ANNUAL PROGRESS REPORT

STRENGTHENING HEALTH DELIVERY SYSTEMS

OBJECTIVE III SURVEILLANCE

PASA H2/AR-0398-6-78

Period Covered

January 1, 1979 - December 31, 1979

Report Submitted on

February 25, 1980

by

Research and Development Division

Bureau of Smallpox Eradication

Center for Disease Control

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ANNUAL PROGRESS REPORT
STRENGTHENING HEALTH DELIVERY SYSTEMS
OBJECTIVE III - SURVEILLANCE

I. Introduction

In accordance with the Participating Agency Service Agreement (PASA HZ/AR-0398-6-78), this annual progress report is submitted by CDC for activities through December 31, 1979. The report is related to the project work plan, showing progress made towards the achievement of program objectives.

II. Summary

The SHDS PASA between AID and CDC was signed in July 1978. The current report covers the initial 18 months of SHDS surveillance activities. The original project work plan (November 20, 1978) has been revised based on suggestions from field personnel and the Project Coordinating Committee of SHDS. A detailed examination of progress towards achievement of the subobjectives of the revised work plan is presented in annex (Appendix 1). Generally progress has been satisfactory.

III. Main Achievements - 1979

Noteworthy accomplishments included the assignment of personnel to the Gambia (Operations Officer and Medical Epidemiologist), Cameroon (Operations Officer), and the full integration into SHDS of the Ivory Coast Operations Officer. At year's end, only the OCCGE Medical Epidemiologist post remained vacant. Pending necessary clearances, Dr. David Sokal will assume the OCCGE post in early 1980.

With all three operations officers in place, most efforts have been focused on implementing immunization and surveillance activities in the demonstration training areas of the three operational countries. Despite a late start, the program in the Gambia is making remarkable progr[illegible] (Appendix 2) A&B.

While EPI disease surveillance has received attention in the demonstration training areas, other surveillance activities have been hampered by the delays in posting of the epidemiologists (the Gambia and OCCGE). The analysis of national disease surveillance systems, such as that done in Cameroon by Dr. Heymann, continues to be a priority.

One of the major achievements of the year was in the field of training. Major training courses in EPI were conducted in Nigeria and Ivory Coast with 82 participants being trained.

Dr. Heymann's achievements in training have continued to be outstanding. He serves as preceptor to 5-7 medical students each year and supports their research with microbiologic tests at the OCEAC laboratory he established. Also, during 1979 Dr. Heymann developed a curriculum for

the WHO Training Course in Field Epidemiology. Again, he made the laboratory services available to the participants, each of whom conducted original research as part of the training.

IV. Major Problems

Besides the difficulties created by delays in posting of personnel already cited above, the other noteworthy operational problem has been in achieving the targeted 70 percent vaccination coverage in the demonstration training areas. We are examining possible causes and will continue to do so until a solution is found.

The other major problem has been in the area of relationships and division of responsibility among the various partners in SHDS. Frank discussions, joint preparation of plans and budgets, and a better defined division of responsibilities are some of the positive signs among the activities and achievements during 1980.

V. Recommendations

A. Future Activities

The revisions made in the project work plan, and which are manifest in the implementation plan as adopted by the PCC, represent CDC recommendations for project activities. We await with interest, however, the results and recommendations of the SHDS Mid-Term Evaluation.

B. Improvement

Although progress has been made in relationships and communications among the SHDS partners, continued and enhanced efforts will be required to address this problem adequately.

Appendix I

Progress Towards Achievement of Objectives

Sub-Objective I

To Expand Immunization Activities in the Region.

Achievement: Overall, this activity is proceeding well. The development of delivery programs is progressing as scheduled; reduction of morbidity and mortality resulting from the immunization activities are beginning to be documented; training in the demonstration-training areas, however, has been limited to date. A detailed look at the activities which comprise this objective follows:

1.1 Develop demonstration-training vaccine delivery programs in three countries. In each country the training area will be divided into three segments of 200,000 population each, or a total of 600,000 per country.

Ivory Coast - One area by October 1, 1978
Two areas by December 1, 1978
Three areas by April 1, 1979

Cameroon - One area by October 1, 1978
Two areas by January 1, 1979
Three areas by July 1, 1979

The Gambia - One area by January 1, 1980
Two areas by April 1, 1980
Three areas by July 1, 1980

Achievement:

Ivory Coast: Target date for third area (April 1, 1979) was inadvertently omitted from plan of action. All three demonstration-training areas now have functioning vaccine delivery programs. The three areas are Abidjan, Abengourou, and Korhogo.

Cameroon: Despite some unforeseen delays in reaching agreement with Ministry of Health on the areas to be selected, the three areas were operational by June 30, 1979. In addition to Yaounde, the areas of Edea and Bafoussam/Bamenda were chosen.

The Gambia: Current plans call for developing the Western Division and the North Bank Division immunization activities first. The established timetable appears feasible.

1.1.1 Achieve 70 percent of identified target populations in demonstration areas within 18 months of initiation of full operations.

Achievement:
Despite being less than 18 months into full operations in most areas, available data permit some observations.

Cameroon: Immunization activities in Yaounde have been ongoing since 1975, predating the inception of activities under this PASA. However, 70 percent coverage has not been attained even after 3 years of operation. As noted in the mid-year 1979 report, in April 1979 a meeting was held in Atlanta to discuss this problem and attempts to identify possible causes. Those attending the meeting, including Dr. Heymann and his two predecessors in the CDC/OCEAC epidemiologist post, decided that surveys need to be done to determine why mothers do not utilize the available immunization services. Subsequently, arrangements were made to engage a social anthropologist to conduct these surveys. She has nearly completed her study, and we await her findings with great interest.

Ivory Coast: Coverage assessments after just less than 1 year of operations in Abidjan and Abengourou showed that the 70 percent target may be reached.

1.1.2 Document coverage through ongoing sample assessment in all areas.

Achievement: Assessment activities are ongoing in all seven operational areas. Assessment of coverage in the Gambia is already documenting moderate levels of coverage (Appendix 3).

1.1.3 Decrease by 50 percent morbidity and mortality due to target diseases by 36 months after initiation of full operations.

Achievement: Of the demonstration areas, only Yaounde has been operational 36 months. A detailed analysis of morbidity and mortality due to measles, poliomyelitis, whooping cough and neonatal tetanus was submitted with the mid-year report.

1.1.4 Cost Effectiveness Study
Although not a CDC responsibility, CDC has critically reviewed proposed protocol.

1.1.5 Explore strategies for other studies such as assessing factors affecting community response to EPI programmes, determining optimal schemes for delivery of vaccine, comparing relative merits of use of fixed centres vs. mobile teams in various programme settings, etc.

Achievement: As mentioned, studies have been performed in Cameroon to address these questions. Results will be available during the first half of 1980. Field studies of various methods of vaccine delivery in Abidjan are summarized (Appendix 4).

1.2 Collaborate with countries of the region in development of country EPI programmes.

1.2.1 Give support to the countries having demonstration zones (Cameroon, Ivory Coast, and the Gambia) in planning for eventual nationwide coverage by EPI.

Achievement: Cameroon proposal submitted to AID December 1977.

1.2.2 Give support to other countries of the region, as requested, on development of country programme for EPI for up to nine visits per year.

Achievement: SHDS-CDC staff have carried out planning and evaluation visits in Congo (Heymann); Liberia (Hull); and Sierra Leone (Hull).

1.3 Measles vaccine/jet injector parts provision (Not a CDC responsibility).

1.4 Conduct at least one indepth surveillance and managerial assessment of each immunization program demonstration and training area.

Achievement:

Ivory Coast - 1980 Appendix 5
The Gambia - 1981
Cameroon - done 1978

Sub-objective 2: Development of training capabilities. (To provide training in the region in EPI management and methodology, disease surveillance, data collection, and epidemiology, and to strengthen regional training capabilities in these subjects).

2.1 Identify and train national counterparts for SHDS/CDC field staff positions.

2.1.3 Identify national counterparts to work with the SHDS/CDC operations officer and PCV's, where applicable, in the three demonstration countries. Provide on-the-job training for national counterparts who will ultimately replace SHDS/CDC operations officers.

Achievement: Accomplished in Cameroon and the Gambia. Ivory Coast has not yet identified a counterpart for the operations officer.

2.2 Continue to develop EPI-related training activities in demonstration-training programmes.

Achievement: See below (2.2.1 and 2.2.2)

2.2.1 Conduct in-service training programmes for all demonstration-training programme personnel in each of the three country programmes, covering topics such as administration, planning, supervision, supply, logistics, maintenance and repair of jet injection equipment and evaluation. Materials may be taken from the mid-level managers training course.

Achievement: Mid-level managers training course curriculum became available near the end of 1979. n-service training todate has not been formalized. During 1980, formalized training will be included using the curriculum.

2.2.2 Provide training programme in the Ivory Coast and Cameroon demonstration-training programmes for EPI personnel from other countries of the region in methods of planning, implementation and evaluation of EPI programmes, as well as maintenance and repair of jet injection equipment. Offer 2-week training programme for up to six participants from other countries in each of the two programmes. Materials may be taken from the mid-level managers training course.

Achievement: The first such training program will take place in The Gambia in May 1980. Similar courses will be given in Ivory Coast and Cameroon later in the year.

2.3 Collaborate in improving training capability of WHO Regional Training Centers in areas of disease surveillance, data collection and epidemiology.

Achievement: Primary responsibility does not rest with CDC. For this sub-objective CDC has only consultative responsibility. So far no specific requests have been received.

Sub-objective 3: Development of capability to gather information (data necessary for health planning, including demographic data). (To strengthen regional and national systems of disease surveillance and health information gathering necessary for effective health planning).

3.1 Collaborate with WHO/AFRO in strengthening national disease surveillance systems within the framework of the national health information systems. Gather information, make indepth analysis of current national disease surveillance systems and collaborate on development of plan for national disease surveillance system, on request, for up to three countries. (Training of necessary personnel and institution of disease surveillance system will be planned for 1981).

Achievements: See below (3.1.1 through 3.1.6)

3.1.1 Assign epidemiologist to OCCGE

Achievement: Scheduled assignment, April 1980

3.1.2 Complete indepth analyses of current national surveillance systems and submit recommendations for improvement.

Achievement: Cameroon completed

Following scheduled:

Congo - March 1980
The Gambia - March 1980
Ivory Coast - March 1980
Gabon - August 1980
Liberia - August 1980
Upper Volta - August 1980
CAR - December 1980
Sierra Leone - December 1980
Togo - December 1980

3.1.3 Determine baseline levels of morbidity and mortality of neonatal tetanus, measles, and poliomyelitis in immunization program demonstration training areas. These diseases have been selected both because they are of priority importance and because feasible means exist for measuring incidence and/or prevalence.

Achievements: In Cameroon, completed for all three demonstration training areas. Underway in the Gambia will expect completion in May 1980. Ivory Coast activity will be carried out by Dr. Sokal and is scheduled for completion by September 1980.

3.1.4 Establish in immunization program demonstration and training areas on-going systems of disease surveillance.

Cameroon - January 1980
Ivory Coast - May 1980
The Gambia - October 1980

Achievements: Cameroon completed

3.1.5 Implement systematic program activity reporting system conforming with WHO Management Information Systems requirements.

Achievements: Will be implemented first half of 1980.

3.1.6 Assist regional/national authorities in investigating unexpected outbreaks of morbidity and mortality. Such investigations may include both diseases included in national immunization programs (e.g. measles, poliomyelitis) and other diseases of low incidence but high mortality (e.g. African hemorrhagic fever, yellow fever). Such investigations are expected to involve 10 percent of Medical Epidemiologist's time.

Achievements: Ongoing

3.2 Plan and implement an annual epidemiological conference of 1 week in Yaounde, Cameroon, for the OCEAC subregion.

Achievements: Conference to be held, instead of the Gambia in conjunction with mid-level managers EPI training course April/May 1980.

3.3 Publish and distribute monthly disease surveillance newsletters in 1 or 2 of the subregions.

Achievements: Ongoing in Oceac sub-region. Will begin early 1980 in Anglophone sub-region.

Sub-objective 4: To develop a coordinated laboratory system to provide necessary back-up services to the disease surveillance and control systems.

4.1 Provide short-term assistance to Institute Pasteur in Abidjan to develop their capabilities to do seroconversion titration for measles.

Achievements: Planned, April 1980.

4.2 Provide support for African laboratory person who will run SHDS/ OCEAC laboratory.

Achievements: Ongoing. Will be completed July 1980.

4.3 Identify specific laboratory needs for surveillance support of the Gambia EPI programme.

Achievements: Ongoing. Scheduled completion April 1980.

4.4 Identify and provide for needs associated with SHDS laboratory work at Institute Pasteur in Abidjan, OCEAC, OCCGE and labs to be identified in the Gambia.

Achievement: Ongoing.

REPUBLIC OF THE GAMBIA

EXPANDED PROGRAM OF IMMUNIZATION

ANNUAL PROGRESS REPORT --- DECEMBER, 1979

INTRODUCTION

Objective III of the USAID/SHDS (Strengthening Health Delivery Systems) is a demonstration-training project for EPI (Expanded Program of Immunization). SHDS is a regional cooperative project between USAID and Boston University encompassing twenty West and Central African countries. Objective III of that project is being implemented through a PASA between USAID and CDC (Center for Disease Control). See Draft Implementation Plan-Revised II, November 1978. The goals of Objective III are to improve regional and national disease surveillance systems, integrate these systems into the national health planning and delivery system, plan, implement, monitor and evaluate an immunization program for 600,000 people, and to use the demonstration-training area to train nationals from other countries within the region. For anglophone West Africa, The Gambia was chosen as such a demonstration-training site. As the entire population of The Gambia is slightly less than 600,000 people, the EPI project will cover the entire country.

A detailed country Draft Implementation Plan was outlined in January, 1979 by Dr. Stanley O. Foster, Director, Research and Development Division, Bureau of Smallpox Eradication, CDC and Stephen A. Fitzgerald, USAID/CDC Operations Officer assisting the GOTG (Government of The Gambia) in the control of a yellow fever epidemic. It was submitted to and accepted by the GOTG, with minor revisions. With the arrival of a permanent operations officer, the EPI Project in The Gambia became operational in May 1979. For EPI purposes, the country is divided into three demonstration-training areas (roughly 200,000 population in each group). They are: Western Division, including Banjul and Kombo St. Mary, North Bank and Lower River Divisions, and finally, McCarthy Island and Upper River Divisions.

EPI is housed at Medical and Health Headquarters, Ministry of Health, Labour, and Social Welfare, in the capital city of Banjul. As presently constituted, EPI consists of a USAID/CDC Operations Officer, a National Counterpart, four Health Inspectors, a Central Cold Store Manager, and a Cold Chain Technician. EPI in The Gambia, while an independent unit, works closely with and through the MCH Program (Maternal Child Health) to improve, coordinate, augment and extend already existing immunization services, to build, strengthen, and monitor cold chain facilities, to provide, advise, train, and assist in vaccine storage, handling, and administration, to order, receive, store, and disburse vaccine through the Central Cold Store to the field, to perform cluster surveys of pre and post vaccination coverage, to organize, assist, and respond to large outbreaks of epidemic diseases which cannot be effectively handled by the local health facilities, and to provide immunization outreach to reduce the backlog of susceptible children in the target age group to the extent that maintenance of high coverage levels can be handled by existing health facilities in static and outreach programs.

PROGRESS REPORT

In accordance with the implementation plan (revised 11 November 1978) provided by the Research and Development Division of CDC's Bureau of Smallpox Eradication results of the sub-objectives of SHDS 'Objective III' applicable to EPI-The Gambia are as follows:

SUB-OBJECTIVE I: TO STRENGTHEN REGIONAL DISEASE SURVEILLANCE SYSTEMS

1. Provide an Epidemiologist to assist regional organizations and member countries to strengthen disease surveillance.
2. Complete in-depth analysis of current national surveillance system, and submit recommendations for improvement.
   ---not applicable at this time.
3. Provide training courses in surveillance of vaccine preventable diseases, and planning, implementation, and evaluation of expanded programs...
   ---The national counterpart EPI attended the training course for National Managers of Expanded Immunization Programs in January 1979 in Lagos, Nigeria. Since that time, however, a new national counterpart has been asigned who will require this training.
   ---The USAID/CDC Operations Officer attended a similar course in Damascus, Syria in October 1979 (involvement in the yellow fever campaign in January 1979 took precedence over attendance at the January course).
4. Determine baseline levels of morbidity and mortality...
   -- Not applicable at this time.
5. Establish in Immunization Program demonstration areas ongoing systems of disease surveillance...The Gambia by October 1, 1980.
   ---Not applicable at this time.
6. Assist regional/national authorities in investigating unexpected outbreaks of morbidity and mortality.
   ---Prior to the assignment of the regional medical epidemiologist, the CDC operations officer assisted the Ministry of Health in investigating several reported cases of yellow fever. Serum samples were collected and sent to CDC/Fort Collins for testing.

SUB-OBJECTIVE II: TRAINING

---Not applicable at this time.

SUB-OBJECTIVE III: EXPANDED IMMUNIZATION PROGRAM DEMONSTRATION-TRAINING AREAS

1. Develop demonstration-training vaccine delivery programs in three countries...The Gambia-January 1, 1980 (one area).
   ---A demonstration-training area was established in Western Division in late August, 1979. This was interrupted in mid-September by a vaccine shortage but was resumed in mid-October. See Attachments 1,2,3,4,5. In the interim period, the teams completed cluster surveys in North Bank and Lower River Divisions...See Attach. 6.
   ---Prior to this time the EPI team was assigned to stay a measles epidemic with several foci throughout The Gambia. In May and June, the team administered 9,795 measles vaccinations. And in Western Division, where low DPT coverage was discovered, DPT was included during the campaign with the result: 1,636 children were started on their DPT schedule. See Attachment 7.

---In July, the EPI team assisted by a contingent of Cross Roads Africa volunteers performed pre-vaccination cluster surveys and yellow fever mop-up operations immunizing an additional 3,437 people. See Attachment 7.

2. Achieve 70 percent coverage of identified target populations in demonstration areas within eighteen months...
   ---Not applicable at this time.
3. Document coverage through ongoing sample assessment in all areas.
   ---Not applicable at this time.
4. Decrease by fifty percent morbidity and mortality...
   ---Not applicable at this time.
5. Implement initial and continuing in-service training in administration, planning, supervision, supply, logistics, and evaluation for all demonstration-training area personnel.
   ---Several informal and two formal sessions have been held with health center staffs and health inspectors. In the two formal sessions the training was in the form of slide presentation and discussion on the importance, nature, and maintenance of cold chain. Both formal sessions were held as part of continuing education seminars through the Health Inspectorate and MCH.
   ---A two-week mid-level course for EPI Managers is planned for late April and early May, 1980 in The Gambia where at least forty nationals and six others from anglophone West African countries are expected to attend.
6. Provide training in methods of planning, implementation, and evaluation of immunization programs to personnel from other area countries...
   ---See 5 above.
7. Conduct at least one in-depth surveillance and managerial assessment...by October 1, 1981.
   ---Not applicable at this time.

SUB-OBJECTIVE IV: FOLLOWING THE EVALUATION...
---Not applicable at this time.

SUB-OBJECTIVE V: PROVIDE SUPPORT TO EXISTING LABORATORY FACILITIES...
---Not applicable at this time.

MISCELLANEOUS: PROGRESS, CONSTRAINTS, & SOLUTIONS

CENTRAL COLD STORE/FIELD COLD CHAIN/VACCINE SUPPLY

The Central cold store is located at Medical and Health Headquarters and consists of one large room. In anticipation of EPI some equipment was ordered and this was put into use during the yellow fever campaign. However, this was an unplanned expansion of the facility. To meet the needs of EPI, several changes were needed. They included: up-grading the present facility, reorganizing vaccine storage consistent with the various vaccine needs, and procuring a back-up power supply in case of power failure (which is a very real threat here in The Gambia). The physical up-grading of the Central Cold Store, that is, installing air conditioning and flashing the doors to prevent loss of cool air, were quickly accomplished through the assistance of the Director of Medical Services. The problem of up-grading the cold chain system itself both at the central level and in the field, however, was beyond the means of The Ministry of Health. Therefore, assistance was sought from WHO and UNICEF. The Ministry and EPI entered into discussions with WHO and UNICEF in June, 1979.

WHO had allocated $15,000 for EPI equipment prior to the start of formal operations. Upon review, it was determined that, in light of the revised local implementation plan, certain of the originally ordered equipment could be substituted for more critically needed items. Therefore, a counter-proposal was made to and was accepted by WHO. See Attachment 8.

Operationally, EPI experienced difficulty in vaccine supply. This resulted in a complete review and reorganization of the vaccine ordering, monitoring, and distributing system. To date, all vaccines had been ordered, except in emergency situations, through the Crown Agents of the United Kingdom. It was discovered that not only were the vaccines very expensive, but difficult to obtain. As a result, UNICEF was consulted and agreed to act as sole source procurement agent for EPI vaccines, except for measles vaccine which is to be supplied by USAID/SHDS. A vaccine projection through 1982 was formulated and presented to the UNICEF Representative in December, 1979, and in the meanwhile vaccines were provided on the basis of preliminary short-term projections worked out in June. In addition, UNICEF agreed to supply all field cold chain equipment and ancellary supplies for EPI/MCH vaccination efforts over the same period. See Attachments 9, 10, & 11. Needles and syringes, except for BCG, are not covered by this estimate. Those are to be supplied by USAID/CDC/SHDS. See Attachments 11 & 12.

SOLAR POWERED REFRIGERATION UNITS

The Gambia has been chosen as a test site for two experimental solar powered refriperator/freezer units developed jointly by CDC/NASA. These tests will help determine the practicality of such units for energy-short developing countries. Slides were taken and plat maps were drawn of the sites selected. These were sent to CDC and NASA for analysis of suitability. Since the initial sites were deemed unacceptable, new sites were selected, mapped, and photographed by the operations officer. A decision will soon be made as to the suitability of the new sites.

TRANSPORT

Lack of reliable transport has hampered the EPI Project. Of the two vehicles assigned to EPI, one has been off-the-road 58 days and the other has been off 43 days since 1 January, 1979. The greatest problem is a lack of consistent and thorough maintenance. Since the assignment of two mechanic/fitters to Medical and Health Headquarters, neither of the EPI vehicles has been out of service more than one day. However, this is only an interim solution. The number of vehicles assigned to EPI is not sufficient to handle the range of requirements generated by the Project. Being assessed of this inadequacy, UNICEF has agreed to supply two non-four-wheel drive vehicles, Puegeot 404 pick-ups, to EPI. They will be received at at time when the Project will critically need them.

Stephen A. Fitzgerald
Operations Officer
EPI/SHDS

TO: Bureau of Smallpox Eradication, CDC
FROM: Harry Hull, M.D., Banjul, The Gambia
SUBJECT: Annual Report

The Republic of The Gambia has agreed with the Center for Disease Control to develop a demonstration-training area for Anglophone West Africa under Objective III of the Strengthening Health Delivery Systems project. Objective III has four subobjectives: 1. To improve disease surveillance and Health/demographic data systems; 2. To integrate these systems into national health planning and delivery; 3. To plan, implement, monitor, and evaluate an immunization project for 600,000 people; and 4. To use the Project for demonstration and training of other Anglophone countries.

In order to implement these subobjectives, the Center for Disease Control has elected to place one operations officer and one medical epidemiologist in The Gambia. The activities of the operations officer are reported separately. As medical epidemiologist for the project, I was initially recruited July 27, 1979. My activities have been guided by the implementation plan agreed upon by The Gambian Ministry of Health and CDC. Accordingly, this report is addressed in the format of that timetable.

1. August 1, 1979: Assigned full-time epidemiologist to the Gambian Ministry of Health. Because of AID orientation, I did not leave the U.S. until August 13, 1979. My arrival in The Gambia was further delayed until September 3 due to my activities in Liberia under the CCCD project proposed by AID. I have traveled out of the country in late September and early October to the EPI Manager Course given by WHO in Damascus, Syria. I then traveled to Sierra Leone to participate in the WHO-sponsored evaluation of Sierra Leone's EPI program, returning to The Gambia on November 5, 1979. Accordingly, my effective posting date for activities in The Gambia should be November 5.

2. August-December 1979: Evaluate current disease reporting systems at the dispensary, health center, divisional, and national levels. This activity is in progress at the present time. Evaluation at the central level is nearly complete, however, evaluation at the health center/dispensary level has been delayed due to lack of transport. Project Vehicles have arrived in Banjul, but have yet to clear customs.

3. October 1979: Initiate monthly surveillance newsletter. The first bimonthly newsletter will be published in January, 1980. Initially the newsletter will not include surveillance data. This will be added once the new surveillance system is operational. Consideration will be given at that time to having the newsletter published on a monthly basis.

4. October, 1979-March, 1980: Determine baseline levels of EPI diseases, morbidity, and mortality, including the identification of populations at risk and patterns of disease occurrence. Surveys are currently in the planning stages for measles, neonatal tetanus, and polio. Personnel have been recruited to perform the interviewing. The data collected by the yellow fever vaccination campaign is being used to develop a list of all villages in The Gambia. The surveys are currently being planned for January through April, 1980. Contact has also been established with Dr. David Mabey, who has conducted a school-based polio survey in the Banjul area. He has indicated a willingness to share his data with our polio survey.

5. January, 1980: Provide Ministry of Health with reporting system evaluation and recommendations for improvement. When the reporting system evaluation is completed, a new surveillance system will be designed and presented for consideration. This is tentatively planned for February, 1980. At that time, a field trial of the new system will be organized and after several months of operation, a final system will be agreed upon and be implemented throughout the country.

6. July, 1980-June, 1981: Identify and train individuals at each level in basic surveillance and epidemiology. Mr. Pap John Williams, a Gambian with a master's

in public health and experience in demography has been designated as surveillance officer for the epidemiology unit. He will receive on-the-job training in epidemiology, and is currently completing a CDC home study course in epidemiology. If appropriate, he will be given further formal training in epidemiology. A proposal from the Medical Research Council, Fajara, which has been funded by the World Health Organization, is currently being considered by the highest levels of the government. It proposes to train a medical epidemiologist and a microbiologist at the MRC and to equip a public health laboratory. Our strong support has been given to the project proposal, but it must await the final approval of the Gambian government.

7. Ongoing: Provide epidemiologic consultation on disease surveillance to other Anglophone SHDS countries. In August, I traveled to Liberia for three weeks to examine the needs of the Liberian EPI program. This report has been previously submitted to CDC and AID under the CCCD proposal. In October, I traveled to Sierra Leone to participate in the EPI evaluation. During that visit, I was able to briefly evaluate the surveillance system as it related to EPI. The report of the evaluation has not yet been released by WHO. However, I was able to establish the desire of the Sierra Leone government to have the surveillance system evaluated in depth. A proposal to evaluate neonatal tetanus mortality was also put forward and favorably received.

8. Ongoing: Develop regional competence in laboratory backup for immunization activity evaluation. As described above, funds have been allocated by WHO for a public health microbiologist and laboratory. The proposal is being acted on by the Gambian government. In addition, the MRC has indicated a willingness to work with the government to provide some public health laboratory services as needed. They are currently actively recruiting a virologist who has indicated a willingness to provide vaccine potency testing and serologic services once his laboratory is established.

9. Ongoing: Carry out applied research on methods to prevent or control morbidity and mortality. Contact has been made with the Medical Research Council regarding participation in future projects. The new director, Dr. Brian Greenwood, will arrive in April, 1980. He has a long-standing interest in malaria and vaccination. He has proposed our participation in several research projects, among which are a trial of mass malaria prophylaxis, interactions between malaria and vaccination, and a trial of killed polio virus vaccine.

APPENDIX 3

Vaccination Coverage Republic of the Gambia

Assessment for Vaccination Coverage

AREA:	Northbank	Lower River
DATE:	September 1979	October 1979
	Percent Coverage	
Vaccination Card	88	84
BCG	86	80
DPT[1]	68	71
DPT[2]	42	47
DPT[3]	28	27
Measles	42	41
Polio[1]	36	38
Polio[2]	9	14
Polio[3]	1	2
Yellow Fever	58	55
Tetanus Toxoid Pregnant Women	41	21

APPENDIX 4

Ivory Coast EPI

Assessment of Vaccination in Abidjan

Richard Greene
Maryanne Johnson

DTP-POLIO

	1st Injection			2nd Injection				3rd Injection				Booster		
accination Site	No. Given	% < 6 Mos.	% < 12 Mos.	No. Given	% < 6 Mos.	% < 12 Mos.	% < 24 Mos.	No; Given	% < 6 Mos.	% < 12 Mos.	% < 24 Mos.	No. Given	% 12-23 Mos.	% 12-35 Mos.
Well-Baby Clinic	21,539	56.5%	74%	17,472	37.5%	70%	82%	15,096	20%	61%	82%	2,898	38%	68%
Mobile Teams	15,488	11%	37%	6,838	3%	27%	67.5%	3,932	1%	23%	65%	1,835	38%	97%
Social Centers	3,347	73.5%	89%	2,773	68%	91%	97%	2,047	33%	89%	96%	214	35%	55%
Total	40,374	40.5%	61%	27,083	32%	61%	80%	21,075	18.2%	56%	80%	4,947	38%	80%

PERCENTAGE OF FOLLOWUP VACCINATIONS FOR DTP-POLIO

Vaccination Site	% Returning for 2nd DTP-Polio	% Returning for 3rd DTP-Polio	% Returning for Booster
Well-Baby Clinics	81%	70%	13.5%
Mobile Teams*	44%	25%	12%
Social Centers	83%	61%	6.3%
Total	67%	52%	12%

* The percentage of children coming back for second and third vaccinations are lower for the mobile teams since, after receiving their first vaccination, children are appointed to a Well-Baby Clinic for subsequent injections.

MEASLES FIRST VACCINATION

Vaccination Site	No. Given	<12 mos.	<24 mos.
Well-Baby Clinic	14,741	61%	78%
Mobile Teams	16,163	29%	63.5%
Social Centers	1,840	83.5%	92%
Total	32,744	46%	72%

SECOND MEASLES VACCINATION

Note: No longer a policy in Ivory Coast

Vaccination Site	No. Given	% of vaccinees at 6, 7, & 8 mos. returned for 2nd inj.
Well-Baby Clinic	1,816	23.6%
Mobile Teams	2,239	28.0%
Social Centers	112	12.0%
Total	4,167	26.0%

Vaccination Site	No. Given	% at 12-23 mos.	% at 12-36 mos.
Well-Baby Clinic	1,816	52.0%	72.0%
Mobile Teams	2,236	39.0%	99.0%
Social Centers	112	8.0%	16.0%
Total	4,167	44.0%	85%

Conclusions:

75% of all cases of measles in Abidjan occur before 24 months of age. Accordingly, for our program to be effective, children should be vaccinated against measles before 2 years of age (the earlier the better following six months of age). The social centers have the best record for early vaccination (83.5 % of all 1st measles were given before the age of 12 months). This can be explained by the larger reservoir of young children already available in the facility due to the weighing of babies. The Well-Baby Clinics have a fairly good record for vaccinating young children, also, though not quite as good as for the social centers. (61% of all 1st measles vaccinations at the Well-Baby Clinics were given before the age of 12 months and 78% are given before 2 years). The mobile teams have the worst record for "prompt" vaccination. Only 29% of the 1st measles injections were given before the age of 1 year. (63% were given before 2 years). This is expected since the mobile teams catch the children inadvertantly, regardless of their age. Overall for the program, only 46% of the children vaccinated received their injections before 12 months of age. This statistic indicates that we were not vaccinating the children at a young enough age against measles. (54% of children vaccinated got their injections after 1 year of age). In the future, priority should be given to shifting more of the burden of vaccination from the mobile teams on to the fixed centers. (Approximately half of all vaccinations done in the first six months of 1979 were by mobile teams.)

The record for 2nd measles vaccinations must also be improved upon. Only 50% of the 2nd measles vaccinations given at the Well-Baby Clinics in 1979 were among children 12 to 23 months of

for the mobile teams where only 39% of the 2nd measles vaccinations were given to children between 12 and 23 months. Overall for the program, only 44% of 2nd measles injections were done at the most propitious time (12 to 23 months).

The age distribution for polio in Abidjan is weighted between the ages of 6 and 18 months with the median age coming at 15 months. Thus it behooves the program to have children vaccinated at least twice with DTP-Polio by six months of age. (Pertussis is also a disease that hits children at a very young age). Among the vaccinated children in Abidjan as a whole 32% receive their 2nd injections of DTP-polio by 6 months and 61% by 12 months. While this is a fairly good record it can be improved upon by the prompt vaccination of children at 3 months and the faithful rendering of rendez-vous slips.

APPENDIX 5

MANAGEMENT REVIEW OF THE EXPANDED PROGRAM OF IMMUNIZATION, IVORY COAST

21 January to 6 February, 1980

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1. INTRODUCTION

In past years, the Ivory Coast has conducted vaccination campaigns against smallpox, yellow fever, tuberculosis and measles. More recently, routine vaccinations of newborns with BCG and mass campaigns against measles have been the major immunization activities. However, coverage has not been sufficient to interrupt measles transmission.

In January 1978, an Expanded Program of Immunization (EPI) was launched. A 5-year plan designated three demonstration areas where the six EPI vaccines would be used: Korhogo, Abengourou and Abidjan. Each area represents a different type of environment: Abidjan - urban metropolis; Abengourou - tropical rain forest; Korhogo - dry savanna. Cold chain facilities were also upgraded with the purchase of new freezers and the construction of a spacious cold room.

By late 1979, it was felt that the Ivory Coast EPI program was working well and that an independent evaluation might be helpful in making future plans.

2. METHODOLOGY

Four types of evaluation are described in the WHO EPI manual:

1) Disease surveillance
2) Seroconversion following vaccination
3) Coverage evaluation
4) Management review and audit

Detailed data on components 1 and 3 are available in the program's semi-annual reports. This report addresses the fourth component.

An independent team, representing WHO and USAID/CDC, was invited to the Ivory Coast to perform the program's first management evaluation.

The evaluation began on January 21 1980 and concluded on February 6 1980. Information was obtained through interviewing,

reviewing documents, and observing vaccine storage practices and vaccination sessions. The evaluation team presented its report for discussion before departing.

3. OBSERVATIONS

3.1. General

In Ivory Coast, the EPI program is being built on a solid foundation of pre-existing skilled public health personnel and excellent facilities. Because of this it may be able to expand from the pilot stage to a national program in a relatively short time. A tentative plan being prepared for the next 5 years calls for nationwide participation by 1985. However, attention to detail is required to insure that the program uses no rotten timber as it erects a national immunization structure.

The observations below are divided into national, regional and peripheral levels and are followed by a summary of recommendations.

3.2. National Level

The Ivory Coast has a population of about 7 million and is divided into 20 medical sectors. Each sector has a physician, called the Regional Medical Officer, in charge of public health activities including leprosy and tuberculosis control, measles vaccination compaigns, and sanitary measures (water supplies, etc.). Each Regional Medical Officer has a staff of about 80 persons (depending on the size of the sector).

The strategy of the Ivory Coast EPI program is to use existing public health personnel and facilities to administer the EPI vaccines. Dr. Coffi Emmou, Director of the Institute of Hygiene has specified four elements that the national program will provide for the local health sectors: (1) reliable vaccines, supplied at no cost; (2) ped-o-jets, and training in ped-o-jet repair; (3) training of personnel in vaccination procedures; and (4) materials for health education.

This strategy is supported by the present Ministry of Health (MOH) and is working well in the three areas that the program is presently serving. Because this strategy calls for the integration of EPI activities with existing programs, there is no separate budget for EPI. MOH expenditures for EPI have come from: (1) re-allocation of resources by Regional Medical officers, (2) increase spending by the Institute of Hygiene, and (3) increased vaccine purchases by the government's Central Pharmacy.

The status of the four elements of the Institute's strategy is described below.

1) Reliable vaccines - Cold chain facilities at the Institute of Hygiene are excellent. The Institute of Hygiene recently completed construction of a spacious cold room, and it also has 9 large top-opening freezers, six of them brand new. Temperatures are recorded once daily from the cold room. Power failure is rare in Abidjan, so contingency plans for such an event have been given a low priority and are not yet completed.

Vaccine shipments to the Ivory Coast are exempted from customs requirements. This makes it relatively easy to import vaccines. EPI vaccines are generally donated by UNICEF or USAID. Both organizations notify the Institute by telegram before each shipment. It takes an estimated five to six hours on weekdays and perhaps up to 10 hours on weekends between the arrival of the airplan carrying the vaccine and its deposition in one of the airport's cold rooms. The airport's cold rooms were found to be between 8° to 10°. Each vaccine shipment is checked shortly after its arrival by Institute personnel to insure proper handling and rapid delivery from the airport cold room to the Institute's cold room or freezers.

Vaccine distribution was previously done largely by the Central Pharmacy. A disadvantage of this was that pharmacy personnel did not have the epidemiological expertise necessary to prevent vaccine wastage. Orders for vaccine were often filled regardless of the size of the vaccine order in relation to the sector's population. The Institute of Hygiene is in

the process of assuming the responsibility for vaccine distribution.

2) Ped-o-jets - There is a shortage of ped-o-jets and spare parts. They have been on order from USAID for over a year, with no deliveries.

3) Training - The National Institute of Public Health has assisted in formal training sessions. It was not possible to observe a training session, however, the observation of former trainees during vaccination sessions showed that the training was generally successful.

The Institute of Hygiene is in the process of preparing a vaccinator's handbook in cooperation with the International Children's Center in Paris. This should help improve vaccination teams' performance and facilitate the training sessions.

4) Health Education - Health education is an area which is beginning to be explored. A puppet show has been created which depicts the advantage of vaccination, and dialogue for the performance has been recorded on a cassette in French and three African languages: Dioula, Agni and Baoulé. Radio, television and newspaper publicity has also been used to encourage vaccination.

Other areas of interest include disease surveillance and personnel practices. At present the national disease surveillance system is sporadic, incomplete and unexploited. The three sectors in the EPI pilot program are improving the surveillance systems in their areas. It is expected that surveillance will improve as EPI expands.

Vaccination personnel receive gasoline coupons but other travel expenses incurred within a sector are not reimbursed.

At the managerial level, job descriptions exist for (1) disease surveillance, (2) health education, (3) record keeping and (4) program evaluation. Job descriptions have not been written for the operations officer and his assistant nor for the regional program directors.

International Assistance

Most of the EPI resources such as vehicles, personnel and ped-o-jets, have been supplied by the Ivory Coast Government. Measles vaccine, ped-o-jets and some cold chain equipment and vehicles have come from external sources: SHDS/USAID and UNICEF. As of 1980 "heat stable" measles vaccine will be supplied.

Other important aid has been in the form of personnel. The EPI operations officer, Mr. Harry Godfrey, is from CDC/SHDS/USAID. Most of the vaccination coverage surveys and disease surveillance work have been done by Peace Corps Volunteers.

The International Children's Center in Paris has provided valuable technical advice and consultation on numerous occasions.

The Pasteur Institute in Abidjan is developing the ability to titrate measles and polio vaccines with help from CDC/SHDS. This will be of great assistance in verifying vaccine reliability.

3.3. REGIONAL LEVEL

3.3.1. Abidjan

Abidjan is a large metropolis of over 1,000,000 population, and is the largest city and capital of the Ivory Coast. In Abidjan, the EPI program is coordinated by the National EPI personnel.

When the program began, most vaccinations were given by mobile teams, but this changes, as more Maternal and Child Health (MCH) clinics and Social Centers began participating in the vaccination program. Social Centers combine nursery schools, sewing classes, and a well-baby clinic. At the well-baby clinic, infants are weighed on a weekly basis up to 1 year of age and then on a bi-weekly schedule. Very large numbers of women and infants attend these centers. In the discussion that follows, Social Centers, MCH centers and other types of clinics will be called "fixed" centers to distinguish them from the mobile vaccination teams. Fixed centers only gave 44% of DTP-Polio vaccinations in Abidjan in 1978, but in

1979 this increased to 68.5%.

While this is highly desirable, it has led to a shortage of ped-o-jets. It is not unusual for a fixed center to have only one functioning ped-o-jet, which is used to give both DPT and measles vaccines. Although most experienced Institute of Hygiene staff can do minor ped-o-jet repairs in the field, MCH personnel are usually unable to do so.

Another problem is the shortage of supervisory personnel. All of the fixed centers should be visited on a regular basis to insure that 1) they have functioning ped-o-jets, adequate vaccine and other supplies, and 2) they are vaccinating with the proper technique and maintaining the cold chain.

Many experienced vaccinators work for the Institute of Hygiene. Most of the personnel have from 10 to 20 years or more experience working in vaccination programs. This constitutes a manpower pool which could be drawn on to develop supervisory personnel.

Because of the shortage of qualified supervisory and mid-level management personnel, Peace Corps Volunteers have been used to great advantage. They have assisted with supervisory visits to centers, improved the disease surveillance system and performed several coverage surveys.

A coverage survey performed in North Abidjan in November 1979 showed 58.5% measles coverage; 71% first DPT-Polio, and 44% third DPT-Polio.

3.3.2. Korhogo Sector

Korhogo sector is in the Sahel, on the country's northern border. It contains two large towns, Korhogo and Ferkessedougou, with populations of about 100,000 and 20,000 respectively. The total population of the sector is about 366,000.

The Regional Medical Officer in Korhogo is responsible for vaccine procurement and storage, budgeting for personnel, and providing other resources such as gasoline coupons for the vaccination teams.

The EPI program in Korhogo was launched in December, 1978, with four days for formal training sessions for paramedical personnel in the area. Personnel from Abidjan and the International Children's Center remained in the area for several additional days until the vaccination program was actually underway.

Initially, the Korhogo MCH clinic was used as the vaccination center in Korhogo, however this proved unsatisfactory because of a lack of space and poor attendance. The vaccination team was then moved to the Korhogo annex of the Institute of Hygiene, and an educational campaign was conducted to tell area residents of the new location of the vaccination center. This was quite successful. One village even rented a truck in order to bring all their children to be vaccinated. An advantage of the new location is that it keeps well infants from coming in contact with sick infants.

In November 1979, a second fixed center was established in Ferkessedougou, the second largest town in the sector, with the help of an EPI supervisor from Abidjan and a Peace Corps Volunteer. The team is short of personnel, but additional team members are being hired. As soon as that is done, the EPI supervisor will return to Abidjan.

The cold chain from Abidjan to Korhogo sector is excellent. There is a paved road between the two cities and the trip requires about eight hours by truck. Vaccine is packed in styrofoam containers with cold dogs and transported directly from the vaccine storage room of the Institute of Hygiene to Dr. Martinet's office. In his office, he has a new top-opening freezer of more than adequate capacity, and an older front-opening refrigerator, both electric. Both are in good operating condition.

Inventory control has been excellent. In the past year, there was only one instance of inventory depletion: BCG vaccine was unavailable for two days.

Two Peace Corps Volunteers, one in Korhogo and one in Ferkessedougou, have begun working on the surveillance system, and are planning to do a coverage survey this spring. A coverage survey done last summer showed only fair coverage: 42% first measles, 56% first DPT-Polio and 17% third DPT-Polio. Hopefully, the coming survey will show higher vaccination rates.

3.3.3. Abengourou Sector

Abengourou Sector is located in a rain forest on the country's eastern border, and has a total population of about 177,000, of whom 35,000 live in the city of Abengourou.

The EPI program in Abengourou has provided perhaps the best indication of the national strategy. Without unusual assistance from the Institute of Hygiene, Abengourou has developed an energetic local EPI program.

Vaccination began in 1978 in the MCH clinic in Abengourou. In mid 1979, a mobile team was created which is now visiting a number of villages on a monthly or bi-monthly basis. Each journey around the villages takes 10 days to 2 weeks during which time the mobile team sleeps in the villages. A schedule of the planned visits is sent to all officials and village chiefs well in advance.

In late 1979, five village dispensaries began keeping their own vaccines and holding their own vaccination sessions on a weekly basis. The village dispensaries use needles and syringes rather than ped-o-jets for vaccine administration. Each village dispensary is visited about every two weeks by supervisory personnel.

The Abengourou EPI program is largely under the charge of an Infirmier d'Etat (Registered Nurse) who spent one week in Abidjan learning about EPI procedures. Abengourou recently hosted several public health personnel from a neighbouring sector who were interested in learning about the EPI program.

Abengourou is only about a 3-hour drive from Abidjan and thus the cold chain and vaccine inventories are relatively easy to maintain. A freezer and refrigerator, both electric,

are in good operating condition. In the event of power failure, the Regional Medical Officer has arranged to use hospital refrigeration facilities which are powered by a back-up generator.

A coverage survey in the city of Abengourou in 1979 showed 56% of infants had been vaccinated for measles; 75% first DPT-Polio, and 61% third DPT-Polio.

3.4. The Peripheral Level

Almost all vaccination sessions are conducted in a similar manner. Mothers are first seen at a registration desk and the infant's vaccination card or "carte sanitaire" is checked to see what vaccinations are indicated. Mothers in the Ivory Coast have accepted vaccination cards very well and usually bring them to the clinic when they come. If the mother does not have a card, one is made out for her. The mother is then given color-coded chits for the vaccines: black for DTP-Polio; red or brown for measles. She then goes to the vaccination desk, presents the chit(s), and the vaccination is done.

In contrast to other centers, the Abengourou team keeps a notebook and records each person's name and checks off the vaccine(s) he or she receives. This takes a little longer, so two registration desks are used.

All centers observed had adequate space, and vaccination sessions were conducted in shaded locations with good ventilation. At some vaccination sessions aspirin was given out, but at others it was not. There was great variability in the amount of health education performed during the vaccination sessions.

In all three sectors, mobile teams are used to visit areas without a fixed center. Preceeding a visit to a village, local officials are notified. When possible, village market days are selected for the vaccination team's visit. Each truck has a loud speaker which is used to announce the beginning of

the vaccination session. So far, villages have generally been visited once every one to two months depending on their size.

Cold chain equipment at fixed centers is generally satisfactory and in good working order. The mobile teams use trucks with battery powered refrigerators which can keep vaccine cold for several days. All of the 20 health sectors have several of these trucks.

Mobile team personnel are capable of doing their own ped-o-jet repairs, however they do not always have a supply of spare parts.

A number of minor problems were occasionally noted at the peripheral level:

1. DPT in freezer; this may have happened because the DPT box resembles the measles box.

2. Measles vaccine in the refrigerator when a freezer was available.

3. Vaccinator gave oral polio after DPT. Infants usually accept it better before an injection than after.

4. Unsatisfactory method for keeping measles vaccine cold during vaccination session.

5. Registration person assigning 6 month old infants to receive measles vaccine when the program policy had recently been changed to 9 months.

6. None of the refrigerators or freezers at the peripheral level had a thermometer, and most were in need of defrosting. One small refrigerator, which needed defrosting, measured +9°C in the freezer compartment.

7. Ped-o-jets were not routinely flushed with iodine solution.

8. At one session, where only one ped-o-jet was being used for two vaccines, it was fired only once instead of twice to clear out sterile water before injections were given.

9. At some sessions, mothers were not warned to expect some fever following DPT vaccinations.

4.1. SUMMARY OF RECOMMENDATIONS

4.1. General

The Ivory Coast has a strong EPI program and should proceed with planning for nation-wide expansion.

4.2. National Level

4.2.1. A national inventory of ped-o-jets should be conducted and renewed pressure put on USAID to expedite delivery of back ordered equipment.

4.2.2. Consideration should be given to the training of nurses as specialists in public health and epidemiology. Training for such a specialist should cover supervising vaccination teams, gathering surveillance data, record keeping and directing health education efforts. Such a specialist should be able to direct a sector's immunization program with minimal supervision by the Regional Medical Officer.

4.2.3. Surveillance of EPI diseases is probably the weakest part of the program. Priority should probably be given to surveillance of measles and tetanus cases. Surveillance of pertussis cases seen in clinics or hospitals, and hospitalized polio cases would also be desirable.

4.2.4. The vaccinator's handbook should continue to be given high priority.

4.2.5. Additional health education materials such as posters and slide shows should be prepared.

4.2.6. Job descriptions should be prepared for the EPI operations officer and his assistant, for professional personnel, and for regional program managers.

4.3. Regional Level

4.3.1. Abidjan

4.3.1.1. Whereas other sectors should be trained to supervise their own vaccination teams, it will probably continue

to be necessary for some time, for the Institute of Hygiene to supervise vaccination practices in Abidjan. More skilled supervisory personnel should be trained or recruited. These personnel could also provide a pool of candidates for managerials positions.

4.3.1.2. In some centers where the numbers of measles vaccinations is small, it may be more efficient to use needles and syringes rather than ped-o-jets for measles vaccine. Since ped-o-jets are in short supply and need frequent maintenance, this could improve the vaccine delivery system by permitting some ped-o-jets to be held in reserve. This recommendation is already being adopted.

4.3.2. Korhogo

The Korhogo sector EPI program had some difficulties initially, but is now well on its way. Establishing a fixed center at Ferkessedougou is an excellent measure, and should continue to be given high priority. Abidjan personnel should be withdrawn as soon as possible.

4.3.3. Abengourou

The Abengourou program is independent and self-supporting. Consideration should be given to using it as a training site for EPI personnel. However, it should be noted that the vaccination sessions there are run slightly differently from those in the other two EPI areas.

4.4. Peripheral Level (Mobile teams and fixed centers)

4.4.1. The morale of the vaccination teams seems good and the vaccination center procedures work smoothly. To correct the minor deficiencies noted above, (3.4), two suggestions are offered:

1. A regular review (perhaps monthly or bi-weekly) of policy and technique by the team supervisor.

2. The introduction of a vaccinator's handbook to facilitate the above review. It should be noted that

the Institute of Hygiene has already foreseen the need for a vaccinator's handbook. The Institute, in cooperation with the International Children's Center in Paris is in the process of preparing such a handbook. It is expected to be published this Spring.

4.4.2. As the EPI program achieves good coverage, the number of vaccinations given daily may decrease to a baseline level proportional to the birth rate. When this begins to occur, visits to villages may be scheduled at longer intervals, perhaps three to six months.

5. SUMMARY OF MAIN WHO PERFORMANCE INDICATORS FOR EPI REVIEW FOR THE IVORY COAST PROGRAM

WHO has suggested ten items that should be given a score from 0 to 10. A perfect score is 100. The items are listed below and the reasons given for low scores.

1)	EPI plan exists	10
2)	Program manager is full time	10
3)	Job descriptions Only four points given because detailed job descriptions are not written for top managerial positions.	4
4)	Coverage evaluation is done one per year or more	10
5)	Coverage Only six points given because coverage in target areas is between 40 and 60% (for measles vaccination)	6
6)	Surveillance Reports Only six points given because surveillance is not yet routine in the target areas.	6
7)	Immunization reports are regularly and rapidly completed	10
8)	Vaccine stock is between 10 and 40% of annual requirements	10
9)	Vaccine quality - all WHO approved vaccines	10
10)	Cold chain Only eight points given because almost all refrigerators were in need of defrosting	8
	TOTAL:	84

6. ACKNOWLEDGEMENTS

The reviewers wish to thank Dr. Coffi Emmou for making all aspects of the EPI program available for scrutiny; and to thank the many other health workers involved at all levels for their warm hospitality and for the generousity with which they gave of their time.