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# Health Systems Vitalization Evaluation

## SUMMARY

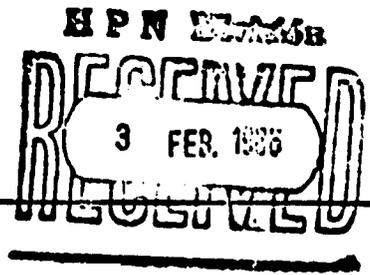
***Submitted To:***

**United States Agency  
For International Development  
San Salvador, El Salvador**

***August 1985***

**SUBMITTED BY**  
**university research corporation**

**URC**



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The logo for University Research Corporation, consisting of the letters "URC" in a large, bold, outlined, sans-serif font.

**EL SALVADOR**

**HEALTH SYSTEMS VITALIZATION EVALUATION**

**SUMMARY**

**AUGUST, 1985**

**UNIVERSITY RESEARCH CORPORATION**

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### TEAM COMPOSITION

A four man team was selected for the mid-term evaluation of the VISISA project. The Team Leader and Health Administrator was Laurence McGriff, M.A., M.I.M. Mr. McGriff is involved in private sector international health projects. The Pharmaceutical Section was prepared by Aida LeRoy, Pharm.D. Dr. LeRoy has served frequently as a consultant for PAHO, AID and other organizations. The Health Manpower Section was written by Hector Correa, Ph.D. who is a professor of Economics at the University of Pittsburgh. Dr. Correa served as a member of the team that conducted a health resources assessment in El Salvador in 1984. Andrew W. Nichols, M.D., M.P.H., is a professor of Community Medicine at the University of Arizona. Dr. Nichols also conducted an assessment of health sector policy and programs in August, 1984. He updated the previous report and reported on the health status of the Salvadoran population.

### ACRONYMS

AID	=	United States Agency for International Development
BEMS	=	Bio-Medical Management Systems
EMG	=	Executive Management Group
GOES	=	Government of El Salvador
ISSS	=	Salvadoran Social Security Institute
MASCI	=	Management and Administrative System with Control Indicators
MCH	=	Maternal and Child Health
MOE	=	Ministry of Education
MOH	=	Ministry of Health
ORT	=	Oral Rehydration Treatment
PAHO	=	Pan American Health Organization
PHC	=	Primary Health Care
PMSPP	=	Preventive Maintenance Schedule Program
T.A.	=	Technical Assistance
TBA	=	Traditional Birth Attendant
UNFPA	=	United Nations Fund for Population Activities
WHO	=	World Health Organization

## I. INTRODUCTION

This report represents the mid-term evaluation of the AID Health Systems Vitalization Project (VISISA) in El Salvador. The general objective of the evaluation is to "provide the U.S. Government and the Government of El Salvador with a current assessment of the status of health of the Salvadoran population, of human resources for health, of health services delivery in El Salvador, of pharmaceutical logistics, and of biomedical and vehicle maintenance as they relate to Project progress." The Project came about because of a request by the Government of El Salvador several years ago. It was experiencing shortages of medicines and equipment and deteriorating logistical systems. A small portion of the Project was for needed emergency supplies, but the bulk of it was for medium and long range needs. The Project is due to be completed on December 31, 1986.

This document summarizes the five documents that make up the report, each examining a slightly different aspect of the Project or health care system:

1. A health administrator evaluated changes in service delivery levels and health facility usage and the specific progress of the VISISA project.
2. A physician evaluated changes in mortality and morbidity and progress in implementing recommendations made in a previous study (August, 1984).
3. A pharmacologist evaluated the pharmaceuticals and logistics system in general and as they relate to the VISISA Project in particular.
4. The mid-term evaluation of the VISISA Project by Kraus International is an important benchmark giving the detail of progress in technical assistance.
5. An educator evaluated progress in the health manpower area and analyzes changes that have occurred since a baseline study that was done a year ago.

The reports document progress and incremental improvements that are being made in the health care system. It is premature to relate changes in health status, health manpower or facility utilization to the VISISA Project. The VISISA Project was limited to bringing in certain critical commodities and a small amount of technical assistance. It was and is significant in meeting an emergency need and in supplying medicines and equipment. Progress in building institutional capability is slow but steady.

## II. SUMMARY OF PROJECT ACCOMPLISHMENTS

The primary purpose of the Project is to increase the availability to the general populace of primary health care and emergency medical services through fulfilling MOH short-term requirements for essential goods and

services. A secondary, corollary purpose, is to strengthen MOH capabilities for health supply and information management and for the maintenance of vital medical and vehicular equipment. The evaluation found that while there had been delays -- now overcome -- in the procurement of the drugs and other commodities required in the medium term, emergency drug procurements had been carried out expeditiously and that within two years of the Project's commencement the Project management has been able to advance activities leading to the upgrading of service delivery capability. Work remains to be accomplished in the areas of management information systems, where significant delays have occurred, and emergency medical training.

With the timely assistance of Project management and technical assistance (T.A.), improvements had also been achieved in the Ministry of Health (MOH) service delivery systems, and particularly in its transport system and the "cold chain" for delivery of vaccines throughout the country and other commodities requiring refrigeration. In this regard, the evaluation notes the significant Health Systems Vitalization Project contribution to the highly successful 1985 nationwide vaccination campaign. While these and other improvements in MOH operations have been effected largely through the Project, this evaluation suggests long-term requirements for strengthening the Ministry, and highlights continuing problems in personal management and human resources development. High employee turnover, low salaries, the rigidity of the civil service system, and deficiencies in budgeting and procurement are significant hindrances to the achievement of efficiencies in MOH operations. It should also be noted that the MOH budget has remained constant since 1981, inclusive of external assistance, and because this shortage of funding is likely to continue for the foreseeable future, MOH priorities are likely to shift from the curative to the preventive, and from high-cost institutional care to community-based primary care.

With respect to the general health of the population and the causal effects of MOH services on it, the evaluation found that incidence rates of major diseases have not changed sufficiently over the past two years to determine significant trends. It can be said, however, that the MOH is providing more (and to some extent more effective) services, given a constant budget which is eroded by inflation. Total outpatient visits, prescriptions written, injections given, and radiology and minor surgery performed in hospitals and health centers increased significantly between 1983 and 1984. Budget constraints notwithstanding, MOH efforts to provide health services to 85% of the population have been quite effective. As to the performance of The Health Systems Vitalization Project (VISISA), the evaluation finds that "although we cannot claim that VISISA solved all the problems or made tremendous improvements in the health care system, the deterioration has been halted, and measurable improvements have been made in some areas."

A summary of the Project outputs is provided below, by Project component:

A. Health Supplies Management System

1. Supply Management

Procurement of drugs and medical supplies has increased dramatically during 1985, and more than 85% of the drugs to be ordered under the Project were in-country as of mid-August 1985. Distribution of most drugs to health units appears to be moving smoothly. A system of health monitors has been instituted to get a precise fix on the flow of drugs and other indicators of supply and service provision. An excellent country-wide cold chain has been developed. The warehouse construction and renovation is one month behind schedule due to (1) the temporary unavailability of several critical materials and (2) additional time needed to complete work on the foundation structure. The construction company and project management do not foresee any additional problems that would further delay the completion of the warehouse. Training in warehouse management, though begun, is still behind schedule. Other areas of MOH supply management, including inventory control, still need major improvement. Due to a rather weak initial performance of the contract supply manager the supply management TA fell behind the schedule developed in the work plan. This trend was reversed by Project Management through restructuring the supply management TA with the contractor. Also, the MOH initiated management improvements are required if its logistics systems are ever to function at peak efficiency.

## 2. Malaria Control Supplies

\$1.3 million in insecticide and spray equipment has been procured and training provided. Malaria control T.A. is being provided to the MOH. Conclusions on the component's effectiveness cannot yet be drawn.

## 3. Drug Quality Control

Selection of a site and an existing structure for a drug quality control lab was significantly delayed. A site has now been agreed upon, site inspection completed, and specifications written for equipment.

## B. Public Health Infrastructure Maintenance

### 1. Vehicle Maintenance

A preventive maintenance program has been designed and implemented. Significant improvement has been made in reducing vehicle downtime. The percent of vehicles' deadline has decreased from 40 to 25 percent. T.A. provided by Westinghouse, Inc. for this component has been extremely effective and should be continued at least on a short-term basis. The maintenance area construction and numerous training programs have been largely completed.

### 2. Biomedical and Electro-Mechanical Equipment

A management system has been developed to track all phases of biomedical maintenance and a biomedical equipment inventory has been completed, as has an equipment needs analysis. Staff productivity

was judged to have risen by 16 percent over the past year. There have been delays in procuring equipment, but all that has been received has been installed. The bio-medical T.A. provided by Westinghouse has been very effective and should continue.

C. Management Information System (MIS)

This component suffered serious delays because of the inability of the MOH to decide on a MIS hardware configuration, due in part to conflicting advice from PAHO and an AID Consultant. An MOH decision was recently obtained and implementation of this component should now be accelerated as other Project components depend on it, particularly supply management.

D. Emergency Medical Services

All equipment and supplies to be procured under this component have been ordered and the bulk of these commodities received. Training for ambulance drivers, general medical officers and nurses has been delayed and scaled back, but will commence shortly, utilizing the trauma training modules that were completed in early August 1985. The GOES decided that three new mobile surgical teams planned for development under this project component were not required.

In addition to the elements of the Project which were authorized by AID-Washington, a series of additional activity requirements were placed upon the Project by the House Appropriations Committee, as conditions for follow-on funding. The requirements included a review of human resources in the health system, an examination of the overall health status of the Salvadoran people and recommendations for improvements in these areas.

E. Human Resources and Health Manpower

1. Health Manpower

Health manpower production and distribution is yet another indirect guide to health services delivery. Treated more extensively in the individual reports, some selected remarks are appropriate in this context.

The issue of physician production is of some relevance. Until 1981-82, all medical school enrollees in El Salvador were in the National University. In that year, 621 students matriculated in private medical schools. The number matriculating in these schools continued to grow in 1982-83 and 1983-84. With a substantial increase in matriculation by the University of El Salvador in 1984-85, there was a corresponding decline in matriculation at the private schools. These data include periods when there was no matriculation in either the National University or private medical schools.

With an eight year curriculum, for example, the failure to enroll new students in 1976-77 by the National Medical School should have resulted in a relatively low number of students available for social service year commitments in the current year. (Since the relationship between matriculation and graduation times is not precise, due to closure of the medical school and varying times required to graduate, such statements are only approximate.) This problem should soon be addressed by the completion of educational requirements for students matriculating in 1978-79 and 1979-80. Assuming most students graduate on schedule, a real shortage will occur again in 1988-89 and 1989-90 when classes which should have graduated from the National University will be absent due to the closure of the school in June of 1980. This problem will be partially alleviated by graduates of private medical schools in 1989-90, following which El Salvador may see an excess of medical graduates for a number of years if present trends continue. When physicians actually in practice are considered for the years 1983 and 1984 (1984 data being unofficial and in prepublication form at this time), it is apparent that the major change in physician staffing is with reference to this social service year of physicians working within the MOH. In 1983 the number of such physicians was 175; in 1984 it dropped to 151. As a consequence of this reduction, several specialist positions were added to the Ministry's budget for medical personnel. The real impact, however, was a reduction of 14 percent in the number of social service physicians in the field.

Based on information presented above, it may be predicted that this reduction will continue for the next couple of years. When distribution of health positions generally in the Ministry is reviewed between 1983 and 1984, it may be seen that there is little, if any, effective change. The actual number of personnel employed by the Ministry increased by five, with virtually no change in distribution by region. Placement by urban and rural location is not provided in Ministry statistics.

Student physicians rotate through outpatient facilities in Metropolitan San Salvador during their sixth and seventh years. All of the Medical Schools provide courses in Public Health Epidemiology, Biostatistics and Medical Anthropology, although the sequence in the curricula of these courses differs from school to school. Orientations are provided to social year physicians (Eighth year medical students) by the Ministry of Health on nutrition, oral rehydration, sanitation and other programs carried out in the Health Regions. Special training modules, assisted by MEDEX and funded by the Project, were developed for this training.

The number of nurses that the MOH should be hiring is specified in the Health Plan 1985-1989. It should be observed, however, that this number is less than that considered advisable in the alternatives presented in the "Health Resources Assessment and Projections for the future of El Salvador" Report. The geographic

redistribution of the nurses in order to reduce their concentration in urban areas has not been implemented. However, some changes in the distribution of personnel are included in the MOH "Health Plan 1985-1989.

A comparison of the implementation status of the recommendations on nurses with those on nurse auxiliaries clearly shows that the simultaneous implementation of the two sets of recommendations might be beyond the capability of the departments of the MOH that are responsible for implementation. For this reason, first priority has been given to the recommendations on nurses. Once they reach a stage in which they require less attention, the recommendations on nurse auxiliaries will be addressed. All medical and nursing curricula are undergoing gradual revision with relatively greater emphasis being given to Primary Health Care.

There continues to be a degree of poor distribution of health manpower, particularly among physicians, who tend to concentrate in the metropolitan area of San Salvador. The distribution of nurses and auxiliaries is less skewed than that for the physicians. The 1985-1989 Health Plan, recently published, addresses the problem of poor distribution, but it will be a slow process to correct the system. It should be noted, however, that poor distribution of health manpower is not a problem which affects only El Salvador. Indeed, poor distribution seems to be the norm in Latin America (Health Conditions in the Americas, PAHO).

**TABLE I**  
**HEALTH ESTABLISHMENTS ACCORDING TO TYPE, REGION,**  
**CLOSED AS OF DECEMBER 1984**

	OCCIDENTAL		CENTRAL		METROPOLITAN		PARACENTRAL		ORIENTAL		TOTAL	
	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984
<b>HOSPITAL</b>												
Closed	-	-	-	-	-	-	-	-	-	-	-	-
Total	3	3	2	2	5	5	2	2	2	2	14	14
<b>HEALTH CENTERS</b>												
Closed	-	-	-	-	-	-	-	-	-	-	-	-
Total	2	2	1	1	1	1	3	3	5	5	12	12
<b>HEALTH UNITS</b>												
Closed	-	-	-	-	-	-	-	-	-	-	-	-
Total	21	21	14	14	23	23	12	14	28	28	98	100
<b>HEALTH POSTS</b>												
Closed	-	-	12	15	1	1	2	4	13	17	28	37
Total	29	29	39	39	4	4	39	37	53	62	164	171
<b>COMMUNITY POSTS</b>												
Closed	-	-	1	-	-	-	-	-	3	2	4	2
Total	9	10	7	7	8	8	2	2	8	8	34	35
<b>HEALTH DISPENSARY</b>												
Closed	-	-	-	-	-	-	-	-	3	2	3	2
Total	-	-	-	-	3	3	-	-	6	6	9	9
Closed	-	-	13	15	1	1	2	4	25	26	41	46
Total	64	64	63	63	44	44	58	58	102	111	331	341

Sources:

- 1/ List of Health Facilities (up dated)
- 2/ Monthly Reports of the Health Facilities

Health Statistics Department

While there may be insufficiencies of health personnel in the system, the root problem is the GOES funding to employ new personnel. Recent GOES austerity measures have frozen existing positions and prohibited the creation of new positions.

In addition, the ability of health personnel to function in the field is a function of the availability of pharmaceuticals, medical supplies and equipment which is in operating order. The Health Project is addressing these issues.

An activity that was not included among the recommendations of the Health Resources Assessment ... Report, but that deserves some attention in the analysis of the activities that have taken place in the last year in relation to the development of Human Resources for Health is the assistance that USAID provided to the construction of the new building for the School of Capacitation. For this, financing of more than C/ 1,000,000. was made available using P.L. 480 funds.

In terms of medical technologists, the information presented has a pattern similar to that observed before with respect to physicians and nurses. This means that activities have been initiated in the School of Medicine of the National University to modify the curriculum used in the preparation of the Medical Technologists. When the modifications are completed, they will be put in practice. Once more it should be mentioned that this seems to be the most acceptable procedure.

## 2. Health Facilities

Regarding the issue of whether health facilities are actually open and functioning, a review of MOH data as well as surveys by Klassen, Kraus, USAID and site visits indicates that five additional facilities have been closed when comparing 1983 and 1984 data. However, during the same period five more facilities were opened (See Table I). All Health Regions, but one (Western) are ahead of their annual goals for outpatient visits at all levels of health facilities. Facilities which are closed or show lower activity are mostly rural health posts in contested military areas in the East and Central Regions.

## 3. Health Status

Among the most useful health status indicators are the infant mortality rate and death rates, generally. These give some indication of unnecessary deaths, as defined in the more developed countries. Given the relationship between mortality from acute diseases in less developed countries and mortality from chronic diseases in more developed countries, mortality rates serve as an indirect index for the degree of development of a particular society.

Morbidity indices, on the other hand, are more a reflection of the environment and health care delivery system prevalent at that particular time. Since they are more open to interpretation and less definite than mortality statistics, they are generally considered

less valuable in measuring the health of a population. Nonetheless, they do have value and can demonstrate changes in health care and environment over a shorter period of time than can mortality indices. Once again, large populations are required for meaningful interpretation.

a. Infant Mortality Rate

Data concerning mortality in children less than five years of age for 1983 is not available at this time. The infant mortality rate for 1983 (provisional) is, however, unofficially available. When compared with data for 1982 (see Table II below) it becomes apparent that there has been little, if any, significant change. The small increase in the rate is consistent with minor fluctuations in other years, but does not reverse a longer term downward trend in this rate. It is equally, if not more significant, however, that there has been effectively no change in the infant mortality rate for the four year period from 1980 through 1983. The historic reduction in mortality underway in El Salvador for many years has been "on hold" since 1980.

T A B L E    I I  
DEATHS IN CHILDREN LESS THAN FIVE YEARS OF AGE  
EL SALVADOR  
1976 - 1983

<u>Proportional Mortality in Children Less than five years of Age as a Percent of all</u>					
<u>Infant Mortality</u>			<u>D e a t h s</u>		
<u>Year</u>	<u>Number</u>	<u>Rate*</u>	<u>Total All Ages</u>	<u>Less than Five Years</u>	<u>Percent</u>
1976	9,154	55.2	---	12,676	41.1
1977	10,529	59.3	---	13,958	42.3
1978	8,790	50.8	---	11,263	36.7
1979	9,232	53.0	32,936	12,094	36.7
1980	7,138	42.0	38,967	9,211	23.6
1981	7,183	44.0	37,468	10,269	27.4
1982	6,621	42.2	33,309	8,931	26.8
1983(P)	6,168	42.8	37,715	---	---

Source: General Office of Statistics and Census

\* Rate per 1,000 live births

P = Provisional Data

b. Morbidity

As stated above, morbidity data can be presented in a more contemporary manner than can mortality data. Once again, this reason is that morbidity data are maintained by the MOH, whereas mortality data are not. Comparisons

for 1983 and 1984 are available and are of some interest. Table III shows data for the ten most common reportable illnesses. It should be noted that unofficial, but available, data from the Annual Epidemiologic Report for 1984 are slightly different than those reported in Table III. The 1984 data used for this table are taken from the Weekly Epidemiology Report for December 1984.

**T A B L E    I I I**  
**TEN PRIMARY CAUSES OF NOTIFICATION OF TRANSMISSIBLE ILLNESSES**  
**EL SALVADOR**  
**1983 - 1984**

C A U S E S	Number of Cases		Rate per 100,000 Population	
	1983	1984	1983	1984
1. Diarrheal Illnesses	120,483	137,731	2,304.1	2,881.7
2. Intestinal parasites	120,483	123,010	2,304.1	2,573.7
3. Influenza and grippe	83,214	100,908	1,591.4	2,111.3
4. Malaria	65,407	66,844	1,250.8	1,398.5
5. Amoebic dysentery	13,739	8,692	262.7	181.9
6. Gonorrhoeal infection of the genitourinary tract	5,957	8,580	113.9	179.5
7. Varicella	4,289	5,721	82.0	119.7
8. Syphilis	4,025	5,674	77.0	118.7
9. Dengue	3,814	5,452	72.9	114.1
10. Hemorrhagic conjunctivitis	2,953	4,760	56.5	99.6
<b>T O T A L</b>	<b>424,364</b>	<b>467,372</b>		

Source: Annual Epidemiology Report, 1983  
 Weekly Epidemiology Reports, 1984 (Preliminary).

Perhaps the most significant difference in the two years is that all categories but one (amoebic dysentery) are higher both in rate and number in 1984 than in 1983. In other words, of the 10 primary causes of illnesses in El Salvador, the conditions have worsened in nearly every instance.

This statement should be interpreted with caution, in that the degree of change in some cases is very slight and there may be subsequent revisions in these figures, including the rate calculations. For the moment, however, it may be tentatively concluded that there has been some deterioration reported in rates for most, if not all, of the ten primary causes of illnesses in El Salvador between 1983 and 1984. It is possible that these reported rates represent more use of health facilities, rather than more disease.

While the data on preventable infectious diseases are mixed, the potential impact on the just-concluded vaccination campaign is substantial. Although evaluation of the campaign is not yet available, it appears that approximately one quarter of a million Salvadoran children received the three required vaccinations over a three month period. These data, taken from information available at the Epidemiology Section of the Ministry, are as follows:

TABLE IV  
RESULTS OF THE VACCINATION CAMPAIGN

---

	<u>First Round</u>	<u>Second Round</u>	<u>Third Round</u>
Vaccination Posts	2,285	2,132	2,132
No. of Children Vaccinated	217,230	262,443	241,223
Goal	312,000	312,000	302,000
Rate	69%	84%	79%

---

In addition, some 15,000 mothers were vaccinated against tetanus in this campaign in an effort to prevent tetanus neonatorum.

Assuming the goal to have been realistic, the campaign seems to have been reasonably successful, apparently having reached approximately 70% of those targeted on all three rounds.

As noted, experience with previous immunization campaigns indicates that there may be a lowering of case rates for preventable infectious illnesses for children five and under in the coming year. Should this be the case, there is also the possibility that the rate will rise again unless the momentum of the immunization campaign is continued.

While 1984 may not have been a particularly good year vis a vis 1983 with respect to morbidity for children under five, it is significant that most of the preventable infectious diseases have shown a general pattern of decline in El Salvador over the past nine years. Several of these diseases experienced rises in their rate of occurrence during the period from 1981 to 1983, which may relate in some way to the social upheaval created by the military conflict in the country. The overall tendency, however, is for improved rates, while short term changes in this pattern may occur. This is particularly true of measles, which demonstrates a wide variability in case rates from year to year.

As may be seen from Table V, the number of medical consultations provided between 1980 and 1984 has been remarkably constant, with some increase in 1984 over 1983. Perhaps the most significant figures are the number of consultations per hundred eligible residents, based on the target population for which the MOH has responsibility. This figure has varied from a low of 49 in 1983 to a high of 60 in 1984--the same figure

T A B L E V  
RURAL HEALTH AIDE ACTIVITIES  
EL SALVADOR 1979-1984

D E S C R I P T I O N	Y E A R S					
	1979	1980	1981	1982	1983	1984
Total Persons Served	479,669	354,598	226,819	284,318	302,364	284,199
Morbidity Attendance*	271,142	196,870	116,829	138,470	134,335	133,123
Preventive Services (a+b+c+d+e)	35,028	23,873	14,930	17,512	17,378	15,714
a)Pregnancies	8,712	5,908	3,613	4,351	4,245	3,914
b)After Childbirth	3,694	2,298	1,528	2,012	2,176	1,996
c)Children less 1 year	12,335	8,910	5,998	6,886	7,035	6,548
d)Malnourished Children	4,793	3,004	1,785	1,874	1,519	1,329
e)Birth Control	5,494	3,753	2,006	2,389	2,403	1,927
IV-Contraceptive Provided	13,128	10,293	6,388	8,557	8,114	5,932
V-Educational Activities	368,376	234,974	156,035	211,932	227,754	217,882
VI-Missed Appointments	9,331	6,684	3,539	3,834	4,440	4,271
VII-Dwelling Unit Visits	313,058	203,017	134,445	175,530	192,278	177,261

Source: Monthly reports submitted by Rural Health Aides.

- \* This refers to consultations given for diarrheal infections, conjunctivities, headaches and other problems requiring primary health services.

which was seen in 1981. Regular consultations by physicians have varied little, emergency consultations by physicians have risen over 40% in the period from 1980-84. It is interesting to speculate to what extent this represents a change in patterns of potential behavior and to what extent it represents a change in the case mix of problems presented for attention.

### III. BACKGROUND

In the spring of 1983 The Health Systems Vitalization Project (VISISA) was developed. It was originally conceived to be a \$9 million Project with three components: health supplies management, public health infrastructure maintenance and management information systems. Subsequently, the project was expanded to \$25 million and a fourth component was added because of the need to increase the procurement levels of medicines, equipment, supplies and to improve emergency medical services.

The purpose of the project is to:

- "Increase existing levels of primary health care and emergency medical services by meeting the initial short-term needs of the Ministry for essential goods and services.
- Vitalize the institutional capacity of the Ministry to more effectively execute their existing systems in health supplies management, maintenance and information management."

In order to handle this large influx of commodities, AID was to provide technical assistance, training, supplies and construction/refurbishing of warehouses to restore the MOH logistical supply system. The objective of the Technical Assistance was "to provide technical assistance to key areas addressed by the Project, which is designed to rapidly restore and revitalize the health system in El Salvador." The four components of the VISISA Project are:

#### Component I

The first component is Health Supplies Management. This Component is made up of three subcomponents: 1) to facilitate the early acquisition of critically needed commodities for infusion into the health supplies delivery system and to restore the management and administrative capability and effectiveness of the supply management functions of the MOH including procurement, inventory control, storage and distribution and to institutionalize this capability; 2) to support and increase the capability of the national and operational areas services to control malaria effectively; 3) to establish a drug quality control program and establish guidelines for shipping, transportation, warehouses, storage, and dispensing conditions to assure the distribution of efficacious safe drugs of high quality.

#### Component II

The second component deals with upgrading the public health infrastructure maintenance and repair of transportation and biomedical equipment. AID is to support the Transport Department to rapidly improve the vehicle fleet and develop a systematic maintenance and repair program for MOH vehicles. The Project will also help MOH develop the capacity to perform maintenance and repair of biomedical, electrical, and electromechanical equipment and to establish a preventive maintenance program.

#### Component III

The third component is to provide the MOH with the necessary resources to develop a comprehensive data base to support MOH activities in procurement, supplies and maintenance management, and to implement a distributed data processing system which responds to the Ministry's decentralized administrative system.

#### Component IV

The fourth component is to improve MOH emergency medical services as a result of the high rates of civilian trauma. The Project is to

establish mobile surgical teams; provide training in intermediate trauma management, wound stabilization, primary level trauma management, first aid and patient handling techniques. In addition, the project is to procure emergency equipment and supplies and perform a special trauma study.

#### IV. PURPOSE OF THE EVALUATION

The general objective of this evaluation is to provide the United States Government and the Government of El Salvador (GOES) with a current assessment of the status of the health of the Salvadoran population, human resources for health, health services delivery in El Salvador, pharmaceutical logistics and biomedical and vehicle maintenance as they relate to the Project in progress.

#### V. EVALUATION ISSUES AND QUESTIONS

It was deemed important to study objectively the following items that were given as a charge to an independent evaluation committee: a) examine the overall health needs of the people of El Salvador; b) review and evaluate existing and proposed AID health programs; c) make recommendations pertaining to the provision of health services in El Salvador and the AID health program; and d) assess the need to train new paramedics and upgrade the skills of nurses and other health personnel.

Concerns have been raised concerning the MOH and the VISISA project such as:

- Deterioration in the health status of the population at large such as an increase in vaccine-preventable and other diseases, increases in infant mortality, malnutrition and malaria.
- That medicines and supplies brought in by the VISISA project have not arrived or have not been distributed.
- That health establishments believed to be open are closed.
- That social service physicians have not received training in outpatient medicine, public health, sanitation, and nutrition.
- That the number and distribution of health care workers is insufficient and their ability to function in the field is impaired.

This evaluation has attempted to respond to these questions. It should be emphasized that these concerns go far beyond the scope of the VISISA Project to the effectiveness of the entire health care system in El Salvador. The Project is concerned with changes in morbidity and mortality, changes in delivery levels and health manpower, as well as those items under the scope of the project such as pharmaceuticals and supplies, and logistical and maintenance systems. Shortcomings in the health care system or deterioration in health status does not indicate a flaw in the Project design. There are many other factors involved. The problems are very complex and there are no easy answers or "quick-fix" solutions.

This evaluation addresses those legitimate global and specific questions that have been raised concerning the health care system in general and the VISISA Project, in particular. The "emergency" nature of the VISISA Project presents a special problem since there were immediate needs as well as the need for long-term institutional development. The "emergency supplies," identified by the Project Paper began flowing into the country within six weeks of the GOES's compliance with conditions precedent. Deliveries were completed within four months. Regular procurements and technical assistance were outside of the "emergency" status. There were delays, however, in these procurements, for reasons to be described later. This evaluation will sort out the many factors which make up this mosaic, evaluate the performance of the VISISA project and make recommendations for future directions for AID health initiatives in El Salvador.

#### A. Accomplishments

The two general purposes of the VISISA project were to get needed drugs and commodities into the country and to revitalize the health system. Although there have been delays, significant Project activities have been accomplished. All of the funds have been committed and most of the goods have arrived in country and have been distributed. The VISISA Project reinforced the health budget and bolstered a weak and inefficient system.

Although it is not possible at this point to measure Project impact by reductions in morbidity, taking into account the five most frequent morbidities (diarrheas, urinary infection, colds, bronchitis, and parasites) Project management has found through surveys that appropriate drugs are prescribed at various health facilities. The list of drugs prescribed also indicates that hospitals and health centers are using discretionary funds (Patronatos) for additional purchases of similar drugs to complement deliveries within the MOH Supply System.

#### B. Impact to date

The evaluation has determined that the Project has achieved the majority of its short-term objectives. Medicines and supplies are flowing in the system and improvements have been made. But, it is more difficult to say whether the VISISA Project has made a significant impact on morbidity, mortality, manpower, and health facilities. Perhaps there will be measurable improvements in a year or so, but measurement is not possible now. Even then, because of the limited scope of the Project in relation to the whole health care system, the overall social, economic, and military situation, it may not be possible to draw direct causal relationships.

The training of counterparts, transfer of technology, and the development of systems that fit the local situation and are appropriate to the local technology, and human and financial resources is a long-range program at best. The frustration of AID and the Project advisors relates to the crisis nature of working in El Salvador and intense pressure from Washington. The biggest single problem was the failure to distinguish between the initial emergency need for commodities, the subsequent medium term need for commodities, and the long-term institutional building needs.

### C. Implications

This evaluation highlights some of the problems that have been encountered, the accomplishments made, and sheds some light on future directions. It was interesting to see how many divergent people and organizations were moving in similar directions - more of an emphasis on community oriented primary care, integrated rural development, human resources development and systems development. The problem is still one of policy and priorities, including budget allocations. There are sparse local resources to implement new programs.

## VI. EVALUATION RESULTS

### A. COMPONENT I: HEALTH SUPPLIES MANAGEMENT

#### Sub-component: Health Supplies Management System

1. The Health Supplies Management Component was developed to attain the following primary objectives:
  - a. Increased availability of drugs/medical supplies in MOH facilities. An increase of 20 percent in pharmaceuticals and medical supplies located in hospitals, health centers, health units, and health posts.
  - b. Additional warehouse space available. The construction of an additional 1,500 sq. mt. at the Matazano Central Warehouse and upgrading of 1,000 sq. mt. at the five regional warehouses.
  - c. Completion of the nation-wide cold chain. The construction of two cold rooms, one at Matazano and the other at San Miguel. One refrigerator truck in-country and operating, 20 refrigerator units and seven freezers installed and functioning.
  - d. Efficient and effective procurement, maintenance, and supply management systems, developed and established for the Ministry.
2. In coordination with the MOH Executive Management Group (EMG), the Project has produced the following results:
  - a. Drug Availability and Health Facilities

Drug availability surveys conducted during 1985 show increases when compared against availabilities surveyed in 1984. (See Table VI)

TABLE VI  
SURVEY OF DRUG AVAILABILITY IN THE HEALTH SYSTEM

ITEM	1984	1985 (FEB)	1985 (APR)
Oral Rehydration Salts	66.1%	67.9%	85.5%
Penicillin	77.4	58.1	90.0
Chloroquine	41.9	51.6	59.5
Tetanus Toxoid	43.6	32.4*	52.0
IV Infusions	45.2	60.0	59.5

\* The drop in this item is attributable to the increased usage as a result of the 1985 National Vaccination Campaign, which began in February 1985.

Table VII below presents the availability of an expanded list of drugs at various levels of the health system, from a survey conducted in April, 1985.

TABLE VII  
SURVEY OF DRUG AVAILABILITY PER  
HEALTH FACILITY

Item	Health Post	Health Unit	Hospital/Center
Penicillin	90.5%	95.0%	95.0%
Chloramphenicol	43.0	52.6	85.0
Oral rehydration Salts	90.5	92.1	90.0
Xylocaine	76.2	86.8	75.0
Antimalarics	76.2	86.8	65.0
Tetanus Toxoid	61.9	76.0	65.0
Syringes	85.7	97.4	100.0
Sutures	57.1	81.6	95.0
Surgery Supplies	85.7	92.1	100.0

There have been significant improvements in availabilities of most drugs and supplies, particularly at the lower end of the system (health posts and health units). Centers and hospitals also show improvements.

b. Central and Regional Warehouse Construction and Modification

Construction of additional warehouse space is now scheduled for completion on September 15, 1985 at Matazano. Although originally scheduled for June, 1985 completion, the initial time

estimates did not take into account delays due to contract negotiations and unanticipated problems with the excavation. The construction budget was projected at 1,098,000 colones, of which 350,000 colones have been disbursed.

Plans and budgets for regional warehouse modifications have been developed and approved. It is estimated that actual work time needed will be three months, with completion by January 1986. Work will include installation of exhaust fans, installation of ceiling materials, and, in several cases enlargement of existing plant space.

c. Cold Chain

Two cold chain storage units were received and installed at the central (Matazano) level, providing sufficient capacity to maintain products for national level vaccination/inoculation programs at optimal stocking levels. The installation of these units required the modification of part of the Matazano warehouse, sectioning off the cold room area, creation of an air conditioned temperature controlled area, and the mounting of an auxiliary generator. This facility was in place before February, 1985, and was utilized during the MOH's inoculation campaign, which required coordination of physical distribution by the EMG and regional administrators. During the vaccination campaign approximately 240,000 children received the complete series of DPT, polio, and measles vaccines. Development of the cold chain required coordination by the EMG of a number of inputs, including 4,600,000 doses of vaccines, 2,800,000 disposable syringes, and 200 vehicles.

An additional USAID input of 186 refrigerator units were in place and operational at regional facilities by July 15, 1985, to maintain stocks of biologicals within the system. Two supplementary cold rooms are scheduled for placement in Santa Ana and San Miguel and this will complete the cold chain. These cold rooms are scheduled for arrival in August and should be installed before December, 1985.

d. Supply Management System

The VISISA Project has provided the necessary technical assistance to initiate inventory tracking and the EMG has developed a set of draft inventory management documents. These systems will be tested during June and July, 1985.

1. Drug Arrivals

- The VISISA Project provided technical assistance in management of drug and medical supplies (disposables); AID funded drugs and supplies are moving through the MOH supply system. The VISISA Project drug and supply procurement/distribution actions are summarized below:

- The two emergency shipments of anesthetics and disposables, ordered in November 1983, began arriving in January 1984. These materials were distributed during February, March and April of 1984 to health facilities.
- The third AID/VISISA shipment (PIO/T 30113), arrived in June-July, 1984. Distribution of drugs was accomplished in the August/September 1984 period. There are still small stocks on hand at the Central IVU warehouse.
- The fourth AID/VISISA shipment (PIO/T 30131), partial shipments of which began arriving in December, 1984, January and February, 1985, a large procurement of 95 drug items, is now flowing through the MOH supply system.
- Shipments from PIO/T 30151 of 24 items, valued at \$1.04 million, began arriving in April/May, 1985. The MOH has prepared a distribution plan, and the physical distribution has begun, drawing against stocks of the 10 items that have arrived.
- The above AID procured drugs and supplies were augmented on the local level by Project purchases of 1) Rabies vaccines, \$21,000; 2) anti-malaria drugs, \$240,000; and Ethane, \$85,000. These items have been distributed to MOH facilities.

Taking into account the combined responsibilities of distributing all drug and medical supply inputs, installation of equipment, and construction, the MOH has been able to manage AID inputs effectively, through close coordination with the USAID staff, T.A., and the EMG. Timeframes for in-country distribution of AID procured products to hospitals, health centers, and regional warehouses, are acceptable. There has been some delay in receiving (inspection of cargo), due to arrivals of other large shipments of supplies. However, records indicate that during the peak period AID/VISISA products were available as active inventory at the central level (IVU) warehouse within thirty days after receipt.

The problem of the arrival of the products can be resolved through better coordination by the procurement section, the MOH purchasing committee, and the EMG. The EMG should track procurement and schedule arrivals and deliveries to minimize congestion during the receiving phase (inspection) at the central warehouse. Congestion due to build-ups of arrivals will also be reduced when the central warehousing operation is transferred to Matazano, which provides sufficient floor space for receiving, inspection, and staging.

2. Drug Utilization at Health Facility Level:

During the May 12, 1985 to June 12, 1985 period of the management evaluation second phase, a field survey of eight priority drugs was completed, using 30 MOH facilities, six in each of the five health regions. The survey was designed to secure information regarding patient load, prevalent morbidities, drugs prescribed, and drug availability over a 2 1/2 year period. In terms of drug availability the survey format provides an efficient way to obtain baseline information to compare availabilities and usage rates. This same format, with little modification, can also be utilized in the MOH drug information system as a basis to check availability and monitor usage rates.

Table VII presented below provides an overall comparison of results of the surveys conducted in February and April 1985, regarding commodity availabilities throughout the system. Clearly, with the exception of chloramphenicol, there has been a significant improvement in availabilities of basic medicines and supplies. This change in availability can be attributed to increased rates of distribution from central to regional and local facilities, as well as to the influx of commodities into the country, financed both by VISISA and other sources.

TABLE VII  
COMPARISON OF SURVEY RESULTS ON COMMODITY  
AVAILABILITY IN THE HEALTH SYSTEM

	<u>Feb./85</u> <u>Results</u>	<u>April/85</u> <u>Results</u>	<u>Percent</u> <u>Increase</u>
Penicillin	47.47%	93.50%	97%
Chloramphenicol	60.00%	60.20%	0.33%
Oral Rehydration Salts	67.90%	90.87%	34%
Xylocaine	54.43%	79.33%	46%
Antimalaria Drugs	47.90%	76.00%	59%
Tetanus Toxoid	52.23%	67.63%	29%
Syringes	84.23%	94.37%	12%
Sutures	70.10%	77.90%	11%
Surgical Supplies	67.77%	92.60%	37%

3. The Commodity System:

Nearly all of the commodities purchased under the VISISA Project have arrived. Some components of the Project are running behind, but there are a number of reasons for these delays:

There have been changes at the Minister and Vice Minister level within the last year in the MOH. Every time a change occurs, new appointments are made at the department level.

There were serious problems in the warehousing and supply systems before and there still are. Progress is being made but this is a long range problem with no easy solution. Infrastructure building, "strengthening institutional capabilities," is, by definition, long-range. It would be unrealistic to expect quantum gains in just one year.

Due to the constraints on the availability of grant funds the technical assistance component was reduced considerably from that proposed in the original Project Paper. The original Project called for 11 long term advisors, but ended up with only six (two at AID in procurement and the four Westinghouse advisors).

In summary, the EMG project management has managed to make significant progress during the 12 month T.A. period and has developed a firm basis for subsequent initiatives in supply management.

The availability of pharmaceuticals throughout the system was variable in terms of types of products and quantity. However, in each of the health facilities visited in the San Salvador area (two hospitals, one health center, two health units) adequate quantities of AID/VISISA drugs were evident. The central warehouse had received nearly 80% of the AID financed products. Of 50 products selected for inspection, 44 (88%) had had movement out of the central warehouse to hospitals and regions. Stocks of four products were totally depleted at the central warehouse, although large stocks of these products were available at several hospitals.

In terms of time to procure the AID financed products, the majority of products (52%) arrived within 120 days of the PIO/C date. An additional 22% arrived within 210 days, and 26% had not arrived as of May 15th. This remaining 26%, however, had a PIO/C date of February 12, 1985, thus May 15th, was still within 90 days of the PIO/C.

Sub-component: Malaria

The Project proposed to reduce the incidence of malaria by five percent in regions where 85 percent of the Malaria cases have been reported.

The Project has delivered \$1.3 million in insecticides and equipment. On May 20, 1985, the Malaria Division of the MOH initiated the spraying of propoxur in the known areas of susceptibility. Original plans called for three spraying cycles (each cycle of 90 calendar days) extending from March 18 to December 13 approximately.

Despite an insufficient amount of propoxur to complete the cycles, the Division decided to start spraying with its own stocks of the insecticide, reducing the number of cycles to two, in hopes of receiving the first shipment of the insecticide (originally scheduled

for March 30, 1985) through VISISA. The insecticide stocks as of May 20, consisted of 11,082 kilos, which are sufficient to last 32 calendar days (approximately half a cycle) of spraying operations.

It is anticipated that completion of the two spraying cycles will only be achieved if a second shipment of insecticide (originally scheduled for May 30, 1985) is received by the end of August.

The MOH Malaria Division received on January 30, 1985 through the VISISA Project, the equivalent of 1,000 Kgs. (2,200 pounds) of ABATE 1% granular (destined for treatment of potable water) and 235 gallons of ABATE 44% (destined for treatment of stagnant or contaminated waters). Both types of ABATE are used mostly during the dry season which was the reason for a rush procurement in January 1985. As of May 20, 1985 all of the ABATE had already been used except for four gallons (ABATE 44%) remaining at the central warehouse. In spite of the rush order, the product arrived in January, 1985, late, since application should have started early in December for best results. ABATE was ordered in October, 1984 by PIO/C No. 519-0291-5-30140, on request from the MOH, after having experienced a series of difficulties related to their International Public tenders.

#### 1. Anti-Malarial Drugs

Chloroquine Phosphate (150 mg. base)

The MOH received two million tablets in December 1984, from Richlyn Laboratories Inc., Philadelphia. This is the total amount to be received by the MOH under the VISISA Project.

Among the drugs to be purchased under the VISISA Project, chloroquine phosphate was the only one to come from the U.S. Others have been procured from local pharmaceutical companies, as these products are not produced in the U.S.

#### 2. Equipment

On April 20, 1985 the Malaria Division received through the Project five Jeep model J-20 pick-ups. These pick-ups, according to Project design, are equipped with one ULV spraying machine each.

During the National Vaccination Campaign 95% of the field malaria personnel provided assistance at the regional level. Malaria personnel devoted an estimated total of 22,113 man days distributed over the three rounds of the Campaign. An additional factor that impacted negatively upon the Malaria Division during 1984 was the lack of resources especially in the areas of larvicides. This type of insecticide has its greatest effect during the dry season, which

is the reason why spray operations need to be initiated during the November-December period. Insecticide for such purpose did not arrive until the end of January, with a consequent delay on larvae control.

Sub-component: Drug Quality Control

The Project proposed to establish a Drug Quality Control laboratory in the MOH to improve the drug quality regulating capacity of the Ministry.

Project Management has negotiated with the Ministry of Agriculture (MAG) and the MOH for the utilization of the MAG laboratory space to mount a unified DQC program. A T.A. consultant has made an assessment of the laboratory space and equipment available. The recommendations of the T.A. will be utilized in subsequent activities designed to upgrade the DQC program during 1985/86.

The T.A. site inspection was completed, specifications have been written for equipment, and a final report is due July 22, 1985.

B. COMPONENT II. PUBLIC HEALTH INFRASTRUCTURE MAINTENANCE

The Project component was designed to provide an improved MOH maintenance/repair capability for vehicles, the physical plant, and medical equipment. Four additional positions in the MOH Division of Transportation were to be created. The average cost of repair and maintenance per car was to be reduced. A reduction to 15 percent in the number of deadlined vehicles in the first Project year, and a reduction to 10 percent at the end of the Project was targeted.

In addition, improvements in the maintenance/capability for medical electro-mechanical, sanitation equipment and physical plants were contemplated. An increase of 40 percent in maintenance visits by the MOH Department of Maintenance personnel to health centers, units and posts was also part of the design.

1. Vehicle Maintenance

All of the vehicles have arrived or have been ordered. There have been delays in getting spare parts which has made it difficult to reduce downtimes. However, significant improvements have been made. Since January 1985, the number of vehicles operating has increased from 59.6 percent to 75 percent, and the percent of vehicles deadlined has gone from 40 percent to 25 percent. These rates would be better if spare parts were more available. A preventive maintenance program has been designed and implemented. Significant construction for vehicle maintenance areas in Matazano has taken place and numerous training programs have been conducted for the mechanics, drivers, and supervisors.

2. Transport

Since October, 1984, the transport T.A. Advisor, working with the EMG, the Transport Section, and the Computer Manager, has developed and completed a series of activities that have, at this writing, produced significant results.

A management and administrative system with control indicators (MASCI) has been developed, tested, and is now operational. This system tracks vehicle utilization, costs of operation, maintenance and repair. The transport manager can utilize the system as a management tool and an evaluation system. Three components of this system (vehicle inventory, cost control, and spare parts inventory) have been computerized. Since January 1985, the system has been successfully used to track the efficiency of repair and maintenance operations. Utilizing the indicator of vehicle turn-around repair performance, the following improvement in vehicle availability can be seen:

TABLE VII

VEHICLE AVAILABILITY

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	<u>Vehicle % Operating</u>	<u>Vehicle % Deadline</u>
January	59.6	40.4
February	61.7	38.3
March	63.3	36.7
April	64.8	35.2
May	69.8	30.2
June*	75	25

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(\*) Projected

As the above Table indicates, there has been a significant decrease in vehicle downtime during the above six month period. The significant increase of operating vehicles and decrease in down time, beginning in April, is due to the opening of an imprest fund at the transport office level, which facilitates acquisition of spare parts. Downtime has decreased dramatically now with the arrival of spare parts, in June, 85. Credit is due to the Transport T.A. Advisor, whose managerial skills have been instrumental in assisting the transport officer to reorganize the Transport Division.

A preventive maintenance schedule program (PMSP) has been designed, tested, and is now operational. Each vehicle in the fleet has received a PMSP folder, which is a basic guide to preventive maintenance.

At the central MOH Transport Headquarters, Matazano, the following plant infrastructure has been put in place:

- Tool shop
- Bathrooms
- Tire shop
- Radio shop
- Vehicle reception office

Construction is over 70% complete in the battery and muffler shops. The gasoline station construction was initiated in July 1985. Additional warehouse construction is scheduled for the Eastern, Central, Para Central, and Western Regions.

Training programs have been developed and presented to support implementation of the PMSP and MASCI. Training on diesel fuel and cooling systems as well as a one-day seminar for drivers has been completed. Additional training on preventive maintenance, engine rebuilding, brakes and tune-ups were held in June, July, and programmed for August of 1985.

With the implementation of PMSP and MASCI the MOH Transport Section clearly has the necessary management information structure to operate its fleet effectively and efficiently. USAID inputs of materials, vehicles, spare parts, tools, radios, technical assistance have been well targeted. However, the management system alone will be unable to sustain the level of current development with a current fleet of 473 vehicles, 200 of which are models ten years or older. The most efficient preventive maintenance and management systems will not be able to keep downtime to a minimum and reduce operating and maintenance costs with half the vehicle fleet sinking into obsolescence. And while still in the MOH vehicle inventory, comprising a significant part of the fleet, these vehicles will become less and less cost effective, a drain on maintenance budgets. The T.A. transport advisor has completed phase I of a vehicle fleet evaluation, which has been instrumental in determining which vehicles are no longer economically operable. This vehicle evaluation also includes a component that requires submission by each division or program of the MOH of a detailed justification for each vehicle. This will assist the MOH in the capital and annual budgetary process, in which informed decisions are necessary to manage efficiently a fleet that currently contains 473 vehicles. The transport TA is on target in terms of both short term and long term objectives.

### 3. Biomedical and Electro Mechanical Equipment

There have been some delays in procuring equipment, but these delays are related to changes in personnel in the Ministry and the time taken to decide on what equipment they want, writing the specifications, getting approvals and going about the lengthy and time-consuming bidding process. All equipment that has been ordered has arrived and has been installed. A management system has been developed to track all phases of the biomedical maintenance. Since September 1984, productivity has risen from 66 percent to 82 percent. A human resources assessment has been completed and training programs were planned for the period from June 25 to July 21 for biomedical technicians. An inventory of all biomedical

equipment was just completed and an analysis of equipment and spare parts currently needed has been developed. Besides all of the planned activity, the bio-medical advisor provided considerable assistance to the MOH in procurement, structuring specifications, etc.

#### 4. Bio-medical and Vehicle Maintenance

These two activities are nearly completed as pointed out previously. The counterpart to the biomedical advisor left just before the Project started. Both the vehicle and biomedical advisors have had difficulty finding and working with counterparts that have the background and ability to do the job, especially in the bio-medical area. Both areas are plagued by low salaries, and the inability to get and keep qualified people. The Ministry likes people who will roll up their shirt sleeves and work along with them. Both of these advisors gained considerable respect by the Ministry and its staff. The biomedical advisor spent two months helping the Ministry rewrite specifications for biomedical equipment which differed sharply from decisions made by the prior Administration.

#### 5. Bio-medical Equipment

The installation of VISISA Bio-med Equipment currently in country has been completed. This includes sterilizers, film processors, and smaller operational and test equipment.

The X-Ray equipment and anesthesia equipment are now on order. The Bio-med T.A. was able to include both installation and training as part of the procurement package, two valuable service elements that were not contemplated in the original specifications. A delivery plan for this equipment has been prepared by the Bio-med T.A. and the EMG.

It should be noted here that the Bio-med T.A. has provided a significant amount of additional assistance in the procurement of major equipment (reviewing requirements and rewriting specifications) to ensure that VISISA capital equipment inputs were technologically appropriate.

#### 6. Bio-Medical Equipment Management Systems (BEMS)

This management system has been designed, tested, and put in operation ahead of schedule. It provides an effective way of tracking all phases of the Bio-med maintenance activity, including the monitoring of work orders, equipment installation, training, and time control. Using the BEMS as a management tool and tracking system, the Bio-med T.A. has prepared an evaluation of productivity over an eight month period (from Sept 1984 to April 1985). The productivity measurement for this phase of Project implementation is a comparison of work requests against completion.

As Table VIII below indicates the productivity, or work completed, has risen from an average of 66% for the four month 1984 period, to 82% during the March-April 1985 period. During the same period it should be noted that the number of requests increased, a total of 339 work requests during the four month 1985 period, against a total of 159 requests during the last four months of 1984, a 114% increase in work requested.

TABLE VIII

AVERAGE MAINTENANCE PRODUCTIVITY

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MONTH	YEAR	WORK REQUESTS	COMPLETED WORK REQUEST
Sept.	1984	53	27
Oct.	1984	29	23
Nov.	1984	40	34
Dec.	1984	37	22
Jan.	1985	101	77
Feb.	1985	53	45
March	1985	99	78
April	1985	87	75

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Beginning in January, 1985, two maintenance shops in San Salvador were unified under one immediate supervisor, which provided more control over the work schedule. Also, the T.A. Advisor in coordination with the maintenance chief, was able to develop an imprest fund for purchasing of spare parts and materials, which is another significant factor that influenced the productivity increase.

7. Training

The Bio-med T.A. has made significant progress in training. A human resources assessment was completed before June, 1985. An evaluation of existing manuals and other maintenance and repair information was completed before November, 1984. The T.A. is now in the process of compiling information and manuals to support maintenance activities. This process is scheduled for completion in August 1985. It should also be noted that T.A. is developing preventive maintenance programs with counterpart for key Bio-med equipment. On the Job Training has been provided on laboratory equipment and sterilizers. A major training course was scheduled for 48 hours (six Saturdays) during the period 15 June to 20 July, in the facilities provided by the Central American Technological Institute. The training covered laboratory equipment, therapy equipment, diagnostic equipment, and shop equipment.

8. Inventory and classification of Bio-med equipment

The Bio-med T.A. and Chief of Party have prepared a plan for a three week inventory of Bio-med Equipment at the hospital, health center and health unit levels. This inventory will be structured to identify replacement requirements for subsequent procurements, and should be completed before July 21, 1985. The Bio-med T.A. has also initiated a classification of equipment scheduled for replacement by AID/VISISA capital equipment inputs to develop a plan for disposing via salvage, Repair/sale or Repair/transfer within the MOH.

9. Spare parts programs

The Bio-med T.A. is currently developing a spare parts program. Spare parts lists have already been prepared for suction pressure apparatus, incubator, defibrillator/monitor, electrocardiograph, centrifuge, and film processor equipment. A draft spare part policy was made available to the MOH decision makers on July 31, 1985.

The Bio-med T.A. has done the initial assessment which should serve as the basis for subsequent MOH capital equipment procurement planning. It is recommended that the T.A. submit a plan for the formation of a capital equipment procurement committee, which, like the MOH procurement committee and the recommended drug selection therapeutic committee would be structured to assess capital equipment requirements and prioritize procurement. This committee would play an important role in direct purchasing and structuring specifications of equipment that is made available through grants and donations.

This second phase of the management evaluation finds the Bio-med T.A. component on track. T.A. services have been effectively delivered. The BEMS management total/evaluation system, now in place, will be utilized to monitor and evaluate all significant aspects of the Bio-med maintenance component during the third phase of the management evaluation. Quite important, of course, is that the MOH now has a practical management system that can provide managers with timely information. This manual system can also be computerized with very little difficulty.

C. COMPONENT III. MANAGEMENT INFORMATION SYSTEMS (MIS)

This is the component that has been delayed because the Ministry received conflicting recommendations on a computer system: one, a \$1.5 million system using a main frame and the other, a less expensive system, based on micro computers. A compromise has been reached and will soon go out to bid. This has caused delays in the MIS part of the other components. It is vital to the success of the overall Project, since little data is available and what is, is hand tabulated.

The MIS component supports development of the MOH data base for procurement, logistics, maintenance and health planning.

D. COMPONENT IV. EMERGENCY MEDICAL SERVICES

The Project was designed to improve the Ministry's capacity to provide emergency medical services, specifically for (but not limited to) war-related trauma for El Salvador's civilian population. Three mobile surgical teams trained and equipped with surgical kits, drugs and other supplies, were to be established and operating. Approximately 1,150 medical personnel, including surgeons, general medical officers, nurses, auxiliary nurses and ambulance divers/attendants, will be trained in wound stabilization, first-aid skills, and patient handling techniques. Ground casualty transport system will be strengthened by the addition of 27 ambulances, some of which will be radio equipped. Power and water supply systems improved in hospitals, centers, units.

1. Development of Human Resources for Emergency Services

Consensus could not be reached by the new administration on the need for the three mobile surgical teams and their equipment. The number of people to be trained was also considered by the administration to be overly ambitious and will not be undertaken on the scale proposed. However, training is planned to be initiated in August 1985 for ambulance drivers, general medical officers and nurses.

2. Equipment and Material for Emergency Services

Supplies and equipment itemized in the Project Agreement have been purchased: the 52 medical stabilization kits, 26 emergency surgical lamps, 249 emergency surgical kits and 97 first aid kits. Emergency generators have been procured and are expected incountry by September 1985. Twelve X-Ray machines have been ordered. Twenty-six suction machines have arrived and are installed. Twenty-seven ambulances have arrived and have been distributed. The radio communication equipment is incountry and is expected to be installed over the next few months. One hundred water pumps have been ordered and will be installed as soon as they arrive.

3. Special Studies

A national trauma study was added to the Westinghouse Health Planner's Scope of Work and will be completed by the end of September. This is a major study and will provide valuable data for future planning for trauma management and primary care programs in El Salvador

The Planning Advisor has also provided assistance to short term consultants who have, or are carrying out studies in rehabilitation needs, cost sharing options, recurrent costs of the MOH and teaching/learning materials needed for health worker training and trauma training modules.

## VII. GENERAL SUMMARY AND RECOMMENDATIONS

### A. Summary:

#### Project Effects and Impacts

Before the VISISA Project, there were severe shortages of basic supplies and medicines. The institutional capabilities were deteriorating and there were no modern management systems. VISISA represents a small but significant proportion (about 20 percent) of all of the drugs brought into the country. AID research indicates that a significant amount is spent by people in the private sector because of the lack of availability of drugs in the public sector institutions. Drugs and equipment also come from private sources, but may be of limited use, e.g. drugs that are not that useful with upcoming expiration dates. Donated equipment may be old, obsolete, and difficult if not impossible to repair. VISISA has brought in biomedical equipment and supplies that are installed and in use.

To expect a Project such as VISISA to have an immediate, measurable impact on morbidity and mortality, health manpower and facilities when there are so many other factors involved and the Project represents such a small part of the total health system would be unrealistic. Nor can health care be evaluated in a vacuum without considering other national priorities, and the overall political, military and economic situation. If one considers the fact that the MOH is doing the same job today, and in some cases more than it did five years ago, with the same budget (which is 50% less in real buying power), they are doing an amazing job. Although we cannot claim that VISISA solved all of their problems or made tremendous improvements in the health care system, the deterioration has been halted, and measurable improvements have been made in some areas.

### B. Major Recommendations

1. Technical Assistance is needed to continue the revitalization of the Salvadoran health infrastructure.
2. Primary care, and prevention should become a major focus of future programs.
3. Develop a national program in trauma management based on the recommendations from the national trauma study.
4. Commodities are still needed, but emphasis should be on those drugs, supplies, and equipment that are absolutely essential.
5. Technical assistance should be provided to ensure that the management information systems are developed and implemented.
6. The MOH should prioritize pharmaceutical products to reflect first, second, third, and fourth priority.

7. The MOH should implement an automated system to determine the quantities of drugs to be procured based on morbidity make-up of the population served, average quantity per treatment per case, and the number of patients to be treated.
8. The MOH should place adequately trained individuals in charge of warehouses, storage depots and pharmacies.
9. The MOH should develop policies regarding ordering of pharmaceuticals from the warehouses and depots.
10. Physician education should continue to place more emphasis on primary health care, prevention outpatient care, nutrition, community education and trauma management.
11. El Salvador should develop a Rural Health Promoter Program (Promotores de Salud Rural), to be composed of volunteer health workers selected by their communities, trained and supported by the MOH and other cooperating agencies, and certified by the MOH.
12. An aggressive program of eliminating mosquito breeding areas should be continued and enlarged in an expanded effort to reduce the incidence of malaria in El Salvador.