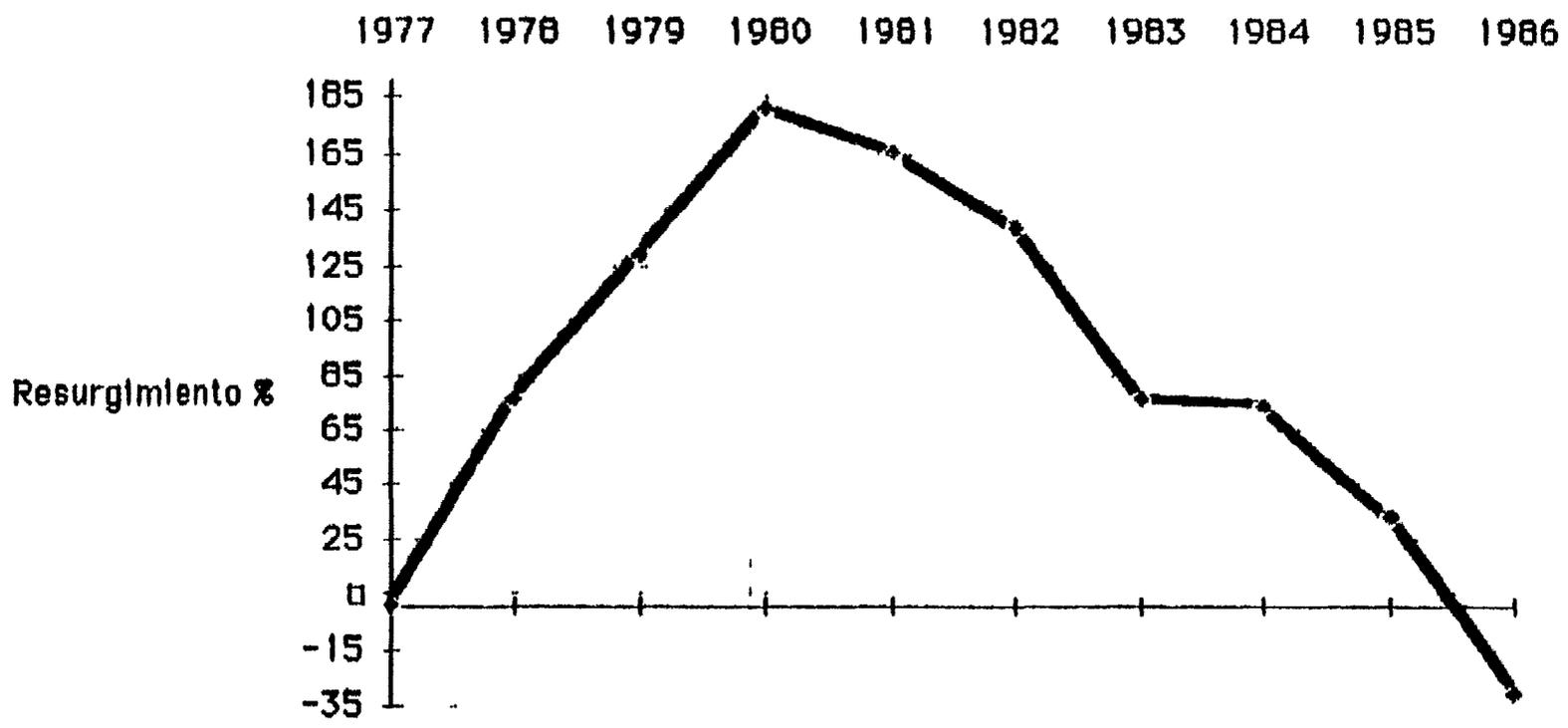


— PROMEDIO ■- 1985 ◊- 1986

FUENTE Division de Malaria, Ministerio de Salud Publica, El Salvador

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Evolucion de la Malaria basada en Porcentaje de Resurgimiento 1977 - 1986 El Salvador



Todos los años comparados con 1977

SOURCE. MOH'S MALARIA DIVISION

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group of three technical officers from PAHO. Two supervisors of the Vector Control group from Project HOPE also attended this course.

To increase participation in malaria control activities by general health services personnel, an epidemiology training course using the module teaching technique prepared by PAHO was offered from August 25 to 29. Among the 22 course attendants were representatives of all five health regions from all decision-making levels and a medical officer from the Comité Evangelico Salvadoreño de Ayuda y Desarrollo (CESAD) health services. Two PAHO epidemiologists and the project consultant served as monitors during the course. This type of training will continue at different health regional levels in the near future.

Two ad hoc training sessions were also provided for 25 CESAD health promoters concerned with malaria control activities. Emphasis was placed on developing small source reduction projects through community participation. A one-week refresher course was offered to a group of six malaria microscopists from the Western Region to correct some apparent misdiagnosis problems. Thirty Project HOPE nurses received instruction on the use and application of larvicide, and a similar program was conducted for CESAD's Voluntary Collaborators on anti-malaria drug distribution and blood sample collection.

During the extension period the DISA/Kraus Malaria Advisor also designed and conducted two three-day courses in microscopic diagnostic techniques. These courses were attended by all 40 microscope technicians in the malaria program.

COORDINATION WITH OTHER ORGANIZATIONS Significant efforts were devoted to establishing coordination mechanisms permitting active community participation with national and international organizations working in the country. As a result, the Malaria Department is now working in coordination with CONADES, Project HOPE, CESAD, and the USAID Displaced Persons Program directed at job generation. The type of coordination varies according to the nature of the programs from those institutions.

These are impressive achievements for the Malaria Department, since increased community participation will extend malaria control coverage. The contributions from USAID for job generation among displaced persons (Project 291) through Cajas de Credito provide an example. Two jobs projects were undertaken in La Union that are expected to provide permanent reductions in malaria vector breeding in that area. A combined reduction in transmission levels affecting approximately 6,500 residents is estimated for the two areas. Other smaller projects directed to clean, maintain, and drain water accumulations bring the total to approximately 20 projects carried out during the year involving community participation, external funding, and coordination with different organizations. To continue promoting additional coordination improvements, the Malaria Director

and VISISA consultant served as lecturers in a one-day seminar on malaria control in El Salvador for all institutions working with the displaced population

SOURCE REDUCTION PROJECTS Following the decision to increase efforts to attack the aquatic phase of the vector, the Division began to explore innovative engineering designs to interrupt the anopheline-favorable conditions found in estuaries and lagoons. The first such source reduction project (Ticuiziapa) was approved in July to be funded under PL-480. To date, all steps required to produce final plans for the bidding process have taken place. Initial disbursement was approved in December, and the MOH procurement office has accepted one of the four offers received from engineering firms. This firm initiated development of final plans during January 1987. Immediately after final plans become available, the bidding process for final construction will take place.

At the request of the Malaria Department, the Irrigation and Drainage Department of the Ministry of Agriculture prepared an engineering design proposal to drain approximately 100 hectares located in the Department of La Libertad. This proposal was reviewed by the project engineer and the VISISA consultant and found to be outstanding. The Malaria Division is seeking required funding but has not met with success to date. Finally, a prioritized list describing the nature and estimated costs of other source-reduction projects was elaborated. The major hope for these projects is that they may permit the long-range elimination or reduction in use of hazardous insecticides, with the additional advantage of temporary job generation. During the first quarter of 1987 a plan of action was developed for the use of \$600,000 in PL-480 funds, already approved, in the execution of a similar project elsewhere in the country.

OPERATIONAL RESEARCH: Entomological assessments to measure the impact of the Ticuiziapa source reduction project began during the rainy season and have continued. However, a supply of required entomology equipment and a protocol improvement are considered musts in order to reach objectives. AID/Washington funded resources will provide specific technical expertise to review and improve the entomological methodology, which could also include the monitoring of environmental changes. The Vector Biology and Control Project is expected to provide the resources for this effort.

In November of 1986 the Malaria Department initiated field testing of the insecticide Bendiocarb (Ficam W) in the Department of Sonsonate. This insecticide is considered to be an alternative to the currently used Propoxur, should the latter be prohibited. Preliminary results of these tests show a very weak residuality for the insecticide -- it does not last more than a month, a period similar to that observed for Propoxur. Nevertheless, Anofelinos appears to be very susceptible to Bendiocarb, mortality rates are in the area of 95-100%.

2 5 2 Obstacles to Maintaining/Extending Beneficial Results

The most important problems confronted during the reporting period were those related with insecticide (Propoxur) procurement and use. A 20,000kg shipment from Southern Mill Creek in June 1986 failed to meet specifications. Two days of spraying operations revealed that the insecticide would not mix well enough with water to pass through filters and nozzles, leading to complete clogging of the spray pumps. Subsequent quality control tests carried out in the United States confirmed that the product did not meet specifications, and the supplier was required to correct the formulation. However, since the product was urgently needed to initiate the already overdue second spraying cycle, AID approved an emergency local procurement of the same insecticide, but, despite these efforts, the delay was significant and only two of three scheduled spraying cycles were accomplished.

Other delays observed were related to the approval and subsequent release of GOES PL-480 Title I funds by the Secretaria Tecnica para el Financiamiento Externo (SETEFE) for the Ticuiziapa source reduction project. As a result, construction of the Ticuiziapa project, which had been programmed for 1986, will instead have to be carried out during first quarter of 1987. The funds approved under PL-480 for 1986 also included the feasibility study of another near-by estuary (San Diego), with the idea of providing additional 1987 PL-480 funds for completion of this project. However, due to delays in 1986 funding approval and the lack of liquidity of SETEFE, this project has been postponed once again.

2 5.3 Recommended Future Activities

Several steps should be taken in the near future to assure the long run continuity and continued success of the malaria control program. First, there is a need to develop an improved long range plan with the Ministry. Emphasis should be given to the identification, evaluation, and selection of sites for large scale source reduction programs. This approach holds the greatest promise for reducing use of insecticides in the future and the attendant threats to human life and the environment, many of which remain poorly understood. This plan should also stress the development of more consistent control activities in order to gradually abandon the present ad hoc type of program, and should provide for an increase in MOH field personnel associated with malaria program activities. The present staffing level, even with the substantial support of voluntary collaborators, is a severe limitation on program activities.

A baseline program should be undertaken to establish a permanent epidemiological surveillance system in regions that are prone to

malaria outbreaks. This system should be used as the basis for future decisionmaking concerning control activities and priorities. In conjunction with this system, improvements in current entomological assessment procedures are required to permit a more rational and realistic basis for malaria control resource allocation decisions.

Finally, there is a great need to overhaul program supervision and evaluation procedures. The kind of information generated by the epidemiological surveillance and entomological assessment systems recommended above is required before MDH managers can make reasoned, statistically and scientifically valid determinations about the effectiveness and desirability of different types of malaria control activities.

Section 3. Component II Public Health Infrastructure Maintenance

The technical assistance team also tackled a variety of operational problems in important MOH support systems, particularly in the areas of vehicle and biomedical equipment inventory control and maintenance

Practical and implementable preventive maintenance and standardization practices were developed and applied to different types of managerial decisions and questions. Numerous renovation projects affected the full scope of MOH health care delivery facilities, from warehouses to gas stations to facilities for housing sensitive computer equipment. Many of these activities required substantial coordination and cooperation with other members of the VISISA project team, as when the implementation of improved supply management techniques at warehouses was contingent on remodeling and restructuring of warehouse space.

3.1 Vehicle Management and Maintenance

Under the VISISA Project the technical assistance team directed its efforts at improving the MOH transport system through preventive maintenance, administrative changes, the strengthening of central and regional maintenance shops, physical redistribution of vehicles, training programs, preparation of manuals in Spanish, and the identification, with detailed specifications, of tools, spare parts, equipment, and other necessary items.

The Transport Advisor identified all required activities and prepared a workplan including desired products and the design and application of a methodology for routine preventive maintenance programs needed for the transport system. AID and the MOH approved this plan which, with small modifications, has been completely accomplished.

As a result of the useful technical assistance provided over a period of 29 months, the Transport Department and decision makers throughout the MOH can now utilize an automated system for administrative analysis which provides them with information never before available for making decisions and formulating policies. The value of this new system to the MOH has been so obvious that other Ministries throughout the Government of El Salvador are seriously considering its direct application. The MOH has established official procedures to assist these other institutions in this process.

3.1.1 Accomplishments Under VISISA

The VISISA project consultant developed, implemented, and evaluated the results of a kilometer-based preventive maintenance (PM) program for old and new vehicles in the MOH fleet (Report 23.) A quarterly confirmation/verification system was developed and implemented,

enabling decisionmakers to readily evaluate the performance of particular vehicles or particular MOH departments or facilities during a specified period (Report 24.)

The results of these evaluations indicate that the PM program has achieved great success in the Ministry: preventive maintenance was performed on 60% of the vehicles in 1985 and 76 4/ in 1986.

At the same time, an automated administrative accounting and control system (MASCI) was developed and applied to the entire MOH fleet. In September of 1986 a microcomputer was established in the Transport Department at El Matazano to provide for timely entry and analysis of field data. Transport supervisors are currently receiving a wide variety of information from this system that can be used in making decisions and in establishing administrative policies oriented at improving the use and reducing the operations costs of vehicles. The system provides information about:

- discarded vehicles, identifying the percentage, the vehicle, and its actual current location,
- costs, including operations costs, preventive and corrective maintenance costs, costs per kilometer, etc ,
- performance of vehicles by type, location, program, etc ; and
- vehicle inventories, reporting monthly information about changes in fleet size or distribution.

The system is also capable of representing this information graphically in addition to traditional reports. This feature is useful in training as well as in being able to "eyeball" important differences that may not be immediately apparent from large tables of numbers.

Analyses of data generated by the Management Administrative System with Control Indicators (MASCI) resulted in recommendations affecting the overall operation of the transport system, as well as identification of specific divisions of the MOH transport system in need of additional training/orientation sessions.

To reinforce the regional and central mechanical shops in terms of their ability to provide preventive and corrective maintenance, improvements were made to the physical installations in the Paracentral and Occidental Regions as well as the Central Shop at El Matazano. Specialized facilities were also constructed at El Matazano, including a gasoline/diesel station, shops for batteries, tire repair, carpentry, welding, and tools, and central administrative offices for the reception of vehicles.

To increase the productivity of MOH mechanics, tools were acquired and distributed in all areas of their work. Training and orientation were provided, and processes for continual monitoring and followup were put into place. To strengthen the vehicle fleet itself, old and deteriorated vehicles were identified and reviewed quarterly to determine if they could be economically operated or repaired. Repair procedures were closely monitored and their effectiveness determined. Vehicles which could not be economically operated or repaired were discharged following official MOH procedures. At present the Ministry has retired more than 100 vehicles using this program, and has replaced them with 93 vehicles donated by the United States through AID and with 29 vehicles donated by other countries.

The mobile and stationary radio communications systems of the MOH have been fortified by the provision of additional radios and base stations through VISISA. This system proved to be quite valuable in the weeks following the earthquake when normal telephonic communications were disrupted.

All of the activities and products included in the approved workplan have been described in great detail in the Quarterly Reports provided by the Transport Advisor to AID.

3.1.2 Obstacles to Maintaining/Extending Beneficial Results

The principal remaining barriers to effective operation of the MOH Transport Department derive from policies and practices that are external to that Department, such as:

- The purchase and availability of spare parts for vehicle maintenance is dependent on the Proveeduría of the MOH, and this is a slow and obsolete process given the current economic situation of the country. The lags in the acquisitions process are such that originally quoted prices from suppliers may no longer hold by the time approvals are obtained and a check is cut.
- It is more practical to make purchases of spare parts through petty cash funds. However, the present limit of \$100 per item purchased from these funds restricts its applicability.
- The scarce human resources and the current policies of the MOH for filling vacancies are reducing morale and productivity of the personnel.

3.2 Biomedical Equipment Management and Maintenance

Activities under the VISISA Project in the area of biomedical equipment were largely defined by a plan of action developed in conjunction with the Ministry and approved in December of 1985. This plan established nine major areas of activity for the technical assistance team, desired outputs of each area, and anticipated schedules for each. With minor modifications, it served as the basis and framework for technical assistance efforts under VISISA.

3.2.1 Accomplishments Under VISISA

An inventory system for biomedical equipment has been designed and partially implemented. The original objective was to collect inventory information in 88 selected health facilities of the country, but in August it was decided to concentrate on the Oriental Region and complete the inventory in the 98 health facilities of that region. This effort was completed in December 1986. (Report 25.) This information has been entered into the computerized inventory system at the central MOH headquarters.

An evaluation of the inventory implementation process was carried out in January 1987 and the suggested changes were adopted. During the first four months of 1987 the inventory system was extended to the Central and Metropolitan Regions, and all health care facilities were visited to collect information on the type and condition of biomedical equipment.

Preventive maintenance programs for key biomedical equipment at different levels of the health system were started and are currently in operation. These programs focus on six principal types of equipment directly supplied under VISISA: suction apparatus, centrifuges, microscopes, incubators, X-ray film processors, and anesthesia machines. Due to lack of personnel and spare parts, the preventive maintenance programs were concentrated in the Oriental, Metropolitan, and Central Health Regions, in which preventive maintenance routines for these six types of equipment were established in a total of 65 health care facilities. (Report 26.)

An evaluation of the preventive maintenance programs initiated in 1986 was carried out in January 1987, and changes or adjustments for their improvement were implemented. During the extension period, quarterly routines were accomplished in four types of equipment for 61 health care facilities in the Oriental, Central, and Metropolitan Regions. A preventive maintenance program for vaccine refrigerators was established in the same regions and covers 110 pieces of equipment in 106 establishments.

Significant amounts of training were provided in the operation and maintenance of diagnostic and testing equipment, following a program

approved by the Ministry in June 1986 (Report 27) Under this program, seven courses were provided for training of 112 technicians at the central, regional, and local levels In addition, on-the-job training was imparted to operators of other specialized equipment in the Oriental Region, and a procedure to select trainees was approved.

The MOH maintenance human resources census was updated and a training plan for maintenance technicians and operators was formulated and presented to the MOH for approval Under that plan, on-the-job training was provided for operators of sterilizers, incubators, anesthesia machines, and X-ray film processors included in the preventive maintenance programs

Assistance was also provided the MOH in developing a program and policies for maintenance administration. (Report 28) This program is being implemented in the Central Maintenance Department at San Esteban, and in the Biomedical Equipment Maintenance Shop of the Oriental Region In conjunction with these efforts, a system of maintenance indicators was also put into effect in these locations to measure progress and identify problems needing attention (Report 29)

Evaluations of the administrative control system implementation in San Esteban and the biomedical regional shop in San Miguel were carried out and a portion of the resulting recommendations were implemented. Tables for 1986 and indicators of maintenance performance for both locations were developed This entire system was also transferred to the San Miguel Hospital and a report on the results of this implementation was prepared Job descriptions were also developed for key personnel at the Central Maintenance Department

VISISA and Ministry personnel collaborated in the development of semiannual plans for the installation of new and donated biomedical equipment, determining the final distribution of this equipment on a priority needs basis A specific study of the location and state of equipment acquired under the VISISA project was also completed Throughout the project, assistance was provided in the installation of important biomedical and support equipment, including laser ray photocoagulators, water pumps, X-ray machines, and emergency power plants that are now in their final phase of installation To further facilitate and rationalize operations and maintenance work, a total of 36 operating and service manuals were translated from English to Spanish, and a procedure for distributing these manuals to final users was established (Report 30.)

During the extension period an evaluation of the status of equipment that had arrived in 1986 but was pending installation took place This served as the basis for an action plan calling for staged installation of this equipment and identifying persons responsible at each stage

Special attention and emphasis was given to the establishment of decentralized biomedical equipment maintenance shops Although this

initiative suffered from the Ministry's inability to create the estimated 30 new technical, support, and managerial positions required to fully staff these shops, progress has been made in constructing the regional shop at San Miguel in the Oriental Region and, in October 1986, the shop began operating using existing personnel. Detailed job descriptions and estimates of personnel requirements have been developed to assist the MOH to continue the development of these regional maintenance shops, considered vital to preserving its ability to extend maintenance coverage in El Salvador (Report 31)

In addition, VISISA personnel have participated continuously in the preparation of lists of tools, shop equipment, spare parts, and biomedical equipment which must be obtained outside the country. Related to this effort, a study was undertaken of the equipment and facilities damaged in the Metropolitan Health Region as a result of the earthquake in October, and a reconstruction study for the Central Maintenance Department (San Esteban) was also developed (Reports 32 and 33)

3.2 2 Obstacles to Maintaining/Extending Beneficial Results

The MOH persists in treating maintenance of biomedical equipment as an institutionally separate function, independent of the important functions of maintenance of physical plant and support equipment. This compartmentalization not only reduces the potential for cost savings in the provision of consolidated maintenance services but, through lack of coordination, actually may tend to increase the maintenance problem in certain areas -- for example, when support equipment used to provide electricity or steam to basic biomedical equipment is allowed to deteriorate.

Critical shortages of trained maintenance personnel continue to plague the MOH and impede the development of regional maintenance shops. Moreover, few private sector maintenance firms have expressed interest or willingness to provide these services on a contractual basis. Although the MOH has made efforts to obtain new positions for these functions, it will be necessary to provide more technical assistance in this area through, for example, studies of the possibility of relocating existing MOH personnel and/or reclassifying currently vacant positions. Training, selection, and contracting processes must continue to improve if MOH is eventually to obtain the kind of qualified and stable maintenance workforce required for effective and efficient delivery of basic health care services.

Other resource limitations also inhibit performance of the MOH in this area. Shortages of vehicles, drivers, and fuel restrict the ability of centrally located maintenance technicians to perform basic preventive maintenance routines, take physical inventories of equipment and spare parts, and provide other services that require trips to remote health care facilities. As in the preceding section,

current MOH procurement policies and practices, particularly for spare parts that must be purchased abroad, create uncertainties and delays in the process that impede performance of timely maintenance programs.

The fact that only two months of technical assistance was authorized for the Biomedical Equipment Advisor during the extension period in 1987 limited improvements that could have been made by extending previous successes to other organizational units of the MOH. Restrictions on funds also led to cancellation of some training efforts and prohibited translation of additional manuals from English to Spanish. Both of these activities had been scheduled for the period January-April 1987.

3.2.3 Recommended Future Activities

Financial and technical assistance to the Ministry in each of the areas described above should continue if the improvements obtained under VISISA are not to evaporate. Budgetary and technical assistance for the related areas of physical plant and equipment maintenance must be included. Continued emphasis on the development of regional shops is required, as this appears to be the most promising, practical, and cost-effective means for biomedical equipment maintenance in health posts and units. At the same time, studies of how to strengthen or reinforce local maintenance services are required, particularly for the regional hospitals of Santa Ana and San Miguel, and for Hospitals Bloom, Rosales, Maternidad, Psiquiatrico, and Neumologico, where the great majority of the more complex and costly biomedical equipment is located.

The severe problem of understaffing should continue to receive considerable attention. Direct lobbying efforts should be supplemented by efforts to relocate personnel and redefine vacant positions, intensified technical training, and the development of seminars for middle- and higher-level managers within MOH to improve their understanding of the role and resource requirements of the maintenance function of the Ministry. Ongoing development of the computerized inventory system will enhance the quality of information available to decisionmakers, but this must be accompanied by efforts to streamline the spare parts acquisition process.

The collection and interpretation of technical information must be kept up, including information about appropriate operation and maintenance procedures, markets for spare parts and equipment, and management indicators designed to signal the need for repair or preventive maintenance activities.

3.3 Facilities Construction and Renovation

The physical infrastructure of the MOH saw substantial additions and upgrading during the VISISA Project. In addition to direct funding of construction and remodeling programs, VISISA personnel directly supervised these many individual projects. The technical advisor provided in this area by DISA/Kraus worked permanently under the direction of the personal of the Human Resources and Humanitarian Assistance Division of AID El Salvador.

3.3.1 Accomplishments Under VISISA

The decision to expand the role and capacity of the central MOH warehouse at El Matazano required significant efforts in upgrading and increasing the capacity of those facilities. A central warehouse for medications was constructed, consisting of two floors of 1260 m² each. Appropriate air extraction and double-hoist material handling systems were also installed. A cold room was designed and installed, and the area served by air-conditioning was expanded to better safeguard temperature-sensitive drugs. Finally, a gasoline station with a capacity of 6000 gallons of gasoline and 6000 gallons of diesel was constructed, and printing equipment was installed in existing areas of the El Matazano administrative complex.

Twelve X-ray and/or fluoroscopy/radiology equipment units were procured with VISISA project funds, and technical assistance was provided in the preparation and remodeling of hospital space to accept this equipment. This work entailed construction of the supporting metal structure, foundations, electric system, lead paneling, dark rooms, drainage and illumination areas. These twelve installations were accomplished in eight separate hospitals of the MOH system: Rosales, Maternity, San Rafael, Santa Ana, Sonsonate, Zacatecoluca, Usulután, and San Vicente. In addition, a total of nine boiler systems were purchased and installed in the Rosales, Sonsonate, San Vicente, and Santa Ana hospitals, and at the Cojutepeque Health Center.

Six emergency power supply units of varying capacity were installed: 344-KVA units in the Rosales, Chalatenango, and Zacatecoluca Hospitals, and 169-KVA units in the San Francisco Gotera, Santa Rosa de Lima, and Ciudad Barrios Health Centers. Electric water pumps were installed in 64 health centers, units, and posts throughout the country, distributed as follows:

Oriental Region*	31
Paracentral Region	16
Central Region.	4
Occidental Region*	13

To support the efforts in logistics and supply management, warehouse remodeling was also accomplished in the Occidental, Paracentral, and Central Health Regions. These efforts included repair and replacement of ceilings, improved illumination and ventilation, painting, and the installation of new floors. In these same three regions, similar temporary remodeling efforts were made to house regional biomedical maintenance shops.

Finally, a complete remodeling of the space to be used by the UTMIM and the MOH Computer Center was accomplished, and designs were elaborated for eventual construction and layout of the Drug Quality Control lab at El Matazano.

3 3.2 Obstacles to Maintaining/Extending Beneficial Results

The major difficulties encountered by the VISISA project team in this area have been of an organizational/administrative rather than technical nature. Specifically, procedures employed by MOH from elaboration of initial designs and plans, to internal approval, to the request for bids from contractors are exceptionally slow. Many of these lags can apparently be traced to the lack of human resources and work programming methodologies at the Health Engineering Department.

The involvement of numerous external and internal parties in the subsequent bidding and service procurement processes (Proveduria, Legal Department, MOH Auditing Office, SETEFE, National Court of Accounts, etc.) also contributes to substantial delays and, quite likely, overall cost increases. Delays of as much as six months in a construction project expected to require only one month have been observed, and the need to renegotiate originally stipulated contract prices creates additional problems.

3 3 3 Recommended Future Activities

Future efforts in the area of refurbishing the MOH physical infrastructure using external financing would benefit from attempts to obtain prior agreement with the GOES streamlining the complete bidding process to be followed in utilizing these funds, from initial design to final execution and supervision of construction activities. To assure that the full value of these funds is received, the formulation and execution of fixed asset preventive maintenance programs is highly desirable.

Section 4: Component III Management Information System

In its most general sense, an information system is a set of organized and coordinated procedures that, when executed, provides information to support decision making and control in an organization. The term embraces much more than the particular structured means selected to collect, store, and process this information, and includes, for example, policy decisions about what basic data to collect, at what intervals, reporting formats and requirements, and many other related topics.

The entire MOH management information system (MIS) received substantial attention under VISISA and continues to be developed. Many of these efforts have been described in previous sections of this report: improved data collection and recordkeeping protocols, production of different kinds of routine and nonroutine data of interest to managers, standardization to control the quality of important inputs (especially informational inputs) and facilitate aggregation of data, and so on. This section, on the other hand, emphasizes the fundamental restructuring and redirection of the MIS that have taken place under VISISA, changes that have been directed both at the objectives of the MOH MIS and the means for attaining those objectives. While much work remains to be done, significant advances have been made in developing user-sensitive software and installing hardware in MOH facilities.

4.1 Development of Hardware and Software Support Systems

The VISISA Project provided for a multi-stage development of hardware and software decision support systems for the Ministry. Phase I, calling for installation of a centrally located minicomputer with an array of hard-wired and remote, dummy and intelligent microcomputer terminals, is largely completed. Associated prepackaged and special purpose software development and installation has kept pace with the hardware implementation, and the MOH is presently positioned to reap large benefits from its improved ability to monitor and control the movement of supplies in the MOH system. Nevertheless, several potentially significant obstacles remain.

The arrival of the Supply Administration/Systems Analysis Advisor in September of 1986 introduced a significant change in direction to the development of the computerized MIS. Previously, technical assistance in the different substantive areas (acquisitions, quality control, pharmacology, logistics, transport, etc.) had been provided somewhat independently from MIS development, and the advisors themselves were not coordinating efforts substantially. The Systems Analysis Advisor brought about a greater integration of the technical assistance team by illustrating the interdependency of their activities, simultaneously promoting an improved appreciation of the potential value of an integrated MIS in the future.

4 1.1 Accomplishments Under VISISA

Through detailed review of MOH documents, unobtrusive observation of extant supply management practices, and interviews and daily interaction with Ministry personnel, VISISA advisors developed a perspective on the strengths and weaknesses of this aspect of MOH operations early in 1986. This resulted in the preparation of a position paper recommending the automation of many aspects of this process and the outright elimination of many others. The data and accounting forms offered in this report mirrored historic practice at the Ministry, insofar as that was consistent with recommendations for changes in the content and format of information retained in the MIS. In addition, Project personnel provided a proposed functional flow-chart for the overall supply management subsystem of the MOH MIS in this document (Report 34) Several elements of this subsystem have been developed under VISISA, as described later in this section.

In collaboration with PAHO/WHO and MOH personnel, DISA/Kraus Advisors helped elaborate guidelines for the long-range development of the management information system in August of 1986. These guidelines spoke to the conceptual basis of the MIS, the organizational location and structure of the Information Unit, and the functions of different MOH personnel within that Unit. Among the components of the plan of action detailed in this document were an organizational elevation of the Information Unit and the provision for higher salaries for MOH computer personnel, both of these recommendations seeking to promote higher retention rates for MOH MIS personnel. The suggested composition and responsibilities of the MOH MIS Users Committee were also detailed in this document. (Report 35.)

The DISA/Kraus team also developed a recommended "turn-key" hardware configuration for the MOH which provided for a centrally located Wang VS65 minicomputer and a network of hard-wired and remote microcomputers and work stations (Report 36) The VISISA Project funded the acquisition of these computers and associated peripheral equipment and spare parts, and this hardware has been installed and tested in MOH facilities

At the central level, programs have been developed and/or installed for morbidity statistics, general inventory, and personnel subsystems, and these have been tested with limited data. A four-week theoretical course in Cobol programming techniques was provided for 14 MOH employees, and Ministry personnel have also received instruction in the transmission of data between the minicomputer and microcomputers.

The central MOH warehouse at El Matazano and three of the MOH health regions have received microcomputers and the software required to control inventories of medicines and medical supplies. The transport inventory and operations control system developed by the VISISA team

has also been implemented at El Matazano, and Ministry employees have received instruction in the use of all these systems. Among other things, the computerized vehicle inventory and maintenance system is currently being used by MOH managers to enhance reporting and accounting systems associated with fuel usage and allocations. Future plans include extension of this control system to other important transport inputs, and consideration is also being given to transferring the system to other GOES agencies.

Delivery of microcomputers to the Central, Paracentral, and Metropolitan Regions was delayed by equipment failures and the local unavailability of spare parts, but was accomplished in April 1987.

Based on earlier analysis and conversations with Ministry planners, managers, and operations personnel, specific recommendations concerning the MOH logistics cycle and its representation in the MIS began to emerge in September and October of 1986. A preliminary issues paper was circulated among involved MOH and AID personnel, treating principal aspects of the supply management process and suggesting MIS features and reports designed to stimulate efficient distribution and use of medical resources and encourage the decentralization process. (Report 37.) The earthquake in October interrupted further development of this report.

The MOH Users Committee is a crucial element for productive use of the MIS. For a number of reasons, very little internal pressures developed to constitute and legitimate this Committee after the guidelines described above were officially accepted by the Ministry in August of 1986. In late November and early December the DISA/Kraus MIS Coordinator developed a set of formal recommendations for consideration by the Users Committee when it formally convened. These recommendations broke first ground in many important technical and policy areas: standardized vocabulary, direction and administration, system security and maintenance, monitoring and evaluation, and training programs for personnel of the computer center and other major user groups. (Report 38.)

Given the significance of the role to be played by the UTMIM, VISISA Project personnel participated directly in the long and arduous process of developing an internal MOH document formally establishing functions, duties, and staffing levels for the Unidad. Throughout the VISISA Project, the Director of the UTMIM relied heavily on DISA/Kraus MIS personnel and resources for analytic support, notably in the development of the 1986 and 1987 medicines and medical supplies purchasing programs, and in the control and distribution of emergency donations following the earthquake in October.

To summarize, the extension period ending in April of 1987 brought the following additional capabilities and advances to the MOH:

- installation of equipment and supporting software in administrative offices or warehouses in two of the Regions not so equipped by the end of 1986 (at the time of this report the remaining two Regions had allocated space for the microcomputers, but actual installation has been postponed to APSISA at the request of MOH),
- development of recommendations for automated and administrative mechanisms to handle uncoded medicines that are introduced into the MOH supply system,
- further integration of the MIS with the distribution system, including the inclusion of an automated system for tracking distribution to special programs (e g., Project HOPE) and establishments not previously coded (e g , mobile clinics),
- installation and hard-wiring of personal computers and workstations in the UTMIM, Biostatistics, and Epidemiology,
- processing of information and production of summary reports of the effectiveness of the three mass vaccination campaigns,
- review and updating of key databases developed under VISISA, including the databases of all coded medicines (a super-set of the Cuadro Basico, MOH facility locations, and local drug and medical supply providers,
- transfer of DISA/Kraus developed software for the purchasing program to the UTMIM, and training of the newly-hired UTMIM programmer in its use and modification,
- development and transfer of generic programs to capture information generated by the precoded prescriptions study to be initiated in the Western Region during May of 1987, and
- relocation of segments of the Central MOH computer hardware to its new location in the building required by structural damage suffered during the earthquake.

4.1 2 Obstacles to Maintaining/Extending Beneficial Results

The continuing military conflict directly and indirectly creates enormous problems for health care planners and technical assistance teams in El Salvador. For MIS analysts and system designers, the problem may be superficially less significant, but it is certainly no less complex. Facilities close at random intervals, or they cannot be used, supplied, or monitored because of paros, often for extended periods of time

Throughout the Project, technical MIS development suffered from discontinuities and organizational impediments of several varieties. Administrative changes in the DISA/Kraus MIS team that followed the earthquake brought with them the usual transitional difficulties, all the more difficult to resolve in those circumstances due to the redirected attention and priorities of MOH counterparts. Unanticipated departures stemming from personal decisions following the earthquake subsequently led to technical and administrative problems. Ultimately, the earthquake resulted in the departure of the Chief of Party and the MIS Advisor, both of whom had been with the Project for extended periods and had played integral roles in the selection of the hardware configuration and early software design and acquisitions. More immediate and tangible, the sudden press of business for the DISA/Kraus MIS group in accounting for donated medicines, estimating emergency requirements, and tracking the distribution of these donations also created temporary obstacles for the MOH MIS development effort.

Numerous and substantial difficulties for MIS development stemmed from within the MOH itself. Space allocation within the Central Headquarters became a severe stumbling block. The Ministry only recently decided on a permanent location for the UTMIM, and it was impossible to install the computer equipment assigned to that unit until remodeling and rewiring were completed in April 1987. In addition, a qualified programmer willing to accept the salary that could be offered by the Director of the UTMIM was only identified in late March. The Biostatistics Department is geographically separate from the main MOH building, and coaxial cables linking this crucial unit to the minicomputer have only recently been installed.

The problems of salary levels and the retention of personnel can be expected to cause difficulty for the Ministry. Higher salaries available for computer-trained personnel in the Salvadoran private sector create the realistic possibility of high turnover rates, with the Ministry serving as a training center for individuals who then capitalize on their improved skills levels elsewhere. Current MOH budgetary restrictions make this a very troublesome possibility, notwithstanding the higher salary levels already approved and in effect for MOH computer personnel.

On the logistics side, acquisition of hardware, peripherals, and spare parts for the MIS is difficult in El Salvador, and shipments from the United States have been subject to extended delays in the Salvadoran customs office. While efforts have been made to streamline and expedite this function, continued import restrictions and other legal issues can be expected to cause this problem to persist.

Reductions in the amount of hardware acquired under VISISA, delays in its arrival, and subsequent mechanical failures made software development too much of an isolated, affair. In the DISA/Kraus office, software development was limited by the availability and

condition of machines, by power shortages, by administrative changes, by unscheduled and unanticipated requests for information from the MOH and AID, and by turnover in personnel. In the Ministry the same kinds of problems exist. In the field, previously unanticipated direct user requirements have been identified and must continue to be incorporated into the MOH system. However, the inability to stage delivery of these microcomputers to the regions created the need for concurrent training and support services in remote areas, and placed great demands on the human and technical resources available to the consulting team. Continued software development needs further exacerbate this problem. The response of the DISA/Kraus MIS group to these difficulties was to reorganize managerial and technical responsibilities within the group and to accelerate the training program for central MOH computer personnel, so that their services may be used in extending the MIS to the Regions. This process began to bear fruit in early April, when central personnel became more directly involved in the delivery of hardware and software and the training of Regional personnel in its use.

The original hardware configuration envisioned for the MOH was considerably more extensive than the configuration that was finally approved and is now installed. Primary responsibility for this reduction in scope rests with the Ministry itself, which quailed at the thought of the organizational impact and recurring costs of a system two to three times the scale of the present one. Although experience with the system and the dawning realization of the economic and time savings it can provide have diminished this reluctance, the large infusion of computer equipment envisioned for the coming long-term project can be expected to rekindle some of these doubts and apprehensions at the central level.

At a purely operational level, difficulties arise because of the unwillingness of experienced MOH field personnel to part with procedures that, in their view, have served them well for many years. In taking the computerized inventory at El Matazano, for example, several accommodations had to be made in designing the forms to be used by warehouse personnel that were technically unnecessary and actually undesirable from an information management perspective. Subsequent discrepancies between the figures provided by the computer and those provided by the traditional kardex system were uniformly traced to correctable keypunching errors, failure to provide the data entry person with all the forms, actual errors in the kardex, and, in some instances, truculence and a lack of cooperation from MOH employees. Although the computerized inventory system has been substantiated on several occasions, some of the more seasoned warehouse personnel remain reluctant to accept it into their working environment, perhaps out of fear for their job security. These kinds of fears are, of course, to be expected, but they can set back system development considerably if not handled correctly.

The delays and postponements of training programs for supply managers contributed to these difficulties. With a better understanding and

appreciation of the motivation for and use of the Cuadro_Basico and Formulario_Therapeutico, many of the implementation problems confronted by the computerized inventory control system may have been averted.

4.1 3 Recommended Future Activities

Additional and extended training of MOH computer personnel is a critical requirement. Their competency level has improved dramatically, but remains inadequate to maintain or extend the system. Fortunately, there are ample and adequate independent training resources in country.

MIS development is rapidly approaching the point where important policy decisions will have to be made by the Ministry before any additional progress can be made. These issues include access to the system and different databases, equipment and database maintenance protocols, system security, and final determinations of the kinds of reports to be generated at different levels, their distribution and format, etc., etc. Most of these decisions fall within the domain of the MOH MIS Users Committee. Efforts to guide and support this group must continue, and they should be accompanied by appropriate training and detailed position papers.

Experiences with the last two drug and medical supply purchase programs of the MOH have revealed numerous shortcomings and obstacles to improving that process. At this stage of development, the MIS is prepared to draw together many of the disparate elements of the acquisitions programs into a much more coherent and integrated system, one which is expected to reduce the substantial delays associated with the present process and the excessive need to rely on ad_hoc rules of thumb. To accomplish this, however, much more coordination between organizational units within and without of the MOH is required. Therefore, a series of meetings and/or retreats for all parties involved in the acquisitions process should be undertaken immediately, while the experiences with recent programs are still fresh on the mind. The agenda for these meetings should be exhaustive and would be developed by the Director of the UTMIM with the advice of planning, acquisitions, and MIS technical consultants. Topics of major concern include elaboration of a specific methodology for calculating requirements based on morbidity data, rationalizing distribution and delivery schedules, further review and modification of the Cuadro_Basico, and incorporating information about the AID purchase program into the MOH MIS.

Continued attention must be paid to the special programming and information needs of the UTMIM. This will involve ongoing and intensive capacitation of the programmer assigned to the Director of that Unit, as well as the elaboration of additional personnel needs. The UTMIM has a very large role to play in the acquisition and distribution processes, and there is a particularly pressing need for additional administrative support for the present Director.

The coming wave of microcomputers to be distributed throughout the MOH system should be preceded by intensive training in all aspects of computer operation, programming, and maintenance. Lack of familiarity with computers and inadequate backup procedures have already cost the MOH considerably, and the potential for these kinds of problems will not decrease at lower levels of the health system. Technical advice will be required for such mundane but critical issues as where to locate the computer, permitting and scheduling access, verification of inputs, etc. As MOH users become more sophisticated and demanding, the emphasis of these training efforts should then shift to providing capacitation in analytical methods suitable for planning decisions.

4.2 Health Planning

To capture the full benefits of any MIS improvements, evaluations of and adjustments to existing health planning processes must be undertaken in tandem with MIS system development. The progress achieved in the health planning area of the VISISA project during 1986 and 1987 is described below. The substantive advances made in the area of acquainting MOH planners with the advantages of and prospects for implementing specific methodologies associated with the programming of public health care service delivery mesh well with the technical strides made in improving the quality of information made available to those planners through the computerized MIS. Nevertheless, imposing organizational barriers to continued progress exist and must be taken into account in future technical assistance programs directed at MOH health planners.

4.2 1 Accomplishments Under VISISA

A general evaluation of the health planning process at the MOH was carried out early in 1986 to establish major areas of strength and weakness. Some 77 potential performance indicators relating to different aspects of health care delivery were presented in this report for the consideration of the Ministry. Divided into eleven distinct groups according to the nature of the activities they reflect, these performance indicators represented the first major step towards developing an integrated model for programming health care services. Use of such a model enables planners to estimate health care resource requirements -- theoretically, all kinds of resources including, for example, transportation -- for different treatment norms and morbidity rates. (Report 39)

This evaluation was followed by the establishment of MOH technical assistance requirements and the elaboration of a specific plan of action to improve the process. This plan was approved by AID and identified by all parties as the basis for major activity designed to (1) strengthen the central planning process at MOH and (2) formulate and implement a methodology for programming health services at the local and regional levels. This methodology was then developed with the active participation of all relevant MOH technical units under the coordination of the Programming unit. (Reports 40, 41, and 42)

Subsequently, a total of 213 individuals working at the regional level and at 59 local health facilities received training in the use of this methodology. Based on the results of post-training examinations, approximately 85 percent of the participants obtained acceptable or excellent knowledge of the process of programming health activities as an important adjunct to the budget planning process. (Reports 43 and 44) As a direct result of these activities, all health units of the Occidental Region prepared their proposed programs and requested budgets for 1987 using the method-

ology developed through the VISISA Project (Report 45.)

During the period from January to April 1987 a training workshop was to be held concerning the health planning programming methodology for central MOH personnel. The conclusions and recommendations stemming from this workshop were to have formed the basis for adjustments in the methodology and its extension to the regions.

Unfortunately, central level personnel were continuously involved in preparing and executing the National Vaccination Campaign and in formulating a plan for reconstruction of the health sector infrastructure affected by the earthquake, predominantly in and around San Salvador. Because of these obstacles, this activity has been postponed until the second quarter of 1987 and incorporated into the plan for the first year of the APSISA Project.

4 2 2 Obstacles to Maintaining/Extending Beneficial Results

In spite of the efforts described above, the overall MOH planning process remains weak and highly centralized. Only limited communication can be observed between the central Health Planning Directorate and the technical and administrative offices at the central and regional levels. In fact, about the only central, regional, and locally integrated activity carried out by the Health Planning Directorate during the period covered by this report was related to implementation in the Occidental Region of the health planning methodology developed under VISISA.

This lack of coordination and communication between different levels of the MOH health system could be a major impediment to the extension of programmed planning practices to other regions, even though the Ministry remains publicly committed to the decentralization process, and reaffirmed this position quite strongly in the days following the earthquake. Without a continuing policy dialog within the Ministry involving health planners from all levels -- even, perhaps, involving representatives of the health care practitioner and primary beneficiary populations -- little hope can be held out for the long run success of planning innovations such as those developed under VISISA. Moreover, just as the Cuadro Basico and Therapeutic Formulary must be viewed as situation-dependent documents, programmed planning methodologies must be seen as flexible and adaptable to changing circumstances and priorities.

A similar lack of coordination and communication among the MOH and international agencies -- PAHO, UNICEF, and AID, in particular -- gives rise to a similar set of problems, with different groups pursuing different agendas resulting in considerable duplication of effort and wasted resources.

4 2 3 Recommended Future Activities

To best follow through on the efforts initiated under VISISA, the technical assistance team and the MOH Planning Directorate consider it to be of the utmost importance to carry out the following activities during the APSISA Project

- Complement and integrate the health planning programming methodology with the methodologies for programming acquisitions of medicines, supplies, biomedical equipment, and transport
- Refine the programming methodology using the new information to be provided by the MIS concerning prevalent morbidity patterns and using therapeutic guidelines developed to improve the use of medicines and the treatment provided for the most common pathologies
- Extend the health planning programming methodologies to the remaining regions over the next five years, staggering this process in such a way as to take advantage of the experiences that will be gained in the process.
- Develop the methodology for programming hospital services, incorporating into this system budgeting processes and integrating these services more directly with those provided at other levels of the health system.
- Prepare an official system for monitoring and evaluation of health care provision in accordance with the budgetary cycle and limitations of the MOH and incorporating the epidemiological and biostatistics systems developed under VISISA

4.3 Epidemiology and Biostatistics

The collection, analysis, and proper interpretation of health system "output" measures is arguably the most important and generally the most neglected area of technical assistance efforts in developing nations. Under VISISA several advances were made in this field which should ultimately result in an improved ability for the MOH to correlate changes in the level, type, and distribution of health care inputs with actual changes in the health status of the target population. In conjunction with recent developments in analytic methodologies, this represents a potentially enormous breakthrough in the ability of the MOH to improve the efficiency and effectiveness of resources devoted to public health care services.

4.3.1 Accomplishments Under VISISA

An initial evaluation of the condition of the MOH epidemiological surveillance system rapidly resulted in identification of several areas of action that would permit, at any given moment, access to valid, reliable, and opportune information for decisions related to prevention, treatment, and control of the most common morbidities in the country. Specific achievements in this area under the VISISA Project are described below.

The central level surveillance system experienced many improvements, particularly in the areas of systematization and data processing. Diverse causes have in the past delayed epidemiological reports for five months and more. Today the MOH can process this information in the course of one or two days, liberating much time for improved analysis and for feedback to the units collecting the base data. Put differently, the system is making possible improved coordination and more effective analysis with regional groups and with other health care institutions in the Salvadoran public and private sectors, while at the same time vitalizing an early warning epidemiological system with a greater capacity for detection and analysis. (Report 46)

Following the earthquake this type of approach was quickly put into practice with the design and implementation of an emergency epidemiological surveillance program to assist the MOH in identifying and anticipating health care needs of the affected population. Daily reports on conditions at each of the 33 Metropolitan Region health facilities were provided, and bi-weekly reports for other indirectly affected facilities were also made. The volume of data generated by this activity has also been used to produce a consolidated report of post-earthquake health conditions for the population of the Metropolitan Region. (Report 47)

Subsequently, the process of designing and implementing an integrated system at the regional level was initiated, drawing together the

diverse components of the MOH concerned with collection and analysis of morbidity data for the Salvadoran population. In the initial phase, this required the development of a multidisciplinary team for processing and analysis of the epidemiological surveillance activities and the activities related with preparation of the Morbidity Report. This will contribute to a more efficient use of these data and eventually be integrated with the programming and budgeting of health care services.

One important advance along these lines was the development of a methodology for stratifying communities according to the estimated risk of contracting immuno-preventible diseases. This methodology has been applied in the Central Region. It is simple and easy to apply, and, in the period of a few days, with the participation of local and regional personnel, can produce an information base quite valuable for decision makers. The approach uses such indicators as degree of accessibility of the community, population density, and the local availability of health care resources. (Report 48)

A parallel effort involved the design and implementation of many improvements in the traditional system for collecting, processing, and reporting morbidity data, including both outpatient and in-patient care. In concrete terms, this means that in 1987 the MOH will succeed in updating its morbidity reports and processing, reducing the delay from five years to a period of less than one year. The major activities involved in this process include modifications in the procedures and norms for both collecting and coding data, and for timely transfer of this information between different technical and administrative levels of the MOH system.

The scheduled and staged transfer of data processing responsibilities and capabilities from the central to the regional and local levels is of particular significance to the new system. By the middle of 1987, the tasks of classifying, sampling, and coding of approximately three million health care attentions will be in the hands of the regions and selected establishments. Additional functions will be added to these over time, with the idea in mind that ultimately the operational level itself will generate, process, and utilize the information about their own respective services. At the same time, linkages will be maintained with the central MOH computer center, both to assure information quality control and consistency, and to provide the consolidated and comparative analyses that can be so useful for decision makers at all levels. (Report 49)

Complementing these activities, the technical assistance team provided sampling strategies and specific samples for the 1986 and 1987 MOH morbidity reports. The first of these is in the initial stage of implementation. Based on the lessons learned in this process, the approach adopted for 1987 was much simpler and more valid and useful. The analytic usefulness of this database will be all the greater for these changes. Appropriate measures have been taken to assure that these databases are compatible with other MOH

programs and databases so that they may be integrated more thoroughly and effectively

Special notice should be given to the improved linkages and communication which have resulted between users of this system and its coordinators. In a preliminary phase, in order to improve the evaluation of the major MOH service programs, traditional data sources have been analyzed and alternative ways have been proposed to get better information on outputs and accomplishments. This process has involved the staff from all the regions and technical personnel of the central level, and is expected to lead to more integrated systems and procedures for monitoring and evaluation of health service provision.

One illustration of this is the current joint activity of the MOH Epidemiology, Biostatistics, and Nutrition Departments to establish the bases for a "nutritional surveillance system" for the population, using indicators such as age-weight relationships for children less than five year old. Maintenance and consolidation of this process is fundamental to direct public sector resources and efforts towards improving the nutritional state of the population.

4 3.2 Obstacles to Maintaining/Extending Beneficial Results

As in so many other functional areas of the MOH, scarcity of adequately trained personnel is a critical problem for epidemiology and biostatistics programs. Moreover, in the first part of 1987 the shortage has been even more acute, due to many factors. The mass vaccination program diverted many people at all levels from the normal functions for a period of three months. Other national and international commitments by key personnel have created further problems. Finally, uncertainty and the high mobility rates of middle level personnel complicated the implementation even more, especially as regards the training and followup of activities.

If these or similar conditions persist, the areas of epidemiological surveillance and biostatistics face the risk of either stagnation or very slow improvement. The indicated systems require continued and sustained exercise by a team interested in and capable of detecting problems and identifying solutions. The constant mobility of personnel works against this goal.

4 3 3 Recommended Future Activities

The quality -- and therefore the value or usefulness -- of epidemiological and biostatistical information is heavily dependent on the mechanisms used to retrieve that information from the field. Efforts under VISISA greatly increased the capacity of the MOH to handle the large volume of data generated in this kind of activity, but additional measures must be taken to assure that the correct

information is being developed in the first place. Outreach and training programs must be targeted at health care delivery personnel at the grass-roots level. Diagnoses and interpretations of doctors and nurses are the ultimate source of morbidity data, and it is imperative that health care providers and health care statisticians speak the same language.

Further attempts to integrate MOH databases with those of other public and private groups should be made so that a more comprehensive and descriptive profile of Salvadoran health conditions can be obtained. Important progress in this area was made under VISISA, but much work remains to be done.

The MOH MIS Users Committee needs to quickly develop a set of priorities and policies concerning use of computational facilities. With the anticipated introduction of additional managerial functions to the computerized MIS in 1987, further pressures will be placed on already highly utilized equipment. The familiar organizational pressures to "put out fires" could result in the de-emphasis of functional areas that demand large amounts of computer time today but deliver information outputs with lagged benefits. The bio-statistics and epidemiological surveillance components fit this description well.

Section 5 Component IV - Training and Basic Studies

During the extension phase of the VISISA Project two additional activities were incorporated into the technical assistance plan in order to ease the transition to the long-term APSISA Project training and basic health studies. The training component met with considerable success and has provided a comprehensive description of the present situation and the steps which should be taken by the Ministry and AID in the future. Basic studies, on the other hand, suffered from an inability to effectively integrate the multi-disciplinary team required for this activity. The reasons underlying both these successes and these disappointments are discussed below.

5.1 Training

Technical assistance in this area was provided during the months of March and April 1987 by a specialist in human resources development and administration. The principal objectives of the Training Advisor were to

- evaluate personnel requirements for the different levels of the MOH system, especially those programs involved in primary health care delivery,
- identify relevant in-country training programs and resources, and evaluate their quality and extensiveness,
- specify MOH training requirements in foreign countries and the mechanisms for participating in and funding this training, and
- formulate a preliminary training plan and schedule for the APSISA Project

5.1.1 Accomplishments Under VISISA

The major activities and accomplishments of the short-term Training Advisor are thoroughly described in Report 50. Principal highlights are listed in this section.

- Basic information was obtained in the areas most significant in developing effective training plans and programs. These areas include fundamental demographic characteristics of the Salvadoran population, basic health services data, administrative organization of the MOH, health care policies and human resources, and the infrastructure and mechanisms for planning in the areas of human resources, training, and

the distribution of personnel

- An analysis of existing MOH training programs for primary health care workers was carried out. These programs presently address the needs of health care personnel at all levels of the system, with widely varying responsibilities, experience, and educational backgrounds.
- The functional profile and educational objectives of administrative training programs were designed for the major aspects of the APSISA Project, including medicines and medical supplies, malaria, and the use and maintenance of biomedical and transport equipment.
- An evaluation was performed on the 1987 continuing education plan prepared by GOES for APSISA and the MOH supervision manual. A set of specific recommendations were formulated and communicated to the appropriate officials.
- An analysis of foreign sources of training assistance -- financial and technical -- was made, and proposals for coordinating and managing these resources were developed.
- In collaboration with the Office of International Cooperation of the MOH, mechanisms were developed for regulating the acquisition and award of national and international scholarships.

Finally, the Training Advisor identified the critical issues and problems to be resolved in developing an appropriate long-term training strategy for the MOH, and developed a general plan of action to address these issues and problems. The three key elements of this program are:

- a five-year plan elaborating general policies, strategies, and projects;
- a specific training plan for APSISA and primary attention workers for 1987-88, emphasizing elementary administrative aspects and the basic care of the population, and
- a proposal for organizing a minimum technical and administrative support system for human resources planning at the central level, using existing elements and refining functions in different areas of activity.

5 1 2 Obstacles to Maintaining/Extending Beneficial Results

Given the limited time and late arrival of technical assistance in the training area under the VISISA Project, the activities under this component were directed at establishing a good starting basis for the extensive training component envisioned for the APSISA Project. The MOH must find the time to analyze and put into operation the plans and recommendations of the Training Advisor if the coming technical assistance program is to get off to a good start.

If the APSISA Project does not provide this technical support, it will be very difficult to establish within the MOH a truly permanent and effective program of training dedicated to improving the quality and increasing the level of health care delivery. Without this continuity, future training efforts will lack the objectivity, coordination, and harmony that the other technical assistance areas included within the scope of the APSISA Project will require.

5 1 3 Recommended Future Activities

Long-term technical assistance for training is considered indispensable to achieve the required strengthening of the MOH Human Resources Department, Training Center, and Nursing Schools. With periodic short-term assistance, the long-term advisor should also review and improve the programs for continuing education of personnel that work in the provision of primary health care services for the Ministry.

Every year, approximately 250 new doctors and an even larger number of nurses begin their year of obligatory social service in MOH. They arrive at health centers, units, posts, mobile units, etc., without any training or orientation in the MOH system and situation. This creates obvious transitional difficulties that could be alleviated by a modest orientation program of short duration before they enter their year of social service. This would produce a professional group of health care deliverers at all levels of the system with an improved awareness and appreciation of the treatment norms and administrative practices and policies of the Ministry.

The proposed orientation program should, in the opinion of the Training Advisor, cover the use and revision of the Basic Drug List and Therapeutic Formulary, the epidemiology and biostatistics systems, the use of the precoded prescriptions, and the management of the health planning programming methodology developed under VISISA.

5.2 Basic Studies

Although the extension period was primarily devoted to maintaining rather than advancing the achievements of VISISA, a limited number of basic investigations into health services planning and delivery were seen to be compatible with this perspective

It rapidly became apparent, however, that the extension period was not the time to push for major advances in this area. MOH personnel were occupied by the mass vaccination program, and a variety of administrative and technical problems affecting different subsystems of the MOH MIS limited its capability to provide the kinds of information needed to accomplish this task. These same difficulties limited the amount of time that the DISA/Kraus Advisor could devote to this activity, since he simultaneously held administrative and technical responsibilities for development of the MIS and in the area of Supply Administration/Systems Analysis

Nevertheless, there is substantial interest in this topic at both the central and regional levels. MOH policymakers recognize the value of and need for diagnostic evaluation methodologies integrated with the planning process

5.2.1 Accomplishments Under VISISA

The advances in this area during the extension period were largely intangible. They amount to promoting changes in the way planners think about and use the information base at their disposal. Through informal conversations and chance opportunities that arose in the course of other activities, MOH officials developed a sense of the role that could be played by basic health studies in the future. They appear to be anxious to exploit this capability, but further development of the MIS and additional advanced training are needed before this can be institutionalized.

The early signals are quite promising, however. Administrators in the MOH have quickly learned not only how to use the information system to influence policy, but also how to use policy instruments to influence the information system. An example of this was provided by the central decision to make gasoline allocations to different MOH transport divisions contingent on the accuracy and consistency of their reported consumption figures.

The DISA/Kraus Advisor in this area performed the analysis of data from the pilot precoded prescription study at San Bartolo and helped produce the final report. He collaborated with the Drug Advisor during the 1987 extension period to revise this study, improve the methodology, and extend the approach to five establishments at different levels in the Occidental Region. The Advisor also designed programs and procedures for capturing and analyzing the large volume

of information that will be produced in this study at the regional and central levels

The Basic Studies Advisor also reviewed and revised the mechanisms for the monitoring function, developing procedures for selecting samples that can be claimed, with some predetermined level of confidence, to be representative of the MOH system. The initial application of this methodology weighted facilities on the basis of their utilization rates, enabling decision makers to determine whether medicines are available where patients are going. The sample design provided in April 1987 for the next monitoring cycle weighted facilities according to their level in the health system, enabling decision makers to determine whether medicines are available where they want patients to go -- i.e., to lower level units and posts.

Working with the Planning and Drug Advisors, the Basic Studies Advisor assisted in the review of the Cuadro Basico and Therapeutic Formulary and in the development of recommendations for the UTMIM and the Therapeutic Committee. Technical assistance was also provided in elaborating the steps and obstacles to integrating the health planning programming methodology, the precoded prescriptions program, epidemiology and biostatistics systems, and the supply management process.

Finally, the Advisor reviewed and revised the structure and content of the pre- and post-tests employed by the Logistics Advisor in the regional supply management training program and by the Drug Advisor in the program to distribute and provide training in the use and updating of the Cuadro Basico and Therapeutic Formulary. The revised tests avoid some conceptual and contextual difficulties and gather additional information that will be useful in the analysis of the results.

5 2 2 Obstacles to Maintaining/Extending Beneficial Results

Basic research often takes a back seat to operational problems, and the operational problems confronting the MOH are indeed large. When basic drugs are not available in MOH facilities, it is a difficult task to argue for funding basic health studies instead of purchasing medicines, even though these studies may result in an increased availability and improved use of medicines in the future. For this reason, little financial support for these activities can be expected from the Ministry's own budget in the near future. Continuity of this activity will depend on external funding.

Ongoing development and integration of the MOH MIS is a prerequisite to accomplishing many types of basic health studies in a timely and cost-effective manner. There is, again, an important role for the MOH MIS Users Committee in this area, and the limited activity and impact of that group to date is problematic.

To institutionalize the ability to conduct statistically valid and useful health services investigations, MOH personnel will require training in some reasonably advanced quantitative methodologies and statistical inference techniques. No formal mechanisms have yet been established or contemplated to accomplish this.

5.2.3 Recommended Future Activities

To stimulate interest and involvement at the local and regional levels, a series of generic baseline methodologies could be developed to address recurrent and widespread topics of interest. These "programmed" studies would specify sampling methodologies, data collection and coding protocols, and analytic techniques that should be employed. They would serve both as an introduction to basic research techniques and as a mechanism for sharing experiences among the regions and levels of the health system.

Efforts under VISISA were directed at the establishment of regional supply committees and at the decentralization of responsibility for collecting and analyzing morbidity data to the regional level and beyond. These initiatives could be consolidated into regional and subregional planning bodies, and these groups would be a natural place to locate investigative or research functions.

As mentioned earlier, little financial or technical support for this kind of activity can be expected to arise from within the Ministry itself in the near term. Under the auspices of the APSISA Project, then, it might be well to consider sponsoring regular research conferences on health care conditions and policies, not just in El Salvador, but throughout Central America. Too few of the lessons learned in neighboring countries are communicated to MOH officials, and this could be a mechanism for transferring experience. Added to this, regularly scheduled conferences devoted to this area would stimulate the interest of researchers and funding institutions outside of the area.

Section 6 Conclusions and Recommendations

A brief summary of the major lessons learned and limitations discovered during the course of the VISISA Project is provided in this section. Hopefully, this information will help improve the design and execution of future health sector projects in El Salvador and elsewhere.

6.1 Coordination and Communication

The VISISA Project was a very complex and ambitious effort, attacking the public health care problem in El Salvador on several fronts at once. The effectiveness of a program like this depends on the nature of the relationship between the three major participants -- the MOH, AID, and the TAT. Unfortunately, coordination and communication within and between these three groups was not as extensive and continuous as it might have been, thereby limiting the extent of progress that could be achieved.

Within the Ministry, the grand majority of middle and lower level technical and administrative personnel knew little of the general objectives and scope of activity sponsored by VISISA. Even at the higher levels, this information was often spotty and inaccurate. For a project such as VISISA (and the coming APSISA), both regional and central operations and administrative personnel should be fully and regularly briefed on these matters to promote the broadest participation and effects possible.

Concentration of this information in the hands of a few higher level decision makers also affected the nature of the counterpart relationships between the MOH and the TAT. Frequently, individual DISA/Kraus advisors had several counterparts in different technical and administrative areas of the MOH. These MOH counterparts themselves would typically be involved with several different technical assistance efforts at once because of their broad responsibilities. The MOH internal steering committee for the VISISA Project has been in existence for some time, but it has never provided sustained and reasoned direction of the activities of MOH personnel in the Project. Strengthening of this internal coordination function is critical to avoiding the problems of overcommitted and underinformed MOH counterparts that frequently have characterized activities under VISISA.

Similar conditions have characterized the reporting/accountability relationship between AID and the technical assistance team. Progress review meetings have been excessively concerned with schedules and products, and insufficient emphasis has been given to joint resolution of difficulties by the MOH, AID, and the TAT.

Ideally, there should be a tri-lateral relationship between the MOH, AID, and the TAT. In practice, the relationships have been bi-

lateral, frequently leaving the TAT in the middle. AID procurement programs are still not adequately integrated into either the MOH or TAT information processing systems. MOH budgetary and resource allocation decisions are often taken without advising either AID or the TAT. And, in fairness, the TAT has also been guilty of various sins of omission in communicating with MOH and AID.

The APSISA Project will require substantial improvements in communication and coordination among these groups. In addition, other donor and technical assistance groups will have to be incorporated into this program to assure that efforts and expenditures are not duplicated.

6.2 Functions and Responsibilities of Technical Assistance

Many of these problems have stemmed from the scheduling of different stages of the Project. Although technical assistance under VISISA has been provided for almost three years, it cannot be viewed as a long-term program in the conventional sense of that term. Rather, VISISA has consisted of a sequence of short-term contracts and extensions to those contracts. The Project has been described as three years of firefighting and, while not entirely accurate, this description highlights some of the problems confronted by the technical assistance team.

The tendency of technical advisors in a situation like this is to focus on short-term solutions/stop-gap measures, since they are required to deliver tangible "products". This tends to distort the role and activity of the advisor. The emphasis on getting things done in a brief period of time leads the advisor to take a more active role, transforming him or her into more of a temporary employee of the MOH rather than a technical expert attempting to transfer his or her expertise to permanent MOH employees. And this is also how the MOH is inclined to think about the role of the short-term advisor.

This tendency is reinforced by the reporting requirements of the AID Mission in El Salvador to Washington. If a TA program largely consists of a series of short-term efforts, excessive amounts of time are spent by AID personnel in developing the terms of reference for the next stage. The technical assistance team comes to be viewed as a temporary appendage to the Mission and it is frequently diverted from its scheduled workplan to perform tasks that are technically the responsibility of AID.

Under these circumstances, it is impossible to effectively develop and implement a coherent long-range strategy for improving health services delivery. Ministry personnel are reluctant to commit themselves to programs or to invest the time in developing effective working relationships with advisors who may or may not be around to assist next week. The technical assistance team itself loses much

time in responding to AID proposals for short-term assistance, developing scopes of work, and producing final reports. DISA/Kraus estimates that as much as one-third of the January-April 1987 VISISA extension was consumed by these kinds of activities, and the MOH uncertainties about the role and extent of future technical assistance resulted in further loss of productive time.

The most common concern and complaint voiced by MOH personnel about the technical assistance effort under VISISA relates to the lack of assurance of continuity and follow-through. At this writing, another three-month extension has been proposed by AID to "provide a bridge" between VISISA and APSISA. While this will certainly alleviate many of the short-term concerns of the MOH, it perpetuates the uncertainty about the long-term strategy and direction. Some even venture to suggest that, because of the time required to solicit, receive, and evaluate technical assistance proposals and to award a contract and establish a technical assistance team in-country, yet another "bridge" can be expected following the one just proposed.

The APSISA Project must be conducted differently. From the outset, it must be conceived and recognized as a long-term commitment. The primary objective should be to provide the MOH with self-sufficiency in meeting public health care goals. This calls for the early establishment of concrete, measurable performance standards and objectives. The MOH, AID, and the TAT have to be able to work as partners in this effort, and this calls for the early establishment of improved communication, coordination, and control mechanisms.

Appendix A*
Listing of Reports Referenced in the Text

Section 2 Supply Management

2.1 Logistics

Report 1 Activities for the Improvement of Supply Systems

Annex 1 Report of Grouping of Medical Products in Accordance
 with the Cuadro Basico

Annex 2. Report of the Actual Situation of the Central
 Warehouse "El Matazano"

Annex 3 Report of the Actual Situation of the Oriental,
 Paracentral and Occidental Regions Warehouses

Annex 4 Preliminary Guidelines for Scheduling Drug Reception,
 Distribution, and Inventories at the Central Warehouse

Annex 5. Hospitals, Health Units, Health Centers and Health
 Posts Visited by the HID/Kraus Monitors

Annex 6 Analysis of Individual Questionnaire for Supply
 Seminar Participants

Annex 7 Training Package for Supply Personnel at Regional
 and Local Levels of the Five Regions

Annex 8 Plan for Health Monitor Integration with the MOH
 Drug Supply/Inventory System

Report 2 Workshop Training Program on Supply Management

Report 3. Issues Paper Control of Donations

Report 4 Drug Monitoring Manual

Report 5 Warehouse Organization Manual

Report 6 Warehouse Procedures Manual

Report 7 Warehouse Personnel Functions and Responsibilities

2.2 Drug Formulary and Therapeutic Guidelines

Report 8 List of Basic Medications for the MOH

- Report 9 Training Seminars Program Background, Policy, and Norms for Use of the Cuadro_Basico and Formulario_Terapeutico
- Report 10 First Review of Cuadro_Basico and Formulario_Terapeutico
- Report 11 Proposed Plan of Action for the UTMIM
- Report 12 Pilot Study of Precoded Prescriptions
- Report 13 Methodology for Extension of the Precoded Prescriptions Study to the Occidental Region

2.3 Procurement Programs and Policies

- Report 14 MSPAS 1987 Drug Purchase Program
- Report 15 Procurement Policies and Procedures Manual
- Report 16. Registry of Suppliers
- Report 17 Model Format for Licitations of Supplies
- Report 18 General Conditions for Public Acquisitions Programs of the MSPAS

2.4 Drug Quality Control

- Report 19 Inspection Procedures for Drug Warehouses
- Report 20 Quality Control Procedures for Warehouses
- Report 21 Quality Control Laboratory Facilities
- Report 22 Laboratory Procedures Manual and Training Manual for Laboratory Technicians
- Report 23 Quality Control Monographs
- Report 24 Quality Control for the Basic Drug List

Section 3 Public Health Infrastructure Maintenance

3.1 Vehicle Management and Maintenance

- Report 25. Preventive Maintenance Routines Manual
- Report 26 Quarterly Evaluation Preventive Maintenance System

3_2_Biomedical_Equipment_Management_and_Maintenance

- Report 27 Biomedical Equipment Inventory of Health Care
 Facilities of the Oriental Health Region
- Report 28 Preventive Maintenance Routines Performance
 Tables for the Oriental, Central and Metropolitan
 Health Regions
- Report 29 Formal and On-the-job Training Plan for
 Maintenance Technicians and Equipment Users
- Report 30 Maintenance Administrative Control System
- Report 31 Maintenance Indicators System
- Report 32 List of Maintenance Manuals Translated from
 English to Spanish
- Report 33 Job Descriptions and Selection and Contracting
 Procedure for Technical Personnel of Regional
 Biomedical Maintenance Shops
- Report 34 Final Report of Equipment Damage in the Metropolitan
 Health Region as a Result of the Earthquake
- Report 35 Reconstruction Study for the Central Maintenance
 Department (San Esteban)

Section_4_Management_Information_System4_1_Development_of_Hardware_and_Software_Support_Systems

- Report 36 Design of the Information System for Supply of
 Medicines and Medical Supplies
- Report 37 Design of the MOH Management Information System
- Report 38 Turn-key Management Information System
 El Salvador Ministry of Health
- Report 39 Proposed MIS Policies and Procedures
- Report 40 Discussion Paper Role and Functions of the
 MOH MIS Users Committee

4_2_Health_Planning

- Report 41 Report on Advisory Services in Health Planning

(San Salvador, March 1986)

- Report 42 Comprehensive Methodology for Health Services Programming (San Salvador, June 1986)
- Report 43 Training Unit for Self-instruction in Comprehensive Methodology for Health Services Programming (San Salvador, June 1986)
- Report 44 Basic Documents for the Programming of Basic Inputs for Health Attention (San Salvador, September 1986)
- Report 45 Workshop Program on Comprehensive Methodology for Health Services Programming Western Region (San Salvador, July 1986)
- Report 46 Report and Evaluation of Training Workshops at the Western Region on the Methodology of Health Services Programming (San Salvador, November 1986)
- Report 47 Occidental Region 1987 Health Services Plan

4_3_Epidemiology_and_Biostatistics

- Report 48 Evaluation of the Epidemiological Surveillance System in El Salvador
- Report 49 Evaluation of Health and Health Service Conditions in San Salvador Following the Earthquake of 10/10/86
- Report 50 Methodology for Stratification Based on Risk from Immuno-preventible Diseases
- Report 51 Bases for the Implementation of the Nutritional Surveillance System

Section 5 Training and Basic Studies

5_1 Training

- Report 52 Report on Health Human Resources Training in El Salvador

n the Methodology of Health Services Programming (San Salvador, November 1986)

Report 47 Occidental Region 1987 Health Services Plan

4_3_Epidemiology_and_Biostatistics

Report 48 Evaluation of the Epidemiological Surveillance System in El Salvador

Report 49 Evaluation of Health and Health Service Conditions in San Salvador Following the Earthquake of 10/10/86

Report 50 Methodology for Stratification Based on Risk from Immuno-preventible Diseases

Report 51 Bases for the Implementation of the Nutritional Surveillance System

U.S. Army Air Corps and Civil Personnel

INTERNATIONAL PERSONNEL

<u>NAME</u>	<u>POST</u>	<u>PERIOD</u>
Mr. Fernando Mendes	Chief of Base ATS Advisor	March-October/86 October-December/86
Mr. S. Spreng	Supd. Station, Basil Studies and ATS Adv. Sec.	September/85-April 1987
Mr. Venio -Andaeta	Supd. / Management Advisor	October/85-June 86
Mr. Luis H. Salido	Supply Logistics Advisor	August/86-April/87
Mr. Juan F. Cudifre	Procurement Advisor	October-December/85
Mr. Jose Zuleider	ATS Adv. Sec.	October/85-October 86
Mr. Carlos Suarez	ATS Adv. Sec.	July/86-April, 1987
Dr. Eusebio Morales	Food Formula Advisor	October 85-December 86
Dr. Manuel Campos	Drug Eval. Control Adv. Sec.	July-December 86
Mr. Carlos Perez	Vehicle Management and Transport Advisor	September/85-April 1987
Mr. Luis Salido	Medical Control Adv. Sec.	July/85-September 87
Mr. Luis Salido	Medical Equipment Management and Maintenance Advisor	October 85-March/87
Mr. Eusebio	Power Plant Maintenance Advisor	September-December 85
Mr. Pedro Soder	Epidemiology Adv. Sec.	December/85-April, 1987
Mr. Armando	Consultant on Advisor	March 86-April 11/87

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<u>NAME</u>	<u>POST</u>	<u>PERIOD</u>
Dr. Enrique Falcon LI	Drugs Advisor	March-April/87
Dr. German Jimenez R	Training Advisor	March-April/87
Mr. Jacob Dale	Logistics Advisor	January/86-April/87
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Mr. Jorge Mazzini	Health Assistant	October/85-April/87
Mrs. Sonia de Valenzuela	Health Assistant	September/85-November/86
Mr. Cesar Avendano	Health Assistant	December/85-April/87
Mr. Matricio Suevara	Health Assistant	October/85-April/87
Mr. John Walthier	Health Assistant	October-December/86
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Mr. Herbert Tovar	MIS Programmer- Key Puncher	July/86-April/87
	Mr. Ernesto Vargas	MIS Programmer September-December /86
Mr. Edoar Borilla	MIS Programmer	September-December/86
Mr. Juan Luis Orrellana	MIS Programmer	September-December/86
Mr. Jorge Aparicio	MIS Programmer	August-December/86
Mr. Rene Aparicio	MIS Programmer	August-December/86
Mr. Reinaldo Delgado	MIS Programmer	January-April/87

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Mr. Mauricio Rodezno	MIS Programmer	January-April/87
Miss Maria Eugenia Sosa	Key puncher	December/85-December/86
Mrs. Rosa S. de Castillo	Key Puncher	September/86-April/87
Mr. Mauricio Sauerbrey	Key puncher	October-December/86
Mrs. Bessie de Jada	Bilingual Secretary/ Key puncher	June-December/86 January-April/87
Mr. Ale Funes	Key puncher	February-April/87

ADMINISTRATIVE SUPPORT PERSONNEL

Mrs. Maria Elena Foucher	Administrative Officer	September/85-April/87
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Mrs. Magdalena Montoya	Bilingual Secretary	January/86-April/87
Mrs. Aida de Lorio	Bilingual Secretary	September/85-April/87
Mrs. Silvia Huevo	Receptionist	September/85-December/86
Miss Maria Elena Guardado	Secretary	June/86-April/87
Mr. Jose Maria Romero	Driver	September 85-April/87
Mr. Mario Roque	Driver	May/86-April/87
M. Jose Antonio Ramirez	Driver	January-April/87
Mrs. Sara Alicia Argueta	General Services	November/85-April/87

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87	
COMPONENT I A1 - SUPPLY MANAGEMENT				
Strengthen the supply administration capability of the MOH by reorganizing the warehouses, improving procedures, and training supply personnel	Training of warehouse and pharmacy personnel at regional and local health facilities based on the training program developed in 1986	Training plan developed and approved by the MOH General Director	02/25/87 Completed	
		Development of final training materials	03/05/87 Completed	
		Training in supplies management and warehousing procedures (900 MOH personnel in the five regions and at the central warehouse)	Matazano	3/31/87 Completed
			Occidental	4/07-4/23 Completed
			Oriental	4/08-4/30 65% Completed
			Paracentral	4/07-4/22 Completed
			Metropolitana	4/07-4/22 Completed
		Central	4/09-4/24 Completed	
		Reorganize the MOH central and regional warehouses in accordance with the basic drugs list	Matazano	12/08/86 Completed
			Occidental	12/18/86 Completed
	Oriental		12/16/86 Completed	
	Paracentral		12/17/86 Completed	
	Metropolitana		Infeasible Infeasible	
	Central	04/30/87 80% Completed		
	Produce a physical inventory for pharmaceutical and medical supplies in the five regions and at El Matazano	Matazano	12/21/86 Completed	
		Occidental	12/18/86 Completed	
		Oriental	12/16/86 Completed	
		Paracentral	12/17/86 Completed	
		Metropolitana	01/31/87 Completed using Kardex	
	Central	01/31/87 Completed		
	Implement automated inventory system for pharmaceutical in the five regions and at El	Matazano	12/21/86 Completed	
		Occidental	12/21/86 Completed	
		Oriental	04/07/87 Delayed (MOH request)	
	Paracentral	04/15/87 Delayed (MOH request)		

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Matazano	04/15/87	Completed
	Metropolitana Central	03/31/87	Completed
	Provide evaluations of and recommended solutions to the problems caused by the earthquake at the Metropolitan and Central Region warehouses	12/19/86	Completed
Implementation of the monitoring system designed in 1986 for drugs and medical supplies in all health regions of the country	Implement monitoring system	04/30/87	Postponed to APSISA due to delays in funding supply management seminars
	Occidental Oriental	04/30/87	
	Paracentral	04/30/87	
	Metropolitana	04/30/87	
	Central	04/30/87	
	Develop and deliver monitoring functions manual	04/30/87	Completed
	Monitor availability of drugs at MOH facilities	02/23/87	Completed
	Sonsonate (H) Gotera (C) Sesora (U)	02/23/87	Completed
	Monitor availability of 32 basic drugs at randomly selected facilities	04/08/87	Completed
	Determination of shelving requirements for 5 unispans at Zacamil	04/07/87	Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
Evaluation of warehousing procedures and preparation of manuals		04/30/87	Completed
Establishment of regional supply committees	Occidental Oriental Paracentral Metropolitana Central	04/30/87 04/30/87 04/30/87 04/30/87 04/30/87	Postponed to APSISA due to delays in funding supply management seminars
Programming, implementation, and follow-up of drug and medical supply, inventory, and distribution at all levels and regions	Develop bimonthly drug distribution schedules	Matazano Occidental Oriental Paracentral Metropolitana Central	Completed Completed Completed Completed Postponed to APSISA Postponed to APSISA
Assessment of the drug and medical supplies distribution program at all levels and regions		Matazano Occidental Oriental Paracentral Metropolitana Central	Completed Completed Completed Completed Completed Completed
Design of a coordination and control system for donations	Issues paper for advance notification of arriving donations from external donors	04/30/87	Completed

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
COMPONENT I-A2 - DRUG SUPPLY SYSTEM AND FORMULARY DEVELOPMENT			
Analyze and modify the overall MOH acquisitions process to improve the efficiency and speed with which necessary medicines and medical supplies are acquired	Analyze the providers registry and the rules and regulations governing suppliers	12/15/86	Completed
	Provide a manual describing appropriate procurement policies and procedures for the MOH	12/15/86	Completed
Increased availability of drugs and medical supplies in MOH facilities	Increase of 20% over 1983-4 levels of essential pharmaceuticals and medical supplies located in hospitals, health centers, health units, and posts	03/18/87	Completed
	Elaboration of the drug and supplies procurement plan for 1987	03/18/87	Completed
	Estimation of the unit cost of items to be procured by MOH and AID	03/18/87	Completed
Elaboration of a therapeutic formulary	Final copy of Therapeutic Formulary - printing and production	12/10/86	Completed
Institutionalize therapeutic drug formulary system	Improvement of the drug utilization system by primary health care facilities	Development of the seminar for regional levels and distribution of Formulary (to be coordinated with supply management training described above)	Occidental 4/07-4/23 Oriental 4/08-4/20 Paracentral 4/07-4/22 Metropolitana 4/07-4/22 Central 4/09-4/24 Postponed (April para) This activity was transferred to the MOH for execution

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87	
	First review of drugs in the Therapeutic Formulary and the Cuadro Basico	04/20/87	Completed	
Development of a functioning Unidad Tecnica de Medicamentos e Insumos Medicos (UTMIM)	Identification of relevant areas of involvement for the UTMIM	04/20/87	Contingent on final MIS status and User Committee policies	
	Design of computer output reports for the UTMIM	04/20/87	Transfer of developed programs completed Other applications described	
Improvement of the system for establishment of drug and medical supplies requirements	Development of a pre-coded prescription system	Final report analyzing results from pilot test at San Bartolo	03/11/87	
	Modification and application of pilot test in the Occidental Region	Modify and print forms Begin two-week test Evaluate and report	03/31/87 04/01/87 04/30/87	Regional and local personnel trained; forms and programs delivered; UTMIM responsible after April 30
COMPONENT I-B - MALARIA				
Reduction of the malaria incidence rate in prevalent areas	Decrease of 5% in incidence rate in places which contain 85% of the malaria cases; full spraying takes place from 1985 to 1988	Initiate the Ticuziapa source reduction project	04/30/87	
		Initiate first spraying cycle of residual insecticide	07/23/87	
		Complete list and specifications of equipment and supplies for 1987	04/30/87	

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Complete first spraying cycle for 1987	06/20/87	AFSISA Activity
	Initiate second spraying cycle	06/23/87	AFSISA Activity
	Complete second spraying cycle	09/19/87	AFSISA Activity
	Initiate third spraying cycle	09/22/87	AFSISA Activity
	Complete third spraying cycle	12/15/87	AFSISA Activity
	Completion of new insecticide testing trials and evaluation initiated during November 1986	01/30/87	Completed
	Develop two training courses to improve diagnosis by microscope	03/27/87	Completed
		04/30/87	Completed
	Initiate improvement of entomological evaluation protocol for impact of source reduction in the Ticuziapa project under TA from VRC project	04/30/87	Completed
	Complete final reconstruction of Ticuziapa project	12/30/87	AFSISA Activity

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Prepare action plan for 1987 PL-480 source reduction projects	03/31/87	Completed
COMPONENT I-C - DRUG QUALITY CONTROL			
Improvement in MOH drug quality regulatory capacity	Establishment of a small drug quality control laboratory and an in-country training program	Presentation of alternative lab installation plans necessitated by the earthquake	Completed
		Preparation of DQC manual detailing procedures, organization, and policies for the lab	Completed
		Selection of products for DQC test	Completed
		Design and utilization of the methodology for selection of products received at the warehouse to be tested by the DQC lab	Completed
		Identification of quality control specifications for more significant drugs	Completed

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Delivery of a standardized testing procedures manual based on U S P		Completed
	Construction supervision of working areas in accordance with the prepared plan	03/31/87	
	Review and reanalysis of location identifying remaining problems	03/06/87	
	Preparation of designs for furniture and service installation for the laboratory	01/15/87 to 02/15/87	
	Supervision of furniture and service installation for the working areas	03/04/87 to 04/30/87	
	Installation of laboratory equipment in the working areas	03/15/87 to 04/30/87	
	Testing of installed equipment	04/01/87 to 04/30/87	APPSISA Activity (Delays in constructing DQC Lab)
	Training of personnel on equipment operation	04/15/87 to 04/30/87	APPSISA Activity (Delays in constructing DQC Lab)

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87	
COMPONENT II - PUBLIC HEALTH INFRASTRUCTURE MAINTENANCE				
SUBCOMPONENT II-A - VEHICLE MANAGEMENT AND MAINTENANCE				
Design and implementation of a maintenance/repair system for MDH vehicles	Development and implementation of a PMSP for new vehicles		Completed	
	Report of evaluation findings regarding PMSP (verification and confirmation system) - 3rd quarter 1986		Completed	
	Report of evaluation findings regarding PMSP (verification and confirmation system) - 4th quarter 1986	Completed and reviewed with Occidental Region personnel	02/15/87	Completed
	Follow-up training to mechanical shops with unsatisfactory performance	Period: 01/86-09/86		Completed
		10/86-12/86	03/15/87	Completed
	Report evaluating MASCI automated transport system and recommending improvements (data from 1/86-9/86)			Completed
	Report evaluating MASCI automated transport system and recommending		02/20/87 to 04/30/87	Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	improvements (comparison of 1986 and 1985 data)		
	Review MASCI automated system with MIS adviser	02/15/87	Completed
	Improved physical layouts, staffing, and training at Matazano		Completed
	Evaluation of vehicle status (repair or discard) - 4th quarter 1986		Completed
	Evaluation of vehicle status (repair or discard) - 1st quarter 1987	04/30/87	Completed
	Evaluation reports of MOH vehicles that should be replaced or discarded identifying type of vehicle needed, drivers, and activity	12/15/86	Completed
	Training in management in transport of regional and central maintenance shops	07/15/87	Completed
	Evaluation of MOH radio communication system	07/15/87	Completed
	Matazano San Miguel	07/15/87	Completed
	Report submitted for review		

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87		
Development of preventive maintenance procedures and related training and orientation	Training/orientation to all drivers on the proper use of vehicles equipped with TURBO-DIESEL	Initiate training and orientation	03/01/87	Completed	
		Complete training and orientation	04/17/87	Completed	
		Orientation to administrators and shop personnel on modifying MASCI		04/17/87	Completed
		Development and implementation of PM routines for motorcycles	Provide PM routines for 125cc, 4-cycle engines	02/28/87	Completed
		Develop and implement preventive maintenance schedules for other donated vehicles		04/15/87	Completed
		Develop, review, and modify fuel control systems to reconcile all balances reported from the field	Design Approval Implementation	03/15/87	Completed
			03/31/87	Completed	
			04/15/87	Completed	

SUBCOMPONENT II-B - BIOMEDICAL EQUIPMENT INVENTORY AND MAINTENANCE SYSTEMS

Development and implementation of an inventory system for medical equipment (ISME)	Evaluation of ISME implementation in the Eastern Region		02/20/87	Completed
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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Implementation of changes suggested by the evaluation	02/27/87	Completed
	Inventory of medical equipment in all health care facilities in the Oriental Region	01/16/87	Completed
	Inventory of medical equipment in all health care facilities of the Metropolitan and Central Regions	04/24/87	90% Completed
Establish Preventive Maintenance Service Programs (FMSF=) in hospitals and health centers for key equipment	Evaluation of PMSPs for seven key pieces of equipment in the Oriental, Central, and Metropolitan Regions	02/28/87	Completed
	Implementation of changes or adjustments suggested for their improvements	02/27/87	Completed
	Carry out quarterly equipment preventive maintenance routines at the Eastern, Metropolitan and Central Regions	04/10/87	Completed
Training in biomedical equipment maintenance and operation	Update of MOH maintenance human resources census	03/09/87	Completed

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Formulation of biomedical equipment training plan for the period January-April 1987	02/06/87	Completed
	On the job training in sterilizers, incubators anesthesia machines centrifuges, microscopes, X ray processors, and microscopes, and suction equipment operation and basic care	04/10/87	Completed
Establishment of the Maintenance Management and Administration System	Evaluation report on the implementation process in San Esteban and Regional Workshop in San Miguel	03/06/87	Completed
	1986 Maintenance Performance Tables and Indicators for San Esteban and San Miguel Regional Shop	03/10/87	Completed
	Job descriptions for deputy chief of biomedical maintenance section and deputy chief of Central Maintenance Department	07/10/87	Completed
	System implementation at San Miguel Hospital	02/13/87	Completed

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
Establishment of indicators to measure progress in the performance and repair of biomedical equipment	Indicators implementation at San Miguel Hospital	02/15/87	Completed
Installation and pre-installation of biomedical equipment	Collaboration with MOH in the formulation of the installation plan for the 1st half of 1987 on the basis of tentative arrival dates for the equipment	03/09/87	Completed
	Assistance to MOH to determine persons responsible for the work to be performed during the 1st half of 1987	03/09/87	Completed
	Evaluation report of the equipment arrived in 1986 but still not installed, with proposals for their installation or reassignment	03/09/87	Completed
Strengthening and development of regional biomedical workshops	Progress evaluation of the workshop in San Miguel and proposals for its improvement	03/06/87	Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
SUBCOMPONENT II-C - HEALTH FACILITIES CONSTRUCTION			
Through construction and remodeling projects, assist the MOH in upgrading its physical infrastructure	Warehouse lift	03/30/87	
	Installation of paper cutter	03/30/87	
	Remodeling of Matazano modules A, B, and C	09/15/87	
	X-Ray installations at:		
	- Rosales	01/15/87	Completed
	- Bloom (moved to Zacatecaluca)		Completed
	- Maternity	01/15/87	Completed
	- Santa Tecla	01/15/87	Completed
	- Santa Ana	01/30/87	Completed
	- San Vicente	02/15/87	Completed
- Usulután	02/15/87	Completed	
- Zacatecoluca	02/15/87	Completed	
Boiler installations at:			
- Cojutepeque	04/30/87		
- Rosales	04/30/87		
- Santa Ana	04/30/87		
- San Vicente	04/30/87		
- Sonsonate	04/30/87		
Remodel biomed shops at			
- Santa Ana	03/30/87		
- San Vicente	03/30/87		
- San Miguel	02/12/87	Completed	
Assistance to the MOH for the improvement of	Construction of five pre-fabricated	04/30/87	

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
infrastructure and equipment installation	warehouses at Zacamil and one at Matazano		
	Preparation of bid documents for installation of the new boilers and emergency generators	02/15/87	Completed
	Remodeling of the administrative offices at the regional warehouse in Santa Tecla	03/30/87	Completed
	Construction of biomedical workshop for the Metropolitan Region	02/28/87	
	Completion of installation of seven emergency generators	02/27/87	
	Construction of drug quality control lab	04/30/87	
	Office remodeling for the Unidad Tecnica	03/31/87	Completed
COMPONENT III - MOH MANAGEMENT INFORMATION SYSTEM (MIS)			
SUBCOMPONENT III-A - AUTOMATION OF THE MOH MIS			
Coordinate and implement	Establishment and	Revised final document	04/30/87

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87		
the MOH management information system (MIS)	operation of new computer facilities and systems, development of administrative and organizational procedures	describing structure, guidelines, and development strategies of the MOH MIS			
		Installation of computer hardware and required support systems	Matazano (transport) Supply management	12/01/86	Completed
			Matazano	12/21/86	Completed
			Occidental	12/21/85	Completed
			Oriental	04/07/87	Delayed (MOH request)
			Paracentral	04/15/87	Delayed (MOH request)
			Metropolitana	04/15/87	Completed
			Central	03/31/87	Completed
			Central MOH minicomputer	12/01/86	Completed
			Central MOH peripherals	04/10/87	Delayed
			UTMIM	04/06/87	Completed
			Biostatistics	04/07/87	Completed
			Epidemiology	03/20/87	Completed
		Initiate Wang VS65 system training program for MOH programmers	02/15/87		
		Complete Wang VS65 system training program for MOH programmers	04/15/87		
	Establishment of an integrated purchase program for the MOH	Complete the design of acquisitions and distributions subsystems	04/15/87	50% Completed	
	Establishment of the supply management subsystem for	Design Programming Delivery/testing	12/01/86	Completed	
			12/01/86	Completed	

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
medications	Matazano	12/10/86	Completed
	Occidental	12/10/86	Completed
	Oriental	04/07/87	Delayed (MOH request)
	Paracentral	04/15/87	Delayed (MOH request)
	Metropolitana	04/07/87	Completed
	Central	04/01/87	Completed
	Training	04/15/87	Completed
	Produce manuals	04/08/87	Completed
Establishment of the vehicle maintenance and inventory subsystem	Design	11/01/86	Completed
	Programming	12/01/86	Completed
	Delivery/testing		
	Matazano	12/01/86	Completed
	Training	04/15/87	Completed
	Produce manuals		Completed
Establishment of the bio-medical equipment inventory subsystem	Delivery of requested modifications	03/18/87	Completed
	Delivery of motorcycle subsystem	04/03/87	Completed
	Design		Completed
	Programming		Completed
	Delivery/testing		Ongoing
Establishment of the bio-statistical subsystem	Training		Ongoing
	Produce manuals		Completed
	Design	01/31/87	Completed
	Programming	04/01/87	
	Delivery/testing	04/08/87	
	Training		Ongoing
Delivery and operation	Produce manuals	04/15/87	
Delivery and operation		Completed	

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	of epidemiological statistics component		
	Establishment of the MOH general inventory system at the central level	12/15/86	Completed
	Training of MOH users and programmers		Ongoing
Design and implementation of subsystems to complement the current MOH management information system	Design and formal delivery of the MOH purchasing program system to the Proveeduria	04/15/87	Possibly infeasible due to time constraints and lack of required policy decisions
	Establish work plan to implement a transport spare parts inventory system	07/15/87	Postponed to APSISA
	Develop and deliver computer programs for the transport spare parts inventory system	04/20/87	Postponed to APSISA
Integration of biostatistical and morbidity data with the MOH planning process and management information system	Produce statistics for 1986 derived from the sample previously approved by MOH	07/31/87	Delayed
	Establish the plan of action for collecting	04/15/87	Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	and analyzing information for 1987		
	Develop the connections of the biostatistical subsystem with other modules of the MIS, including programming of medical services	04/15/87	50% Completed
Establishment of a functioning Users Committee for the MOH MIS	Approval of the operating procedures for the Committee and its technical and administrative subcommittees	04/07/87	Postponed to APSISA
	Approval of the general procedures concerning management of the MIS and its use in relation to the process of decentralization	04/20/87	Postponed to APSISA
	Establishment of the technical and administrative relations between the Unidad de Informatica and regional MIS users		Ongoing process dependent on User Committee decisions
	Establishment of monitoring procedures and system security	03/20/87	50% Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
SUBCOMPONENT III-B - HEALTH PLANNING			
Strengthening and improvement of the health planning process	Evaluation of the MOH planning process and formulation of a technical assistance program to improve it	03/30/86	Completed
	Evaluation of AID health projects in El Salvador and provision of associated recommendations	03/30/86	Completed
	Determination of required indicators for the planning process	03/30/86	Completed
	Formulation of a health activities programming methodology to be used at the local and regional levels	06/13/86	Completed
	Review and analysis of the computer program for morbidity records tabulation	06/20/86	Completed
	Elaboration of a self-teaching educational module on Health Programming	06/20/86	Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Methodologies		
	Training of approximately 220 persons (doctors, nurses, auxiliaries, technicians, etc) in health programming at the Western Region	09/30/86	Completed
	Elaboration of the health activities program for all units in the Western Region for 1987	12/05/86	Completed
Extension of the health planning process at regional and local levels	Workshop for central level personnel on health services methodology prepared in 1986	04/15/87 to 04/21/87	Postponed to APSISA Project at MOH request
	Adjustment of services programming matrices in accordance with the workshop results	04/30/87	Postponed to APSISA Project at MOH request
	Evaluation of the local programming in the Occidental Region during the 1st quarter of 1987 and selection of the next region to be incorporated in the health services	04/30/87	Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87

programming process			
SUBCOMPONENT III C - EPIDEMIOLOGICAL SURVEILLANCE SYSTEM			
Evaluation, design, and implementation of an epidemiological surveillance system (ESS) to provide current and reliable information for the MOH	System analysis and report on the potential for modifying the existing MOH ESS	Conduct review of all the activities related to the ESS	11/05/86 Completed
		Joint review with the MOH Epidemiology Unit of the main obstacles and alternatives to improve the system	11/10/86 Completed
		Establish priorities and a plan of action for the ESS	11/10/86 Completed
	Design of a modified system for collection, processing, and reporting of epidemiological data	Design and development of programs to improve data processing and reporting	11/21/86 Completed
		Update morbidity reports using computer facilities to generate epidemiological reference curves for the different regions	12/20/86 Completed
		Generation of epidemiological reports for national and regional health planners	01/16/87 Completed

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Training of personnel to handle the subsystems already developed	12/10/86	Completed
Implementation and operation of an emergency ESS for two months following the earthquake	Determination of measures to be taken by MOH health personnel	10/14/86	Completed
	Identification and selection of data collection teams to cover the metropolitan area	10/16/86	Completed
	Development of forms and procedures for data collection	10/15/86	Completed
	Establishment of a data processing unit at MOH headquarters, including emergency and back-up equipment and procedures	10/17/86	Completed
	Monitoring and reporting of health services provision by different groups	10/20/86	Completed
Development, implementation, and evaluation of the system at the regional level	Organization of the regional committees to work on monitoring and evaluating epidemiological activities	03/20/87	Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	Development of six month workplan for 1987	04/15/87	Completed
	Training of personnel to operate programs and procedures of the epidemiological system	04/30/87	Completed
	Implementing and evaluating the plan for the different regions	09/30/87	APRISA Activity
	Design and development of a system for stratifying health situations at the local level	04/30/87	Completed
Strengthening and modification of the MOH morbidity reporting system	Production of El Salvador morbidity reports for the years 1984 through 1986	11/19/86	Completed
	Design and development of new procedures for data collection and coding	11/26/86	Completed
	Development of framework and procedures for sampling of morbidity data throughout the MOH system	Design and development of computer programs for data coding and verifying morbidity according to the 1975 ICD/WHO	* 12/18/86

OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87	
	Evaluation and modification of computer programs	03/28/87	Completed	
	Provide training on improved data entry protocols and procedures	01/23/87	Completed	
	Implement procedures for increased utilization of morbidity data in health planning and drug inventory control	04/24/87	20% Completed	
Development of an efficient system for monitoring and evaluating health services provision to the Salvadoran population	Design and feasibility assessment of a comprehensive system of monitoring and evaluation of health services delivery	Assessment of the information system related to health services provision	12/15/86	Completed
		Identification of priority areas for improvement or development	12/19/86	Completed
		Development of a unified system for services provided by the vaccination program	01/21/87	Completed
		Formulate and begin implementation of a plan for reviewing the main components that pertain to direct health care	04/03/87	AFSISA Activity

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	provision		
	Identification of instruments and procedures to improve data collection and processing for health services provision and health status	04/30/87	Completed
SUBCOMPONENT III-D - TRAINING (New Activity)			
Increase the capacity of the MOH Training Center to design and implement competency based training for basic health services providers	Evaluation of on-going MOH training programs for basic health services personnel (health units and posts, rural auxiliaries)	03/05/87 to 03/21/87	Completed
	Preparation with the MOH of a phased five year training plan for basic health services personnel	03/05/87 to 04/30/87	Completed
	Description of the procedures for identifying and obtaining external and administrative training resources (including scholarships)	03/05/87 to 03/30/87	Completed

OBJECTIVE*	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
SUBCOMPONENT III E - BASIC STUDIES (New Activity)			
Review and improve performance measures used to evaluate comparative efficiency of health care delivery in the MOH system	Review existing methods for analyzing performance of MOH facilities and programs	01/31/87	Completed
	Identification of institutional, economic, and technical limitations to advanced analytic techniques	03/15/87	Continuing process, also dependent on User Committee policy decisions
	Application of data envelopment analysis to hospitals	04/15/87	Postponed to APSISA
Determination of cost savings associated with implementation of treatment norms at the local level	Elaboration of treatment norms for the most frequent health problems encountered by the Salvadoran population	03/31/87	Completed
	Establish unit costs for resources used in treating these health problems	04/15/87	Postponed to APSISA
	Elaboration of a training program and on-going communication mechanism concerning	04/22/87	30% Completed

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OBJECTIVES	ACTIVITIES/ DELIVERABLES	COMPLETION DATE	STATUS AT 4/30/87
	treatment norms for local health system personnel		
	Methodology for integration of treatment norms, biostatistics, and morbidity data with historic consumption patterns for the estimation of MOH drug requirements	04/30/87	50% Completed

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