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EVALUATION REPORT  
of  
COMBATING CHILDHOOD COMMUNICABLE DISEASES - PROJECT  
in  
RWANDA  
by  
Institute for Resource Development, Inc.  
October 1986

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## ACRONYMS

ADB	African Development Bank
BCG	Bacillus Calmet Guerin
BUFMAR	Bureau de Formations Medicales Agreees du Rwanda
CCCD	Combatting Childhood Communicable Diseases
CDD	Control of Diarrheal Disease
CE	Continuing Education
RMO	Regional Medical Officer
DPT	Diphtheria, Pertussis, Tetanus
EPI	Expanded Program of Immunizations
FRW	Franc Rwandais
GDP	Gross Domestic Product
GNP	Gross National Product
GOR	Government of Rwanda
HC	Health Clinic or Health Center
HE	Health Education
HIS	Health Information System
LOP	Life of Project
MCH/FP	Maternal and Child Health/Family Planning
MINISAPASO	Ministere de Sante et Affaires Sociales (MOHSA)
MO	Medical Officer
MOHSA	Ministry of Health and Social Affairs
OPD	Out Patient Department
OPHAR	Office Pharmaceutique du Rwanda
ORS	Oral Rehydration Salts

ORT	Oral Rehydration Therapy
PHC	Primary Health Care
PEM	Protein-Energy Malnutrition
PRO AG	Project Agreement
TO	Technical Officer
UNICEF	United Nations Childrens Fund
WHO	World Health Organization
USAID	United States Agency for International Development

1.0. Evaluation Team

The team members on the External Evaluation team were:

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Resource persons for the team were:

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Maryanne Neill, CDC Technical Officer, CCCD Rwanda

Dr. Augustin Ntiliyamunda , National Coordinator, CCCD, and Dr. Laurent Bugilimfura, CCCD accompanied the team on its visits, both in the capital and in the field, and made a valuable contribution to the teams comprehension of the CCCD project in Rwanda.

## 2.0 Executive Summary

### 2.1 Background

The CCCD external evaluation team of two epidemiologists (one from WHO/AFRO), one health economist, and one health management advisor carried out its evaluation in Rwanda from September 29 to October 17, 1986. During this time the team had the opportunity to meet with the Minister of Health and Social Affairs (MOHSA), the Acting Director General of Public Health, the national CCCD coordinator, and other senior ministry officials, Regional Medical Officers (RMOs), Regional CCCD supervisors, Hospital/Health Center and Dispensary doctors, nurses, medical assistants and staff, as well as the executive director of BUFAR (Office of Private Medical Facilities in Rwanda), WHO, UNICEF, World Bank, as well as USAID, French and Belgian aid representatives.

The team's mandate was to:

- a. evaluate CCCD activities in Rwanda through systematic collection and analysis of data on CCCD management and operation at the central, regional, and peripheral level;
- b. measure the extent to which CCCD activities have been integrated into Rwanda's existing Primary Health Care (PHC) structure;
- c. offer a series of recommendations to improve the expansion and delivery of CCCD services (including development of the Health Information System (HIS), Health Education (HE), and Training);
- d. accelerate their integration into the present PHC delivery structure given ever present resource constraints; and
- e. examine the important questions of costs, financing and sustainability.

In addition the team was invited to consider whether the project warranted continuing beyond 1986.

### 2.2 Overview

In summary, the team found that Rwanda had an operating Primary Health Care program that was functioning in the 10 regions and at peripheral level, and was making good use of the CCCD inputs in the three pilot regions. While just starting preliminary indications from the four new regions were positive. Regarding the integration of CCCD activities into the government's Primary Health Care (PHC) program, at the regional level the CCCD activities are integrated in the sense that the same staff responsible for the general PHC program also carry out CCCD activities. The CCCD supervisors at the regional level are the old EPI supervisors who have been trained in CCCD programs. At the Center the newly created

intra ministerial coordinating committee chaired by the CCCD chairman which brings together the principal department heads and support services responsible for PHC/CCCD activities should help. The committee needs to set up a regular schedule of meetings, and assure that the meeting agenda and relevant documents are distributed in time.

The principal problem is lack of supervision and communications from the Center to the Regions, and from the Regions to the peripheral health facilities, and vice versa. In addition, there are no approved multi-year plans for Control of Diarrheal Diseases (CDD), or Malaria Control to provide the framework for effective day to day operations, although drafts are circulating for approval for Malaria and CDD. The EPI ten year plan from 1978-87, which has served Rwanda well, is coming to an end. It is no longer sufficiently relevant to the current set of circumstances, and needs replacement with a new multi year plan.

The team also noted that progress had been made in the last few months in reinforcing the CCCD headquarters staff (one physician and three medical assistants) and making available the first GOR financial contribution to the CCCD program, albeit modest.

While some significant technical, administrative and management problems were found, the government is to be congratulated on its success in establishing a PHC infrastructure, and in decentralizing its operation. Good progress has been made in its EPI activities with percentage of fully vaccinated children from 12-21 months old rising from 21% in 1983 to 58% in 1986.

In view of the slow start up of the CCCD project, the team recommends extending the project an additional year to May 1989 to allow four full operational years to meet the project objectives.

While basically encouraged about the government's commitment to the CCCD project, the team felt the establishment and approval of up to date national plans for the three core CCCD programs (EPI, CDD, and Malaria) was crucial to the future success of the project. As a result the team recommended that the continuation of the project beyond June 1987 be contingent on the government's examination, modification and approval of the two plans for CDD and Malaria (1987-1990) now circulating in draft with in the MOHSA, and the preparation and approval of a multi year EPI plan (1987-1990) by June 30, 1987. The EPI plan (1987-1990) is needed, in any case, in conjunction with the major UNICEF EPI project now in final stages of approval. In discussing this recommendation with the Minister of Health and Social Affairs, he agreed that operational programs should be based on sound multi year plans.

A second area of major concern to the team, was in administration and management of the operating programs. There was an acute lack of supervisory visits from the Center to the field by those responsible for running the Primary Health Care (PHC) programs which include EPI, CDD and

Malaria. Not only was transport (vehicles and gasoline) difficult to obtain, requests for travel orders were often delayed. While it is true that the PHC program has been decentralized to the Regions and Regional Medical Officers (RMOs) meet monthly in Kigali with the MOHSA, the team found that this limited contact was insufficient to keep the Center informed of what was going on in the peripheral areas, and to meet the supervisory responsibilities of the Center.

Further, during its field visits the team found the Regions restricted in the amount of supervision and training of Health Centers and other health facilities due to personnel limitations, and restrictions in vehicles and gasoline availability. Major difficulties were being encountered in repairing the refrigerators in the cold chain due to delays in processing requests for spare parts and maintenance visits.

While the operating heads of the major programs, and supervisors in the regions visited readily agreed with the need for more supervision of the health facilities, senior management at the Center was less convinced given its policy of decentralization.

Regarding the capacity of government to sustain the project after 1990, the team found considerable potential. For example, there are possibilities for reimbursement on the part of the population for health care delivery services rendered. In fact, in spite of low per capita income, families appeared prepared to purchase medicines from private pharmacies when medicines are not available at the government/private clinics. In addition, they will go to private health facilities, even if they cost more than government facilities, when it is felt that the quality of health care is better.

Support programs in Health Education, HIS and Training have considerable potential for the future, and are in a good position to provide strong support to the PHC/CDC activities if certain operational, technical and managerial improvements are made. Specific suggestions are contained in the main body of the report, and in Section 2.3 Recommendations,.

There follows a summary of the principal recommendations of the team by category.

## 2.3 Recommendations:

### 2.3.1 Planning and Strategy

1. Satisfactory four year plans (1987-1990) and budgets should be developed, reviewed and approved by the MOHSA within the next six months for the following four programs:
  - Expanded Program on Immunizations (EPI)
  - Control of Diarrheal Diseases (CDD)

- Malaria Control
  - National training plan for CCCD activities.
2. Continuation of the CCCD project beyond June 30, 1987 should be made contingent on satisfactory development and approval by the government of the four plans listed above.

### 2.3.2 Administration and Management

1. Steps should be taken to assure that supervisory visits from the Center to the Regions are organized on a regular basis so that each region is visited at least once every quarter (for example three regions every month, plus one extra every quarter).
2. Logistic problems at the Regional level should be resolved so that the monthly supervisory/training visits can be accomplished on a regular basis.
3. Current administrative bottlenecks to cold chain repair and purchase of spare parts should be resolved quickly to avoid a breakdown in the system including transport and travel orders for supervision and training in care and maintenance in the peripheral areas.

### 2.3.3 Health Information System (HIS)

1. The central level statistical unit should be provided with a computer to permit a computerization of the HIS. Standardized reporting forms should be distributed to all reporting units to guarantee uniform information collection.
2. The central level statistical unit should make field supervisory visits at a minimum of two regions per month to permit in-service training of personnel in information system needs. Regional staff should be retrained in the requirements of the information system.
3. Registries of daily out-patient department (OPD) consultations should be implemented at the local level which contain information on the name, place of residence, age, diagnosis and treatment of all patients presenting themselves for curative consultations.
4. Consideration of a quarterly CCCD newsletter for distribution to all CCCD project area health facilities which would contain information related to the epidemiology of CCCD target diseases as well as results from special

surveys and studies performed related to CCCD target interventions. Monthly reports from the field presently sent only to the regions should also be sent to all reporting units in the country to serve as feedback for data reported.

#### 2.3.4 Expanded Program of Immunizations

1. Location of the EPI program should be reexamined by the MOHSA, and consideration should be given to its return to the Epidemiology Directorate given its technical nature, thus consolidating all three of the major CCCD programs (EPI, CDD, and Malaria) in one directorate.
2. Strengthen the central level EPI staff, currently composed of three persons, the Director, a statistician and her assistant.
3. Supervise all of the ten health regions at least once every three months. During supervision, ensure data collection and distribution.
4. Train personnel on the new immunization schedule and the relevance of vaccinating sick children, especially against measles.
5. Use only one syringe and one needle per child during vaccinations to prevent potential transmissions of diseases such as hepatitis and/or AIDS.
6. Formulate urgent request for sufficient injection and sterilization materials for Rwanda's health facilities to be able to carry out the "one syringe/one needle" vaccination policy.
7. Implement policy with fixed health facilities that immunization activities will be carried out every working day once they are properly equipped.
8. Purchase a standby generator with at least 25KVA capacity to prevent any protracted electricity outage at the level of the central storage of vaccines should normal power sources fail.
9. Take necessary steps to protect and maintain cold chain at satisfactory operational level by increasing the staff responsible for the cold chain to two, increase the number of supervisory/training visits to the field, and order and keep a sufficiently large stock of spare parts for the cold chain equipment on hand to permit prompt servicing.

### 2.3.5 Control of Diarrheal Disease --CDD

1. Consideration should be given to appointing a National Diarrheal Diseases program coordinator within the CCCD project office in the Epidemiology office.
2. Central CCCD/CDD personnel should conduct a minimum of two regional supervisory visits each month so that each of the seven regions with a CCCD program can be supervised once each quarter.
3. Current project agreement objectives between the GOR and USAID should be amended to discontinue the advocacy of home prepared Sugar Salt Solution (SSS) for the treatment of diarrheal episodes, and increase the emphasis on the exclusive management of diarrheal episodes with Oral Rehydration Salt (ORS) packets.
4. Health Education/Communication activities should be developed using mass media along with other techniques to increase the acceptance and utilization of ORS packets by mothers for the treatment of diarrheal episodes.
5. Feasibility of USAID/CCCD assistance in the purchase of packaging equipment for the National Pharmaceutical Laboratory in Butare should be investigated. If found feasible increased local production of ORS packets should be supported.
6. Priority should be given to the continued development of regional ORT units through cooperation with the Kigali ORT unit for training health care personnel. CDC/Atlanta should provide TA to help with this effort. TA should be coordinated with assistance required to finalize the four year CDD plan now under consideration in the MOHSA.
7. Data collection should be improved with respect to diarrheal diseases and death in the 0-5 year old population in order to follow the impact of CDD project interventions.

### 2.3.6 Malaria Control Program

1. MOHSA should adopt a policy for the recommended treatment of presumptive malaria as soon as possible and establish clear cut guidelines of the drugs and dosage schedules of choice. This should include establishment of standardized treatments for implementation in all health facilities.
2. Sentinel laboratory/health facilities should be established to follow the chloroquine resistance through continued in vivo studies.

3. Consideration should be given to changing the supply system for chloroquine distribution to be uniform throughout the country for health facilities so that health facilities do not receive two supplies to be used in different populations.
4. Distribution of non-chloroquine anti-malarials should be rationalized so that referral centers are assured a constant supply for cases of emergency.
5. The National Pharmaceutical laboratory should be encouraged to correct the deficiencies identified by the USFDA inspector so that USAID/CCCD support for increased local chloroquine production can be provided.
6. Current efforts to improve data collection on the true morbidity and mortality due to malaria should be encouraged. In addition, use of sentinel centers to study the proportion of febrile episodes in children that are due to malaria should be supported. Also efforts to collect data on the slide positivity rate for presumptive malaria cases treated by the health facilities should be encouraged.

#### 2.3.7 Health Education/Communications--(HE) & Training

1. The HE division should be made a full member of the CCCD planning team so that appropriate HE/Communications activities can be incorporated in the planning and execution of major vaccination/CDD/and malaria programs. This participation should include required logistic support in terms of a vehicle, materials and basic equipment.
2. Short term TA of up to three months from AID/s regional Health Comm project or other CDC/Atlanta sources should be provided within the next two to three months to reinforce the Health Education activities particularly as they concern the multi year planning documents for CDD and Malaria now under consideration, and the EPI multi year program that will be prepared in connection with the UNICEF project in this field.
3. Health Education/Communication services working with mass media should help increase the acceptance and utilization of ORS packets by mothers for the treatment of diarrheal episodes.
4. A National training coordinator for all CCCD training activities should be designated by the MOHSA as soon as possible who would help with the drafting of a multi year national training plan (1987-1990). Plan would assess the

training needs, plan for necessary facilities, course materials staff and financing required if needed.

5. Retraining (recyclage) should be scheduled for those trained earlier to refresh their skills. and train them in the latest developments.

#### 2.3.8 Project Costs, Financing and Sustainability

1. CCCD bilateral spending on fuel and maintenance has been well above projected level for this line item, and GOR spending for this category barely begun. Therefore, it is recommended that the GOR take full responsibility for kerosene, gasoline and repair CCCD vehicles for the remainder of the project.
2. Content of the GOR's contribution to the CCCD project over the next few years should be revised to realistically reflect what is needed and feasible (either by amendment to the Project Agreement or by a project implementation letter (PIL). Such items as local cost financing of kerosene, per diem for supervisory visits, and spare parts for refrigeration equipment is still needed.
3. A study should be undertaken to determine the cost effectiveness of different types of facilities and health services in Rwanda. For example, estimates of the additional cost required to implement improved vaccination practices.
4. Current proposals for cost recovery such as raising health facility fees, or of selling drugs through a national pharmacy should be acted upon as soon as possible. CCCD should help the GOR accelerate this process as much as possible through technical assistance and/or the initial seed money for the establishment of a revolving drug fund.,
5. Receipts from any increase in medical charges should stay within the community to be used entirely for health care in order to help increase the quality of health care within the community.

#### 2.3.9 Operational Research

1. Priority should be given to increasing the use of CCCD bilateral funds for operational research on CCCD/PHC subjects, and TA should be provided by the TO and CDC/Atlanta to the extent needed in the development of appropriate operational research protocols and budgets.

2. A National Review Board should be set up by the MOHSA to review and approve operational research proposals as they are prepared and are ready for implementation.

### 3.0. Evaluation Process

The basic team consisted of two epidemiologist (one from WHO), a health economist and a health management specialist. The team worked in Rwanda from September 29 to October 17, 1986. Orientation for the mission took place at Centers for Disease Control (CDC) headquarters in Atlanta, Georgia, September 25 and 26. The team had the opportunity to meet with the key CDC staff working on the CCCD project, as well as Wendy Roseberry (Project Officer) who came from AID/Washington to participate in the briefing. Substantial documentation was made available for the team to study and review both in Atlanta and Kigali. (A list of principal documents used in the evaluation is noted in Annex II.)

During the first week the team met with the USAID Representative and members of his staff, as well as the CDC/CCCD technical officer and her staff. Meetings were held with MOHSA and BUFMAR officers and representatives of UNICEF and WHO, as well as supervisors at the national level responsible for carrying out the CCCD Project.

The second week concentrated on field visits to three of the seven CCCD health regions, which included visits to hospitals, health Centers (HCs), and dispensaries. Meetings were held with the Regional Medical Officers, regional CCCD supervisors, medical assistants in charge of the HCs. (A list of persons contacted is contained in Annex III.)

The third week was spent drafting the report, verifying data and developing a team consensus. The team also met with the Minister of Health, MOHSA, and presented its preliminary findings.

Three weeks was a minimum amount of time for the team to review in depth the multifaceted CCCD project and its integration into the Primary Health Care (PHC) program of the Rwandan Government. However, the wisdom, frank discussions, and suggestions provided by those in policy, program, supervisory, and operating positions made it possible for the team to analyze and make recommendations concerning the project.

#### 4.0. Observations and Findings

The CCCD Evaluation team carried out its evaluation in Rwanda from September 29 to October 17, 1986. During this period, the team had the opportunity to meet with Ministry of Health and Social Affairs (MOHSA) officials, Regional Medical Officers (RMOs) and Regional CCCD Supervisors, Hospital/Health Center/and Dispensary doctors, nurses, medical assistants and staff, as well as the executive director of BUFMAR (Bureau Des Formations Medicales Agreees du Rwanda), WHO, UNICEF, World Bank, as well as USAID, French and Belgian aid representatives.

The team's mandate was to: "a) evaluate CCCD activities in Rwanda through systematic collection and analysis of data on CCCD management and operation at the central, regional and peripheral level; b) to measure the extent to which CCCD activities have been integrated into Rwanda's existing Primary Health Care (PHC) structure; and c) to offer a series of recommendations to improve the expansion and delivery of CCCD services, (including development of the Health Information System (HIS), Health Education (HE), and Training); and d) to accelerate their integration into the present PHC delivery structure given ever present resource constraints." The important questions of cost, financing and sustainability were also examined. (Annex I contains the "Scope of Work of the team.)

The government is to be congratulated on its success in establishing a PHC infrastructure and decentralizing its operation. In addition, excellent work has gone on in the past in the EPI program. However, significant work is needed on the planning side, and there are significant technical, administrative and management problems due to lack of supervision from the center to the region to the peripheral areas. The team was especially encouraged by recent MOHSA actions within the last six months which will have a positive and real impact on the project both from a program and operational standpoint.

The following pages set forth the teams principal findings.

#### 4.1. Planning and Strategy

The medium term planning and strategy for the CCCD have not kept pace with the advances made on the operational side in getting the project going in the three pilot regions of Cyangugu, Gigongoro, and Kibungo, and beginning operations in four additional regions (Byumba, Gitarama, Kibuye, and Kigali)., The three remaining regions which are already relatively well served (Gisenyi, Ruengeri, and Butare will be added to the CCCD areas in 1987 or later. (Figure 1 Contains a map of Rwanda and Figure 2 contains a map of current and projected CCCD program areas.)

To illustrate the fact that planning has not kept pace with implementation, there is no multi-year plan for the Expanded Program of Immunizations (EPI), and the four year programs for Control of Diarrheal



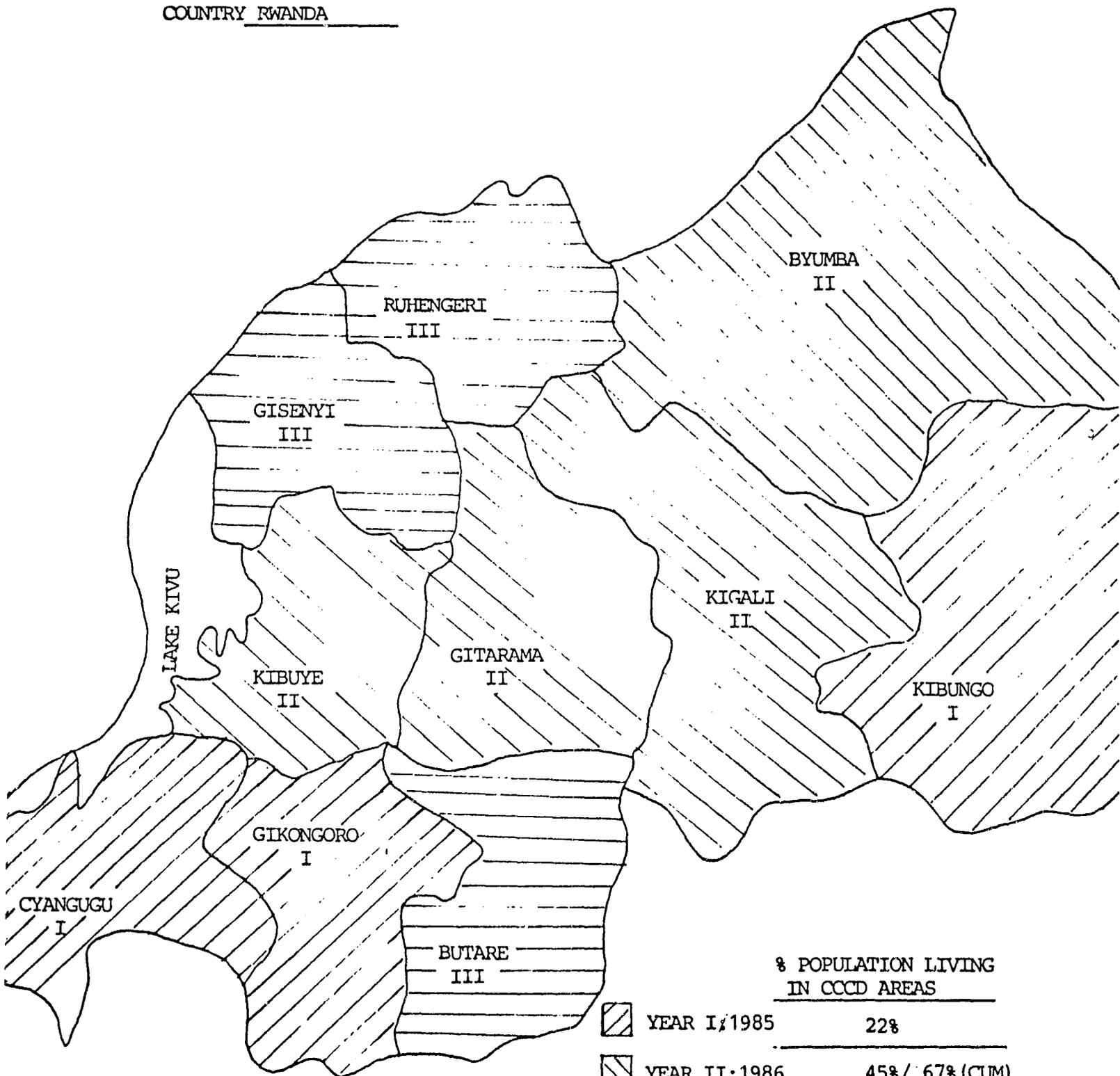
Scale 1:400,000  
Map data from 1960s  
Scale 1:400,000

— Road  
✈ Airport

MAP OF CURRENT AND PROJECTED CCCD PROGRAM AREAS

(SOURCE: RWANDA CCCD ANNUAL COUNTRY REPORT 1985, NEILL)

COUNTRY RWANDA



	% POPULATION LIVING IN CCCD AREAS
YEAR I: 1985	22%
YEAR II: 1986	45% / 67% (CUM)
YEAR III: 1987	33% / 100% (CUM)
YEAR IV: 1988	100%
YEAR V: 1989	100%

Diseases (CCD) and Malaria have only recently been prepared in draft, and still require Government of Rwanda (GOR) consideration, modification and approval.

While the results of the recent EPI cluster survey show that full coverage of children under five, increased from 25 percent in 1983 to 55 percent in 1986, indications are that in recent months the rate of increase in full coverage has begun to level off. A satisfactory agreed on four year plan for EPI is needed if the government's goal of 80 percent full coverage of children under the age of five by 1990 is to be attained. Also needed is a multiyear National Training plan for CCCD activities and their integration into the government's Primary Health Care (PHC) program.

In terms of MOHSA strategy in the future, the prompt development of a draft four year plan for EPI for consideration by the MOHSA, and approval of the existing draft CDD and Malaria plans, plus a National Training Plan will do much to accelerate future coverage, and will allow for improved planning on the part of the government in determining its annual plans of action. The multi-year plans should contain illustrative budgets for each year of the plan. Also donors will have a clearer idea of any special financial and technical support required in carrying out the program. Given the major GOR/UNICEF project (using Italian funds) focusing on EPI that is in final stages of approval, an appropriate strategy option would be to utilize the remaining CCCD bilateral project funds (\$510,000) principally in support of the Malaria and CDD activities once the four year plans are approved.

#### 4.1.1 Recommendations:

- 1) A satisfactory four year EPI plan and budget (1987-90) should be developed, reviewed and approved by the MOHSA within the next six months;
- 2) The multi year plan for Controlling Diarrheal Diseases-CDD-(1987-90) now ready in draft should be reviewed, amended and approved by the MOHSA within the next three months;
- 3) The draft Malaria plan (1987-90) now in draft and ready for consideration should be reviewed, amended and approved by the MOHSA within the next three months;
- 4) A national training plan for CCCD activities (1987-90) should be developed, reviewed, amended and approved by the MOHSA within the next six months which also suggests steps for eventual integration of appropriate parts of the CCCD training program into the government's PHC program;
- 5) Continuation of the CCCD project beyond June 30, 1987 should be made dependent on satisfactory development and approval of the four plans listed in recommendations 1-4 above.

- 6) Should it not be possible to complete this work by the end of June, AID/Washington and CDC Atlanta should dispatch an internal management team to Rwanda within 60 days to work out arrangements for an orderly phase-out of the project.

#### 4.2 Administration and Management

The team found the administration and management situation mixed. There were some examples in the regions visited of excellent teamwork, management and administration, particularly in those cases where there was a close working relationship between the Regional Medical Officer and the CCCD Supervisor.

The team was particularly impressed by a number of MOHSA actions over the last several months such as:

- a) Formation of a internal coordination committee chaired by the Coordinator for CCCD activities composed of the different MOHSA departments and divisions directly concerned with CCCD activities.
- b) Provision of the additional professional staff (one doctor and three medical assistants) in the summer of 1986 to reinforce the CCCD office which will enable it to carry out its planning, supervisory and training functions in the field over the coming months.
- c) Preparation of two draft four year plans (1987-1990) for Malaria and the Control of Diarrheal Diseases (CDD) which are now ready for review, amendment and approval by the MOHSA.
- d) Allocation of 3.125 million FRW to the CCCD project for gasoline and repair of the CCCD vehicle fleet for 1986 of which roughly 64% has been sub obligated to date.

The distinction between administration and management is not clearly defined. However for the purposes of this evaluation report administration usually will deal with organizational structure, personnel, staffing, travel order, gasoline, etc., and management with operational decision-making activities.

Generally speaking the geographical coverage of health facilities in Rwanda's ten regions is reasonably good, although the mountainous nature of the country can make even a distance of a few kilometers to the nearest health facility a challenge for the mother and her child. While the CCCD project does not yet cover all of Rwanda, preliminary CCCD results in the three pilot regions have been encouraging, and CCCD programs are starting in four additional regions. Figure 3 shows the location of the various health facilities throughout the country, and Table 1 shows the distribution of health/social affairs facilities by region and by kind.



TABLE 1

Distribution of Social/Health Facilities  
by Region and by Kind (End of 1985)

Social/Health Structures	Hospitals		Health Centers		Dispensaries		Maternities	
	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.

REGIONS

Insert  
Regions

---

Subtotal

Total

Social/Health Structures	Nutritional Centers		Health Posts		Specialized Health Facilities		TOTAL
	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	

Insert  
Regions

---

Subtotal

Total

N.B. The Gishali Sanatorium and Psychiatric Center at Ndera are not included.

Source: Draft Malaria Plan, 1987-1990, September 1986.

In total there are 395 health facilities throughout the country of which 29 are hospitals, 147 health centers, 76 dispensaries, 5 maternities, and 140 nutritional centers, health posts, and specialized social/health institutions. The private sector is responsible for 48% of the hospitals, 50% of the Health Centers, 24% of the Dispensaries, and a significant proportion of other services.

On the personnel side, at the end of 1985, there were 6006 medical personnel, paramedic, social workers, and support staff working under the guidance of MOHSA. Of these there were 248 doctors of which 71% are Rwandans, and 29% expatriates. Nurses (A1 level) number 79 of which 32% are expatriate. Nurses (A2 & A3 level) number 714 of which 16% are expatriate. In support staff the largest category are laborers (2176) or 36% of total health care staff. Adequate personnel does not appear to be as much of a problem as the lack of supervision from the center and regional levels, and the lack of logistic support required to carry out the supervision in terms of vehicles and gasoline.

The team noted that the CCCD program coordination activities, training, malaria and GDD were located in the Epidemiology Directorate, but that EPI activities had been moved from Epidemiology to the Integrated Health Care directorate several years ago. Health Education and Statistics are under the Directorate General of Social Affairs. OPHAR and CCCD pharmaceutical activities are separate. This dispersion has led to difficulties in coordinating the diverse activities of the CCCD project. The recently formed MOHSA internal coordinating committee for CCCD activities should help alleviate this problem. If EPI were to be moved back to Epidemiology, the three most important programs would be consolidated in one directorate, and would make for tighter program direction, and supervision. This kind of problem does not arise at the regional/field level since all of the CCCD activities are already integrated under the direction of the Regional Medical Officer (RMO). (Figure 4 contains an organizational chart of the Ministry of Health and Social Affairs (MOHSA)).

Regarding financial management, though called for in the project agreement signed on June 30, 1984 the MOHSA still does not have an accounting system established which identifies and quantifies the government's contribution to the CCCD project on an annual basis. This makes it impossible to determine the degree to which the government is meeting its obligations under the agreement. Further the line item in the project agreement which calls for government contributions in specific areas where the needs (for example, oral rehydration packets (ORs)) are already supplied by other donors is not realistic and should be revised. Further, due credit should be given to the government for its contribution in other areas of project activity such as personnel, per diem, kerosens, and maintenance of cold chain equipment.

In the management area, the lack of supervision from the Center to the regional and peripheral health facilities was striking. In the EPI

ORGANIZATIONAL CHART OF THE MINISTRY OF HEALTH (MOHSA)

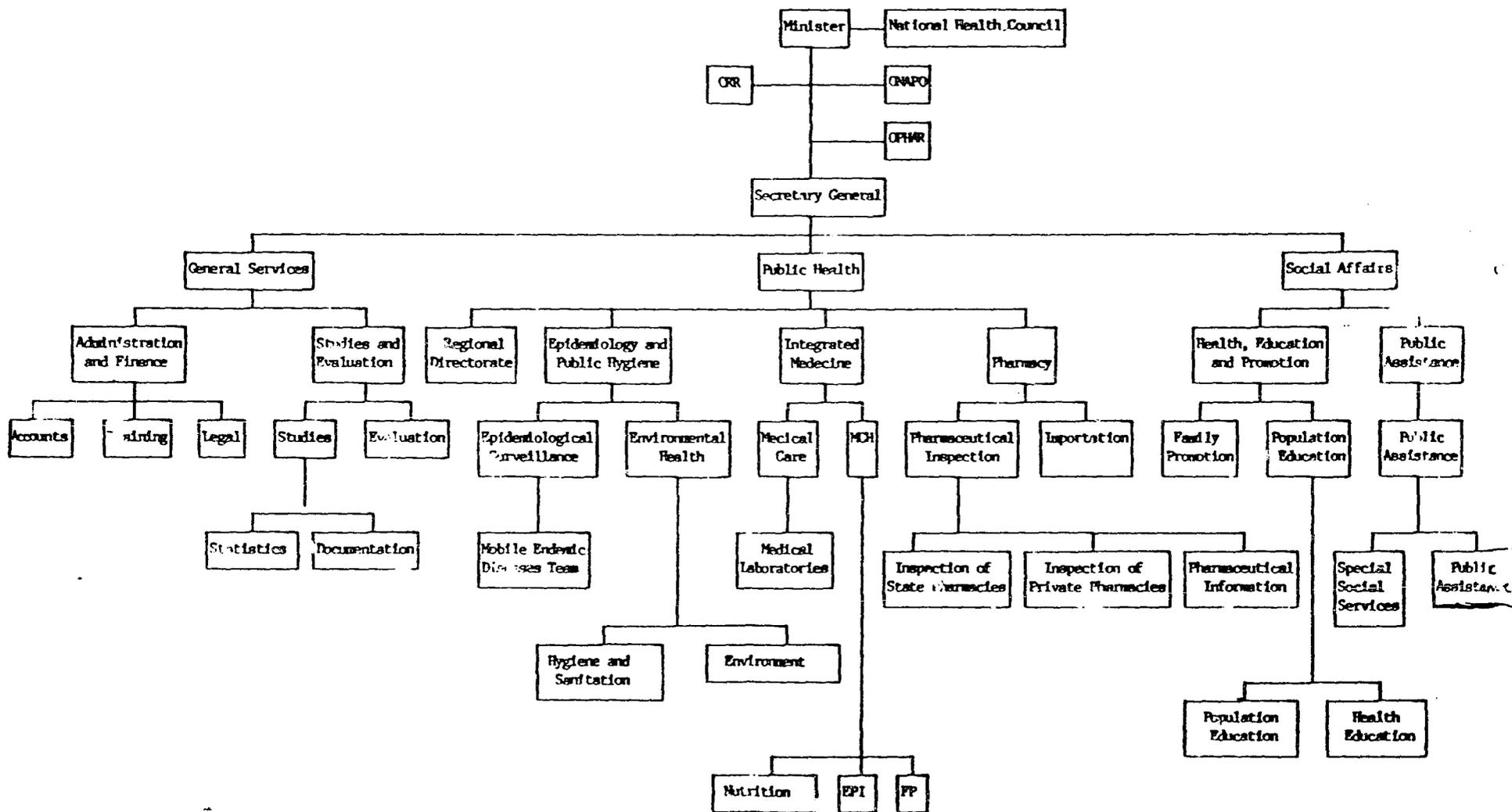


FIGURE 4

program supervisory visits had not been made to the ten regions in over a year. Up until the summer of 1986, the CCCD coordinating staff was too limited to permit regular visits to the field to monitor the core programs in EPI, CDD, and Malaria. Even where field trips were planned by the relevant offices, significant difficulties were encountered in obtaining travel orders, vehicles, gasoline, and per diem. All of these factors together appear to have discouraged frequent supervisory visits even though the costs were often covered under the CCCD project.

At the regional level the supervisory visits to the peripheral health facilities are carried out more regularly, but the quality of the supervision varied markedly from place to place depending upon the RMO, the CCCD supervisor and the priority accorded the EPI/CDD/ and Malaria programs. Some of these problems can be easily rectified by instituting standard supervisory visit check lists, more frequent visits from the center to the regions so that the objectives of the various programs are clearly understood, and continuing education (recyclage) so that those who might have missed earlier training are brought up to date.

A specific example of administrative delays which slow the operation of the CCCD program might be helpful. The Cold Chain system through out the country is well thought out and works well, adequate funds are available for its maintenance under the project, and Rwanda has a highly competent technician capable of maintaining and repairing the refrigerators as necessary. However, frequent requests for cold chain spare parts have been stalled, and requests for travel have been delayed or refused at the Center. As a result more than 20 refrigerators are not repaired due to lack of spare parts due to difficulties in processing purchase orders, obtaining travel orders, approval for requests for vehicles etc. Should this continue much longer there is a real danger of spoilage of vaccines due to lack of adequate cold storage facilities.

In the early stages of the project, it was necessary for the Technical Officer to go to the field alone, resolve problems, conduct training, etc., due to CCCD staff limitations, and the logistic problems described above. Now that the initial start-up period is over, significant training has taken place, additional staff and funds made available by the MOHSA, it would be preferable for the Technical Officer to be accompanied by one of the CCCD supervisors or technicians on all of the future field trips.

The team noted with satisfaction that as provided under the Project Agreement (except for those being repaired) all of the 21 vehicles supplied under the project had arrived and were being used for project activities.

The advances in the three pilot regions (Cyangugu, Gigongoro, and Kibungo) in recent months are impressive, and the MOHSA and those in the pilot regions are to be complimented. The work in the four new regions (Biyumba, Gitarama, Kibuye and Kigali) is just getting under way. Much

effort will be required to consolidate the gains made, bring up to standard those hospitals, health centers and dispensaries that are lagging behind, and train those in the new regions. Although initial steps are promising, it would appear wise not to expand the coverage of the project at this time, to the remaining three regions (Gisenyi, Butare, and Ruhengeri) which are relatively well served by vigorous MOHSA health programs supported by Belgian and French assistance.

#### 4.2.1 Recommendations

- 1) that the MOHSA reexamine the present location of the EPI program, and consider the merits of returning it to the Epidemiology Directorate, thus consolidating all three of the major CCCD programs (EPI, CDD and Malaria) in one directorate.
- 2) that the MOHSA continue its steps to set up the accounts in such a way that the government's contribution to the CCCD project can be determined accurately, with a view to furnishing this information following the end of the GOR fiscal year (Feb. 28, 1987).
- 3) As separate matter, either by Project Implementation Letter (PIL) or amendment to the Project Agreement, the nature of the GOR contribution to the CCCD project should be redefined to reflect the changes due to large inputs from other donors, and describe more accurately the nature of the Government's obligations/contribution in personnel, facilities, and operating cost.
- 4) Steps should be taken to assure that supervisory visits from the center to the regions are organized on a regular basis (e.g. quarterly), and to the peripheral facilities as needed. High priority should be given to enhanced supervision using the additional CCCD personnel provided to the CCCD project in the summer of 1986 thus establishing a two way communications between the seven regions and the center. Administrative delays which hinder the carrying out of the schedule should be brought to the attention of senior management in the MOHSA so that they can be resolved promptly.
- 5) Center CCCD/MOHSA management should investigate the reasons for the delays in ordering spare parts and repairing equipment for the Cold Chain network, including the delays in approval of service/repair visits so that corrective action can be taken, and the backlog of non operative refrigerators can be eliminated.
- 6) In the future, field visits of the Technical Officer should always be accompanied by the appropriate CCCD staff, Ministry officer or technician to assure that all operational decisions can be taken by Rwandan supervisory staff. In this way the

Technical Officer's operating experience can be readily shared, but with the decision making responsibility being assumed by the CCCD person and/or other appropriate MOHSA staff.

- 7) CCCD activities and programs should be limited to the three pilot regions and the four new ones coming on stream for at least a year (until December 1987) to allow sufficient time to consolidate gains in the pilot regions and to provide the necessary training and technical assistance in the four new regions.

#### 4.3 Donor Coordination

Donor coordination in the health field in Rwanda is carried out by a Committee for the Coordination of Health Projects established by the Government. The chairman of the committee is the Acting Secretary General of the Ministry of Health and Social Affairs (MOHSA). Bilateral donors in the health field (e.g., Belgium, Canada, France, Germany, USAID) international organizations (UNICEF, WHO, World Bank) BUFMAR (Association of Churches and private organizations working in health care) voluntary agencies, and appropriate representatives from MOHSA participate. Thus far, the committee has not met frequently. Its most recent meeting was July 9, 1985. Another meeting is scheduled for October 1986.

In addition to the health committee, the Government has established an overall committee for economic and technical assistance which meets monthly. Each monthly meeting normally will include a review of a specific sector (agriculture, Health, Industry, etc.). Regular participants include: Belgium, Canada, France (FAC/La Caisse Centrale), Germany, the United States (USAID), and international organizations such as (UNDP, UNICEF, WHO, World Bank, Common Market (FED), and the representative of the Vatican, etc.

In addition, there is informal coordination that goes on between donors. In the case of the CCCD project, the TO works closely with UNICEF, consults with the WHO representative, and meets with technical representative (doctors, nurses, health administrators, etc.) from bilateral donors such as Belgium and France on all facets of health care. While the emphasis is on PHC and preventive medicine, the curative side is also reviewed in these meetings.

There is a good potential for the government to utilize this coordinating committee for health more effectively. It would appear useful to meet more often on a regular basis (e.g. quarterly). Documents from MOHSA, and donor sponsored program descriptions, project documents, studies and research could be circulated in advance, thus allowing more time to discuss the contents/recommendations/conclusions, etc. at coordinating committee meetings.

At present the government has been very slow in approving draft reports, studies, etc., and clearance of research and technical studies can take as long as six months. Members of the coordination committee would benefit from seeing the results of these studies earlier. One solution would be to mark the documents not yet cleared as internal draft documents, and not for quotation. This would allow for the information to be shared promptly, while waiting for the government's normal clearance procedures to be completed, without delaying the results of the study, research, field trip, etc.

#### 4.3.1 Recommendations:

- 1) That the coordinating committee for health projects should meet more frequently, at least quarterly or more often if needed. Documents should have circulated well in advance so that the members can read them before the meeting, thus allowing more time for dialogue.
- 2) Working document/studies/research results, etc., in the field of health should be made available promptly to Committee members. Where documents have not yet been cleared by the government, they should be clearly marked as internal documents, and not for quotation in writing.

#### 4.4 Health Information System

##### 4.4.1 Structure of the Health Information System

###### 4.4.1.1 Central Level

At the central level there are four individuals assigned to the Statistical Unit in the Division of Public Health. These four individuals have responsibility for collating and analyzing all data related to the MOH activities, including disease surveillance, program activity statistics, personnel statistics, and health facility activity statistics. At present all data processing is done manually with the assistance of several desktop calculators. None of the four individuals have had formal training in health administration. The formal training is varied and includes one nurse, one social worker, a statistician and clerk.

While there is presently no computer available for the Health Statistics Unit, the staff would greatly welcome the addition of a computer to facilitate their work. For a while there was a delay in the production of the Annual Report of the MOH, with the 1984 summary just available in the second trimester of 1986. At the time for the evaluation team's visit, the 1985 Annual Summary Report was in press.

With respect to CCCD related data, there is a weekly disease reporting form that requests information on the number of cases and deaths related

to eight disease processes by commune of residence, including measles and pertussis. In addition to this, there is a monthly epidemiological surveillance report requesting information on the number of cases and deaths due to 48 different disease processes including: malaria, poliomyelitis, diphtheria, amoebic dysentary, diarrhea of other forms, tetanus, tuberculosis, bacillary dysentary, measles and pertussis -- all disease entities of interest to CCCD project interventions. Of note, information collected on the occurrence of tetanus cases is not further subdivided into neonatal and non-nenatal tetanus. Information on the age distribution of cases is not routinely collected through the HIS.

In addition to the routine information on disease surveillance, a new form requesting age group and vaccination history of reported cases of EPI target diseases has recently been implemented by the CCCD project office.

These reports are sent to both the CCCD project office (in the Division of Public Health/Epidemiology) and the Health Statistics Unit.

Information on the disease specific mortality is felt to be greatly underreported. While civil registries of births and deaths are maintained, in actuality it is estimated that only 5% of deaths are routinely reported. While mortality information is collected from health facilities (primarily from hospitals and those health centers with in-patient facilities), the observed practice is that when death appears imminent, the family takes the patient back to the house so that the death will occur in the home and is therefore not reported through the HIS.

There is also a monthly report form on the number of vaccinations given by age of recipient (0-11 months, 12-23 months, and greater than or equal to two years).

The central level Statistical Unit prepares a monthly summary of disease surveillance data that is sent to each of the 10 Regions. The most recent monthly report available is for July 1986. In addition to sending information on disease occurrence, the report mentions those health facilities that have not submitted their reports on time. A review of the reports available at the central level reveals that approximately 90% of reports are received within two months of when the monthly report is due. The central level keeps a control sheet of the flow of reports received by each of the regions and by reporting units. This control sheet permits an analysis of the timeliness of reports received.

The staff of the central level in the Statistical Unit have not made supervisory visits to the regional or local level units. Among the reasons given for the absence of supervisory visits includes a lack of time given the high demand on this unit, and a lack of transport and per diem allotment for them to mobilize. Thus, while the quality of the work performed at the central level is excellent, there have not been

field checks to verify the quality of the data sent to the central level. In addition, while information is available on the timeliness of reports, those health facilities which are delinquent are sent a memo, but are not visited to review what the problems are.

#### 4.4.1.1.1 Recommendations

- 1) The central level statistical unit should be provided with a computer to permit a computerization of the Health Information System.
- 2) The central level statistical unit should make field supervisory visits at a minimum of two regions per month to permit inservice training of personnel in information system needs. There should be at least one visit to each region every trimester. These supervisory visits could be coordinated with CCCD central level supervisory visits in order to integrate activities and economize on mobilization cost (transportation).
- 3) Consideration should be given to sending the personnel in the health statistics unit for formal training in health statistics.
- 4) Consideration should be given to modifying the weekly disease reporting system to include all vaccine preventable diseases that are amenable to control measures. These include polimyelitis and diphtheria.

#### 4.4.1.2 Regional Level

At the regional Level, the CCCD/EPI supervisor and the Regional Medical officer have the responsibility to consolidate all data sent by each of the health facilities in the region. While some of the regions do have a statistician assigned to the regional office, this is not uniform, so that in many of the regions it is the responsibility of these individuals to perform the consolidations.

In addition to the forms mentioned in the receding section, the CCCD project has also designed forms for reporting on the number of cases of diarrhea in children 0-5 years of age and their treatment (including ORT, SSS AND IV), the number of children 0-5 years of age treated for presumptive malaria (with chloroquine and other non-chloroquine antimalarials and the number of pregnant women given chemoprophylaxis for malaria.

Field visits to three of the CCCD project regions revealed that not all of the regional level personnel were including health information system requirements in their supervisory visits. In one of the regions visited, there were obvious inconsistencies in some of the data reported that had not been questioned by the supervisory personnel. In contrast, in another region, during the field visit, the regional level personnel

detected inconsistencies in the data collected that suggested a lack of understanding of the report form and the personnel accompanying the evaluation team proceeded to give inservice training on the proper completion of this form during the course of the visit.

The three regions visited all had graphic representations of the disease activity in their region (related to the CCCD project interventions EPI and CCD). None of the regions were graphing the malaria incidence in their region.

Information on the proportional coverage of the target population with the EPI vaccines, was available in each of the three regions visited. Although not all of the regions were preparing graphic presentations of the coverages with the EPI vaccines in their regions.

#### 4.4.1.2.1 Recommendations

- 1) There is a need for retraining of the regional level staff in the requirements for the information system. Emphasis should be placed on the quality of the data received and how to use the data as an indication of the services provided through the project.
- 2) A supervisory check list should be designed which includes an emphasis on the verification of data reported through the HIS.

#### 4.4.1.3 Local Level

At the local level, information related to CCCD activities are kept in special registries. Thus, one encounters registries related to chemoprophylaxis of pregnant women with chloroquine, registries of diarrheal episodes in children 0-5 years of age that are treated with ORS and in some of the health facilities, registries of children and pregnant women containing their immunization status.

In only one of the health facilities visited was there a registry of outpatient consultations that permitted an assessment of the diagnoses and related treatment regimens prescribed. Verification of the data received is difficult. Thus, while information on the number of childhood presumptive malaria episodes treated with chloroquine was available, the number of febrile episodes not treated with chloroquine was not available. A similar situation held true for the number of childhood diarrheal episodes not treated with ORS.

With respect to disease surveillance data, most health facilities maintained a daily tally sheet (hand written) with disease diagnosis treated in the OPD activities that day. At the end of the day, these tallies were entered into a registry which conformed with the monthly disease reporting format.

All health facilities visited maintained copies of the reporting forms sent to the regional level. Very few of the health facilities visited were analyzing the data reported on a regular basis. Thus, their registries were serving as archival rather than active.

While the central level has designed standardized forms for the HIS, at the local level these forms were not consistently available, with most health facilities creating hand drawn reporting forms. Thus, the data collected from the local level was not standardized. An example related to CCCD project interventions is the collection of data on the treatment of childhood diarrheal episodes. Some of the health facilities were recording only those cases treated with ORS, while others included treatment with antibiotics and other medications.

Diagnoses of disease processes reported through the disease surveillance reporting system are primarily established on clinical presentation. All of the health facilities visited had laboratories capable of performing thick smears for malaria parasite determination and for processing stool specimens. None of the laboratories were equipped for bacteriological studies. Supervision and retraining in laboratory skills had not been performed on a regular basis. Thus the level of accuracy of the results has not been determined. This is especially true with respect to the diagnoses of bacillary vs. amoebic dysentery.

As mentioned earlier, mortality reporting from the health facilities is felt to be incomplete due to the practice of families to remove a patient from the hospital when death appears imminent. At present there are no outreach activities directed towards follow-up of critically ill patients discharged from the hospitals to improve upon the mortality statistics.

#### 4.4.1.3.1 Recommendations

- 1) Registries of daily out-patient department (OPD) consultations should be implemented at the local level. These registries should contain information on the name, place of residence, age, diagnosis and treatment of all patients presenting for curative consultations. Thus, during supervisory visits, the quality of the information reported through the HIS could be verified. In addition, this will permit a verification of the CCCD interventions in terms of target population covered by the CCCD interventions.
- 2) Standardized reporting forms should be distributed to all reporting units to guarantee uniform information collection.
- 3) Consideration should be given to improve disease related mortality statistics collection.

#### 4.4.2 Data Analyses and Feedback

#### 4.4.2.1 Central Level

As mentioned above, the central level statistical unit receives reports from all of the regions and prepares monthly summaries of disease surveillance data that are sent to all regional level offices as well as other MOH Divisions, International agencies within Rwanda, neighboring country MOHs, WHO/AFRO Brazzaville and WHO Geneva. In addition to the monthly report, the central level statistical unit prepares an annual summary of all health information received which includes all activities of the MOH including personnel allocation, personnel trained, services delivered, hospital in-patient activities, OPD activities, and program related activities.

While monthly reports are distributed to the regional offices, they are not routinely distributed to the reporting units. Thus, the central level is not providing direct feedback to the reporting units. Reports are not distributed due to a lack of materials for the production of sufficient numbers of reports for distribution to all local units.

Morbidity and mortality data are analyzed in terms of absolute numbers of cases reported. Population based rates are not routinely calculated.

The central level CCCD unit collects and analyzes the data related to CCCD project activities but has not developed a CCCD bulletin (or newsletter) for distribution to project areas. Thus, while there have been special analyses of the epidemiology of the CCCD target diseases, and also coverages of the target populations, these data have not been distributed to the project areas. As part of the CCCD project assistance, TA in HIS activities has been scheduled from CDC Atlanta, but has not been conducted as yet.

##### 4.4.2.1.1 Recommendations

- 1) Consideration should be given to the development of a quarterly CCCD newsletter for distribution to all CCCD project area health facilities. This newsletter should contain information related to the epidemiology of CCCD target diseases as well as results from special surveys and studies performed related to CCCD target interventions.
- 2) CCCD/CDC Atlanta should provide TA for improvement of the HIS at the central/regional/local levels before the end of this calendar year.
- 3) In addition to the analyses of the morbidity and mortality data by absolute numbers of cases, population based rates should be calculated.
- 4) The monthly reports presently sent to all regional levels should also be sent to all reporting units in the country to serve as feedback for data reported.

#### 4.4.2.2 Regional Level

The regional level receives reports from all health facilities in their jurisdiction and has the responsibility for the collation of all data received and its transmission to the central level statistical unit. All regional offices have data related to the populations in their region by commune and the estimates of the populations in the target groups of interest to the CCCD project interventions. Many of the regions are performing analyses of the coverages obtained in the CCCD target intervention areas by trimester.

While all of the regions visited had reviewed the monthly disease activity summary from the central level statistical unit, dissemination of this information to the local level reporting units was not consistent. None of the regions had prepared summaries of regional related information for distribution to the health facilities in their jurisdiction.

While there is a weekly reporting system for selected disease of interest (which include measles and pertussis), there does not appear to be an epidemic response capability. Thus, the data reported through the weekly system serves as archival data. None of the regions visited routinely investigate increases in reported disease activity. All information related to increased disease activity is analyzed on a regular basis from data reported from the health facilities but active community based case finding is not conducted. This absence of "epidemic" investigation is accompanied by an absence of implementation of control measures. Example of this include the recognized nationwide measles epidemic that began in July 1985 and peaked in January/February 1986 and the reports of eight cases of poliomyelitis in April 1986 (when there had been no cases of poliomyelitis reported in 1985). Neither of these increased disease occurrences were accompanied with active case finding and implementation of control measures (immunization activities) in the affected areas of the country.

##### 4.4.2.2.1 Recommendations

- 1) All regional offices should routinely provide feedback to the health facilities under their jurisdiction on the information reported through the HIS.
- 2) An epidemic response capability at the regional level with participation of the regional medical officer, the regional CCCD/EPI supervisor and the central level CCCD personnel should be developed. Thus, increases in disease occurrence should be immediately investigated with resultant implementation of control measures.

#### 4.4.2.3 Local Level

While all health facilities visited kept records of all information reported through the HIS, very few health facilities were analyzing the

data collected. During the field visits, none of the health facilities visited had information on their coverages of the target populations with CCCD project interventions.

Very few of the health facility personnel interviewed were aware of the target populations in their areas although all had received estimates prepared by the central level CCCD project office. There was an awareness on the part of the health facility staff on the disease occurrences of most CCCD target diseases, although none of the facilities visited had graphic representations of disease activity of interest.

#### 4.4.2.3.1 Recommendations

- 1) Health facilities should be encouraged to analyze data related to disease occurrence and CCCD intervention coverages in their areas. Consideration should be given to the design of standardized analyses to be performed by the local level staff that would serve as immediate feedback to the health facilities on coverages achieved.

#### 4.5 Expanded Program of Immunization

##### 4.5.1 Background and Administration of the Program

Rwanda is one of the African countries that started its program of immunization early - a program which began in 1960. The launching of this program introduced tuberculosis vaccine and eradicated smallpox. The successes brought about by these campaigns, particularly that against smallpox, had a great effect on the health of the population. In 1977, Rwanda submitted a request to the WHO and to UNICEF for support in the fight against the following six target diseases (Tuberculosis, Diphtheria, Tetanus, Whooping Cough, Polimyelitis and Measles) in infants aged 0 - 6 years <sup>1</sup>. A 10 - year plan was laid down and applied to cover the period 1978 - 1987. The launching of the program in 1978 began with the training of personnel and the establishment of infrastructures at the central level.

In 1980, AID intervened to help continue the reinforcement of the Expanded Program of Immunization. During this period the EPI remained under the tutelage of the Epidemiology Directorate until 1984, when it was integrated into the Directorate of Integrated Medicine . In spite of this separation, the Directorate of Epidemiology will continue to carry

out its task, which is the epidemiological supervision of all diseases, including those of the EPI. This means that, at present, although the EPI was integrated with the CCCD in 1984, it still depends administratively on the directorate of Integrated Medicine and technically on the Directorate of Epidemiology.

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<sup>1</sup> Expanded Program of Immunization - Plan/Rwanda 1978-1987.

As for the plan of operations, the Central Bureau of Immunization develops the annual plan of activities, sets the objectives to be attained and measures the achievement of objectives in the ten health regions of the country.

#### 4.5.2 Objectives of the EPI (1978-1987 Program):

The programs long term objectives were to:

- Vaccinate against the six target diseases (Tuberculosis, Whooping Cough, Diphtheria, Tetanus, Poliomyelitis and Measles) all infants before their first year of age.
- Vaccinate all pregnant women against Tetanus.
- Involve the population in each stage of the program - development, execution and evaluation.

Its mid term objectives were to:

- Reduce the morbidity and mortality rates due to the six diseases, by 50%.

Its short term objectives were to:

- Improve the system of supervision by stressing the link between regular vaccination and morbidity and mortality due to the six diseases mentioned.
- Vaccinate with antigens of Tuberculosis - DPT - Polio(Oral) - Measles, 75% of infants aged 0 - 1 year and approximately 20% of children aged 1 - 2 years, and who were not vaccinated during the first year of age.
- Evaluate and analyze the results of each stage of the activities. Supervise the activities at the regional and peripheral levels.
- Collect epidemiological and statistical data of the disease.
- Evaluate the impact of immunization on the disease.
- Evaluate the administration of the program.
- Provide quarterly, semi-annual and annual reports to the various organizations involved in the program.

#### 4.5.3 Principal Strategies adopted:

- The systematic integration of vaccination into the activities of fixed centers, and in the absence of those, the organization of advanced strategies or "outreach" in areas which are not accessible on foot.

- Social mobilization to ensure the active participation of all social levels.
- The trainings of personnel.
- The effective maintenance of cold storage.

4.5.4 Specific Objectives: Annual Immunization Coverage Objectives

<u>Year of Program</u>	<u>Coverage Projected</u>	<u>Corresponding Calendar Year</u>
1st	5%	1978
2nd	10%	1979
3rd	15%	1980
4th	20%	1981
5th	30%	1982
6th	40%	1983
7th	50%	1984
8th	60%	1985
9th	70%	1986
10th	80%	1987
11th	90%	1988
12th	95%	1989
13th	100%	1990

4.5.5 Vaccination Coverage

The progress made by the real vaccination coverage is indicated in the following table.

Table 2

Vaccine	EVALUATION OF THE VACCINATION COVERAGE	
	May-June 1983	September 1986
	(GOR/USAID/WHO/UNICEF ) Children aged 12-23 months	(GOR/WHO/UNICEF/USAID/BUFMAR) Children aged 12-23 months
Measles	53	78
DTC 1	63	98
DTC2	46	95
DTC3	46	95
Polio 1	57	97
Polio 2	39	94
Polio 3	25	86
BCG	60	92
Completely vaccinated	21	58

This table show the efforts made under the EPI in Rwanda through a joint participation in the area of integration. Though total coverage has reached the objective of the African Year of Vaccination in the country, this is not the case if the analysis of this coverage is carried out by health region.

For the Kibungo health region for instance, the theoretical immunization coverage from December 1985 to August 1986 has been assessed here below, based on estimates made by the CCCD Project in 1986. The following table indicate the coverage obtained for each antigen from the cumulative monthly numbers of vaccinated children aged 0 to 11 months and of pregnant women. The total target population is 24,470 children and 7,511 pregnant women.

Table 3

Vaccine	KIBUNGO REGION -- Theoretical Immunization Coverage		
	Number of vaccinated persons	Coverage reached %	Loss for multidose antigens
BCG	16,542	67.6	%
POLIO1	18,901	77.3	P2/P1 82
POLIO2	15,494	63.3	P3/P2 82
POLIO3	12,692	51.9	P4/P3 8
POLIO4	1,021	4.2	P4/P1 5.4
DPT1	16,820	68.8	D2/D1 86
DPT2	14,508	59.3	D3/D2 80
DPT3	11,557	47.2	D3/D1 69
SMALL POX	9,420	38.5	
TETANUS1	10,724	39	TET2/TET1 52
TETANUS2	5,570	20.3	

This demonstrates not the inappropriateness of the new immunization schedule in terms of the formulation of the problem in the field, but rather the inadequate training for the implementation of this schedule.

#### 4.5.6 Recommendations

- 1) Integrate the central EPI, now located in the Directorate of Integrated Medicines into the Department of Epidemiology under the responsibility of which it is placed for technical matters.
- 2) Strengthen the central level EPI staff, currently composed of three persons - the Director, a statistician and her assistant.

- 3) Supervise all of the ten health regions at least once every three months.
- 4) During the supervision, ensure data distribution and collection.
- 5) Train the personnel on the new immunization schedule and the relevance of vaccinating sick children, especially against measles.
- 6) During the vaccinations, use one syringe and one needle per child to prevent potential transmissions of disease such as hepatitis and/or AIDS.
- 7) Make an exhaustive inventory of all EPI equipment, specifying its distribution and operation in the field.
- 8) Standardize the equipment in the field by identifying the minimum required material for an integrated center.
- 9) Keep an adequate stock including the following items:

Syringes, 0,1 ml,	code: E8/01
Syringes, 1 ml,	code: E8/02
Syringes, 5 ml,	code: E8/03
Needles, 26g 10mm,	UNIPAC 07-515-02
Sterilizer	E9/01
Timer	E7/23
Vaccine trays	E7/24
- 10) Formulate an urgent request for sufficient injection and sterilization materials with spare parts.
- 11) Once the health facilities are equipped, develop fixed immunization activities to be carried out every working day.
- 12) Increase the staff responsible for the cold chain to two (instead of 1) to avoid any problems which could possibly emerge in relation to sickness, leave or whatever.
- 13) Have a stand-by generator with at least a 25 KVA capacity to prevent any electricity outage at the level of the central storage of vaccines should normal power sources fail.
- 14) Fill out correctly the cold chain temperature monitoring charts which come with the vaccines from outside and send them with vaccines to the field.
- 15) Check the cold chain temperature monitoring charts in the field to evaluate the operating status of the cold chain.
- 16) Identify the sources of energy that are available in the field, which constitute a good base for planning the energy to be supplied.

- 17) Keep a sufficient stock of spare parts for the cold chain equipment based on inventory.
- 18) Keep a reserve stock of kerosene for a least a six-month period.

#### 4.6 Control of Diarrheal Disease -- CDD

##### 4.6.1 Organization Administration and History of Country Program

In Rwanda, diarrheal diseases are recognized as an important cause of morbidity and mortality among the childhood population. Historically, international assistance within the field of diarrheal disease control began in 1978 when in response to a major countrywide epidemic of cholera, UNICEF imported large numbers of Oral Rehydration Salt (ORS) packets into the country which were not used. In 1982 there was a national sample survey of 1,700 households to define the diarrheal incidence, mortality and treatment patterns.<sup>2</sup>

At the time of the CCCD Evaluation Team's visit, a national plan for diarrheal disease control was still in draft form and had not as yet been implemented. Preceding the development of a national plan was a nationwide Knowledge Attitudes and Practice (KAP) survey performed in November 1985 to further delineate the needs within CDD program activities in Rwanda. This survey was conducted with the assistance of TA from CDC Atlanta. To assist in the finalization of the National Diarrheal Disease Control Plan, the CCCD/TO has requested TA from CDC Atlanta.

Administratively, the CDD program activities are located in the Epidemiology Office of the Division of Public Health within the CCCD project office. The country program coordinator is the CCCD project coordinator. Thus, in addition to the responsibility for overseeing all activities under the CCCD program, as well as all activities under the Malaria Control Program (to be discussed in further detail in the section on Malaria Control Activities), and, as director of the epidemiology program in charge of communicable disease control, this individual also has the responsibility for overseeing all activities related to CDD.

The CCCD program coordinator has just returned from two years overseas training (in the USA) for a MPH. He is assisted at the central level by a newly appointed physician to the CCCD activities and three technical assistants. These additional personnel have just been added to the CCCD project office since July 1986. None of the personnel at the central level have attended internationally sponsored CDD National Program Directors Training Seminar.

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<sup>2</sup> CDC/USAID/GOR, Combatting Childhood Communicable Diseases Project, Country Assessment, Rwanda, October 1983.

Because of personnel shortages as well as the heavy work demand on the central level CCCD personnel, supervision by the central level through field visits has been virtually impossible to date. CDD program activities have been part of the CCCD training curricula in the pilot regions.

At the regional level there are no designated CDD personnel. All CDD activities fall under the responsibility of the Regional Medical Officer and the CCCD/EPI Supervisor. All CCCD pilot regional personnel have undergone MLM training which incorporated CDD subject material.

At the operational level, the physicians, staff nurses, medical technicians, and nursing technicians have been trained in CCCD project activities (including CDD interventions) by their respective regional level personnel. Training of operative level personnel has been completed in the initial three pilot regions (which underwent training in 1985) and is presently underway in the second four regions during the course of 1986. Three regions remain for incorporation into CCCD/CDD program activities.

Of note is that the draft plan for the National Diarrheal Disease Control Program includes participation of other sectors with an emphasis on the provision of safe drinking water to the entire Rwandaise population by 1990 and the provision of safe waste disposal to the entire population.

#### 4.6.1.1 Recommendations

- 1) A National Plan for the Control of Diarrheal Diseases should be completed within six months of the evaluation with the policies that have been established rapidly distributed to all of the regions.
- 2) CDC/Atlanta should provide TA for the finalization of the National Plan for the Control of Diarrheal Diseases (CDD) within three months of the CCCD evaluation.
- 3) Consideration should be given to appointing a National Diarrheal Diseases program coordinator within the CCCD project office in the Epidemiology office.
- 4) The Central CCCD/CDD personnel should conduct a minimum of two regional supervisory visits each month so that each region should be supervised once each quarter.

#### 4.6.2 Oral Rehydration Therapy (ORT) and Diarrheal Disease Episode Management

As mentioned earlier, ORT was first introduced into Rwanda in 1978 in response to a major cholera epidemic with the importation of VORS packets by UNICEF. In 1981, an expatriate physician working in a Mission

hospital explained the use of ORS and imported packets for their use in this hospital.<sup>3</sup> Since that time, the French and the Belgian Cooperations as well as individual medical missions have been importing ORS packets for use in health facilities in which they provide assistance.

During the period 1978-1983 (the exact time frame is unknown) health workers at the local level were trained in the preparation of a sugar salt solution (SSS) to teach mothers to prepare for the treatment of diarrheal episodes at home. The formula most frequently taught is to mix:

- salt - 1/2 coffee spoon
- sugar - 4 coffee spoons
- water - Primus beer bottle (720ml)

There was concern raised about the availability of sugar in the homes. A KAP survey conducted in November of 1985 revealed that of 65 mothers who prepared SSS, there were 54 different formulas prepared, and analyses of 17 of these formulas revealed that 76% had sodium concentrations above the WHO established safety maximum of 90 mmol/l. These high concentrations raise serious concerns that if the mothers are actually administering these SSS preparations to children, they are potentially hazardous to the children's health.<sup>4</sup>

At the same time as the household based KAP, a health facility based KAP was conducted to determine the formulas recommended by the health facility personnel. Of eight health facility personnel interviewed, eight different recipes were taught to mothers:

Thus, none of the health workers were recommending recipes that were in agreement with the WHO recommended formula. Additional problems related to the preparation of the SSS at home is the absence of standardized measuring instruments. A one liter measuring container is not routinely available in Rwandaise homes. The most common recipient available is the Primus beer bottle which contains 720 ml. The standard soda bottle (cola etc.) contains 300 ml. Thus, the combination of the two bottles is a close approximation of one liter. With respect to the measuring spoons used for the salt and sugar, there are no standardized coffee spoons in the country. The spoons that are referred to as coffee spoons vary in capacity from less than 5 ml to greater than 15 ml. This lack of uniformity of measuring instruments contributes to the observed hazards of relying upon a home based SSS for ORT treatment of diarrheal episodes.

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<sup>3</sup> CDC/USAID/GOR, Combatting Childhood Communicable Diseases Project, Country Assessment, Rwanda, October 1983.

<sup>4</sup> Ntilivamunda, A., Deming, M., and Neill, M. Enquetes nationales sur le traitement de la fièvre et de la diarrhée chez les enfants de moins de 5 ans à domicile et dans les formations sanitaires, Novembre, 1985, Rapport Final

TABLE 4

Recipes for SSS taught to mothers by health facility personnel, Rwanda, KAP survey, November 1985

<u>Water</u>	<u>Salt</u>	<u>Sugar</u>
1/2 liter	2 coffee spoons	5 coffee spoons
1 liter	1 pinch/3 fingers	1 handful
1 liter	1 coffee spoon	4 coffee spoons
1 liter	1/2 coffee spoon	4 coffee spoons
1 liter	1 pinch/2 fingers	1 handful
700 ml	1 coffee spoon	4 coffee spoons
1 liter	1/2 coffee spoon	3 coffee spoons
1 liter	2 coffee spoons	8 soup spoons

(Recipe recommended by WHO)

1 liter	2 coffee spoons	8 soup spoons
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Source: Ntilivamunda, A., Deming, M., and Neill, M. Enquetes nationales sur le traitement de la fièvre et de la diarrhée chez les enfants de moins de 5 ans à domicile et dans les formations sanitaires, Novembre, 1985, Rapport Final.

It is important to mention that the Project Agreement clearly states as an objective of the CCCD/CDD component that "By the end of 1987, ORT is the primary treatment for diarrhea with dehydration in 80% of health facilities." and "By the end of 1987, 25% of children with diarrhea receive appropriate home prepared ORS".<sup>5</sup> A survey conducted in 1982 found that 23% of diarrheal episodes that occurred in the two weeks preceding the survey had been treated with SSS and 25% of episodes treated with ORS packets. The November 1985 KAP survey found that 8% of diarrheal episodes treated by health care personnel were treated with ORT (7% used SSS and 1% used ORS) and 7% of diarrheal episodes not brought to the attention of the health sector were treated with ORT (6% with SSS and 1% with ORS). Of note is that 42% of diarrheal episodes were brought to the attention of the health sector according to mothers' verbal histories.

The CCCD project has been training personnel at the national and regional level using the WHO recommended treatment schedules for diarrheal episodes based on the hydration status of the child at the time of first evaluation by the health care personnel. Of the three regions visited by the evaluation team, two of the three regions had incorporated the recommended treatment regimens in their local training schedules so that

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<sup>5</sup> Rwanda CCCD Project Agreement, Project 698-0421.96; detailed project description, Annex 1 p.2

all health facilities visited in these regions had posters describing the treatment regimens clearly visible. In addition, in one of the regions, health care personnel included an evaluation of the child's hydration status as part of CDD registries of children treated with ORS for diarrheal episodes, but very few listed other treatment modalities if given concurrently. As mentioned in the section of HIS, only one of the health facilities visited maintained a registry of all OPD consultation diagnoses and treatments that would permit an assessment of the proportion of diarrheal episodes among the 0-5 year old population that were treated with ORS. None of the health facilities visited had records of having treated diarrheal episodes with SSS although this information could not be verified.

Anecdotal information received by the evaluation team suggested that many of the physicians and the nursing cadre had not as yet accepted the use of ORS for the management of moderate or severe dehydration, especially at the level of the hospitals. Thus, there is continued use of IV therapy for the management of diarrheal episodes accompanied with dehydration. Verification of this could not be performed during the field visits as none of the hospitals maintained registries of in-patient treatment regimens. Of the hospitals visited during the course of the evaluation, there were no children observed who received IV therapy at the time of the visit. Very few of the health facilities visited discussed the use of NG lavage for the administration of ORS during diarrheal episodes in children who were unable to take the solution by mouth.

Evidence supporting the relatively low utilization of ORS for the management of diarrheal episodes is that of the original 450,000 packets of ORS provided by the CCCD project in May 1985, there were 287,455 packets still stored in the CCCD warehouse, in addition to 350,000 packets supplied by UNICEF which arrived in 1986. (There are an estimated 1,297,773 children 0-5 years of age in Rwanda in 1986, and an estimated CCCD/ORS utilization for 1986 of 194,666. If 43% of diarrhea episodes come to the attention of the health sector [as described in the KAP], with an estimated 2 episodes per child per year, then 1,116,085 episodes of diarrhea in children 0-5 years of age are expected to come to the attention of the health sector in 1986, of which 67% (747,777) occur in CCCD project regions).

In addition to the management of diarrheal episodes with ORT, the CDD project has been training health care personnel to reduce the use of antibiotics and antidiarrheal agents in the management of simple diarrheal episodes. Field visits revealed that most health facility personnel reserved the use of antibiotics for cases of dysentery as confirmed through laboratory examinations of stool specimens. Cases are defined as amoebic dysentery if red blood cells are identified in the stool (Metronidazole is prescribed) as bacillary dysentery if white blood cells are identified in the stool (in most instances Bactrim is prescribed). All health facilities visited had laboratory capabilities

for microscopic stool examinations although there had been no supervision checking the quality of the recorded results. Thus, there is concern that there is continued over-prescription of antibiotics for the management of diarrheal episodes. In one of the health facilities visited, the medical technician stated that for severe diarrheal episodes (those not resolving in three days), chloramphenicol was the drug of choice for therapy. Because of the absence of OPD consultation registries, the use of antibiotics in diarrheal episodes could not be evaluated by the team during the field visits.

In addition to activities directed towards the medical management of diarrheal episodes, the CCCD project is emphasizing the need for improved nutrition during diarrheal episodes. During the field visits, very few of the health facilities visited had posters visible that referred to feeding practices during diarrheal episodes.

#### 4.6.2.1 Recommendations:

1. In view of the findings of the November 1985 KAP consideration should be given to amending the Project Agreement objectives to discontinue the advocacy of home prepared SSS for the treatment of diarrheal episodes and increase the emphasis on the exclusive management of diarrheal episodes with ORS packets.
2. Continued efforts should be made to increase the acceptance of ORS therapy for the management of diarrheal episodes by all health care personnel discouraging the use of IVs except in extreme emergencies.
3. Retraining of health care personnel in project regions identified through supervision as in need of further CDD instruction should emphasize the need to assess hydration status of children with diarrheal episodes.
4. There is the need to retrain health care personnel on the indications for antibiotic therapy in diarrheal episodes. Consideration should be given to assessing the accuracy of laboratory diagnoses of dysentery by health care personnel during supervisory visits.
5. Further study into locally available one liter measurements should be conducted to insure that ORS prepared in the home has the proper concentration.
6. There is the need to develop a standardized diarrheal disease treatment reporting form for implementation in all project region health facilities so that the implementation of the CDD interventions can be accurately monitored.

7. Consideration should be given to the development of health communication activities with the use of mass media to increase the acceptance and utilization of ORS packets by mothers for the treatment of diarrheal episodes. This technology has been successful in several other countries.
8. There is the need to concentrate health education messages on the proper feeding practices during diarrheal episodes.

#### 4.6.3 ORS Supplies and Distribution

ORS packets have been available in Rwanda since 1978 from a variety of different sources. These sources have included international donors such as UNICEF, WHO, the Belgian Cooperation and the French Cooperation, as well as NGOs such as religious missions. BUFMAR (the confederation of religious medical missions) has produced ORS salts in bulk under the name "Apache solution" since 1979.

As mentioned earlier, USAID/CCCD imported 450,000 packets of ORS in May 1985, and UNICEF an additional 350,000 packets in 1986.

In addition to the imported packets of ORS, OPHAR (the national pharmaceutical organization) has a production laboratory in Butare with capabilities to produce 30,000 packets of ORS from imported bulk material per year. Production is limited by the absence of a mechanical packaging machine so that all packets are manually prepared. Due to the limited packaging capacity of the laboratory, this year's production of ORS was in packets of 10 liter salt quantities destined for use in health facilities. The decision to produce 10 liter packets was justified by the need to use all of the imported raw materials before decomposition. During the course of the CCCD evaluation, the team visited the National Pharmaceutical Laboratory in Butare and reviewed the facilities. The development of the laboratory is part of the Belgian Cooperation assistance, with two Belgian pharmacists on staff. This laboratory was evaluated by ten USFDA to assess suitability for US support in chloroquine tablet production. As part of this evaluation there were several technical deficiencies detected that preclude US support for production of chloroquine (see section on Malaria control program). It is unclear if the restrictions against US support of chloroquine production by this laboratory also apply to support in the purchase of an automated packing machine.

Of additional note, it was learned that the National Pharmaceutical Laboratory has plans to develop increased production of IV fluids for distribution to hospitals in the country. The concern was raised about the advisability of such increased production in view of the CCCD/CDD objectives of decreasing IV use for diarrheal episodes.

Given the varied sources of ORS packets, there are at least four defined distribution networks. The first distribution network is through the

CCCD project which stores all USAID/CCD and UNICEF ORS packets in the CCCD warehouse and distributes them to CCCD project regions. A second distribution network is through OPHAR, which supplies ORS packets (imported and locally produced) to non-CCCD regions. Another distribution network is the BUFMAR network which provides ORS packets to mission related health facilities in the country, both in CCCD and non-CCD project regions. The final known distribution network is the private sector which provides ORS packets to pharmacies. The extent of coverage of the private sector with ORS packet distribution was not known at the time of the evaluation.

ORS packets distributed through the CCCD project are sent to the CCCD regional offices in response to requests for needs. The central level CCCD office has estimated the project ORS packet needs for 1986, based on an expected coverage of 3.75% of diarrheal episodes. These estimates need to be reassessed based on the project goals of 80% of health facilities to be using ORS in the treatment of diarrheal episodes.

During the field visits, all health facilities had adequate supplies of ORS packets, and none of the health facilities claimed to have had ruptures in stocks in the twelve months preceding the field visits.

Storage of ORS packets at the central level CCCD warehouse is in a relatively shaded room as per recommendations, but the cartons are stacked on the floor so that in case of water seepage, the packets are potentially subjectable to water damage. One of the cartons appeared to have been subjected to water but when checked, all packets were in good condition. At the regional level, ORS packets are stored in regional stock rooms which are generally windowless. In one of the regions visited, the storeroom was in a mud constructed building with a mud floor, raising doubts as to the safety of storage of supplies during the rainy seasons.

Neither the central level CCCD warehouse, nor OPHAR have transportation to permit delivery of supplies to the regions. The regional CCCD/EPI supervisor comes to Kigali once a month to collect vaccines and other related supplies such as ORS packets and chloroquine tablets. At the local level, the CCCD/EPI supervisor is responsible for the distribution of the supplies to the local health facilities. In the event of shortages of supplies before the delivery, the health facility staff have to go to regional office to collect supplies, paying for their transport out of their personal funds. The level of dedication of the health facility personnel observed during the field visits revealed that this was not a deterrent to the maintenance of adequate supplies in the health facilities.

Inventories of ORS packet supplies were not routinely kept by the regional or local levels. Thus it was hard to estimate actual quantities and predict future distribution needs on a regular basis.

#### 4.6.3.1 Recommendations:

1. The feasibility of USAID/CCCD assistance in the purchase of packaging equipment for the National Pharmaceutical Laboratory in Butare should be investigated. If found to be feasible, increased local production of ORS packets should be supported.
2. Inventories of ORS packet supplies at the regional and local levels should be maintained to permit an ongoing assessment of supply needs and utilization patterns.
3. The central CCCD warehouse should redesign the ORS packet storage room to ensure that all cartons are stored on shelves to prevent possible water damage should flood occur.

#### 4.6.4 Hospital ORT Units

The first hospital based ORT demonstration unit was established at the Kigali Hospital in 1984 with the assistance of a Belgian Pediatrician. This unit has five beds, and due to a lack of personnel is operational during daytime hours only. Thus, with a requirement to treat cases for a minimum of 6-8 hours, admissions to the unit cease at noon. All OPD consultations for diarrhea with dehydration seen after noon are admitted to the in-patient facility for monitoring. It was learned that there are no permanent unit personnel, but rather all hospital nurses rotate through the unit. It was also learned that WHO has approved the support of two permanent ORT unit staff to begin in January 1987.

A visit to the unit suggests an underutilization of the facility, with average daily patient load ranging from 0-5. On the day of the visit by the CCCD evaluation team, there were no patients admitted to the unit.

The Belgian physician in charge of the Unit attended a WHO sponsored ORT course in Alexandria, Egypt on the development of operational research in Diarrheal Disease Control. As a result of this course, a protocol for the study of a sorghum based ORS preparation was designed and has been approved by WHO Geneva for financing.

The CCCD project has taken advantage of this unit for the training of regional level personnel, with the goal of establishing three regional based ORT units. To date, three groups of two individuals from project region hospitals have undergone two week training courses at the Kigali ORT Unit. Field visits to two of these CCCD ORT units revealed that they were also underutilized with average daily patient flows of 0 -3 cases.

It is important to mention that the Kigali ORT unit only treats mild to moderate dehydration in the unit and admits all severe dehydration to in-patient facilities. This is justified by the lack of staffing to provide the close monitoring felt necessary by the physician in charge.

One of the concerns raised by this physician was the tendency for hospital based personnel to prefer IV therapy for the management of dehydration, a practice he has had difficulties discouraging.

It does not appear as though the use of NG tubes for administration of ORS to children unable to swallow ORS is a standard procedure in the ORT unit. None of the personnel interviewed in the field, in charge of project ORT units were considering these of NG tubes.

The Kigali Hospital has laboratory facilities for stool analyses and cultures and all patients admitted to the ORT unit are studied. Of interest, the most frequent organism isolated is cryptosporidium.

Record keeping in the Kigali ORT unit includes a form on which the patients name, residence and age are listed as well as the amount of ORS administered and the laboratory results once available. All patients are weighed upon admission and discharge from the unit. Additional information on the patients are kept on individual hospital record cards. An assessment of the hydration status and treatment category (as per WHO recommendations) is not routinely kept. However, those individuals in CCCD regions, who received training in the ORT unit in Kigali, keep registries in accordance with those kept at the Kigali unit.

Information on the hydration status at admission to the regional ORT units is not routinely available.

In an attempt to improve the record keeping at the regional ORT units, a prototype form has been developed by the CCCD project office with the assistance of the TO. To date, the form has not been officially approved for distribution. The CCCD/TO has requested the assistance of TA from CDC Atlanta to improve the development of the ORT units in CCCD project areas. This assistance has not been scheduled as yet.

#### 4.6.4.1 Recommendations:

1. The CCCD project should continue the development of regional ORT units through cooperation with the Kigali ORT unit for training of project personnel. The personnel shortage at the Kigali unit could be resolved through the placement of project area personnel for training in the unit with the understanding that the training period would include working during night shifts.
2. The CCCD project should implement the prototype ORT unit reporting form and should coordinate with the Kigali Unit to attempt to standardize the information collected.
3. The CCCD project should ensure the TA from CDC/Atlanta for the further development of ORT demonstration units in project areas. This TA could be coordinated with the assistance provided for the finalization of the National Plan for Diarrheal Disease Control.

4. Increased utilization of the ORT units should be encouraged by a policy decision that all diarrheal cases presenting to facilities with ORT units should be admitted to the unit for initiation of ORS treatment.

#### 4.6.5 Morbidity and Mortality Due to Diarrheal Diseases

In 1984, diarrheal diseases were the second leading cause of morbidity presenting to the health sector in Rwanda with 65,108 cases reported, representing 13.4% of all OPD visits. In contrast, there were 687 deaths due to diarrheal disease, representing 40.6% of all reported deaths, ranking as the leading cause of reported mortality in the country.

In 1984, there were 176 reported cases of cholera from the Gisenyi region. Information is also collected on the numbers of cases of bacillary dysentery by region and are shown in Table 5 below:

TABLE 5

Annual reports of bacillary dysentery by region, Rwanda, 1983-1984

<u>Region</u>	<u>1984</u>	<u>1984</u>
Kigali	1053	3448
Gitarama	47	111
Butare	442	348
Gikongoro	227	5851
Cyangugu	418	1175
Kibuye	1879	1559
Gisenyi	78	1324
Ruhengeri	892	466
Byumba	2099	2309
Kibungo	8086	14654

Source: Ministere de la Sante Publique et des Affaires Sociales, Rapport Annual 1984/1985

In 1985, there were a total of 78,002 cases of diarrheal diseases reported with 51 deaths, suggesting the earlier mentioned high degree of underreporting of mortality (see section on HIS). During the first seven months of 1986 (January through July) there were a total of 66,713 cases and 154 deaths due to diarrheal diseases reported. Thus, diarrheal diseases continue to be a major problem.

Prior to the implementation of the CCCD project, information on diarrheal diseases was not collected according to age group of cases. Thus, information on the incidence of diarrheal diseases in the 0-5 year old

population was not routinely available. Beginning in January 1986, information on the diarrheal episodes occurring in the 0-5 year old population is being collected from CCCD project regions.

In response to the lack of information on the incidence of diarrheal diseases in the CCCD target population, a special retrospective study of hospitalized cases due to diarrhea was performed in selected sentinel hospitals throughout the country. Figure 5 shows the results of this study.

Due to incompleteness of mortality registration, an assessment of the impact of CCCD/CDD interventions cannot be made at this time. A household based survey performed in 1982 revealed that 19% of deaths in children 0-5 years of age that had occurred in the year preceding the survey were associated with diarrheal episodes<sup>6</sup>.

Information on the proportion of diarrheal disease episodes treated with ORT were not available for the review of the evaluation team.

#### 4.6.5.1 Recommendations:

1. There is a need to improve the data collection with respect to diarrheal diseases and deaths in the 0-5 year old population in order to follow the impact of CDD project interventions.
2. Consideration should be given to the establishment of selected sentinel reporting sites with the design of an outreach component to follow-up on early discharge of probable diarrheal deaths in order to better understand the mortality burden of diarrheal episodes in the 0-5 year old population.
3. Information on the proportion of diarrheal diseases treated with the different modalities should be collected and analyzed in CCCD project areas.

#### 4.7 Malaria Control Program

##### 4.7.1 Organization, Administration and History of the Malaria Control Program

In Rwanda, malaria is recognized and discussed as the major cause of morbidity and mortality for all age groups in the country. Historically, activities on the part of the health sector have been limited to the treatment of suspected or confirmed cases, health education, chemoprophylaxis of selected pregnant women and children, and vector control activities limited to urban areas within the country.

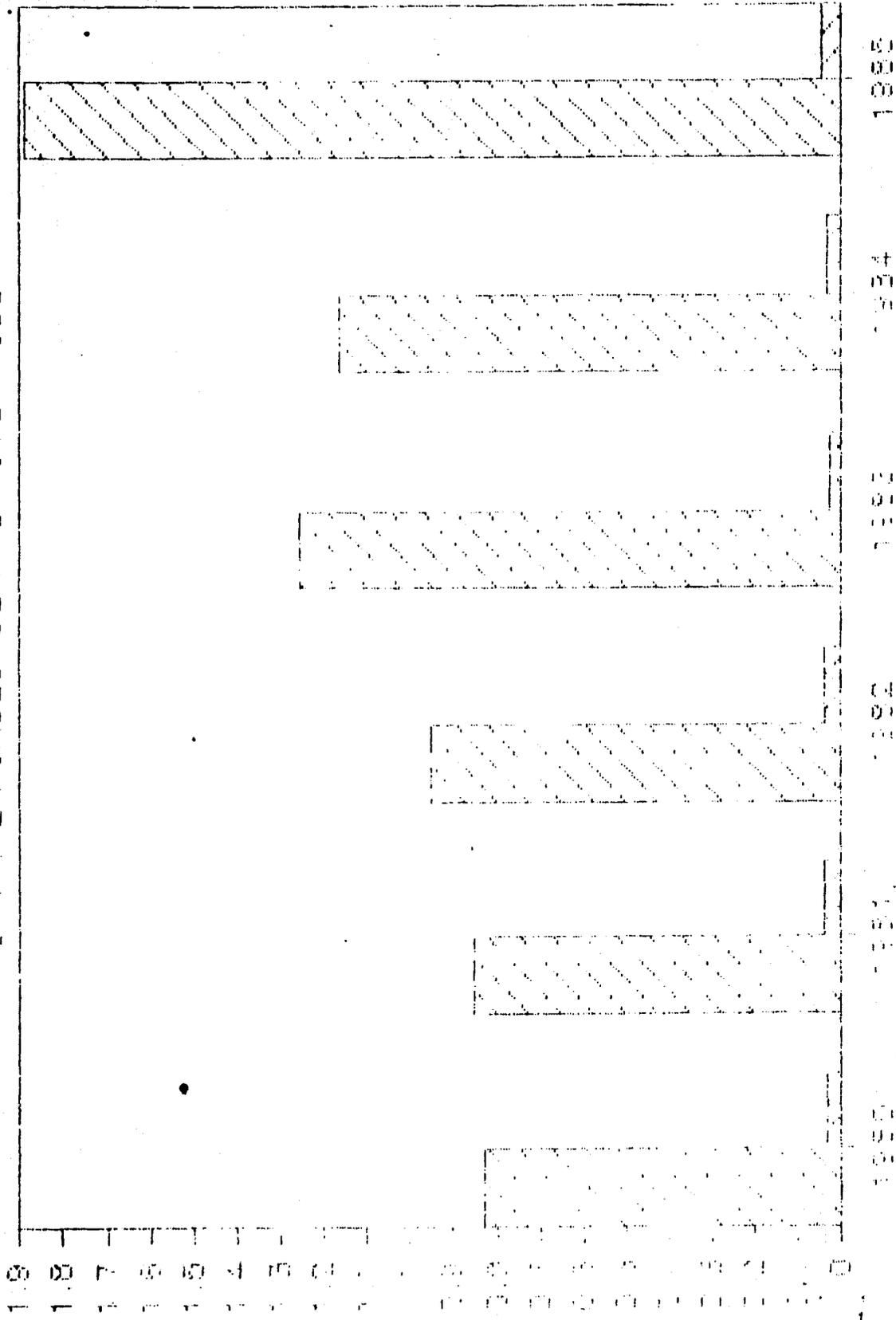
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<sup>6</sup> CDC/USAID/GOR, Combatting Childhood Communicable Disease Project, Country Assessment, Rwanda, October 1983

FIGURE 5

# RWANDA REFERENCE HOSPITALS

DIPYRRIA CASES (1980-1995)



DIPYRRIA CASES (1980-1995)  
DIPYRRIA CASES (1980-1995)

In spite of the recognized magnitude of the disease burden, there have been no organized national plans for attacking the problem preceding the implementation of the CCCD project. Thus, at the time of the CCCD Evaluation Team's visit, a National Plan for the Control of Malaria was still in draft form, and a national program coordinator had not as yet been designated. Preceding the development of the draft National Plan was an in vivo study to determine the degree of chloroquine resistance and compare different treatment regimens, and thus provide the necessary background information for the development of a national strategy.

Administratively, the Malaria Control Program activities are located in the Epidemiology Office of the Directorate of Public Health within the CCCD project office. The country program coordinator is the CCCD project; coordinator. Thus, as mentioned earlier, the CCCD National Coordinator in addition to the responsibility for overseeing all activities under the CCCD program as well as the section on CDD, and, as director of the epidemiology program in charge of communicable disease control, this individual also has the responsibility for overseeing all activities related to Malaria Control.

As mentioned earlier, the CCCD national coordinator has recently returned from overseas training. He is assisted at the central level by a newly appointed physician to the CCCD activities office and three medical assistants. Of note is that the newly appointed physician has attended an internationally sponsored training program in the field of malaria and is a qualified malariologist.

The same personnel shortages and heavy work demand constraints discussed in the section on CDD apply to Malaria Control program supervisory activities. Thus, the central level has been unable to conduct supervisory visits to the regional and local level related to malaria program activities. CCCD objectives within the field of malaria have been incorporated into the CCCD training program curricula in the pilot regions.

At the regional level there are no designated malaria control program personnel. Responsibilities for the CCCD related malaria control activities fall under the aegis of the regional medical officer and the regional CCCD/EPI supervisor. All regional level personnel in CCCD pilot regions have attended an MLM course which contains subject matter pertaining to CCCD objectives in malaria activities.

At the operational level, the physicians, staff nurses, medical technicians, and nursing technicians providing curative and preventive services have been trained by their respective regional level personnel in the objectives of the CCCD malaria interventions. The operative level in the original three pilot regions have completed their training, and those in the second four regions incorporated into CCCD are undergoing training at the present time.

#### 4.7.1.1 Recommendations

1. A National Plan for the Malaria Control Program should be completed within six months of the evaluation with the policies that are established rapidly distributed to all of the regions
2. Consideration should be given to appointing a National Malaria Control Program Coordinator within the CCCD project office in the Epidemiology office. This individual should be under the guidance of the CCCD project coordinator to insure integration with all CCCD project interventions.

#### 4.7.2 Chloroquine Resistance and Treatment of Presumptive Cases of Malaria

Chloroquine resistance has been reported from the surrounding countries in East Africa since 1978. Official reports of chloroquine resistance in Rwanda began in 1984, but anecdotal reports indicate that true resistance has been observed since at least 1980.

In response to the observed chloroquine resistance in the country, the medical community has developed several different treatment modalities. Chloroquine treatment doses have ranged from 5-50 mg/kg body weight given over a range of 3-6 days. In addition, some of the health care delivery personnel have opted to begin therapy with second line non-chloroquine antimalarials (such as Quinimax, Amodiaquine and Fansidar) without trying chloroquine first.

In order to better define the epidemiology of chloroquine resistance in Rwanda and the efficacy of chloroquine in treating children under five years of age, an in vivo study addressing these issues was conducted in August/September 1986, just prior to the arrival of the evaluation team. The population 0-5 years of age was selected for this study as it is the target age group for CCCD interventions, with the goal of CCCD being the reduction of morbidity and mortality in the childhood population.

This study tested the clinical and laboratory efficacy of two chloroquine treatment regimens - 25 vs. 50 mg/kg body weight over a three and five day period respectively. Results of the study revealed that the 50 mg/kg body weight dose administered over a five day period was only slightly more effective in decreasing the parasitemia than the 25 mg/kg body weight dose given over a three day period. The investigators concluded that the slight advantage of the higher dosage schedule was more costly, time consuming, and may have greater side effects and therefore was not indicated as the treatment of choice. Thus, the recommendation for the treatment of presumptive malaria is 25 mg/kg body weight of chloroquine given over a three day period (10,10,5), with follow up second line antimalarials in the event of treatment failures.

Of the children 0-5 years of age in the study treated with chloroquine, fourteen days after the beginning of the treatment schedules, 75% of those children treated with 25 mg/kg body weight over three days had positive thick smears and 69% of those children treated with 50 mg/kg body weight over five days had positive thick smears. Those children identified as treatment failures were then treated with either Amodiaquine or Fansidar. While there were no failures reported in the Fansidar group, preliminary results showed several failures in the Amodiaquine group.

As part of this study, health facility records were reviewed and revealed that the treatment modalities varied as stated above. This finding was additionally confirmed by the evaluation team during the field visits. The Medical School at the University at Butare is recommending a 50 mg/kg body weight dose regimen to be given over a five day period and all physicians and nurses trained at the university receive this protocol.

Reviews of health facility records showed that not all of the health facilities maintained records that permitted an assessment of compliance with treatment regimens. The standard protocol for treatment of malaria is for the health facility to perform a thick smear and administer the first days dose, and then to require the patient to return on each of the subsequent days to complete the treatment dose. In the absence of registries of those individuals enrolled in chloroquine treatment schedules, it is impossible to evaluate the compliance rate. Of note is that in the recently trained CCCD, records of all children treated with chloroquine for malaria are being kept, and the compliance rate is quite good.

In the absence of OPD consultation registries (discussed in earlier sections), the proportion of presumptive malaria cases actually treated with chloroquine versus non-chloroquine anti-malarials cannot be accurately determined. Discussions with the health facility personnel revealed that in the region that had been trained first, there was still indiscriminant use of non-chloroquine antimalarials.

All health facilities visited by the evaluation team had laboratories equipped to perform thick smears and all places claimed to do thick smears on all presumptive cases. None of the health facility personnel claimed to withhold treatment in the event of a negative thick smear. Of note is that supervision of the quality of the preparation of the thick smears and the interpretations of the results has not been performed. In addition, very few of the health facilities would do a repeat thick smear in the case of clinical failure to respond to treatment. Thus, ongoing assessments of chloroquine sensitivity are not routinely performed.

Of note, children less than one year of age are routinely treated with Quinimax IM. This practice has been associated with polio-like paralysis in the limb in which the injection has been received and is felt to be due to the highly irritating nature of the product. Quinine IV perfusion is rarely given, although it is the recommended treatment of choice for cerebral malaria.

The continued indiscriminant use of second line non-chloroquine antimalarials is disturbing as there is the possibility that this behavior will hasten the development of resistance to these drugs, thereby leaving the medical community with no second choice in the event of treatment failures.

Of additional concern is the results of a KAP survey performed in November 1985 which showed that only 41% of febrile episodes in children 0-5 years of age come to the attention of the health sector. Of these, 1% are treated with antimalarial by their mothers prior to coming to the attention of the health sector, and 42% are treated by the health sector with injections, and 67% are treated by the health sector with pills or syrup. In those cases where the antimalaria was given by the parent when the health sector was not consulted, 95% received chloroquine, 3% received Fansidar and quinine.<sup>7</sup>

#### 4.7.2.1 Recommendations:

1. Results of the in vivo study on the comparative efficacy of two treatment regimens with chloroquine should be disseminated among the health care delivery personnel as soon as possible.
2. The MOHSA should adopt a policy for the recommended treatment of presumptive malaria as soon as possible and establish clear cut guidelines of the drugs and dosage schedules of choice. This will include the establishment of standardized treatments for implementation in all health facilities.
3. Sentinel laboratory/health facilities should be established to follow the chloroquine resistance through continued in vivo studies.
4. CCCD supervision should include an evaluation of the quality of the laboratories with respect to malaria thick smear preparations and readings.
5. All health facilities should maintain clear records of all presumptive malaria cases and their treatments with inclusion of thick smear results and repeat thick smears in the event of treatment failures.

#### 4.7.3 Chemoprophylaxis of Pregnant Women

The current recommendation of the CCCD project is for the chemoprophylaxis of pregnant women with 300 mg of chloroquine weekly during gestation.

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<sup>7</sup> Ntilivamunda, A., Deming, M., and Neill, M. Enquetes nationales sur le traitement de la fièvre et de la diarrhée chez les enfants de moins de 5 ans a domicile et dans les formations sanitaires, Novembre, 1985, Rapport Final.

All CCCD project regions have implemented this recommendation and field visits confirmed that all health facilities had registries of pregnant women enrolled in chloroquine prophylaxis. The standard method for the administration of this program is to have pregnant women come for prenatal visits once a month, at which time they are given 12 100mg chloroquine tablets to be taken over the subsequent four weeks. Women are advised that the chloroquine supply they receive is to be exclusively used for themselves, and in the event another family member becomes ill with malaria compatible illness, the family member should not be given any of the women's supply, but rather should come to the health facility for treatment. Follow up studies on the true compliance rate are not available.

Recent information from neighboring countries is presently casting doubt on the true efficacy of chloroquine prophylaxis during pregnancy in terms of increasing birthweights and reducing stillbirths and perinatal mortality. In response to this, several countries have begun studies to address this issue. This issue is pertinent to Rwanda, given the expense and time consumption of a continued program of chloroquine chemoprophylaxis of pregnant women.

#### 4.7.3.1 Recommendation:

1. Consideration should be given to the development and execution of an operational research protocol addressing the efficacy of chloroquine chemoprophylaxis in pregnant women.

#### 4.7.4 Chloroquine Supplies and Distribution

Chloroquine supplies have been available in Rwanda from a variety of different sources. Most recently chloroquine has been available through donations of UNICEF and through the CCCD/USAID project and are also purchased by the GOR.

In addition, chloroquine is imported through BUFMAR.

The national pharmaceutical laboratory in Butare has the capacity to produce ten million chloroquine tablets annually. At present they are producing chloroquine phosphate but they have plans to change to the sulphate preparation as sulphate is lighter and will have reduced freight charges of importation. As mentioned earlier, the national pharmaceutical laboratory was inspected by the USFDA in order to evaluate its suitability for USAID support in increasing chloroquine production. It was discovered that the same machinery was used for the production of chloroquine and antibiotics, a practice that is considered dangerous by USFDA standards. Until this situation is resolved, USAID will be unable to assist in the increasing of local production of chloroquine tablets.

The evaluation team discovered that there are several distribution systems for chloroquine throughout the country. These systems include

the CCCD distribution network, (as described in the section on CDD program activities), OPHAR, BUFMAR and the private sector. Of concern was that both CCCD and OPHAR are distributing chloroquine to the same health facilities in CCCD project regions. Because the CCCD target population for receipt of chloroquine is the 0-4 year olds and pregnant women, CCCD distributed chloroquine is only to be administered to the target population and the OPHAR distributed chloroquine is to be administered to the remainder of the population that presents to the health sector with presumptive malaria. In practice this has created a complicated supply management system at the level of the health facility. All health facilities visited have reported ruptures in chloroquine stocks during the preceding twelve months. In some cases the rupture have been in CCCD supplies, in other OPHAR supplies. Whichever the rupture may be in, the existence of chloroquine in the facility has resulted in borrowing from whichever is available to be used in the population presenting for treatment and to be "repaid" as soon as stocks from the ruptured supplied are replaced. When total rupture of stock occur, patients are given prescriptions to be filled at the local pharmacies.

Non-chloroquine anti-malarial are not consistently available in any of the health facilities. Some of the dispensaries are supplied with Fansidar while some of the larger health clinics/hospitals do not have Quininmax. There does not seem to be a clear MOH policy as towards which drugs should be available at which level of attention. The absence of non-chloroquine anti-malarials has not contributed to a lesser use of the drugs by the health care personnel; when the drug is not available, the family is given a prescription to purchase the drug at a local pharmacy.

The KAP performed in November 1985 revealed that of those children treated with antimalarials at home without consultation from the health sector, 31% obtained their drugs from the pharmacy, 21% obtained the drugs from the marche, 18% obtained the drugs from a boutique, 18% used antimalarials at home received from a health care worker at an earlier consultation and 13% received them from a family member or friend. Thus, there is clearly widespread availability of antimalarials outside of the governmental health sector.

Of note, during the course of the evaluation, the team learned that there have been difficulties in the procurement of CCCD chloroquine over the preceding months which has resulted in the shortages of chloroquine observed out in the field. Most health care workers stated that they had sufficient supplies for the treatment of presumptive cases of malaria in children 0-4 years of age but that they had insufficient supplies to cover the pregnant female population for chloroquine prophylaxis. The source of the procurement delays was identified as administrative and the evaluation team has been assured that the problem has been resolved and the supplies are forthcoming.

Inventories of chloroquine usage at the local level have not routinely been kept so that estimations of chloroquine needs have been difficult. CCCD project regions are reporting CCCD chloroquine utilization, but non-CCCD chloroquine utilization is unknown. The use of the higher dose schedule has doubled chloroquine needs in those health facilities that prescribe it. Thus, a decision to recommend the lower dose schedule (25 g/kg body weight) should result in lower chloroquine needs. Some estimates for country wide chloroquine needs have ranged as high as 32,000,000 tablets per year. With 343,416 malaria cases reported through the health sector in 1985, if one estimates 15 tablets per treatment dose (a 60 kg average adult) then 5,151,240 tablets were necessary (this does not account for pregnant women chemoprophylaxis, or adjust for reduced dosages in childhood cases). The estimated needs for the CCCD project objectives countrywide (children 0-4 and pregnant women) in 1986 are 2,076,437 tablets for children and 9,712,810 tablets for pregnant women; or 11,789,247 tablets.

#### 4.7.4.1 Recommendations:

1. Consideration should be given to changing the supply system for chloroquine distribution to be uniform throughout the country for health facilities so that health facilities do not receive two supplies to be used in different populations.
2. Distribution of non-chloroquine anti-malarials should be rationalized so that referral centers are assured a constant supply for cases of emergency.
3. The National Pharmaceutical Laboratory should be encouraged to correct the deficiencies identified by the USFDA inspector so that USAID support for increased local chloroquine production can be provided. USAID should investigate if it can assist in the resolution of the identified problems.
4. Inventories of chloroquine supplies should be maintained by all health facilities and the central level should study the actual chloroquine usage at the national level.

#### 4.7.5 Morbidity and Mortality due to Malaria

In 1985, malaria was the leading cause of morbidity in the country with 343,416 cases reported. In 1984 it accounted for 57.6% of all outpatient visits to the health sector and 6.5% of all deaths. In all years it ranks in the leading four reported causes of mortality.

A study on the health situation in Rwanda by a WHO consultant estimated that malaria affects at least 50% of the rural population, with affected

adults having two acute attacks a year and children having four acute attacks a year.<sup>8</sup>

Thus there is sufficient evidence of the magnitude of the disease burden among the Rwandaise population.

As with other disease reporting, it is felt that malaria is greatly underreported in terms of both morbidity and mortality. The KAP survey demonstrated that 59% of febrile episodes do not come to the attention of the health sector, and that 58.5% of children 0-4 years of age had a reported febrile episode in the month preceding the survey.<sup>9</sup>

A review of selected hospital records for a six year period 1980-1985 are presented below:

Information on the slide positivity rate for presumptive malaria cases is not known.

#### 4.7.5.1 Recommendations:

1. All efforts to improve data collection on the true morbidity and mortality due to malaria should be encouraged.
2. Consideration should be given to the use of sentinel centers to study the proportion of febrile episodes in children that are due to malaria.
3. Efforts to collect data on the slide positivity rate for presumptive malaria cases treated by the health facilities should be encouraged.

#### 4.8 Health Education/Communications

Rwanda has made considerable progress in Health Education/Communications area, and should be able to render valuable service to the CCCD project in carrying out its programs involving making the mothers and families aware of EPI, CDD and Malaria programs. Present plans are to give first priority to the Measles "Mini" campaign and EPI in general, next the CDD program, and then the Malaria campaigns. The MOHSA Health Education division is located in the directorate general for Social Affairs has an experienced well informed chief. KAP surveys concerning the attitudes of mothers concerning diarrhea, malaria, vaccination (particularly measles) have been carried out by the Health Education Division under the CCCD project, and the results are being used by the Health Education division.

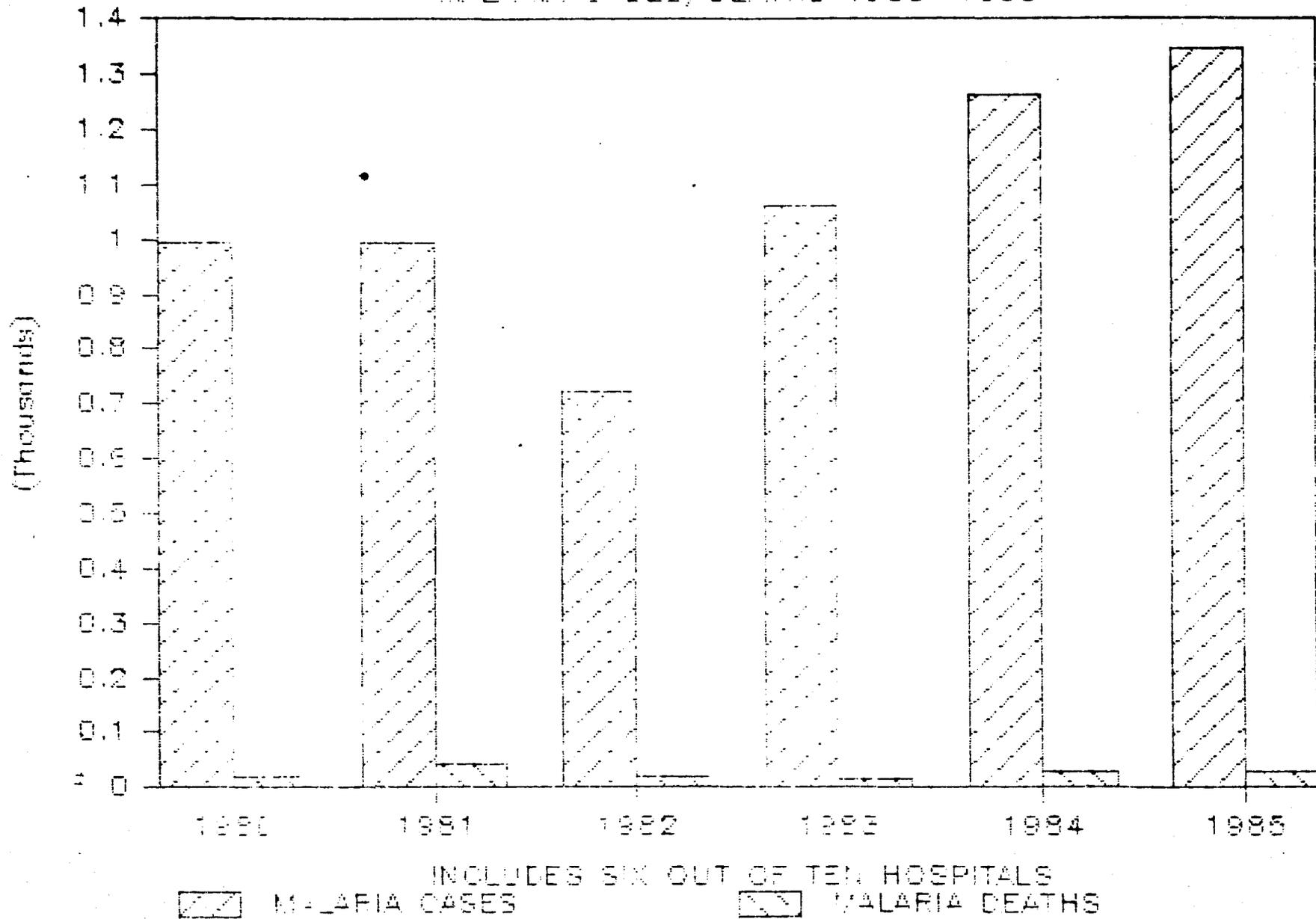
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<sup>8</sup> CDC/USAID/GOR, Combatting Communicable Childhood Diseases, Country program assessment, Rwanda, October 1983

<sup>9</sup> Nktilivamunda, A., Deming, M., and Neill, M. Enquetes nationales sur le traitement de la fièvre et de la diarrhée chez les enfants de moins de 5 ans a domicile et dans les formations sanitaires, Novembre, 1985, Rapport Final

# RWANDA REFERENCE HOSPITALS

MALARIA CASES/DEATHS 1980-1985



Based on the most recent KAP involving measles, eight key messages have been developed for mothers to educate them about basic fundamentals of immunization starting with the health card. For example, a recent KAP survey showed that the current broadcast time (18:30) was not the most convenient for mothers. A request is under way via the Minister of MOHSA to the Minister of Information to find out if the present broadcast time can be changed to a more convenient time for the mothers. Posters have also been prepared and field tested illustrating some of the more important messages. The goal is to coordinate the sending of these eight messages on immunizations to the mother by using three different approaches: radio broadcasts, posters (appropriately field tested), and lectures given to the mothers at the hospital, health center, and/or dispensaries in the week following the radio broadcasts.

A mini campaign for measles vaccinations is underway at the present time using this three pronged strategy. Most Health Centers have now received their posters (3000 for the 10 regions, including the 150 health centers/dispensaries, plus 250,000 mini posters for distribution directly to the mothers by the health centers.) Thus far coordination between the radio broadcasts, poster distribution and lectures at the peripheral levels has been spotty but the campaign is just getting under way.

Three cases might be mentioned where CCCD/EPI has been able to support effectively Health Education Programs of the Ministry:

- 1) the November 1985 Knowledge, Aptitudes, and Practices (KAP);
- 2) the June 1986 KAP study; and
- 3) the "mini" campaign for EPI (measles).

On these occasions the Health Education Service has carried out the studies and the planning activities with the assistance of CCCD.

The government has cooperated with the Health Education activities of the Ministry in addition to the CCCD support. For example, the Ministry of Health and the Department of Information agreed to consecrate all of its radio programs in the health field to the "mini" campaign against measles during a period of four months. In addition the Social Affairs Direction Generale will consecrate all of its radio broadcasts to the EPI campaign.

Eight newspapers of the government, the church, private voluntary organizations, the Army, and youth have offered to use a part of their pages free of charge to help assure the success of the "mini" campaign. This support means two articles each week for three months. The articles will have the same theme that the radio spot announcements broadcast each week, and the two radio programs.

In addition, it is possible that as many as 10,000 government managers might assist in the distribution of the mini posters and in explaining the messages broadcast on the radio. Eight officers of the Health Education service have been freed up to work exclusively on the EPI campaign. A technician and equipment will be made available by the Office of Information to improve the quality of the broadcasts.

Finally, the governmental authorities offered to be interviewed during a 60 minute broadcast on October first in order to stress the importance of the campaign.

Some of the difficulties encountered are as follows:

- CDC/Atlanta didn't begin its first Health Education activities until November 1985 -- more than one year after the start of the project.
- The national CCCD office considers the Health Education service as an external service.
- Health Education activities tend to be ad hoc interventions for specific events, instead of an integral part of annual plans.
- Material and financial resources are sometimes lacking.
- When the time comes to carry out studies or planning all goes well. However, when it comes time to execute the program, large numbers of decision makers become involved who were not in the least concerned during the planning phase. This lack of interest at the planning stages on the part of decision makers leads to unfortunate delays in the execution stage.
- He needs regular logistic support in the form of a vehicle, and funding for materials from the CCCD project.

The Director of Health Education should be more fully involved in the planning of the CCCD activities so that his services can be used more effectively. Coordination is somewhat difficult since the HE is in a different Directorate of the MOHSA than the CCCD staff and in a separate building. The recent creation by the MOHSA of an internal coordination committee for CCCD activities should help.

For example, HE should have an important contribution to make in the finalization of the four year plans for CDD and Malaria. On the operational side, in the past transportation, gasoline, and per diem have been an obstacle HE participation in the field, but a CCCD vehicle recently has been made available to the Health Education office to allow it to participate fully in the "mini" campaign against measles.

#### 4.8.1 Recommendations:

1. The CCCD Coordinator should work with the HE division to help develop and distribute a coordinated message to the mothers concerning measles vaccination. Funds should be made available to carry out a follow up evaluation.
2. The HE division should be made a full member of the CCCD Planning team so that appropriate HE/Communications activities can be

incorporated in the planning for major vaccination/ORT and malaria programs. This should include required logistic support in terms of vehicle, materials and basic equipment.

3. Consideration should be given to assisting HE financially in obtaining the recording equipment needed for radio broadcasts and producing a tape which will provide clear transmission to the field.
4. The HE unit could benefit from a three months short term consultancy from AID's regional Health Comm project in the next few months. Eventually a full time Information/Education/Communications advisor will be provided under the UNICEF expanded EPI project now under consideration.
5. As noted earlier in section 4.6.3.1 on Oral Dehydration Therapy (ORT and Diarrheal Disease episode Management,) there is a need to use Health Education/Communication services working with mass media to increase the acceptance and utilization of ORS packets by mothers for the treatment of diarrheal episodes. These health education messages should also emphasize proper feeding during diarrheal episodes.

#### 4.9 Training/Continuing Education

MLM training was completed successfully for the three pilot regions in July, 1985, and a similar course was carried out for the four new regions in July 1986 using course materials in French adapted for Rwanda.

TABLE 6

Summary of National Training and Continuing Education - 1985/86

Dates	Place	Health Regions Concerned	Participants	Training Provided
<u>(A) National Training</u>				
7/15 to 7/24/85	Kigali	Yanguga, Gikongoro, Kibungo	29 particip. (3) EPI Superv (13) Health Ctr. Heads (6) Central Lev. Officers (7) Doctors (facilitators)	--MLM Course-- -Training Method. -Local Lev. Plan. -Productivity monitoring -Monitoring/Eval. of Utilization -Epidemiological monitoring -EPI -Diarrhea Treatment -Communal Health education

(A) National Training (Continued)

6/16	Gitarama	Kigali,	39 particip.	(same course content
to		Gitarama	(5) EPI Superv.	as above)
6/26		Byumba	(34) Health Ctr.	
		Kibye	Heads	
			(6) Doctors	
			(facilitators)	

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(B) Continuing Education (retraining)--Regional

1/15	Butare	Gikongoro	20 particip.	-Epidemiological
to	(Sovu)		(heads and officers	surveillance
1/17/86			from medical	-Health Education
			facilities)	-Diarrhea Treatment
				-Malaria
				-EPI
3/10	Kibungo	Kibungo	23 particip.	(same course content
to			(heads and officers	as above)
3/13			from medical	
			facilities)	

Source: CCCD TO, Kigali October 1986.

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So CCCD supervisors (previously EPI supervisors) have been trained for all 7 regions, as well as other health personnel. Job aid materials were revised May 1986 and have been made available.

In addition regional workshops were held in Butare in January 1986 with all 16 health centers represented. Five modules were covered in three days (Malaria, Epidemiologic Surveillance, Community Health Education, Cold Chain and Treatment of Diarrhea). Three days proved a very short time for the participants to cover and absorb all of the material presented. Regional training was also carried out in March 1986 in Kibungo with all 17 health centers represented plus 3 hospitals. During the same month three of the facilitators were trained in the national-level MLM. Four participants have been trained in ORT practices at the Kigali Hospital.

While more time for the individual training sessions would be desirable, the training already carried out has proved to be satisfactory in launching the CCCD program in the three pilot regions. However, due to changes in personnel, and new approaches and policies in the CCCD project, retraining (recyclage) is needed for those who already received the MLM course, and also for those now in posts affecting CCCD activities who were not available when the initial courses were given.

The major need at the present time is for a national training plan -- e.g. from 1987-1990. This needs to be done as soon as possible for the seven regions now included in the project and eventually for the remaining three regions. Without this kind of overall plan and strategy, it will be hard to mobilize the necessary budgetary, human, and material resources required to systematically cover all aspects of the CCCD activities and their integration into the PHC program. In line with earlier recommendations, a MOHSA designated training coordinator is needed at the national level to avoid duplication of effort, training conflicts and to help program the training in an orderly manner.

The Faculty of Medicine at the National University of Rwanda offers a potential resource in assuring that doctors coming out of medical school are fully conversant with the objectives, techniques and practice of the CCCD programs in EPI, CDD, and Malaria. Inclusion of material into the courses of the professors teaching the relevant courses might be accelerated somewhat by their participation in operational research and KAP surveys involving these programs. Over time once the national program is prepared and a national training coordinator is appointed one might envisage a similar initiative for medical assistants, and nurses.

#### 4.9.1 Recommendations:

1. Retraining (recyclage) should be scheduled for those trained earlier to refresh their skills, train them in latest developments, etc. New personnel transferred to posts affecting CCCD activities after the earlier courses should be identified, and receive MLM or other appropriate course training.
2. A multi-year National Training Plan (1987-1990 should be drafted, reviewed and approved by the MOHSA which would assess the training needs under the CCCD project, and plan for the necessary facilities, course materials, staff, and financing.
3. A national training coordinator for all CCCD training activities should be designated by the MOHSA as soon as possible.
4. Once the national plans for EPI, CDD and Malaria and Training are prepared and approved, steps should be taken to convince the Faculty of Medicine and Schools for Medical Assistants and Nurses to include in their curriculum segments concerning EPI, CDD and Malaria.

## 5.0 Project Costs

### 5.1 CCCD Bilateral Expenditure

The Project Agreement between U.S.A.I.D. and the Government of Rwanda (GOR) requires that U.S.A.I.D. contribute \$1,072,000 and the GOR contribute \$810,402 over the life of the project (LOP). The percentage of project cost born by the GOR is expected to increase over the LOP while that of U.S.A.I.D. is expected to decrease. Table 7 is the U. S. government projected contribution in each project year.

TABLE 7

CCCD Rwanda Project Grant Agreement

	<u>Project Year 1</u>	<u>Project Year 2</u>	<u>Project Year 3</u>	<u>Project Year 4</u>	<u>LOP</u>
ORS	50,000	55,000	60,000	65,000	230,000
Chloroquine	21,000	23,000	25,000	27,000	96,000
Vaccination Supplies	14,005	9,320	6,627	--	29,952
Cold Chain Equipment	29,190	22,955	7,625	2,000	61,770
Vehicles	130,000	15,035	7,533	--	153,468
Fuel/Vehicle Maint.	47,028	35,271	23,514	11,757	117,570
Malaria Laboratory	--	4,000	3,000	3,000	10,000
Health Education	21,000	18,000	15,000	11,000	65,000
Health Information	17,000	12,000	11,000	8,000	48,000
Training	19,740	21,420	22,275	24,300	87,735
Operational Research/ Evaluation	25,000	32,750	6,250	16,000	80,000
Contingency	26,039	21,738	20,565	24,163	92,505
<b>TOTAL</b>	<b>400,902</b>	<b>270,489</b>	<b>208,389</b>	<b>192,220</b>	<b>1,072,000</b>

Source:

"Project Grant Agreement between the Republic of Rwanda and the United States of America for Combatting Childhood Communicable Disease", June 30, 1984

The Project Agreement was not signed until June 10, 1984, after which there was a considerable lag before activities and spending began. It had been anticipated that \$723,489, 67% of LOP bilateral funds, would have been spent to date. Instead only \$561,784, 52% of LOP funds, has been committed and actual expenditures have been \$436,812. Thus bilateral

spending two and one quarter years into the project (September 30, 1986) is only 60% of planned spending. There is \$510,216 uncommitted for the remainder of the project.

Expenditure in most categories is less than anticipated except for fuel and vehicle maintenance. In this category actual expenditure is 15% higher than anticipated at this date and already 85% of the LOP allocation. Table 8 compares anticipated and actual bilateral expenditure to September 30, 1986.

TABLE 8

CCCD Bilateral Projected and Actual Spending<sup>1</sup>

	Projected <sup>2</sup> Spending to Sept. 30, 1986	Projected Spending Life of Project	Obligated but not disbursed	Disbursed
ORS	\$120,000	\$230,000	\$	\$ 71,498
Vaccination Supplies	50,250	96,000	92,972	5,187
Cold chain Equipment	24,982	29,952		17,252
Vehicles	147,818	153,468	32,000	24,797
Malaria Laboratory	4,750	10,000		2,768
Fuel & Repairs	88,178	117,570		101,490
Health Education/ Health/Information Training	121,229	200,735		33,043
Operations Research and Evaluation	59,313	80,000		29,955
<u>Contingency</u>	<u>59,918</u>	<u>92,505</u>		<u>13,278</u>
<b>TOTAL</b>	<b>723,489</b>	<b>1,072,000</b>	<b>124,972</b>	<b>436,812</b>

1) The dollar value of local spending, item 7-10 was calculated using an exchange rate of \$1.00=95.17 Frw which was the weighted average of the exchange rates at which funds were actually disbursed.

$95.17 = \frac{\sum i. (\text{Exchange rate } i \times \text{FRW disbursed at exchange rate } i)}{\text{Total FRW disbursed}}$

2) Project spending to September 30, 1986 was calculated as projected spending for the two years of the project plus one quarter of the projected opening in the third year.

Source: 1) "Project Grant Agreement" June 30, 1986  
2) U.S.A.I.D quarterly accounting records.

5.2 Government of Rwanda Contribution

The Project Agreement stipulates that the Government of Rwanda should provide the salaries of the core management staff and health workers to

implement the CCCD program and finance the basic operating costs of administrative and health facilities. In addition, the GOR is expected to pay for an increasing share of the cost of oral rehydration salts, chloroquine, gasoline and vehicle maintenance. The GOR has not met its financial obligation in terms of gasoline, vehicle maintenance, chloroquine and ORS packets. This is partly due to the fact that the MOHSA does not have a separate accounting for its contribution to CCCD activities and has not made a serious effort to extract this information from MOHSA general accounts. Inadequate accounting also resorted in part of the GOR contribution for 1985 getting lost in the general MOHSA budget. An additional problem is that the Project Agreement estimates of ORS and chloroquine needs and costs are no longer accurate. Thus, GOR contribution in these areas may no longer be the best use of those funds. The following two sections describe the efforts the GOR has made toward meeting its obligations in terms of facilities, personnel and commodities.

### 5.2.1 Personnel and Facilities

It is not possible to quantify the GOR contribution in terms of facilities and personnel but it is substantial. The CCCD project operates through already established administrative channels and health facilities which are also engaged in other activities. In 1985 CCCD began in three regions covering 56 health facilities. In 1986, four more regions were added, an additional 135 health facilities. The operating expenses of all these facilities are all or in part covered by the GOR. In addition, the GOR Regional Medical Directors, Regional EPI Supervisors, and the central level CCCD Director and Deputy Director have been instrumental in the administration of the CCCD program. It is not known what percentage of the cost of these facilities and personnel should be attributed to CCCD activities.

It is possible to partially quantify the GOR contribution for those people who work exclusively for CCCD. In 1985, three administrative employees were hired for CCCD. In July, 1986, three medical assistants and a doctor were hired to work full-time with CCCD. The contribution of the GOR in terms of salaries of personnel hired specifically for the project will be approximately equal to 2,397,384 FRW (\$25,000, \$1=95FRW) by the end of Project Year.<sup>9</sup> (Two years of salary for those hired in 1985 plus one year of salary for those hired in 1986.) This does not include the cost of benefits such as housing which may be worth more than the salary. In addition, the GOR contributes 3,116,000 FRW (\$32,000, \$1=95FRW) in per diem for supervisory visits by Regional Supervisors and the CCCD Coordinator. Thus the minimum GOR contribution in terms of personnel has been 5,513,384FRW (\$58,036, \$1=95FRW).

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<sup>9</sup> The exchange rate used to convert expenditure to date into dollars was 95FRW = \$1, which was the average exchange rate from June 1984 to September 1986. The exchange rate used to convert future expenditure into dollars was 85FRW = \$1, which was the exchange rate as of the end of September, 1986.

### 5.2.2 Commodities

The Project Agreement requires the GOR to contribute to an increasing share of the cost of ORS packets, chloroquine and vehicle repair and maintenance. Table 9 shows the projected Pro Ag contribution of the GOR for each category.

TABLE 9

GOR Projected Contribution to CCCD (\$)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>LOP</u>
ORS	25,478	30,937	49,136	76,433	181,984
Chloroquine	67,200	81,600	129,600	701,600	480,000
Gasoline/Repairs	17,500	21,250	33,750	52,500	125,000
Miscellaneous	3,451	7,986	3,514	8,167	23,418
<hr/>					
TOTAL	113,629	141,773	216,000	339,00	810,402

The table on Page 10 of the Project Agreement incorrectly states that the government of Rwanda will supply \$181,984 in chloroquine and \$480,000 worth of vaccine supplies instead of \$181,984 in ORS packets and \$480,000 of chloroquine. The correct categories of contributions are found on pages 9-10 of Annex 1 of the Project Grant Agreement and page 64 of the CCCD Rwanda Country Assessment.

Source: Table 9 was calculated by taking the percentage contribution in each year (p. 11 of Project Grant Agreement) and applying that percentage to each category of expenditures (p. 10, Project Grant Agreement).

The following three sections describe the efforts the GOR has made to meet their obligations in terms of the three major commodity categories: gasoline and vehicle maintenance, ORS packets, and chloroquine.

#### 5.2.2.1 Gasoline/Maintenance (\$1=85FRW)

In 1985 the GOR funds designated for gasoline and maintenance of CCCD vehicles were not used due to GOR administrative confusion. In 1986 the GOR has allocated 3,125,000FRW (\$36,765) for repairs and maintenance whereas the Pro Ag requires a contribution of \$47,187 after two and one quarter project years. This is equivalent to 78% of the Pro Ag required contribution. CCCD has received 1,997,790FRW (\$23,500) and is expecting

the rest before March 1, 1987, which is the end of GOR FY 1986/1987. Because of delays in receiving the GOR allocation only 793,743FRW (\$9338) had been expended as of September 30, 1986. This small expenditure by the Gor to date has resulted in increased expenditure of bilateral funds for maintenance and fuel, including kerosene for refrigerators. In order for the project to continue and enable the GOR to meet its contribution to fuel and maintenance, the GOR needs to take full responsibility for this category of expenditure, including kerosene, for the remainder of the project. Annex IV, Section 1.1 shows the expected annual cost of fuel and vehicle maintenance.

#### 5.2.2.2 ORS Packets

To date the GOR has not contributed any ORS packets to the CCCD project. The supply of ORS packages to CCCD have come from bilateral funds (450,000 packets of which 163,000 have been distributed) and UNICEF (350,000 packets which arrived in 1986, of which none have been distributed). UNICEF has also supplied 310,000 packets in 1985-1986 directly to the Office Pharmaceutique de Rwanda (OPHAR). Of this supply, 303,000 have been distributed. In 1986, 30,000 10 liter packets were produced domestically at the Laboratoire Pharmaceutique de Rwanda (See Section 6.221). This latter group is the only category which can be considered GOR contribution. The Oral Rehydration program is just beginning to take off thus the rate of utilization of ORS packets has been low as evidenced by the fact that 637,000 out of 800,000 packets received remain in the central CCCD store room. This rate of utilization does not warrant additional purchases at this time. However, the GOR needs to prepare to meet this cost in 1990 when demand will be considerably higher and current supply will be exhausted. One possibility is increased local production at the Laboratoire Pharmaceutique in Butare which is described in section 6.2.2.

#### 5.2.2.3 Chloroquine

The GOR has not contributed chloroquine specifically to CCCD. It does however distribute chloroquine to all regions through OPHAR which either imports it, or purchases it from the domestic pharmaceutical factory (see Table 6.4 for OPHAR supply). The lack of specific accounting for the CCCD project makes it very hard to quantify the value of this contribution.

However, it appears that 1,064,000 chloroquine tablets were distributed by OPHAR to the three pilot regions since their beginning in May 1985 until June 1986. At an average of .7FRW (\$.007) this equals 1,064,000FRW (\$7840, \$1=95FRW) which is only 4.3% of the projected contribution of \$181,200. Because of inadequate accounting, it is not clear whether this is an overestimate or an underestimate of the GOR supply of chloroquine to CCCD target groups. It may overestimate GOR supply because not all the chloroquine distributed in this manner goes to CCCD target groups, although the majority does. It may underestimate it because it does not

include the four additional regions started in July 1986. It is worth noting that the original chloroquine contribution of the GOR was based on a price of \$.021 per tablet whereas the actual price at which the government purchases chloroquine ranges from \$.007 to \$.009 per tablet. (See "Combatting Childhood Communicable Diseases Project: Country Assessment, Rwanda," October 1983, p.66. and table 7.8). Thus the Pro Ag may have over estimated by three times the cost of providing the necessary chloroquine.

In spite of the low level of GOR contribution accounted to date there is evidence that the GOR is moving to increase the availability of chloroquine. As can be seen in Table 6.4, OPHAR has more than doubled its purchases of chloroquine from 6,321,800 tablets in 1984, to 14,197,500, in 1985. Chloroquine supplied to the pilot regions has also been increasing from an average of 155,000 per region in the last eight months of 1985, to an average of 200,000 per region in the first six months of 1986. Thus although the GOR contribution to date is well below the Pro Ag level, its contribution has been increasing. An adequate accounting system would allow the GOR to show the full value of its contribution.

TABLE 10

Supply of chloroquine by OPHAR

Chloroquine Tablets (100 mg)

	<u>Imported by OPHAR</u>	<u>Produced at Butare</u>	<u>UNICEF</u>
1984	5,000,000	1,321,800	2,200,000
1985	5,000,000	9,197,500	2,200,000
1986	3,000,000	not available	

Suppositories (150 mg)

1984	10,000
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Source: OPHAR, UNICEF, Etude de Rentabilite et d'Autonomie Financiere, Le Laboratoire Pharmaceutique de Rwanda.

### 5.3 Average Cost Per Intervention

It is impossible with the available data to know how much it costs to fully vaccinate a child, or treat a case of malaria or diarrhea. This requires knowledge of the percentage of time spent on each activity at different health facilities, the number of vaccines, medicines, and other materials used and their cost and the rate of depreciation of buildings and materials. It was clear from the field visits that there was a wide diversity in the efficiency with which patients were treated. A study needs to be done that would 1) compare the cost of treatment at different facilities, (this information may be partially available from study being done by WHO, see Section 6.2.1) and, 2) determine the additional cost of certain recommended practices such as vaccination every day, and one syringe and needle for each vaccination.

### 5.4 Conclusions and Recommendations

The minimum quantifiable GOR contribution to the CCCD project has been calculated at \$44,605, which is only 14.4% of the \$309,402 agreed upon in the Project Agreement. In the case of chloroquine and ORS the low level of contribution has not hindered the project since between UNICEF, CCCD, and OPHAR, current supplies are adequate. The Pro Ag should therefore be modified (e.g. by a PIL) to provide for more essential areas of contribution such as vehicle maintenance, gasoline, kerosene, and per diem. It appears that the GOR will be able to increase the supply of ORS and chloroquine when needed.

Part of the reason for the apparent low level of GOR contribution is the result of inadequate accounting on the part of the GOR for those materials and services it finances in support of CCCD activities. Members of the team and the Government agree that an improved accounting system for CCCD activities needs to be immediately implemented. The MOSHA should furnish the CCCD office with monthly records of how many gasoline booklets have been issued; or are being used on CCCD activities, who used them and dates of use. All used booklets should be available for verification. Vehicle repair records should be kept in the same way, and photocopies of bills should be supplied to the CCCD office. The MOHSA should also furnish complete records on dates and costs of supervisory visits by regional and central level personnel, including members of PEV, Health Education, and Health Information. OPHAR should provide the CCCD office with summaries, photocopies of their records on purchases, production and distribution of chloroquine and ORS packets by region so that its contribution to the CCCD project can be accurately be determined.

- 1) CCCD bilateral spending on fuel and maintenance has been well above the projected level and has almost entirely exhausted the funds for the LOP. GOR spending in this category has barely begun. It is recommended that GOR take full responsibility for kerosene, gasoline and repair of CCCD vehicles for the remainder of the project. This would help GOR to meet its financial obligations to the project and begin the process of financial sustainability.

- 2) The Project Agreement should be amended or modified by a Project Implementation Letter (PIL) to include GOR contributions to other local costs such as kerosene, per diem for supervisory visits by regional and central level personnel, and spare parts for refrigeration equipment, etc. These amendments could take place when the GOR develops an accounting system to enable CCCD and USAID to verify the contribution. USAID should provide some assistance in setting up this system.
- 3) In order to give the project four full operational years, the Project should be extended with no additional bilateral funding but full technical assistance from the CCCD regional project (see section 8.0). The extension depends critically on whether the GOR shows satisfactory progress toward meeting its financial obligations to the project.
- 4) A study should be undertaken to determine the cost effectiveness of different types of facilities and health services. Included in this study should be estimates of the additional costs required to implement improved vaccination practices.

## 6.0 Financing

### 6.1 Overview of Rwanda's Public Finance

Rwanda's economy, like many developing countries, is heavily dependent on agriculture which in 1983 accounted for 46% of GDP and 75% of export earnings. Rwanda's foreign exchange and government revenue are greatly influenced by the price and quantity of coffee exported. In 1984 <sup>10</sup> export taxes produced 11% of government revenue, and coffee accounted for 68% of export earnings<sup>11</sup>. Thus Rwanda's economy, including its public finance is greatly affected by the price and quantity of exported coffee. Rwanda experienced a budget surplus in 1979 and 1980 as a result of high coffee prices. Between 1981 and 1985, the price of coffee fell resulting in budget deficits. The Government of Rwanda anticipates balancing its ordinary budget in 1986 through a combination of expenditure cuts and increased taxes (In 1985 the government instituted a 4% sales tax on wholesales and small importers). World Bank predictions are that the Government of Rwanda will experience an overall budget surplus in 1986 and 1987. This is largely the result of the drought in Brazil with the subsequent increase in coffee prices and the suspension of export quotas by the International Coffee Organization.<sup>12</sup>

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<sup>10</sup> World Bank, Rwanda Country Economic Memorandum, Report No. 6191, Rev. July 9, 1986

<sup>11</sup> The Economist Intelligence Unit, Quarterly Economic Review of Zaire, Rwanda and Burundi, 1st quarter 1986

<sup>12</sup> IBID., World Bank Rwanda Country Economic Report

Rwanda is heavily dependent on foreign aid. Official development assistance to Rwanda has averaged \$150 million per year (80% grants) between 1980 and 1985 while the government budget has averaged less than \$200 million over the same period. Thus, GOR fiscal independence is unlikely in the near future. Table 11, which follows, summarizes Government of Rwanda revenue and expenditures for the years 1980-1986.

TABLE 11

Government of Rwanda Finances 1980-1986  
(million Rwandan Francs)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
<u>Total Revenue</u>	13,406	14,993	15,445	15,785	17,311	19,640	27,100
Current Expense	10,195	13,839	15,180	16,278	16,452	17,700	19,700
Develop. Exp.	2,327	2,714	3,250	3,031	2,626	3,600	3,600
<u>Total Expend.</u>	12,522	16,553	18,430	19,309	19,078	21,300	23,300
Deficit/Surplus	884	-1,560	-2,985	-3,524	-1,767	-1,660	3,800

Source: Rwanda Country Economic Memorandum, The World Bank, July 9, 1986, p. 164 and p. 70.

The GOR 1986 projected revenue is lower and projected expenditure is higher than that predicted by the World Bank. Below is the GOR projected 1986 budget.

TABLE 12

Government of Rwanda 1986 Budget

	1986
<u>Total Revenue</u>	22,734
Current Expenditure	22,734
Development Expenditure	3,636
<u>Total Expenditure</u>	26,370
Surplus/Deficit	-3,636

Source: Journal Officiel de la Republique Rwandaise June 1, 1986

As can be seen in Table 11 and Table 12, between 1980 and 1985, the GOR ordinary expenditure increased, however, the increase did not keep pace with the rate of inflation. Real government expenditure fell between 1982 and 1984. In 1985 real expenditure finally returned to its 1982 level. The 1986 budget should well surpass previous levels in real terms. Table 14 shows GOR real expenditure from 1982 to 1986.

TABLE 13

Consumer Price Index 1976-1985 (1976=100)

1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
100	117	131	152	163	173	196	209	220	224	226

Sources: Rwanda Economic Memorandum, World Bank, 1983  
Rwanda Country Economic Memorandum, World Bank 1986

TABLE 14

Real Government Current Expenditure 1982-1986 in 1982 Rwandan Francs  
 (Million of Rwandan Francs)

	1982	1983	1984	1985	1986
				(GOR)	
Expenditure	15,180	15,270	14,663	15,485	19,717

Calculated from Table 11, 12 and 13 by the CCCD Evaluation Team, 10/86.

The percentage of the nominal budget devoted to the Ministry of Health and Social Affairs (MOHSA) has risen steadily since 1982.

TABLE 15

MOHSA BUDGET 1982-1986  
 (in millions of Rwandan Francs)

	1982	1983	1984	1985	1986
					(GOR)
MOHSAQ Expenditure	840	860	989	1177	1325
Percentage Budget	4.5%	4.5%	5%	5.2%	5.8%

Source Rwanda Country Economic Memorandum, World Bank, July, 1986

As can be seen from Table 16 below, total CCCD project spending including the GOR contribution has ranged from 5.2% to 2.8% of MOHSA Annual Budget.

TABLE 16

CCCD Expenditure as a Percentage of MOHSA Budget

	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
	(GOR)			
Projected ProAg Expenditure	\$514,531	\$412,262	\$424,3889	\$531,220
% of MOHSA Budget	5.2%	3.5%	2.8%	
	(\$1=100FRW)	(\$1=101FRW)	(\$1 = 88 FRW)	

It is significant to note that the total annual cost of the CCCD is relatively a small percentage of the Ministry of Health budget.

6.2 Financial Viability of CCCD

Average bilateral and GOR annual expenditure on the project is projected to be \$470,595 (see Tables 7 and 8). UNICEF has provided considerable additional support for the project in terms of vaccines (5,210,000FRW), chloroquine (2,257,153FRW), and ORS packets (1,215,153FRW) which totals 9,194,116FRW or 4,597,058FRW (\$48,3900, \$1=955FRW) per year. Thus expected annual expenditure for the four years of the project was estimated to be about \$518,000. It is expected that the GOR will have to bear at least this cost when the project terminates in 1990. Even costs such as vehicles, cold chain equipment, and training, although considered one time investment costs rather than recurrent costs, will likely to have to be renewed every four years, since the average life of equipment in Rwanda is relatively short, and personnel will continue to need training due to turnover and the need to update all personnel on new developments. Given population growth and increase coverage of the target population, however, the expected recurrent cost supplies and maintenance equipment activities could be \$945,000.00 (see Annex IV). Some of this cost, such as the \$173,000.00 cost of vaccines, is likely to be covered by donors leaving \$772,000.00 to be covered by the GOR.

The largest share of cost is for chloroquine and ORS packets (\$662,000) which could be covered by the GOR through efforts on two fronts. The first is to increase the percentage of costs paid by the users of health care, either by changing for medicare, including chloroquine and ORS, or by raising the current fees for consultations and

other services. The second way is to decrease the cost to the government of chloroquine and ORS packets. It is very encouraging that the MOHSA is studying proposals that would move it in both directions. The following two sections describe the various proposals being considered by the GOR to increase health care revenue and lower health care costs.

#### 6.2.1 Auto-financing

There is considerable potential in Rwanda for generating increased revenue for health care through user fees and drug charges. There is already a well-established tradition of paying for health care services in Rwanda. Fees for health care at government facilities were established in 1975 and have not been raised since. Fees at mission facilities (40% of facilities) run considerably higher than those at government facilities. In addition, 47% of the drugs supplies in Rwanda are supplied by private pharmacies at relatively high prices. Though government facilities only charge nominal fees for health care (20FRW, \$.23, for consultation), the majority of the population is already paying considerably more. The low fees for government facilities create a great deal of inequality of cost and quality of health care between facilities. Mission facilities use their additional receipts to purchase medications to supplement those furnished by OPHAR, CCCD and other donors. Government facilities rely exclusively on the inadequate supply from OPHAR and CCCD. As of 1986, the law was changed to allow the local commune to keep receipts from government health centers rather than send the revenue to the central government. This is a very positive step since it enables local communes to use that revenue to improve the quality of care at local facilities. This in turn provides incentives for patients to pay the fees since they can see the tangible benefits. However, communes do not always use that revenue to provide better health care, but may divert it to roads, schools and other local needs. None the less, the fact that health care providers and patients see benefits in their community from fees provides incentives to collect and monitor revenues.

In the GOR 1984 and 1985 budget, receipts from medical charges were projected to be 60 million Francs. This represents 5% of the MOHSA projected 1985 budget. It has been estimated that health facility receipts cover 7% of their operating cost.<sup>13</sup> In the 1986 budget only the revenues from hospitals (20 million Francs) went to the central budget due to the change in the law that allowed local governments to retain the rest.

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<sup>13</sup> World Bank - Report on Recommendations of the President of IDA to the Executive Directors on a Proposed Credit of SDR 9.8 Million to the Rwandese Republic for a Family Health Project, March 1986.

The GOR shows considerable interest in increasing the financial contribution of health care users to the cost of providing health care services. The MOHSA has co-sponsored two studies dealing with health care financing. One study (Mach and Nyandagazi, expected by February 1987), co-sponsored with the World Health Organization (WHO), is attempting to determine the recurrent costs of different types of health facilities and analyze additional recurrent costs that would result from proposed investments. The second study (Shepard, Carrin, and Nyandagazi, October 1986) co-sponsored by CCCD, examines the population's willingness and ability to pay for health services. This study concludes that people are both willing and able to pay more for health services. People seem especially willing to pay for drugs, which accounted for 50% of health care expenditure in the sample population (even though two of the four sample areas were served by government facilities that ostensibly do not charge for drugs).

Two proposals have been suggested to help cover the cost of providing health care. One proposal would establish communal pharmacies that would purchase drugs out of a revolving drug fund, thus lowering the burden of the government to supply drugs. One communal health center, in the region of Kibuye, has established this type of revolving fund on its own.

A second proposal being considered by the GOR is to approximately double the current fee schedule. The current fees have not been raised since 1975 whereas the average price level has risen over 126% (see Table 13). Thus even a doubling of fees would leave the real cost of health below what it was in 1975. Nonetheless, this is an important first step toward increasing health care receipts.

It is possible to get a rough idea of the amount of revenue that could be generated by raising health care fees. This is done by assuming a base revenue of 60 million Francs (1985 Budget) and a price elasticity of demand of  $-.13$ , which was the elasticity determined by Shepard, Carrin and Nyandagazi. Two cases are examined. The first case, doubling all health care fees, would raise an additional 52,800,000FRW (\$621,176, \$1=85FRW). The second case, increasing health care fees by 126% to bring them back up to their real 1976 level, would generate an additional 65,800,000FRW (\$774,118, \$1=85FRW). (See Annex V). Either of these cases would cover the \$519,000 current annual cost of the CCCD program or the \$662,000 projected cost of chloroquine and ORS in 1990.

#### 6.2.2 Lowering the Cost of Pharmaceuticals

There are two developments in the pharmaceutical sector that have significant potential for lowering the cost of drugs in Rwanda and increasing the efficiency of their distribution. The first proposal, which has been in the works for several years, is a reorganization of OPHAR. Currently OPHAR is operated as an office of the government and its provisional budget has remained constant or decreased in the last several years. Below is the OPHAR's provisional allocation for purchase of drugs from 1982 to 1986.

TABLE 17

Amount Allocated for Purchase of Drugs in GOR Budget  
(Million of Rwandan Francs)

1982	1983	1984	1985	1986
130	130	141.79	117.7	141.79

SOURCE:-----  
Government of Rwanda Provisional Budgets.  
CCCD Rwanda Country Assessment 1983.

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The goal of the reorganization is to find a private partner to supply OPHAR with initial capital to buy and sell drugs in competition with private pharmacies. This new company, to be called Society National des Pharmacies (SONAPHAR), would be operated as a mixed enterprise. The delay in implementing this proposal seems to be the inability to find a private partner. The benefits of this reorganization would be to increase the capacity of OPHAR to supply drugs which should lower their price, and raise revenue for GOR.

Another very important development in the pharmaceutical sector is the start of domestic production at the Laboratoire Pharmaceutique de Rwanda in Butare. The Laboratoire began production in 1983 with Belgian capital and technical assistance. Most of the cost of production is paid for by the GOR, through OPHAR, including cost of bulk materials, labor, electricity, and water. The Laboratoire in turn supplies the finished drugs to OPHAR for distribution at health facilities. The Laboratoire has yet to reach its full production capacity largely due to lack of working capital on the part of OPHAR, and its own lack of any independent source of capital. The Laboratoire can produce up to 50 million tablets and 40,000 packets of power, such as ORS packets, per year. A new arrangement between the Laboratoire and OPHAR that would give the Laboratoire more financial independence is being reconsidered by the Ministry. In spite of the fact that it is operating below capacity, 1985 unit cost estimates supplied by the Laboratoire indicate that it is competitive with other suppliers. Below are unit cost estimates of Chloroquine production at the Laboratoire. The costs are calculated as material alone, material and production costs, and material, production, and amortization of capital. These different costs estimates were needed in order to make comparisons with other suppliers, such as OPHAR, which does not include administrative or capital costs in its estimates, and BUFMAR, which does not include capital costs in its estimates.

TABLE 18

Comparison of unit cost of Chloroquine 1985  
(Rwandan Francs/100 mg tablets)

	<u>Laboratoire Butare</u>	<u>OPHAR</u>	<u>BUFMAR</u>	<u>Private Pharmacies</u>
Materials	.335	.872		
Materials and Production costs	.435		.58	
Materials, production costs and amortization of capital	.548			4.1

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SOURCE:

Laboratoire Pharmaceutique de Rwanda, Etudes de la Rentabilite et d'Autonomie Financiere, Mai 1986.

As can be seen in Table 18 chloroquine production at Butare is far cheaper than what is available at private pharmacies and seems to be competitive even with non-profit organization such as BUFMAR.

The Laboratoire produced 30,000 ORS packets in 1986. Their maximum capacity is only 40,000 because the process is not mechanized. The packets were made to produce 10 liters of ORS solution each time because of the limited production capacity. Although there is no immediate need for increased ORS production, a much higher level demand is anticipated by 1990 when the CCCD project ends. Domestic production of ORS packets offers potential for lowering the GOR cost of supplying those packets at the end of the project.

### 6.3 Conclusions and Recommendations

The GOR is in a very strong position to increase the quality and lower the cost of health care. The next two years of expected budget surplus should give the GOR time to implement cost recovery programs and reorganize the administration of OPHAR and the Laboratoire Pharmaceutique to increase the supply of low cost pharmaceuticals. The GOR needs to take action on these proposed reorganizations and proposed cost recovery programs such as selling drugs through OPHAR or village pharmacies, or raising the current fee schedule at health facilities. Any of these proposals should help relieve the financial burden of the health sector on the government as well as improve the quality of health care. ;

Recommendations:

1. The current proposals for cost recovery such as raising health facility fees or selling drugs through a national pharmacy, should be acted on by the Minister as soon as feasible. CCCD should help the GOR accelerate this process as much as possible through technical assistance and/or the initial seed money for the establishment of a revolving drug fund.
2. In order to help increase the quality of health care in government facilities the GOR should ensure that the receipts from any increase in medical charges stay within the community to be used entirely for health care.
3. CCCD should look into purchasing its chlorquine supply directly from the Rwanda Pharmaceutical Laboratoire or supplying the Laboratoire with bulk materials for chloroquine production, once the Laboratoire meets USFDA standards (see section 5.7.4.
4. CCCD should also look into the possibility of supplying to the Laboratoire the machinery necessary for increase production of ORS packets

## 7.0 Program Monitoring Evaluation and Life of Project

As mentioned under the Administration and Management section supervision--ergo monitoring--leaves much to be desired. If the initial steps taken be the MOHSA in the summer of 1986 in providing additional personnel are followed through, and these personnel are sent to the field for frequent supervisory and problem solving visits, it is within the capability of the government to improve the operation of the CCCD project and its PHC system markedly. No system of internal evaluation exists but the project provides for frequent overall and sectoral evaluations.

The life of Project (LOP) from May 31, 1984 to May 30, 1988 was reviewed in terms of the project goals and other work envisioned during the Life of Project (i.e. 47 months from the date of signing the Project Agreement on June 30, 1984). In the judgment of the team, four full operational years will be required to carry out the objectives of the project. After allowing the time required to put the personnel and equipment in place prior to starting operations (i.e., 12 months), it appears that the project goals will be more fully achieved and better integrated into the government's PHC structure, if 12 months are added to the life of project (i.e., and extension from May 31, 1988 to May 30, 1989). No additional bilateral funds will be needed given the low expenditure rate the first year of the project. However, additional funding from the extension of the TO and other regional costs will need to be found from the CCCD's regional budget.

### 7.1 Recommendations

1. That the MOHSA give high priority to supervisory visits by CCCD supervisory personnel at central and regional levels in order to assure adequate monitoring of the CCCD project and PAC activities.

2. That the Life of Project (LOP) be extended by 12 months to May 30, 1989 to provide four full operational years given the 12 months required for the "start-up or preparatory period" of the project. No additional bilateral funds are required.

## 8.0 Operational Research

Only 19 percent of bilateral Operational Research funds have been utilized to date (i.e. \$5654 out of \$30,000 earmarked for this purpose). However, there are significant operational research needs.

The MOHSA should encourage research in all CCCD fields of activity, and involve the Butare University Public Health Center. For example, it would be helpful to strengthen the operational research on serological studies related to measles in children under 9 months of age already carried out by the Butre University Public Health Center with a second study on seroconversion after 12 months of age to measure the facility of immunization before the age of 9 months. This is especially relevant as most recent studies indicated an important prevalence of measles in this age group during the 1985 epidemic. To the extent help is need in preparing research protocols, the TO and CCCD/Atlanta should be prepared to provide assistance.

A national review board should be set up to review and approve the research protocols and budgets as they are prepared.

### 8.1 Recommendations

1. Priority should be given to increasing the use of CCCD bilateral funds for operational research on CCCD/PHC subjects.

2. Technical assistance should be provided by the TO and CCCD/Atlanta to the protocols and budgets.

3. A National Review Board should be set up by the MOHSA to review and approve operational research protocols as they are prepared and are ready for implementation.

## ANNEX I

### Terms of Reference

#### 1. OBJECTIVES OF EVALUATION:

1.1 To evaluate CCCD activities through systematic collection and analysis of data on CCCD management and operations at the central, regional and peripheral levels.

1.2 To measure the extent to which CCCD activities have been integrated into the existing primary health care structure.

1.3 To offer a series of recommendations to improve the expansion and delivery of CCCD service (including training, health education and health information system development) and to accelerate their integration into the primary health care delivery structure given ever present resource constraints.

#### 2. METHODS OF EVALUATION:

2.1 Study relevant reference documents at central and regional levels.

2.2 Visit selected service delivery units and other health institutions in Rural and Urban areas of a Representative number of regions of the category.

2.3 Review survey data.

2.4 Interview relevant project implementing agents.

#### 3. EVALUATION COMPONENTS:

3.1 Project planning, administration and management

A. Review the CCCD agreement and evaluate its adequacy as the basic planning document for the CCCD project.

B. Review the development of plans of operation and the adequacy of those plans to govern and support field activities.

C. Describe and review the capacity of governmental management and administrative structure to manage and administer a regional program incorporating immunization, ORT and Malaria treatment

D. Review the aid, CDC administration and support to the project and adequacy of procedure for project support.

E. Review project executive management structure and functions with particular emphasis on relevant CCCD project and executive committees.

F. Review donor coordination structures and accomplishments.

### 3.2 Project Support.

A. Review epidemiologic and health services statistic in order to determine if the CCCD project has exerted an influence on lowering morbidity, mortality or increasing the availability or quality of primary health care service.

B. Review the adequacy of information systems (current and Planned) to provide data necessary to determine project impact.

### 3.3 Program Operation:

A. Review the delivery system (current and proposed to be utilized to deliver CCCD services.

B. Review the following operational aspects of the delivery system - supervision, logistics and supply, communications, personnel, coverage, control of funds and supplies.

C. Review staffing distribution for delivering points of CCCD services

D. Review staffing distribution for delivering CCCD Services.

E. EPI program components: 1) Analyze geographic converge of delivery systems and characterize the system; 2) Review immunization policies and schedules; 3) Review frequency of vaccination schedules; 4) Review coverage of immunization; and (5 review immunization practices with special emphasis on sterilization of equipment, immunizing ill children and frequency of immunization clinics.

F. ORT program 1) Analyze geographic coverage of oral rehydration therapy delivery system and characterize the delivery system: (2) Review national ORT policy; (3) Review population coverage of ORT; (4) Review ORT practices with special emphasis on continuing use of I.V. Adequacy and frequency of use of ORS and adequacy of public information regarding ORS.

G. Malaria: (1) Analyze geographic coverage if delivery system and characterize the system; (2) Review national malaria treatment and anti-malarial chemoprophylaxis policies; (3) Review population coverage of malaria treatment; and (4) Review malaria treatment and chemoprophylaxis practice with particular emphasis on availability of chloroquine, adherence to chemoprophylaxis in pregnant women.

H. Procurement, distribution and quality control of ORS and other commodities; (1) Review drug acquisition and distribution; (2) Review cold chain performance; (3) Review vaccine distribution system;

I. Training: (1) Review types and magnitude of training provided; (2) Review training materials developed (3) Review numbers and types of personnel trained and evaluation of their performance; and (4) Review training plan for remainder of project.

J. Target disease surveillance and medical information system: (1) Review baseline surveys; (2) Review current reporting and report keeping system; (3) Review plan for modification of present to provide accurate M and M data and utilization data; and (4) Review Health information system activities proposed for remainder of project.

K. Health Education: (1) Review the current health education structure, plan of execution and activities to date; (2) Review staffing and institutional capacity for delivering health education services; and (3) Review the adequacy of technical assistance provided for support to health education activities.

L. Financing: (1) Review sources and amount of funding for current program activities; (2) Review normal budget and auto financing; (3) Review USAID Bilateral funds and funds from other bilateral and multilateral donors; (4) Review future financing of recurrent cost estimate, and project ability of national government to finance recurrent costs in 1986, 1987 and 1988 from governmental sources.

M. Program Costs: (1) Review cost for immunization given, cost per fully immunized child, and cost per pregnant woman immunized; (2) Review ORT cost per ORT given, and cost per child covered per year; and (3) Review antimalarial treatment and chemoprophylaxis average cost per antimalarial treatment provided, cost per child covered per year, and cost per pregnant woman covered per period of gestation.

## ANNEX II

### List of Principal Documents Consulted

1. CCCD T.O., Rwanda CCCD Annual Country Report, 1985
2. Ntilivamunda, Demning, & Neill, Enquetes Nationales Sur le traitement de le fièvre et de la diarhea chez les enfants demoins de 5 ans a Domicile et dans les formations sanitaires, Novembre, 1985
3. CCCD/PEV - Ministere de la Sante Publique et des Affaires Sociales Direction Epidemiologie et Hygiene Publique, Strategie Nationale de Lutte Contre le Paludisme, 1986
4. GOR, Strategie Nationale De Lutte Contre les Maladies Diarrheiques 1986
5. Avant-Project D' Immunization Accelerie Pour le Programme de Survie et de development de L'enfant au Rwanda
6. Rapport de L' evaluation Internationale du Programme Elargi de vaccination du Rwanda Mai 30, 1983
7. MOHPSA, Rapport Annual, 1984
8. CCCD technical Coordinator, et al - CDC, Foreign Trip Report, January 14, 1986
9. Ministry of Health/UNICEF, Rwanda Accelerated Immunization Project for Child Survival and Development Program, 1986
10. Slattery and Godfrey, CCCD/Republic of Rwanda Program Review, 1985
11. Government of Rwanda, & USAID Project Grant Agreement. 1984
12. The World Bank, Staff Appraisal Report - Rwanda Family Health Project, March 6, 1986
13. The Economist Intelligence Univ, Quarterly Economic Review of Zaire, Rwanda and Burundi, 1986
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15. Laboratoire Pharmaceutique de Rwanda, Etude de Rentabilite et D' Autonomie Financiere, Mai 1986
16. Guichard, A., Evaluation Financiere et Economique due Laboratoire pharmaceutique du Rwanda, September, 1986

17. Shepard, Carrin, & Nyandagazi, L'Autofinancement des Soins de Sante dans les Centres de Sante Gouvernementaux du Rwanda Sommaire Executif et Recommendations, Aug 27, 1986
18. Gaye, P., Training Workshops for Facilitators and for the 2nd Mid Level Course for Health Center Officials and E.P.I. Supervisors, July 1986
19. CCCD Project, The Evaluation of Efficacy of Chloroquine Therapy and years of Age in Rwanda, Aug-Sept. 1986
20. Government of Rwanda, Journal Officiel de la Republique Rwandaise, June 1, 1986
21. World Bank/Rwanda Economic Memorandum: Recent Economic and Sectoral Developments and current Policy Issues Report No 4059-RW. May 20, 1983
22. World Bank Rwanda Country Economic Memorandum Report No 6191-RW, July 9, 1986
23. World Bank. Report on Recommendations of the President of the International Development Association to the Executive Directors on a Proposed Development Credit in an Amount Equivalent to SDR 9.8 million to Rwandese Republic for a Family Health Project, March, 1986

## ANNEX III

### List of Persons Contacted

#### 1. MOHSA/Kigali

- . Minister, Dr. Francois Muganza
- . Dr. Emmanuel Kazima, Acting Director General of Public Health  
Director of Medicine and Assistant Coordinator of CCCD/PEV
- . Dr. Augustin Ntilivamunda, Director of Epidemiology and Public Hygiene  
(CCCD National Coordinator)
- . De Laruent Bugilimfura, CCCD/PEV
- . Mr. Augustin Rwigimba, Manager of Cold Chain and Storeroom
- . Mr. Frederic Yababaliye, Chief of Maternal and Child Health Division
- . Mr. Christophe Nsanzabaganwa, Chief of Immunizations
- . Mr. Gabriel Muligande, Chief of Health Education Office
- . Mr. Paul Euge Nshimyimana, Chief of Office
- . Ms. Theresa M. Niwebasa, Chief of Health Statistics Office
- . Ms. Jean Marie Vianney Buzizi, CCCD/PEV
- . Mr. Timothee Rugwizangoza, CCCD/PEV
- . Mr. Augustin Nsanzabera, Administrator-Controller of CCCD/PEV
- . Mrs. Maryanne Neill, Technical Officer of CCCD/(Conseillere Technique)
- . Ms. Goretti M. Mujawamaliya, Secretary of CCCD/PEV
- . Mr. Prosper Nyandagazi, Chief of Finance and Administration
- . Ms. Therese Karugwiza, Statistics Manager of PEV
- . Mr. Pascal Karekezi, Refrigeration Technicien
- . Dr. Nzaramba Didas, AIDS research
- . Dr. Susan Allen, Researcher, AIDS
- . Dr. Andre Ndikuyeze, Researcher CCCD, Butare University
- . Dr. Nshimyumukiza Jotham, Vice Doyenne, Butare University
- . Mr. Hornikx Rutger, Executive Secretary, BUFMAR
- . Dr. Melanie, WHO Researcher
- . Mr. Theodore Nsengiyaremye, Director of Pharmacy, OPHAR
- . Ms. Collette Mukangiliye, World Bank

#### 2. WHO/Kigali

- . Mr. John Wright, Resident Representative

#### 3. UNICEF/Kigali

- . Ms. Bilge Ogun, Representative
- . Mr. William Standaert, Program Officer
- . Dr. Maurice Ramakanelo, Project Officer for Health and Nutrition

#### 4. Regional Health Visits

- . Gikongoro - Kigeme Hospital  
Dispensary Gikongoro  
Kaduha Health Center  
Karambi Health Center

Kibungo - Rwamagana Hospital  
Mukarange Health Center  
Zaza Health Center  
Rusumo Health Center

Gitarama - Byimana Health Center  
Musambira Health Center

5. AID/W and CDC Atlanta

AID/Washington

Ms. Wendy Roseberry, CCCD Project Officer, AFR/TR. HPN

CDC Atlanta

- . Mr. Andy Agle, Technical Coordinator, CCCD Project, IHPO
- . Dr. Jason Weisfeld, Chief, Training Activities, IHPO
- . Dr. Bill Taylor, Evaluation and Research Division, IHPO
- . Dr. Ron Waldman, Evaluation and Research Division, IHPO
- . Mr. Dennis Olsen, Country Supervisor, IHPO
- . Ms. Kathleen Parker, Health Education Specialist, IHPO
- . Ms. Carol Goettl, Administration, IHPO
- . Mr. Kevin Murphy, Country Supervisor, IHPO
- . Mr. Jean Roy, Deputy Technical Coordinator, CCCD Project

7. Belgian Cooperation

- . Dr. Phillippe LePage, Chief of Pediatrics, CHK
- . Dr. Hitimana, Pediatrician, CHK
- . Dr. Phillippe Van de Perre, AIDS Researcher

8. USAID/Kigali

- . Emerson J. Melaven, AID Representative
- . Rose Marie Depp, Program Officer
- . Richard Thornton, Health Officer
- . Carina Stover, Health Officer
- . Michael Fuchs-Carsch, Ag Development Officer
- . Maryanne Neill, CDC Technical Officer for CCCD Project

## ANNEX IV

### Recurrent Costs For CCCD in 1990

#### 1.0 Gasoline, Vehicle Repairs and Kerosene

The estimate for expected costs in 1990 for gasoline, vehicle repairs and kerosene is based on average expenditure to date.

##### 1.1 Vehicle Repair and Gasoline

Approximately 7,000,000 FRW has been spent on vehicle repairs and gasoline from May 1, 1985 to September 30, 1986.

There have been 14 Suzuki Jeeps operating for all 17 months and two land rovers operating for 9 months or 256 vehicle months of operation. It has therefore cost 27,344 FRW /month to operate each vehicle. As of October 1, there will be 14 Suzuki Jeeps and 3 landrovers in operation which will cost 464,848FRW per month. The cost per year is estimated to be 5,578,176 Or \$65,626 (\$=85FRW). No account is taken of additional maintenance costs as vehicle age or potential changes in gasoline prices.

##### 1.2 Kerosene

Expenditure in Kerosene for cold chain equipment have been 3,272,330 FRW between April 1, 1985 and September 30, 1986 averaging 181,796 FRW/month or \$25,665 (\$=85FRW).

#### 2.0 Vaccine Supplies & Maintenance of Cold Chain Equipment.

It's assumed that 20% of the expenditure on vaccine supplies and cold chain equipment will need to be spent each year to maintain the stock. Total expected LOP expenditure on vaccine supplies is \$30,000 and expenditure on cold chain equipment is another \$61,770 or \$91,770 over LOP. This requires that 18,354 be spent each year to maintain this stock.

#### 3.0 Vaccines

UNICEF accelerated vaccination proposal which expects to reach 90% immunization of infants less than 12 months of age and tetanus for pregnant woman by 1990 estimates the cost of vaccines for 1990 to be \$173,000.

#### 4.0 Oral Rehydration Salts

The UNICEF proposal estimates the Rwandan population to reach 7,316,800 by 1990 assuming that 20% of the population is less than 5

years old, and 60% of that population is covered by oral rehydration therapy then 878,016 children will need and have access to oral rehydration therapy. Assuming two episodes per year and 2 packets per episode, Rwanda will need 3,5212,064 packets per year (based on Strategie Nationale de Latte Contre les Maladies Diarrheui, 1986. At \$1.5 per packet (the price at which CCCD recently purchased ORS packets including transport) will cost Rwanda \$526,800/year for ORS packets.

5.0 Chloroquine for Children less than Five Years Old

Again, assuming that 20% of the population is less than five and 60% of the children have access to treatment that means 878,016 will be treated for malaria. Assuming two episodes per year and two tablets per episodes, 3512,064 tablets will be needed in 1990. At a cost of .007/tablet (most recent OPHAR purchases) this will cost \$24,584 in 1990. (Assumption based on Strategie Nationale de Latte Contre de Paludisne, 1986)

6.0 Chloroquine for Prophylaxis of Pregnant Women.

Assuming a population of 7,316,800 people in 1990 of which 6% will be pregnant women and 60% will covered by chloroquine prophylaxis, 263,400 women will need chloroquine tablets. Assuming 20 weeks of coverage and 3 tablets per week requires 15,804,288 tablets in 1990. At \$.007/tablet this will cost \$110,630. (Assumptions based on Strategie Nationale de Latte Contre de Pa;usisime, 1986

7.0 Total Recurrent Cost of Supplies and Maintenance in 1990

Gasoline and Vehicle Repairs	\$65,626
Kerosene	25,665
Vaccine Supplies and Cold Chain Equipment	18,354*
Vaccines	173,000*
ORS Packets	526,800*
Chloroquine	135,214*
<b>TOTAL</b>	<b>\$944,659</b>

\* Cost estimates for Vaccines, ORS packets and chloroquine . Assume that UNICEF and private Voluntary organizations such as BUFMAR will not be contributing any medication to the target populations

ANNEX V

Total Revenue Calculations

The price elasticity of demand is calculated as the percentage change in quantity/divided by percentage change in price. The elasticity calculated by Shepard, Carrin, and Nyandogaziis is -.13. This elasticity implies that when price rises 100%, the quantity demanded falls 13%. This indicates relatively little quantity change in response to the change in price. A low price elasticity of demand is not unusual with respect to health care which people are unwilling or unable to do without even at higher prices

Nonetheless, it should be stressed that this elasticity is a very rough estimate and the estimate of the potential total revenue generated is also rough. The elasticity probably underestimates the extent to which demand for health care falls in response to a price increase. This is because the calculation did not control for the fact that the higher priced health centers in the sample were also higher quality health centers. Thus if price were to rise with no increase in quality there would probably be a bigger fall in utilization. This should not be a serious problem in this case because it is expected that if communities spend the revenue from health care fees on the local health care facilities quality should in fact increase. A more serious problem with the calculation of total revenue is that the elasticity used was calculated based on cost of services at the health centers. Services provided at different types of health facilities may have higher or lower elasticities

The change in total revenue was calculated as follows:

Total Revenue = Price x Quality

$$TR = PQ \ (dp/dp)$$

$$dTR = (dp/dp)Q + (dQ/dP)P \ dP$$

$$dTR = (Q + (dQ/dP)P) dP$$

$$dTR = (1 + (dQ/dP)(P/Q)) Q \ dP$$

$$dTR = (1 + (dQ/dP)(P/Q)) PQ \ dP/P$$

$$(dQ/dP) (P/Q) = \text{price elasticity of demand} = -.13$$

$$PQ = TR = 60 \text{ million FRW in 1985}$$

$$dP/P = \text{percentage change in prices} \quad \text{Case 1} = 1 \ (100\% \text{ increase})$$

$$\text{Case 2} = 1.26 \ (126\% \text{ increase})$$

Case 1

$$dTR = (1 + -.13) (60 \text{ million})(1) = 52.2 \text{ million FRW}$$

Case 2

$$dTR = (1 + -.13) (60 \text{ million})(1.26) = 65.8 \text{ million FRW}$$