

INTERNATIONAL DEVELOPMENT  
PROJECT PAPER FACESHEET  
TO BE COMPLETED BY ORIGINATING OFFICE

APPROPRIATE USES  
 ORIGINAL     CHANGE  
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 DOCUMENT CODE 3

2. COUNTRY/REGIONAL ENTITY/GRAANTEE: **ZAIRE**

3. DOCUMENT REVISION NUMBER: **110**

4. PROJECT NUMBER: **660-0058**

5. BUREAU: **AFR**    D. CODE: **1**

6. ESTIMATED FY OF PROJECT COMPLETION: **FY 810**

7. PROJECT TITLE - SHORT (STAY WITHIN BRACKETS): **[Endemic and Communicable Disease Control]**

8. ESTIMATED FY OF AUTHORIZATION/OBLIGATION:  
 A. INITIAL: **MO. YR. 2/76**    B. FINAL FY: **810**

9. SECONDARY TECHNICAL CODES (MAXIMUM SIX CODES OF THREE POSITIONS EACH)

10. ESTIMATED TOTAL COST (\$000 OR EQUIVALENT, \$1 = 49)

A. PROGRAM FINANCING	FIRST YEAR			ALL YEARS		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL (GRANT)	( 400 )	( )	( 400 )	( 1,887 )	( )	( 1,887 )
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER: 1. U.S. 2. HOST GOVERNMENT		407	407		2,901	2,901
OTHER DONOR(S)	125.		125	1,356		1,356
TOTALS			932	3,243		6,144

11. ESTIMATED COSTS/AID APPROPRIATED FUNDS (\$000)

A. AID APPROPRIATED PURPOSE (ALSO A CODE)	B. PRIMARY TECH. CODE	FY 75		FY 79		FY 77		ALL YEARS	
		D. GRANT	E. LOAN	F. GRANT	G. LOAN	H. GRANT	I. LOAN	J. GRANT	K. LOAN
PH	419 540	400				490		1,887	
TOTALS		400				490		1,887	

12. ESTIMATED EXPENDITURES: **65**    **335**

13. PROJECT PURPOSE(S) (STAY WITHIN BRACKETS)  CHECK IF DIFFERENT FROM PID/PRP

To strengthen the endemic and communicable disease control and monitoring capabilities of the GOZ

14. WERE CHANGES MADE IN THE PID/PRP FACESHEET DATA NOT INCLUDED ABOVE? IF YES, ATTACH CHANGED PID AND/OR PRP FACESHEET.  Yes     No

15. ORIGINATING OFFICE CLEARANCE

SIGNATURE: **USAID DIRECTOR**

TITLE: **USAID DIRECTOR**

DATE SIGNED: **MO. DAY YR. 01 15 76**

16. DATE RECEIVED IN AID/W. OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: **MO. DAY YR.**

ENDEMIC DISEASE CONTROL

PROJECT PAPER

PART I - PROJECT SUMMARY AND RECOMMENDATIONS

A. See Face Sheet.

B. Recommendations:

Grant	\$ 1,887,000
Total New Aid Obligations	\$ 1,887,000

C. Description of the Project

The National Health Council (NHC) of the Government of Zaire has specifically asked USAID/Zaire for assistance in planning and implementing a program for the control of endemic and communicable diseases. This project resulted from that request.

The pattern of development of Zaire's health sector has been largely atypical of that of most developing nations. The extensive health system instituted by the Belgian Government was shattered by the political upheavals and civil rebellions which followed independence in 1960. Since then, with help from a variety of private voluntary agencies, notably missionary and church groups, the GOZ has slowly established a rudimentary health network mainly for medical care. Until recently, there has been little central planning and direction of health activities at the national level. Many autonomous health activities,

created as emergency measures, have developed with little interaction or coordination.

One result of such an unorchestrated development of the health sector is the limited accomplishments in preventive medicine and public health. Although morbidity, mortality and other health data are both incomplete and often unreliable, it appears that there has been little or no overall improvement in the health status of the people during the last two decades. Crude death rate is 20-23 per 1,000 population; in 1955-57, it was about 20 per 1,000 population. Infant mortality rate ranges from 150-200 per 1,000 live births; in 1955-57, it was about 165. Deaths of children under five years (child mortality rate) are probably in the range of 400-500 per thousand population in this age group. Seventy-five to eighty per cent of total deaths are in children five years old or younger.

Most of the deaths in early life are from preventable diseases, notably: malaria, gastroenteritis, respiratory infections including pneumonia, and acute communicable diseases of early childhood, particularly measles. Calorie-protein malnutrition is a contributing factor in a high percentage of deaths in the nine months-three years age group. Tuberculosis, trypanosomiasis, shistosomiasis, onchocerciasis (river blindness), hookworm and other intestinal parasites are all widespread and directly or in combination with other diseases cause high rates of disability, dependency and death in both young and older age groups.

The institutional capacity for the GOZ to cope with such a widescale burden of debilitating diseases is limited. The existing fragmented health activities, mainly concentrated on curative health services, is costly and could not be sustained or expanded without large inputs of funds, commodities and manpower from external donors. It is clear that a better balance between preventive and curative services is imperative.

The GOZ is aware of these problems. President Mobutu, in a policy speech in 1973, designated health as one of four key sectors for national development priority. Implementation of this policy has, however, been slow and difficult because of lack of Zairian health manpower for the upper levels of management, direction and planning.

On November 6, 1974, President Mobutu, by decree, established the National Health Council charged with the overall responsibility of clarifying health policy, coordinating existing health services and initiating new programs aimed at improving the national health status.

Membership in the Council is comprised of the Commissioner of State for Public Health, the Director of the Presidential Medical Services, the Director of FOMECO (Fonds Medical de Coordination), the Commissioner of State for Education and the Dean of the Medical Faculty of the University of Zaire. Although the Council is nominally headed by President Mobutu, in practice the Commissioner of State for Public Health, Dr. Ngwete, has presided over the Council's meetings and activities.

The National Health Council developed a plan to gradually restructure the existing health activities into a unified system of integrated curative and preventive services. This will be done under the concept of health development zones each with a regional hospital, a series of health centers, and outreach programs down to a village health post. This reorganization of health services will be accomplished in phases and the national health sector to support, direct and coordinate the integrated health system will be concurrently realigned and strengthened.

Obviously, the restructure and development of a definitive integrated health delivery system will take a long time -- perhaps a decade or more before it is fully functioning in a comprehensive way. In the meantime, some progress will have to be made towards reducing the high morbidity and mortality from certain diseases which are panendemic.

USAID/Kinshasa's assistance program in the health sector responds to these considerations. The Health System Development Project, No. 660-057, is aimed at strengthening the overall planning, management operations of all health activities at the national level. The Basic Family Health Project, No. 660-067, to start in FY 77, focuses on the development and extension of an integrated health delivery system in health development zones. These two projects are primarily aimed at the long range development of the general capability and infrastructure needed for a permanent integrated curative/preventive nationwide health delivery system. The

Endemic and Communicable Disease Control Project is specifically directed towards reducing the morbidity and mortality caused by certain panendemic and communicable diseases which require nationally organized initiatives, at least at the outset. Priority attention has also been given to those diseases that cause many deaths in young children.

Although the Endemic and Communicable Disease Project has well-defined short term goals in terms of reduction of selected diseases in specified geographic areas, these "action programs" also provide working operational experiences which are essential for a realistic realignment and strengthening of the national health sector. The project also has an institutional building role particularly in developing an epidemiology capability within the Department of Health which will be essential to the proper analysis and evaluation of endemic and communicable diseases and the progress made towards their control.

The selection of disease control programs in malaria and measles provides an opportunity to develop operational cadres, infrastructure and methodologies in two widely applicable but distinctly different fields. Endemic diseases, as typified by malaria, are spread by an intermediary live host or vector such as mosquitos, flies or snails. Such diseases, therefore, require control programs utilizing an environmental approach. Eradication of the endemic disease as a major health problem requires the successful elimination or control of the host carrier as well as treatment of the affected population. Communicable diseases, on the other hand, are transmitted through direct contact with infected persons. Such

diseases, therefore, are susceptible to control through comprehensive vaccination techniques and treatment of the target population. Measles control typifies a direct attack on a communicable disease by mass immunization of the population at risk. The development and extension of integrated health services to development zones will require an experience base in both these basic methodologies as well as technical and material support (logistics, supplies, etc) from the national sector.

The logical framework contained in the Appendix to this Project Paper identifies the relationship between the project's goal, purpose, outputs and inputs. The section that follows is a more complete description of the contents of that framework.

#### GOAL

This project is directed towards achieving the goal of reducing the morbidity and mortality caused by endemic and communicable diseases.

#### PURPOSE

The purpose of the project is to strengthen the Government of Zaire's (GOZ) institutional capacity for monitoring and controlling endemic and communicable diseases.

This will be done by:

1. The establishment in five years of a model malaria control program in the Kinshasa Region and in one nearby rural area (total population estimate 2.5 million).
2. The establishment in three years of a permanent measles control program by immunizing children six months to three years old in Kinshasa and 15 other major urban areas of Zaire: namely,

Kikwit, Bandundu, Matadi, Kananga, Mbandaka, Lisala, Isiro, Kisangani Mbuji mayi, Kamina, Bukavu, Likasi, Kindu, Lubumbashi and Gamena. (Total population estimate 4.6 million; children six months to three years protected estimate 500,000).

3. The extension and integration of these and other endemic and communicable disease programs into the health delivery systems of five development zones, with an estimated population of one million, will be carried out in coordination with the Health Systems Development Project No. 660-057 and the Basic Family Health Project No. 660-067, both of which are in the design/approval stage.

4. The development of a cadre of Zairian health workers competent to deal with the problems of endemic and communicable diseases and environmental health.

5. The development of an epidemiology capability within the GOZ's Department of Health for assessing, monitoring and evaluating communicable disease problems and programs.

AID will provide the following assistance to the GOZ for this project:

1. Five person-years of long-term technical assistance in malaria control concentrating on operational techniques and program management logistics, and motor transport.

2. Three person-years of technical assistance in communicable disease control concentrating in data systems design and data analysis.

3. A total of five work-years of assistance in epidemiology (three years-measles, two years-malaria).

4. Twenty-eight work-months of consultation services for assessment and advice on specialized technical problems encountered pertaining both to the control of malaria and

other endemic and communicable diseases. The first year of these short-term services will be utilized for logistics support to the malaria program. This short-term support may become long-term in later years of the project if program evaluation indicates such a need.

5. Ten work-years of long-term participant training in the fields of public health administration, entomology, parasitology and epidemiology. (It is envisaged that this training would be given for two health officers, two entomologists, one parasitologist, and one epidemiologist, but this is subject to modification later depending on availability and interest of suitable candidates and refinement of project's professional staffing needs.)

6. Limited commodities to support the above activities.

USAID inputs are specifically designed to complement and augment assistance from WHO and UNDP. The World Health Organization plans to provide:

1. Five work-years of technical assistance in the form of a physician malariologist who is already at post.

2. Consultant services in sanitary engineering, entomology, assessment, and collection of baseline data as a bench mark for future evaluation and as a guideline for preparation of the Plan of Operations for the Malaria Control Program.

3. Limited short-term training.

4. Limited commodity support in the form of specialized supplies and equipment.

UNCP will provide:

1. Funds to conduct a socio-economic survey of the malaria

problem, if deemed necessary.

2. Training funds for seminars, workshops and other in-country training.

3. Commodities for endemic disease control programs.

4. A small amount of consultation services, mainly concerned with coordination of efforts and inputs pertaining to UNDP.

Coordination and management of AID inputs will be done by the USAID Public Health Officer, who will work in close cooperation with GOZ National Council of Health and the GOZ Department of Health.

The major agency and focal point for overall planning, direction and coordination of the project within the GOZ is the National Council of Health. The National Health Council has an overall responsibility for developing a methodology and organization mechanism for the systematic collection and analysis of health data as a rational basis for the assessment of endemic and communicable diseases and for establishing and evaluating endemic and communicable disease programs. The execution of this function falls within the Department of Health. This capability is very rudimentary and AID inputs in epidemiological technical assistance and training are aimed at strengthening this capability. The AID-provided epidemiologist will, during the first three years, focus on the epidemiological factors of measles and communicable disease -- particularly in building into these programs evaluation techniques. During the remaining years, the epidemiologist will concentrate on health and endemic disease data in the development zones as a basis for designing integrated

health services aimed at control of communicable diseases.

The specific activities aimed at malaria control will be implemented by the National Malaria Services in the Department of Health. The Director of the Malaria Service is a newly appointed medical officer, and a staff is being developed to serve this office. This unit will have direct operational responsibility for the Kinshasa Region Malaria Control Program and for coordinating malaria control activities in the health zones as they are developed and established.

The Measles Control activities will be implemented under the National Campaign for Eradication of Smallpox (CNEV: Campagne Nationale d'Eradiation de la Variole). The Director of CNEV, Dr. Kalisa, has overall responsibility for planning and directing the program. Operational responsibilities for execution will be assigned to the Assistant Medical Director of CNEV. He will have an assistant for administration and logistics. The measles vaccination program in the 15 major urban areas, excluding Kinshasa, will be carried out in collaboration with the Regional or sub-regional medical inspector for the respective area.

The WHO's representative in Zaire has reviewed the PRP and agrees with its concept and direction. The WHO's Regional Office for Africa, located in Brazzaville, has an inter-country malaria team consisting of a malariologist, entomologist, sanitary engineer, and statistician. Subject to GOZ official request, they are willing to furnish the technical expertise for the collection and analysis of the initial base line data with which a Plan of Operations will be developed for the malaria

control program in Kinshasa.

AID's technical assistance in malaria control will focus on field operations, logistics and motor transport and maintenance. WHO will have the prime role for technical assistance pertaining to the medical, technical and entomological aspects of the program. AID will, however, maintain a participation and liaison role in the overall malaria control program on a regular basis by the USAID's Public Health Officer and, periodically, through short-term malaria consultants from AID/W. Annual, external evaluation of the malaria control program will be done jointly by the GOZ, WHO and AID -- and perhaps with representation from UNDP subject to their wishes.

The focus for the first two years of this project will mainly be on the specific programs aimed at setting models for the control primarily in Kinshasa and the 15 urban centers listed. An extensive evaluation will take place at the end of the second year. This evaluation will be aimed at assessing the efficiency and effectiveness of the project in achieving its disease control goals. At this point, the nature of funding for the last three years of the malaria project and the last year of the measles project will be determined based on the results of the evaluation.

It is anticipated that the last three years of the malaria/endemic disease component of the project will shift from Kinshasa to an emphasis on integrating endemic disease control programs into the health services of the five development zones.

The operational details of the project, including the specific plans for undertaking the malaria and measles control

activities, will be more fully presented in Part II, B - "Detailed Description."

The duration of the total endemic diseases portion of the project will be five years. By that time, the following conditions will be achieved:

1. There will be an effective malaria control program operating in Kinshasa and the adjacent areas, with a demonstrable decrease in the transmission of malaria as shown by a decrease in malaria parasites in blood smears taken from a random sampling of the population (by districts and age groups) as compared with initial base line and subsequent data from annual assessments.

2. There will be a similarly effective malaria control program operating in at least one rural area covering at least 500,000 population.

The duration of the measles and communicable diseases section of the program will be three years. This shorter time period is valid given the nature of control methods for diseases such as measles. Vaccines allow the effective immunization of children against the disease. Thus, a vaccination program, not requiring a vector control component, can be effectively established in three years. This program will achieve the following results.

1. The measles vaccination program will be operating effectively in Kinshasa and in at least 15 urban centers with a population of 4.6 million. Effectiveness of this activity will be measure by:

a. Immunization of 585,000 children (six months to three years) for measles during the first year, and 300,000 children (6 months to 18 months) annually thereafter.\*

b. A decrease of at least 50 per cent in the number of measles cases occurring in 0-5 age group in these areas, as determined by reported disease statistics and treatments at hospitals, clinics and dispensaries.

2. A section of epidemiology will be operating effectively within the Department of Health and will have a demonstrated capability to monitor and assess endemic and communicable disease problems as evident by:

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\* Technical Note:

Recent medical reports\*\* have noted the occurrence of measles in children previously vaccinated. Vaccination failures are due to:

- an inherent 2-5% failure rate of the vaccine;
- vaccination at less than one year of age when maternal antibodies may interfere;
- improper storage of the vaccine resulting in inactive measles virus.

Recent statistics have shown that children should be re-vaccinated approximately four years after initial vaccination.

Recognizing that the proposed measles vaccination program is only three years in duration, the AID contribution to the project will not involve revaccination efforts. However, on the basis of the recent medical findings noted above, an important part of the long and short term advisors' contributions will be to establish an awareness in the Department of Health of the need for future revaccination and to begin to develop plans for integrating revaccination programs into planning for on-going communicable disease control programs.

\*\* Pediatric Alert, January 22, 1976  
Journal of the American Medical Association, January 5, 1976.

a. At least one professionally trained Zairian epidemiologist.

b. A functioning data systems capability for the collection, processing, analysis, storage and retrieval of data relating to endemic and communicable diseases and their control. Such a capability will include a basic trained Zairian staff or statisticians, technicians, clerks and data systems personnel.

c. Reports, analysis and other outputs being effectively used in assessing endemic and communicable disease patterns and applying the results in establishing, operating and evaluating endemic and communicable disease control programs.

Together, the two activities will establish a program for endemic and communicable disease control, the effectiveness of which will be demonstrated by decreases in deaths and disability caused by endemic and communicable diseases, particularly in children 0-5 years of age. It is anticipated that the program will eventually be integrated within the health care delivery system of the new development zones at such time as the zones are able to sustain program efforts (probably 15-20 years).

#### D. SUMMARY FINDINGS

This project is considered technically sound, economically viable and administratively feasible. The country has the capability to effectively maintain and utilize the project. The technical methods used are based on techniques which have been widely used with success in Africa and other parts of the world.

Provisions have been made to adapt methods to actual conditions in Zaire as determined by base-line and periodically monitored data collection. Appropriate consultation from WHO and CDC have been built into the project at the onset. Provision has been made for periodic (annual) evaluation with the participation of technical experts from outside agencies to assure objectivity. The project meets all applicable statutory criteria.

E. PROJECT ISSUES

1. Issue

The institutional framework within which the project would take place.

Discussion

This project is one of several projects that collectively aims at the development of the GOZ's capability to plan and implement health programs. The measles control component is being implemented through the organization structure established for the National Small Pox Eradication Campaign (CNEV) which has a proven record of performance. (Over 20 million small pox vaccinations and essentially successful eradication of Small Pox in Zaire). The GOZ Malaria Service is new and will need strengthening. This is one of the developmental objectives of the project. The technical assistance training and other resources provided by USAID and WHO should be adequate to accomplish this within the limits of the targets set for the project.

2. Issue - End-of-project status

Discussion

The project has been redesigned and the end-of-project status is now defined largely in terms of quantifiable targets subject to verification and evaluation.

3. Issue

Definite commitment from other donors and timing of their inputs.

### Discussion

WHO/Zaire has agreed to assist with the Malaria Program. WHO/Brazzaville, has by exchange of letters, agreed to supply the Base Line Survey Team subject to formal request from GOZ. The GOZ is waiting for finalizing of PP with USAID before making this request to WHO.

UNDP has agreed in principle to support the project at the levels indicated. Unfortunately UNDP budget in Zaire has been cut 40% (per local representative of UNDP) and full commitments may be difficult to meet. The most critical category of UNDP support is the continued support for imported commodities for the Malaria Control Program. It is anticipated that combined USAID and UNDP support for commodities for Malaria are sufficient to carry the program for the first two years - and probably through the 5 years for Kinshasa. Extension of malaria control beyond the Kinshasa region will be uncertain unless UNDP is able to furnish sizable commodity support in later years. This element of the issue is therefore not fully resolved at this point.

CDC has furnished initial consultation in February, 1976 on a non-reimbursable basis and AID/W provided travel cost and per diem. The results of this consultation and future CDC activities are discussed in the "Detailed Description" section of this paper.

#### 4. Issue

Effect of project on the role of women in development.

Discussion

This is amplified in Part III - C. "Social Soundness Analysis".

5. Issue

Project emphasis.

Discussion

Further rationale for target selection is provided in the "Background" and "Detailed Description" sections of this paper (Part A and B).

6. Training

Discussion

More details on plans for training are provided in the "Detailed Description" (Part 2B) and Part 4 B "Implementation Plan".

7. Data Collection

Discussion

Plans for data collection, analysis and utilization are presented in the "Detailed Description" (Part 2 B) and "Implementation Plan" Part 4 B.

## PART II - PROJECT BACKGROUND AND DETAILED DESCRIPTION

### A. Background

Traditionally, the leading causes of morbidity and mortality in developing countries have been infections, parasitic diseases and respiratory diseases. It is understandable, therefore, that international assistance agencies have concentrated their efforts on supporting those government or voluntary agencies' disease control activities in these categories.

In most cases, external health assistance was primarily directed at curative medical care. In Africa, including Zaire, a large percentage of domestic and external support has gone to hospital-based treatment of disease. As a result, curative care has been, and in many countries, still is, the major recipient of health resources.

Preventive public health care, on the other hand, has received more lip service than support. There are a number of reasons for this, including:

- unavailability of specific preventive measures or techniques to deal with endemic diseases;
- unfamiliarity with the details of host-vector-parasite relationships;
- geographic constraints;
- social, economic, cultural constraints.

In addition, the health infra-structure is often not sufficiently developed to permit the utilization of even the simplest disease control measures. Furthermore, political considerations frequently determine that curative care which is more visible should receive priority emphasis in health care service delivery.

There have, however, been notable exceptions to this approach. Diseases which lend themselves most readily to control are those for which:

- an effective vaccine, treatment, or vector-control mechanism exists;
- a well-organized and supported monitoring system is developed;
- man is the only host.

One of the most successful examples of such a wide-spread campaign has been against smallpox. In 1974, the disease was reported in only nine countries, three fewer than in 1973 and 34 fewer than in 1967 when the worldwide eradication program began under WHO sponsorship. Moreover, continuing transmission is believed to be limited to three specific areas in three countries -- Bangladesh, India and Ethiopia. A specially convened international commission declared that eradication has been achieved in two of the four geographic areas where the disease was originally located -- South America (August, 1973) and Indonesia (April, 1974).\*

Nevertheless, most other diseases endemic to developing countries have not been so successfully attacked. Malaria is an appropriate example of a disease whose eradication was anticipated but whose endemicity is still a major health problem in most developing countries.

Together with the World Health Organization, the efforts of donor assistance agencies and the host governments have

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\* "Smallpox in 1974," WHO Chronicle 29:134-139 (1975)

made some progress in malaria control. According to WHO, by the end of 1972, nearly 40% of the population previously exposed to infection had been protected and another 25% ran a lesser risk of contracting the disease.\*

Yet, ongoing progress remains slow and uneven. Dispersed populations, geographic-access problems, financial constraints and organizational complacency have either handicapped or halted many malaria control programs in previously model areas. Consequently, the disease is undergoing a resurgence once again. Compounding the problem, quinine is in short supply, and the malaria parasite is showing a rising resistance to chloroquine, a synthetic substitute for quinine. Inflation has also contributed to current resource constraints. The fourfold increase in petroleum prices has sent the cost of insecticides skyrocketing. For instance, DDT which cost India \$500 per ton in 1974 now costs \$1,500 per ton. This has placed a burden on the shaky LDC economies, leading some countries to feel that health expenditures in this area were expendable.

The record of past near-successes, the resurgence of infectious, parasitic and respiratory endemic diseases in LDC's, and the budget, manpower and organizational constraints under which local LDC-operated control programs exist has led assistance agencies to consider re-entering the area of endemic and communicable disease control. Health experts, however, remain divided as to the most effective strategy for doing so. Should categorical

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\* Fifth Report on the World Health Situation, 1969-1972. Official Records of the World Health Organization, No. 225, Geneva, 1975.

disease programs be emphasized in and of themselves in order to regain an advantage against diseases, or should the effort be subsumed under a general health care program with concomitant attempts to improve socio-economic conditions?

This is the central question facing agencies as new endemic and communicable disease control programs are envisioned. Based on the major reasons for past program failures, i.e., lack of continuous followup, the answer to the question may be a compromise. To gain once again an upper hand against such diseases, a major, categorical effort may be required for the initial years of the program. Subsequently, however, it is advisable that control measures be integrated into overall health budgeting, manpower training and health infrastructure development as well as into other health programs and socio-economic development projects. Through this strategy, it is felt that the disease control effort can be ongoing and effective.

In Zaire, just such a strategy is proposed for USAID assistance in endemic and communicable diseases. Past malaria, measles and other disease control programs, with a variety of sponsors, were categorical but lacked sufficient followup integration into overall health and development programs.

Health assistance in Zaire for endemic and communicable diseases has changed hands over the years. Under Belgian direction, major endemic diseases came under control. At independence, however, this system disintegrated and has not been adequately replaced. WHO efforts have resulted in considerable success against smallpox. The number of cases has markedly declined with fewer than 100

cases reported each year. As with other LDC's, however, periodic external assistance for endemic disease control has been limited to only a few diseases. A more complete discussion of Zaire's particular endemic and communicable disease problems is contained elsewhere in this project paper.

In summary, the nature of and reasons for past assistance agency involvement in disease control in Zaire has paralleled that in other developing countries. The successful cases of control are far outnumbered by the frustrations. Current resurgence is due to the high cost of control programs as well as a past failure to link such programs to ongoing planning and health service delivery capacities in general.

This proposed project, by including specific outputs both to link endemic and communicable disease control to the health care plans and to train epidemiology specialists for the GOZ, provides both short-term categorical assistance and long-term disease control mechanisms.

The major endemic and communicable diseases in Zaire, as well as the ongoing programs to deal with them, if any, are discussed below.

1. Endemic Diseases

- a. Malaria

Malaria is a major health problem in Zaire and a major cause of morbidity and mortality. Nearly the entire population is affected and re-infection is common; transmission occurs throughout the year and is both urban and rural. High rates

of malaria infection are found in Kinshasa, and it is one of the most common diseases treated at hospitals and clinics in the city. Infection occurs early; about 50% of infants are infected in the first year of life. Three cases of cerebral malaria are diagnosed each week at Mama Yemo Hospital. Plasmodia falciparum is believed to be the most prevalent form of the parasite, with the balance generally Plasmodia vivax.

While there is no accurate data, the main vector of malaria in Kinshasa is believed to be Anopheles gambiae, an especially difficult mosquito to control because of its adaptability to a wide variety of breeding conditions. This vector is apparently still susceptible to DDT and malathion.

Although the Hygiene Service of the City of Kinshasa has conducted some spraying and larviciding operations, its work to date has not been sufficient to appreciably reduce malaria transmission. The medical facilities have been doing a commendable job in providing treatment services for malaria cases, but this has little effect in reducing malaria levels.

In an attempt to form a viable framework for a successful anti-malaria campaign, a Malaria Service has been incorporated within the Department of Health which will be responsible for Malaria Control activities. WHO has agreed to provide technical assistance to a program of malaria control. It is envisaged that this

initial control program in Kinshasa would provide the experience base and model for eventual expansion to other areas.

b. Trypanosomiasis (Sleeping Sickness)

As much as one-third of the Zairian people live in endemic trypanosomiasis regions, heavily infested with tsetse fly, the principal vector of sleeping sickness. Woodland areas bordering lakes, rivers, or streams pose the greatest risk of infection. The principal focus of the disease at present is in the eastern regions of Bas-Zaïre and Equateur, Haute-Zaïre, and the Kasai and Northern Shaba regions with an "at risk" population of some seven million people.

Prior to independence, trypanosomiasis had largely been controlled through the operation by the Belgians of an extensive and vigorous program. Over 500 mobile teams scanned the nation for surveillance, and by 1960 overall prevalence was reduced to approximately 1,000 new cases per year. The breakdown in the health care system following independence led to a complete interruption in the control program between 1960 and 1963. The incidence of the disease rapidly increased, and areas formerly clear were reinfested with the tsetse fly.

In 1964, the anti-trypanosomiasis program was resumed with support by the Fonds Medical Tropical Belge (FOMETRO), a Belgian non-profit organization.

The current program is administered by a Central Office of Trypanosomiasis through an agreement with the Fonds Medical de Coordination (FOMECO) in the office of the President. Operationally, 24 mobile units of 11 men each (all Zairians) cover about 6% of the country visiting each endemic village approximately every six months. There are also two additional itinerant teams in the Bas-Zaire region and a special trypanosomiasis treatment center at Kimpangu along the Angola frontier. Other itinerant teams also operate from a number of government and missionary hospitals. Altogether, less than 25% of the "at risk" population is currently covered by some trypanosomiasis program, yet 20,000 cases have been identified and are under treatment.

Several factors have hampered efforts to regain control of this debilitating disease. These include large-scale reinfestation of many areas with tsetse fly, increasing vector resistance to chemical control measures, patient resistance to treatment methods, substantial population mobility from infected to non-infected areas, and the existence of health carriers. Although the degree of endemicity in terms of new cases is decreasing in many areas, the geographic area affected is expanding and sudden outbreaks occur in areas previously considered free of the disease. Clearly, trypanosomiasis remains a

serious and widespread health problem, and effective control will be difficult.

c. Schistosomiasis

Schistosomiasis is prevalent and may, in fact, be spreading throughout Zaire. This disease is especially endemic in areas close to natural waterways which provide ideal breeding sites for the vector. While the exact national incidence is not known, in the Bas-Zaire region alone it is considered to be the leading cause of morbidity among infectious diseases. In a study of a village near Kimpese, 90% of the children examined between one and 12 years of age were infected with the disease, in both its intestinal and urinary forms.

While the curative aspect of schistosomiasis now focuses on the relatively inexpensive provision of one dose of chemotherapy, the preventive aspect of the disease is an inherently costly one. The institution of a major national campaign against schistosomiasis will require not only medical inputs and the training of a large number of health personnel but, more importantly, a coincident change in many cultural habits of the population (e.g., swimming in areas infested with the vector).

d. Onchocerciasis

Onchocerciasis is endemic, with the major sites being located in the Kasai region, where some villages

have a 100% infection rate, including up to 15% associated blindness.

Created in 1973, the national Onchocerciasis Mission located in the Lusambo region of Kasai, has begun control measures along the length of the Sankuru River. The ongoing Zaire River Expedition, with its team of doctors and scientists, may aid in eradicating the disease by locating breeding sites and identifying the most cost-effective methods of eliminating the vector.

e. Hookworm and Other Intestinal Parasites

Almost all Zairians have some form of intestinal parasite infestation, frequently multiple. Hookworm infection rates are high and undoubtedly contribute to the widespread anemia found in children and pregnant women. Because of the difficulty of attacking this group of diseases without significant improvements in environmental sanitation, particularly sewage disposal systems (a slow and costly process), there is little possibility of reducing the overall incidence of these diseases in the near future. Gains are eventually possible with extension of permanent integrated health delivery systems. In the meantime, recognition and treatment of selected cases with high hookworm infestation and accompanying anemia offer the only realistic approach to reducing deaths and severe disability from these parasites.

f. Dysenteries and Other Diarrheal Diseases

As in the case of intestinal parasites, most of the population suffers from dysentery and other diarrheal disorders. Both amebic and bacillary dysentery are common. There is little hope of reducing these diseases without substantial environmental improvements, notably the provision of potable water, better food sanitation, and proper disposal of feces. None of these is within reach in the foreseeable future. In infants where the death toll from dysenteries is highest, improvements in nutrition will substantially reduce the mortality from these diarrheal diseases, since death usually occurs only in malnourished infants.

g. Yellow Fever

Yellow fever is rare in the country although the Aedesaegypti mosquito vector is present. A suspected outbreak in 1971 in Equateur region was brought under control through the inoculation of an estimated 365,000 persons and strict quarantining of the two diagnosed cases. There have been no known outbreaks since that time. Since the mosquito vector of yellow fever is present in the country, the danger of an outbreak of this disease is omnipresent.

h. Skin Infections

Skin infections are common throughout Zaire, with virtually the entire population affected at one

time or another. One of the most prevalent infections is that caused by the chigger flea. In addition to general pain and discomfort as the flea expands after entering the body, the associated entry of secondary organisms may result in suppuration, tetanus, and/or gangrene. While the feet and the lower legs are the most commonly infected sites, all exposed skin is vulnerable to attack.

Infections caused by fly bites are prevalent, not only in rural areas but in Kinshasa as well. Upon biting, the fly deposits eggs which subsequently hatch, causing the body to be a living breeding site.

Yaws, tropical ulcers, fungus infections, and itch mites are also widespread, although data on exact incidence are not available.

A high prevalence of cutaneous ulcers has been reported in several geographical areas, including Kimpese, Bolobo, Watsa and Kasongo. Although the ulcers, which persist from a few weeks to months, can occur in any age group, they appear to be most prevalent from infancy through 20 years of age. The epidemiology of the disease, including the natural reservoir of transmission to man's skin, is not known and is currently under study. Data collected to date, however, suggest that the disease is neither seasonal nor contagious.

## 2. Communicable Diseases

### a. Measles

Measles is an acute national health problem. Although exact national incidence is difficult to determine because of scant reporting procedures, measles is considered one of the four leading causes of death in children five years of age and younger. Incidence generally peaks during the dry season between June and October, but transmission continues throughout the year.

The severe course of measles in Zaire, leading to excessively high mortality rates, can be attributed to several factors:

- frequent serious post-measles secondary infections, most commonly broncho-pulmonary complications and gastroenteritis;
- patients already weakened by repeated and often multiple infections such as malaria, intestinal parasitism, and diarrheas;
- malnutrition intensified by febrile diarrhea, lack of appetite, fluid loss and dehydration;
- poverty and associated poor living conditions including crowding and lack of basic sanitary facilities;
- delays in obtaining competent medical care because of continued reliance on traditional practitioners and the use of useless and sometimes harmful remedies.

A total of 9,441 cases of measles was reported in Kinshasa in 1973. Local health authorities, however, estimate that actual incidence in the capital is probably closer to 45,000 cases with an overall mortality rate of 6%. The mortality for those children hospital-

ized (the more serious or complicated cases) varies from 15-20%. In the United States only about one child per 100,000 infected with measles dies.

The most recent attempt by the Government of Zaire to control this disease was a citywide mass immunization campaign in Kinshasa in June-July, 1974, which innoculated over 100,000 susceptible children. This effort, however, was not sustained, and a citywide outbreak of measles recurred in 1975 with high mortality. The National Health Council focused its attention on this problem, and the national Smallpox Campaign (CNEV) has been assigned the responsibility to organize and maintain a permanent measles immunization program for Kinshasa and 15 other major urban cities. The GOZ has purchased 600,000 units of measles vaccine, and a preliminary plan has been drawn up to launch this program early in CY 1976 for urban areas. If this initial program is successful, similar programs will be extended to rural areas as health development zones are established.

b. Smallpox

Historically smallpox has been a major problem in Zaire. In the decade prior to independence, a total of 32,793 cases was registered with an average annual incidence of over 3,000 cases. With the breakdown of health services following independence, the incidence of smallpox rose rapidly with epidemics

occurring throughout the country and with the loss of tens of thousands of lives.

In 1967, the Government of Zaire attached highest priority to eradication of smallpox. A campaign was organized to immunize the entire population in four years. It started in March, 1968 and reached this objective in July, 1971, five months before the target date. In total, 24,346,418 vaccinations were given. In August, 1971, the control operations were cut back to 11 mobile surveillance teams which have maintained a high level of smallpox vaccination in the population. Despite numerous epidemiological surveys, no confirmed cases of smallpox have been found since August, 1971.

This eminently successful program was directed and executed by the Compagne Nationale de l'Eradication de la Variole (CNEV), an operational unit in the Department of Health with substantial WHO technical and material assistance. With smallpox apparently "eradicated" in the country, and no longer a serious threat to the health of the people, the vestige of this experienced organization is available for the control of other diseases susceptible to mass immunization techniques.

c. Tuberculosis

While precise data on the prevalence of tuberculosis is not available, it is common throughout

Zaire and is a very serious health problem. All forms of acute tuberculosis in early life, including tubercular meningitis and tubercular pneumonia, are regularly seen in clinical practice. Poverty, under-nutrition, crowded housing, and poor sanitary facilities are important underlying factors in the occurrence and spread of the disease. Treatment facilities are grossly inadequate to care for the large numbers of cases. Antituberculosis measures are necessarily based on BCG vaccination and, to a lesser extent, on ambulatory drug treatment and follow-up.

The campaign against smallpox was the major vehicle for tuberculosis control. Between March, 1968 and July, 1971, this combined program reportedly administered 11,356,928 BCG immunizations. The maintenance of BCG immunization in the subsequently born population has been incomplete and tuberculosis continues to be prevalent, notably in overcrowded urban centers. Because of the deep-rooted socio-economic causes of tuberculosis, significant sustained reduction in this disease must be accompanied by improvements in income, nutrition, environmental sanitation, and general living standards. Effective control will also require an effective local level health delivery system.

d. Typhoid Fever

Typhoid fever is widespread with occasional

epidemics throughout Zaire. Although reporting of typhoid and paratyphoid fever is mandatory, official data on incidence are greatly under-reported. Highest incidence levels occur during the dry season when water levels are low. During the Belgian colonial administration, all government workers were required to be inoculated against this disease and the infection rate decreased. The breakdown in the preventive care system in the post-independence period, however, resulted in an increased incidence of this disease.

e. Leprosy

The exact prevalence and incidence of leprosy is unknown, although in the early 1970's the Ministry of Health reported 400,000 existing cases. In the mid-1960's there were a reported twenty to thirty thousand new cases annually, or an infection rate of approximately 1,500 - 2,000 per million population. The Equateur and Oriental regions of the country have traditionally been the highest areas of prevalence.

Current programs in leprosy are centered in a special office of the Department of Public Health to treat known cases, to locate and treat new cases and to collect medical statistics on the nationwide incidence. In accordance with new international knowledge and understanding of this disease, most patients are now dealt with on an outpatient basis and only the most severe cases are hospitalized.

f. Other Communicable Diseases

Venereal disease, notably gonorrhea, is reaching epidemic proportions and can be viewed as a major cause of the abnormally high rate of sterility among Zairian women. At Mama Yemo hospital alone approximately one-third of the women are sterile due to venereal disease. In addition, there is an empirical but undocumented impression that the gonorrhea organism is becoming resistant to penicillin.

Meningococcal meningitis (type unknown) is widespread on the northern borders. In the same way, although encephalitis is reportable, there is no information regarding precise etiology. Influenza is reported with great frequency but there is similarly no information regarding strain or type of disease.

## OVERVIEW

Zaire has almost unsurmountable health problems associated with endemic and communicable diseases. To date, with the exception of a successful small pox eradication campaign, little progress has been made in preventing or checking the spread of these diseases. The accompanying tables summarize the present status of the most serious diseases including the salient factors which will influence the outcome of any attempted control program.

The seriousness of Zaire's health problems are indicated by the fact that, of the ten major endemic and communicable diseases, one (small pox) is fully under control; three (trypanosomiasis and malaria and measles) are probably susceptible to control with reasonable favorable outlook for at least limited success; the other diseases offer little chance for success under present conditions except that perhaps a greater effort for vaccination with BCG would slowly produce gains in the control of tuberculosis. There is a tremendous immediate need for good epidemiological studies and well-executed action-oriented research related to the actual and potentially very grave problems created by schistosomiasis and onchocerciasis and on the recent changing trends in patterns of trypanosomiasis.

With the plethora of endemic and communicable disease problems, and the limited measures and resources available to combat them, it is indeed difficult to design a project in disease control which is, on one hand, broad enough to make substantial impact towards building a general institutionalized

capability for control of endemic diseases, while at the same time being specific enough to provide the stimulus, encouragement and action-based experience that can only come from field oriented specific disease control campaigns. Our decision in this respect is to approach the overall problem through two types of programs:

1. A malaria control model program to develop the experience base, cadre and general organized capability for the control of a vector-borne disease. This institutionalized capability could be developed as the eventual direction for control of other endemic, vector-borne diseases.

2. To support an attack on measles by immunization techniques, and build and extend this capability to other communicable diseases susceptible to control by mass immunization. Included in this communicable disease effort will be the establishment of an epidemiological and data systems capability in the Department of Health. This will provide a basis for sound evaluation for disease control programs as well initiate and coordinate efforts to clarify the patterns and trends of endemic diseases.

DISEASE	MAIN CONTROL MEASURES	STATUS OF APPROPRIATE CONTROL ORGANIZATION	DONOR SUPPORT AVAILABLE	LIKELIHOOD OF SUCCESSFUL CONTROL	COMMENT
Malaria	1.Reducing breeding sites of mosquitoes by drainage, landfills, clean up of areas, etc. 2.Insecticides: for larvicides, area spraying, intra-domicillary spraying. 3.Drug prophylaxis. 4.Detection and treatment of cases.	1.Limited, less than effective, control activities being carried out in Kinshasa. 2.National Commission of malaria established. 3.New malaria service created in Dept.Health and new director appointed.	WHO/Zaire WHO/Regional Office,Brazzaville UNDP	1.Favorable for control in limited areas. 2.Country-wide control unlikely foreseeable future 3.Eradication impossible.	1.GOZ considers as high priority. 2.No known insecticide resistance in mosquito. 3.No known drug resistance in humans.
Trypanosomiasis (Sleeping disease)	1.Control of tsetse fly by chemical spraying, reducing breeding sites. 2.Sanitary legislation and enforcement. 3.Detection and treatment of cases. 4.Follow-up and surveillance.	1.Central office of Trypanosomiasis established under FOMETRO. 2.24 control teams under FOMETRO cover 6% of country. 3.Other itinerant teams working from government and missionary hospitals.	FONDS Medical Tropical, Belge (FOMETRO)	1.Favorable for control in limited areas. 2.Unfavorable for country-wide control.	1.GOZ considers as high priority. 2.Some fly resistance to insecticides. 3.Some drug resistance 4.Serious population improvement problems.
Onchocerciasis (River blindness)	1.Control of fly vectors by insecticides. 2.Detection and treatment of cases. 3.Sanitary legislation & enforcement.	Natl.Onchocerciasis Mission of Dept. of Health established at Lusambo Kasai Region-heavily infested area.	Zaire River Expedition. Foreign scientists assessing problem and to recommend control measures.	UNKNOWN No efficient control measure. Some areas up to 100% infected - 15% blindness.	Treatment generally unsatisfactory.

DISEASE	MAIN CONTROL MEASURES	STATUS OF APPROPRIATE CONTROL ORGANIZATION	DONOR SUPPORT AVAILABLE	LIKELIHOOD OF SUCCESSFUL CONTROL	COMMENT
Schistosomiasis (Bilharziasis)	1. Control of snail breeding in waterways. 2. Personal protection by not bathing in infested waters 3. Treatment of cases	Requires well-developed permanent integrated health delivery system at local level.	None	Unlikely. Present control measures inadequate. Requires major change in cultural habits.	1. Needs more research and assessment. 2. Drug treatment toxic. Sometimes dangerous.
Hookworm and other intestinal parasites	1. Sanitary improvements in food, water supplies and sewage disposal. 2. Shoes. 3. Better personal hygiene. 4. Sanitary legislation and enforcement.	Same	WHO UNDP ? WORLD BANK?  Needs large grants or loans for sanitary facilities.	Very unlikely because: 1. Requires major change in cultural habits. 2. High investment costs in sanitary facilities.	Interim measures:  Treatment of selected small children and pregnant mothers with high wormload and anemia.
Dysenteries and diarrhea	Same as above except "shoes" not applicable.	Same	Same	Same	Interim measure:  Concentrate on improving nutrition - 6 months - 3 years age group.
Typhoid and Paratyphoid fevers	Same as above and immunization of population.	None  Immunization programs can be done by mobile teams as emergency measures. Maintenance requires local health delivery systems.	Same	Unlikely	Interim measure: Epidemiological surveillance. Immunization in areas of high endemicity.

DISEASE	MAIN CONTROL MEASURES	STATUS OF APPROPRIATE CONTROL ORGANIZATION	DONOR SUPPORT AVAILABLE	LIKELIHOOD OF SUCCESSFUL CONTROL	COMMENT
Tuberculosis	1. BCG vaccination of newborns and children. 2. Case detection, treatment and follow-up - mainly ambulatory. 3. General measures that improve nutrition standards of living & general well being.	Campaign for eradication of small pox did massive BCG vaccination program 1968-71. Impetus not maintained - needs more organized efforts and cooperation various in-country health care units.	WHO	Slow improvements possible, but substantial control unlikely in foreseeable future.	The BCG immunization program must be revitalized on large basis.
Small Pox	1. Vaccination 2. Surveillance	Has residual 12 teams, from massive campaign completed 1971 by CNEV (Campagne National de l'Eradication de la Virole)	WHO	Small pox essentially eradicated.	This capability could be assigned new work.
Measles	1. Immunization 2. Treatment of severe cases & complications.	Organization structure & field team of CNEV could expand into measles control & perhaps later incorporate other immunization programs.	None presently. Communicable Disease Center (CDC) of Atlanta helped in this area previously.	Favorable	GOZ assigned responsibility for measles control to Director CNEV late 1975.
Other Diseases. Skin conditions, leprosy, diabetes, hypertension, Cancer of liver.	Varied. Needs epidemiological studies and more definitive assessment.	Needs integrated health delivery system.	Medical universities, Research foundations.	Unknown	These conditions are of particular interest to clinicians.

## B. Detailed Description

The design framework for the project has already been presented in Part I (C)--Description of the Project, which sets forth the project's goal, purpose, outputs and inputs, as well as end of project status with targets and indicators. This section amplifies on this frame and offers more detail on how the project will be implemented. For ease of description, project activities for endemic and communicable disease control, will be described separately.

### MALARIA AND ENDEMIC DISEASE CONTROL

As discussed previously, malaria control will be the pilot activity for establishing a vector-borne endemic disease control capability in Zaire.

1. Preparatory Phase consisting of baseline studies, assessment of the problem and formulation of an initial Plan of Operations.

2. Attack phase involving implementation of actual control measures in accordance with the Plan of Operations. Progress during this phase will be evaluated periodically (probably annually) by joint external assessment with representation from the GOZ, WHO and AID. Plan of Operations will be modified according to findings and recommendations resulting from periodic external assessments.

The preparatory phase is a fundamental part of any malaria control and involves the collection of the baseline data and studies without which sound realistic planning and effective operations cannot take place. In Kinshasa, the following types of data should be collected:

a. Concerning the vector -

(1) Determination of the primary and secondary vectors -- which species of anopheles are involved and to what degree under varying conditions.

(2) The breeding and biting habits of the principle vectors.

(3) The susceptibility of the vector (both larval forms and adults) to control measures. The comparative applicability, efficacy and practicability of such techniques as residual domicillary spraying, use of larvicides, sanitary measures including drainage, land fills, clean up of container breeding sites, etc.

b. Concerning the malaria parasite -

(1) Types of plasmodia present and relative importance of each.

(2) Susceptibility to drug treatment and suppressive regimes.

c. Concerning the human host -

(1) Prevalence of human infection by age groups, geographic areas and occupational groups as determined by malariometric survey using blood smear examination of an appropriate random sample of the population.

(2) Living, working and movement patterns of the people.

(3) Migrative patterns of the population.

(4) Incidence of malaria disease from available data on morbidity and mortality.

d. Concerning the environment -

(1) Types of dwelling; suitability for intra-domicillary spraying; average size; measures taken for individual protection; screening; use of mosquito netting, etc.

(2) Mapping of houses, methods of identification and marking, adequacy of existing house identification and location under the civil cadastral system.

(3) Identification of major breeding areas and applicability of sanitary engineering measures as a means to reduce major breeding sites.

Based on the findings obtained from the baseline data, the initial Plan of Operations will be drawn up which will include:

1. Selection of control measures to be applied in different areas of the city and in different population groups.

2. Detailed scope of work to be performed in terms of quantities of each type of activity and time scheduling, e.g., number of houses to be sprayed in each year, number of sanitary measures in a certain time, breeding sites for larvacide treatment, number of people on suppressive drugs, etc.

3. Allocation of resources in terms of manpower, vehicles, supplies, equipment and operating funds.

The baseline data gathering and problem assessment will be done by the WHO regional malaria team that is stationed in Brazzaville. This team is composed of:

- Malariologist
- Entomologist
- Sanitary engineer

-- Statistician

This team is experienced in performing such studies. The WHO representative in Kinshasa and the head of WHO's Malaria Control Section in Geneva are aware of Zaire's interest in developing a malaria control program. They require a specific request from the GOZ asking for the services of the Brazzaville team. Given the magnitude of the malaria problem in Kinshasa, and the urgency to begin the malaria control project, it is imperative that the baseline study and assessment be initiated at once.

Most baseline surveys and assessments take approximately 9-12 months to complete. Every effort should be made to compress this time frame. Since some information about the vector and the host has already been collected by previous (but incomplete) studies, it should be possible for the WHO team to have its recommendations completed earlier, hopefully by February or March of 1977.

In the meantime, some aspects of the action program can be initiated, even while the baseline studies are underway. These steps will include:

- development of the project organization;
- identification of project facilities;
- development of project procedures (e.g., personnel policies, management procedures);
- training of personnel (e.g., microscopists, mosquito collectors);
- initiation of community education and public relations program;

- development of a supply distribution network, including procedures and vehicle maintenance;
- ordering of commodities on the basis of preliminary estimates of needs.

Two USAID technicians (one for malaria field operations and the second, short-term in the first year, for logistics, vehicle and equipment maintenance, and management) should arrive by the autumn of 1976. They will assist with finalizing the Plan of Operations and complete other preliminary arrangements to initiate the attack phase by early CY 1977. They will collaborate their work with the WHO malaria advisor who is already in-country.

#### MEASLES AND COMMUNICABLE DISEASE CONTROL

As described earlier, the measles control program will be a three-year project, for reinforcing the communicable disease control and immunization planning and implementation capacity begun by Zaire's smallpox campaign. This program activity is deemed of great importance for four reasons:

- measles is currently an emergency problem of pandemic proportions in urban areas of Zaire;
- since the smallpox immunization campaign has nearly eradicated that disease in Zaire, the measles program will serve to renew and reinforce the communicable disease control capacities of the CNEV
- by covering 15 major urban areas, the program will initiate planning for the decentralization of communicable disease control in the health zones currently being established;

-- the program will maximize the willingness of the GOZ to contribute, financially and organizationally, to an immediate effort to control the current measles outbreak.

This program activity, then, will focus on measles due both to the disease's current importance as well as to the applicability of the control capability in other communicable diseases and in the planned health zones.

The Director of the Campagne Nationale de l'Eradication de la Variole (CNEV), Dr. Kalisa, has been given responsibility for organizing and execution of the measles control activities in this project.

The CNEV organization already has 12 mobile teams stationed in 12 major cities of Zaire. These existing teams will cover the 15 major urban areas: Kikwit, Bandundu, Matadi, Kananga, Mbandaka, Lisala, Isiro, Kisangani, Mbusimayi, Kamina, Bukavu, Likasi, Kindu, Lumbumbashi and Gemena. The estimated population for these areas is 2.6 million.

The CNEV already has personnel assigned to these teams and team supervisors. It also has administrative and logistics personnel and central headquarters in Kinshasa. Freezer storage space for vaccine storage is already located at Kinshasa and at each of the 12 major urban areas. Experienced personnel are available for reception, storage, and regular distribution of vaccines. Vaccine distribution to local areas will be by air by Zaire National Airways. Daily radio contact is already available from national headquarters to the 12 urban centers in order to coordinate vaccine shipments and pick-up.

The Regional (or in some cases Sub-Regional) Medical Inspector of the Department of Health will be responsible for the planning, implementing, and evaluating of the program in areas outside of Kinshasa.\* He will plan and conduct the necessary publicity campaign, coordinate the flow of supplies, and follow up on progress of the program. This will be done under central direction of the Office of Director of CNEV and in collaboration with the CNEV supervisor in each area.

Four new teams will be established for the Kinshasa area each consisting of two vaccinators and one chauffeur. The operations in Kinshasa will be directed and supervised by the central staff of CNEV at the headquarters area in Kinshasa. Four older vehicles are being reconditioned for assignment to these new teams. USAID on first tranche of commodities will provide additional input such as refrigeration, ped-o-jets, etc.

In CY 1976, the program aims to immunize all children in these geographic areas in age group 6-36 months. The estimated total children of this age in the target area is 585,000. The GOZ has 600,000 of measles vaccine on hand which is enough to cover the first operational year. Samples of this vaccine have been sent to the Communicable Disease Center laboratories in Atlanta for viability/potency tests.

In subsequent years, the project will immunize all unimmunized children 6-18 months and maintain measles immunization in this

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\*As described later in this section, CDC experts will also be available to assist in program evaluation.

group thereafter. It is estimated that this will require approximately 300,000 measles immunizations per year after completion of the first round in 1976.

The Center for Disease Control (CDC) has been involved in planning activities for this measles program. In January of 1976 a CDC consultant developed an evaluation plan for the measles control activity which provides for four aspects of project assessments. These include:

- plans for an attempt to improve the surveillance system regarding mortality and morbidity attributable to measles;
- plans for coverage assessment teams of one or two persons in Kinshasa to periodically determine, within particular target age groups, the number of children with completed vaccination records;
- plans for evaluating the immunizing capability of the program, a function which includes:
  - 1) evaluation of vaccine quality. Samples of the vaccine may be sent to CDC for evaluation at four points in time:
    - a) the arrival of a new shipment from the manufacturer;
    - b) before the expiration date of a particular lot (e.g., samples of the remainder of a lot with a twelve-month expiration will be sent for evaluation after the 10 months

to determine the quality of the remaining vaccine).

c) on a random basis when vaccine has been returned unused from the field (estimated 20-25 vials to be treated per year).

2) periodic serologic testing of children to determine if the vaccine renders the recipients immune;

-- plans for evaluating the operational/management components of the project including budget, training and supervision.

These plans involve training CNEV staff in evaluation techniques as well as carrying out evaluations in the initial years of the project. CDC has also suggested an annual, independent evaluation requiring two man-months per year of CNEV staff time. This evaluation would focus on management questions and serologic testing.

It is anticipated that the CDC involvement could be handled through the short-term technical assistance in this project.

The epidemiologist to be provided by USAID beginning in July-August, 1976 (see next section) will assist in monitoring the measles control program. In addition to assisting in training a Zairian epidemiological corps, the USAID epidemiologist will:

1. Monitor seasonal occurrences of measles in each region in an effort to plan vaccination programs for peak risk seasons;

2. Analyze data on the occurrence of other rash-producing diseases to identify other viral diseases that produce higher morbidity/mortality among children;
3. Provide data analysis assistance in assessing the effectiveness of the program;
4. Through analyzing reporting data, provide assistance in identifying those geographical areas and/or age groups where re-vaccination is appropriate.

Once the measles vaccination program is functioning well, it is anticipated that other immunization programs can be added to this capability (e.g., polio, BCG, DPT, typhoid).

This established national organization could also support the extension of mass immunization programs to the health development zones.

As part of the measles/communicable diseases efforts, USAID beginning in August of 1976, will provide one epidemiologist to work with the National Health Council and the Department of Health to develop a GOZ capability in epidemiology. The epidemiologist will monitor progress in the disease control program for measles, but will also assist the Department of Health in organizing and developing its overall capability in the epidemiology of other serious endemic diseases.

Additionally, the epidemiologist will concentrate on development of a professional cadre of Zairians capable of independently

carrying on epidemiology services in monitoring endemic diseases and advising on measures for their control. This will be done by a program of both short-term in-service training and long-term participant training.

In addition, a data system design specialist will ensure that data is collected and stored in a retrievable fashion. This data will include:

- monthly reports from urban administration zones, Department of Health facilities, from the four inpatient facilities in Kinshasa (Clinic Kinshasa, Mama Yemo Hospital, Kintombo Hospital, University Clinic) and from major hospitals and clinics in other target cities;
- trend analyses of morbidity and mortality as indicated in the above reports;
- data from random sampling and surveillance systems.

The activities of this systems design expert will be applicable not only to measles and communicable diseases, but also to other health data gathered by the Department of Health.

PART III - PROJECT ANALYSIS

A. Technical Analysis Including Environmental Assessment

1. Appropriateness of the Project in Terms of Timing and Location

The five-year National Health Plan (1975-1980) for the Republic of Zaire set the following general objectives to be accomplished before the end of 1979 in certain selected areas.

1. The reduction of infant mortality to less than 50 deaths per 1,000 live births per year (presently 150+).
2. The reduction of deaths in young children (1-4 years) to less than 100 deaths per 1,000 infants in the age group per year (presently estimated at 300-350).
3. The reduction in maternal mortality to less than 5 per 10,000 live births per year (now 10 in Kinshasa, 20 in rural areas; U.S. is about 2.5).

Recognizing the large influence of acute-communicable diseases in the excessive deaths of infants and young children, the five-year plan stresses the importance of preventive health services and in Chapter 5, "Endemic Diseases," sets the following national objectives in respect to the control of endemic diseases:

1. "By the end of 1976, to complete the studies necessary to draw up a national plan for control of tuberculosis, measles, malaria, leprosy, trypanosomiasis, schistosomiasis, goiter and the

complete eradication of small pox in Zaire."

2. "To initiate control programs against these endemic diseases in all rural and urban development zones."

The plan of action to implement these objectives provides for the formation of a commission under the auspices of the National Health Council "to study the problem of the serious endemic diseases in Zaire and to define a detailed plan of control against these diseases."

In respect to malaria, WHO has set the following targets for Africa up to 1980:

1. To protect 70 percent of the urban population in the affected countries of the region (67.8 million inhabitants out of an estimated 97.6 million inhabitants) by mosquito control and malaria treatment facilities.
2. To protect all children aged 0-14 by means of chloroquine prophylaxis.
3. To protect all pregnant women by chemo prophylaxis.

In 1975 the Manifesto of the Health and Welfare of the People of Zaire (an official policy paper of the National Health Council) recognized that 75% of all morbidity in Zaire derives from ten major causes (includes: malaria, tuberculosis, measles, trypanosomiasis, schistosomiasis, hookworm and intestinal parasites,

veneral diseases, leprosy, goiter and road accidents). The policy paper of the NHC gave priority to "unborn babies, pre-school age children, and their mothers" and further stated that: "for them (as well as for all the other population groups), the National Health Council will take the necessary action to lower the incidence of diseases - especially those diseases which are known to be preventable and which are responsible for 75% of the morbidity."

As stated at the onset of this paper, the National Health Council has specifically asked USAID/Zaire for assistance for the control of endemic and communicable diseases.

## 2. Suitableness of Technology for Needs of Problem and Area

Malaria: techniques for malaria control in the Kinshasa region will be specifically adapted to the needs and problems of the area, as these are defined and quantified in the initial base-line data survey. After study and analysis of this base information, a Plan of Operations for the first three years will be drawn up (with technical participation by WHO and AID technical staff).

It is anticipated that no single malaria control technique will be suitable or practicable for all areas of the Kinshasa Region nor for all groups of the population. Residual domiciliary spraying will not, for example, be a generally acceptable methodology for control in the higher income residential areas where homes are substantial and house furnishings and interior decor

are elaborate. Here reduction of mosquito breeding sites, individual chemo prophylaxis and possibly ultra-low volume (ULV) spraying of malathion to reduce the numbers of adult mosquitoes, would probably be alternative methodologies. In poorer, crowded areas with small basic houses and minimum furniture intra-dormicillary spraying may be appropriate probably in combination with reduction in breeding sites by drainage, fills, cleanups and larvicidal methods. Consideration will also be given to chemo prophylaxis with chloroquine for certain groups, e.g., soldiers and their dependents, young children and pregnant women.

Measles: methodology and techniques for measles control by mass immunization of young children are well established. Many such programs have been successfully carried out in Africa under AID's assistance programs. The Communicable Disease Control Center (CDC) at Atlanta, Georgia, an organization of the United States Public Health Service, has been involved in many of these programs and has provided technical assistance to the recent 1974 measles immunization campaign in Kinshasa.

The main problems encountered in measles immunization programs concern organization, management, logistics and transport. The problems concerned with continuity of the cold transport chain and the need for repeated checks on potency and viability of the live virus vaccine are well known and are anticipated.

As described earlier, CDC has suggested an extensive and ongoing measles data collection system and evaluation procedures. These suggestions will provide pre-determined benchmarks as checks on program methods and progress.

In sum, special emphasis has been given to the question of suitability of the technology used in this project. The project has built-in base-line assessment and periodic evaluation to assure appropriateness of techniques and to provide opportunity for modification of methodology depending on progress and results.

3. Suitability of Project Technology for Replication and Diffusion

Malaria: The project's malaria control activities are first concentrated on Kinshasa city and environs with later extension to a nearby rural area. The techniques used will be varied and adapted to conditions in different parts of the city. Since some of the methodology is designed for application in an urban, well built up area, these special techniques are suitable only for similar urban areas. This is not a serious limitation since most urban centers in Zaire are malarious, and with urban population increasing at about 11% per year, Zaire will (unless this trend is reversed) become relatively more urbanized in the future.

In a later phase, malaria control will be extended to an accessible rural area not too far from Kinshasa. The methodology and technology developed in this more rural environment should be more suitable for replication and diffusion through rural areas of Zaire.

However, further expansion into rural areas will require further technology changes, approximately one-third of Zaire has only two inhabitants per square kilometer, half of geographical area less than five per square kilometer, and nearly three-fourths

of country less than ten inhabitants per square kilometer. Poor roads, transportation, and communication networks would make malaria control extremely difficult and probably not feasible in these sparsely populated areas. Therefore, malaria control in foreseeable future could only be extended to those areas characterized by manageable geographic environment. This does not negate rationale of attempting malaria control in more populous areas that have high economic and political importance to the country. This third stage of integration of malaria into local health services important and more specifics must be developed in collaboration with Health Systems Development Project (057) and basic family health project (067).

The techniques and methodology used in the immunization program are designed for larger urban centers with a fairly high concentration of population. The cost effectiveness and overall efficiency of mobile immunization teams is higher for city areas where larger number of children can be gathered for each team site visit. In more rural areas the technique of multi-purpose mobile team linked with fixed site health posts may be more efficient than single purpose immunization teams.

Regardless of these operational details, the development of the overall capability to design, organize and carry out major disease control programs involving vector control and mass immunization programs should be widely applicable throughout the country.

The extension of disease control programs to the National Health Zones will provide the means to further test and adapt

the early general techniques to specific conditions in these zones. The technical assistance and training provided in epidemiology will create the professional competence and direction needed to define local problems and conditions and to modify control techniques appropriately as needed.

#### 4. Host Country Capability

GOZ's capability to administer and implement this project has been discussed in previous sections of this paper. It will be further discussed in part 4A. It is USAID/Zaire's judgement that this capability is reasonably adequate and will improve with the assistance provided within this project and in the provided by the Health System Development Project No. 660-057 and the Basic Family Health Project No. 660-067 - both of which are aimed at the long-range development of the GOZ's general health capability and infrastructure.

#### 5. ENVIRONMENTAL ASSESSMENT

##### Background

The potential environmental hazards from a malaria control program are limited to the storage, handling and application of chemical insecticides and to effects of the slow biodegradability of some of these insecticides and their consequent ecological magnification in food-chain organisms.

The two principle insecticides that are planned to be used in the Zaire Malaria Control Program are DDT and Malathion. Of these, DDT has been widely criticized and its use limited in the United States to specific agricultural pests and the USPHS

certified health emergencies. Malathion, an organophosphorus compound, is more biodegradable than DDT and is considered a safe insecticide for mass spraying campaigns if normal precautions are observed.

In 1971 the Director General of the World Health Organization emphasized the continuing importance of DDT in operations against malaria. Excerpts from his report appeared in the WHO Chronicle of May 1971 and portions are quoted below:

"The safety record of DDT for man is remarkable.

At the height of its production over 400,000 tons per year were used for agriculture, forestry, public health, and other purposes, all involving some human contact. For typhus control whole populations have had 10% DDT powder blown into their clothing as they wore it. For malaria control, millions of men, women, and children have had the interior walls of their homes sprayed year after year, in some places for more than 20 years. For the control of yellow fever, DDT has been added directly to drinking water. For food protection, many plants and animals eaten by man have been sprayed with this insecticide.

Yet, in spite of the prolonged exposure of the population of the world and the heavy occupational exposure of a substantial number of people, the only confirmed injurious effects have been from massive accidental or suicidal ingestion.

Dosage of DDT hundred of times greater than those encountered by the general population have been tolerated by volunteers for more than a year and by workers for as long as DDT factories have existed, that is, for about a quarter of the human life span. Over 150 persons with heavy and prolonged occupational exposure to DDT have been studied exhaustively without any other than the predictable finding, that is, increased storage and excretion of DDT and its metabolites and a mild stimulation of the microsomal enzymes of the liver. The storage of DDT in heavily exposed workers is about 40 times that in the general population, reflecting (because of increased excretion at higher intakes) over 500 times the dosage.

Those who oppose the use of DDT suggest that it may present a hazard as a carcinogen and a mutagen. The experimental evidence in rodents that DDT, even in massive doses, has such an effect is inconsistent. In the light of the health record of the people most heavily exposed to it, there is no reason to believe that the millions of people protected against vector-borne diseases are at any risk from their small exposure to DDT.

The presence of DDT in the environment during the past 25 years is believed to have produced two serious effects. The first is the contamination of streams, lakes, and offshore areas and the reduction of the fish population. The second is the progressive extermination of certain predatory birds. But whereas damage to wildlife has sometimes followed the use of DDT in agriculture and forestry, the same risks do not accompany the use of DDT in

anti-malaria operations. Since most of the DDT used in the control of malaria is applied as a residual spray indoors, only a small fraction of the insecticide is likely to involve any direct contamination of the environment.

It has therefore become important to review objectively the issues at stake. Any risks involved in continuing the use of DDT in certain public health programs need to be evaluated as fully as possible, and every opportunity must be taken to reduce unnecessary input of DDT into the environment. In doing this, it is necessary to bear in mind that operations against vector borne diseases, particularly malaria, must be continued by some method that is within the financial and the logistic ability of countries in the tropics.

#### The Situation in Zaire

Long term experience in Africa with insecticides has shown that there is little risk to the general population from the use of DDT, the most persistent of the synthetic insecticides in malaria control and eradication programs, and that application of insecticides to the interior and surface of houses poses little danger to fish and wild life. Because of increasing resistance of the vector mosquitos to DDT and other chlorinated hydrocarbons, which have been noted in other parts of Africa, i.e. Togo, Senegal, Sudan, Zaire will have to depend more and more on other, more expensive but safer, residual insecticides such as malathion. Thus the small risks to the population and to fish and wild life associated with DDT in a malaria program should decrease even further. However,

the level of resistance to DDT of Anopheles gambia in Kinshasa is not presently considered a problem and DDT will be the insecticide of choice.

The segment of the population that is at relatively greater risk in a malaria program are the spray men, who are subjected to prolonged exposure daily for many consecutive weeks during the spraying season. There is no evidence in other parts of the world that this degree of exposure will produce any detectable effects. At the peak of Zaire's program there will be several hundred spraymen, most of whom will be hired locally for each spraying season. Some, but not many will return for work in subsequent seasons. Thus while their exposure during any one spraying season may be relatively more severe than that of the general population the overall level of exposure will be low. The risks to the spray men will also decrease with the use of malathion. While the threshold limit value (amount permissible in the atmosphere) for DDT is 1.0 milligram per cubic meter ( $\text{mg}/\text{m}^3$ ), it is 15  $\text{mg}/\text{m}^3$  for malathion. Concentrations of malathion observed in work areas in other cooperating malaria programs are in the range of 0.1 to 0.6  $\text{mg}/\text{m}^3$ .

Another method of vector control not normally a part of a malaria control program but is being considered for use in urban areas such as Kinshasa, is the ultra low volume (ULV) spraying of malathion into the atmosphere to reduce the numbers of mosquitos. The technique involved the dispersal from special air or ground equipment of fine liquid particles of pesticide concentrates containing 90% or more of active ingredients at application rates

of one litre or less per hectare. GOZ is aware of the high concentrations of pesticides being considered for this application and will demand special care in dealing with spills and leaks from equipment and will set up special training courses for operators to ensure high standards of operation and maintenance. Although people in the community are inevitably exposed to falling particles of pesticide outdoors or sometimes even inside rooms, it has been calculated that this exposure is not significant. The WHO Expert Committee on Insecticides in its Twentieth Report (1973) on the Safe use of Insecticides, concludes "The Committee considered that insecticides of a toxicity similar to, or less than, that of fenitrothion could be used in such applications, even if repeated regularly at intervals of 2-4 weeks, without exposing applicators or those in the sprayed areas to any toxic hazard from the insecticides." Since malathion is less toxic than fenitrothion, its use in ULV applications is considered safe. The use of the ULV technique will not be carried out until the latter part of the project and only after pilot studies on its usefulness.

Thus it may be concluded that the risks involved from the use of chemical insecticides in the proposed Malaria Control Program will be low and will decrease even further with the shift from DDT to malathion.

There are other methods of vector control, particularly for urban areas, which are being considered for this program. Included are three methods of control of the vector in the larval stage application of oil, or oil and insecticides, to breeding areas, draining and filling of low lying areas, and the introduction of

larvivorous fish.

The first two methods present few, if any, environmental hazards, in the amounts used for larval control, and should improve the environment by reducing the numbers of nuisance as well as malarial mosquitos. It is now planned that source reduction and water management will be major work activities in the Zaire program.

The introduction of an larvivorous fish poses no known danger to human beings. It may, however, pose a serious danger to local, native fish, both small and large. Before deciding to bring a new species, malaria experts and other scientists will study the problem and explore first the possibility of finding a small larvivorous native fish that might be effective in controlling mosquito larvae. If none is available, the decision whether or not to introduce a new species will be based on all relevant ecological factors, including a consideration whether the net mostquito reduction is likely to occur will be sufficient to warrant the risk to existing fish.

#### Alternative Strategies

There have been significant recent developments in the use of biological agents such as nematodes, fungi, protozoa, bacteria, and viruses as alternate methods of insect control. The potential hazards of such methods are not discussed here since it is unlikely that they will be sufficiently tested and approved in time for use in Zaire during the life of this project.

Another alternative, of course, would be to decide to do nothing or to defer action until later, either on economic or environmental grounds. The establishment of this project is a clear indication that the GOZ desires to organize and operate a malaria project and is prepared to support that effect.

### Conclusion

The net effect of the proposed Zaire Malaria Control Program on human health and the environment in the broad sense is positive. Any possible risks are greatly outweighed by the benefits arising from properly controlled use of insecticides in the program.

6. CONCLUSION

It is the conclusion of USAID/Zaire that the project described in this paper is technically sound and its objectives can be reached.

B. FINANCIAL ANALYSIS AND PLAN

1. Financial Rate of Return/Viability

Measles Control Program

The life-of-project (3 yrs) USAID costs for the proposed Measles Control Program are summarized below:

TABLE I

MEASLES CONTROL PROGRAM

TOTAL USAID COSTS ALL YEARS

U.S. \$'000

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>TOTAL</u>
Capital	68*	15*	-	83
Expenditures				
Operating Costs	<u>185</u>	<u>206</u>	<u>204</u>	<u>595</u>
TOTAL COSTS	253	221	204	678

\*Initial Expenditures include: vehicles (if necessary) PED-O-JET Injectors, Bull Horns and other minor imported equipment.

Cost effective analysis compares estimated expenditures for (1) medical treatment of measles cases with (2) cost of Measles Control Program plus cost of medical treatment of measles cases at reduced incidence (due to beneficial effects of immunization program).

Cost of Medical CARE Without Control Program

a. Estimate of Measles Incidence

Annual incidence of measles in Kinshasa and 15 other urban areas (population 4.6 million) estimated to be (1975) between 100,000 - 140,000 cases. Cost effectiveness is tested for sensitivity at three incidence levels: (1) 100,000 cases/yr. (2) 120,000/yr. (3) 140,000/yr.

Basis for Estimate: GOZ Department of Health official estimates for 1974 of total country incidence of measles: 720,000 cases and for Kinshasa City: 45,000 cases.

Population Program Area (4.6m)	Expected Annual Measles
<hr/>	<hr/>
Total Population Zaire (22 m)	= Incidence in Program Area
	Total Measles Zaire 1974
	(720,000)

Expected Measles Incidence Program Area 105,000 cases. Above calculation valid if measles occurrence is evenly distributed throughout country. However, more probable that measles incidence is higher in cities and more crowded urban areas.

Official estimate of measles incidence in Kinshasa suggests' that this is true:

$$\frac{\text{Population Kinshasa (1.5 m)}}{\text{Population Program Area}} = \frac{\text{Estimate Measles Kinshasa (45,000)}}{\text{Expected Measles Program Area}}$$

Expected Measles incidence program area: 138,000 cases. Therefore sensitivity testing at 100,000, 120,000, and 140,000 appears appropriate.

Estimates of Costs per Treatment Unit Case of Measles

Unit cost figures are needed for:

- 1) Out-patient (ambulatory) treatment of one case of measles.
- 2) Hospital treatment of one case of measles.

Mary Susan Ueber of Medical Service Consultants, Inc. calculated average unit costs based on measles cases treated at Mama Yemo Hospital in 1975. The results and her caveats are as follows:

Cost Out-Patient Treatment	=	Z. .70	=	US. \$ 1.40
one measles case				
Cost One Hospital Stay	=	Z. 6.5	=	US. \$12.10
one measles case				

[\*These unit costs are based on actual cost of drugs and supplies consumed. No charges were assessed for hospital overhead, salaries of personnel and other administrative costs]

These unit cost figures grossly under represent the total cost of measles treatment since costs other than those for medications and supplies (particularly personnel costs) typically represent 60% or more of all costs in medical care budgets. However, these other costs would not be directly reduced by the measles control program although additional hospital beds and other treatment facilities would be made available for non-measles patients. No attempt either was made to assess such factors as deaths and human suffering, residual disability due to measles, time lost for parents and other personnel family expenses including drugs bought at private pharmacies. Obviously these additional costs are considerable although not readily quantifiable.

The following assumptions were made in computing Medical Treatment Costs for measles with or without a preventive immunization program:

1. 10% of all measles cases occurring in the Project area will need hospital care. (Overall death rate from measles in Zaire is about 6%; 22 percent of cases develop some complications).
2. 25% of measles cases will require out-patient treatment services at a medical installation (high death rate and 22% complication rate justify this assumption).

3. Measles treatment costs in the 15 urban areas will approximate those found at Mama Yemo hospital in Kinshasa (highly likely since unit cost of treatment is based solely on medications and supplies which in other areas should equal Kinshasa cost plus transportation).
4. Inflationary increases in medical care cost would approximate such cost increases in the preventive control program and therefore will not be a factor in this comparative cost analysis (Note: future increases in costs of imported medicines and medical supplies would more adversely affect the later years costs of medical care without measles prevention and thus would increase relative cost effectiveness and viability of the proposed control program).

Based on above assumptions the estimated costs of medical care for measles cases 1976 - 1978 without a control program are shown in Table 2.

TABLE 2  
MEASLES, COSTS OF MEDICAL CARE  
WITHOUT CONTROL PROGRAM  
US.\$'000

<u>Estimated 1975 Incidence</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>TOTAL</u>
HIGH				
(140,000 Cases/Year)	217	217	217	651
MEDIUM				
(120,000 Case/Year)	186	186	186	558
LOW				
(100,000 Cases/Year)	167	167	167	501

Unit Costs: \$ 1.40 / Out-Patient treated case  
\$12.00 / Hospital treated case

In estimating costs of medical care with the proposed measles control program the following assumption was made:  
1. The measles immunization program if effectively carried out as designed will decrease measles incidence (as of 1975) in the program area by: (a) 10% in 1976 (b) 25% in 1977 (c) 50% in 1978.

Based on this assumption the expected measles cases were computed with the Control Program. These shown in Table 3 and compared with continued 1975 values for the incidence of measles without a control program.

TABLE 3  
EXPECTED MEASLES CASES  
(THOUSANDS)

Estimated 1975 Incidence	TYPE OF PROGRAM	1976	1977	1978	TOTAL
H I G H	WITHOUT CONTROL	140	140	140	420
	WITH CONTROL	126	105	70	301
M E D I U M	WITHOUT CONTROL	120	120	120	360
	WITH CONTROL	108	90	60	258
L O W	WITHOUT CONTROL	100	100	100	300
	WITH CONTROL	90	75	50	215

Note: 1. Due to the nature of communicable diseases including measles, cases each year will not occur at constant rate, but will fluctuate depending on "herd immunity" as influenced by prior levels of natural infection. However such fluctuations should average out over the total project period.

Concurrent costs of Medical Care with the measles preventive program and associated with the progressive decreases in annual measles cases shown in the previous table were calculated with results shown in Table 4.

TABLE 4  
COST OF MEDICAL CARE WITH  
PROPOSED MEASLES CONTROL PROGRAM  
US.\$'000

<u>ESTIMATED INCIDENCE</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>TOTAL</u>
H I G H (140,000 cases per year)	195	162	108	465
M E D I U M (120,000 cases per year)	167	130	77	374
L O W (100,000 cases per year)	130	116	72	318

Basis:           \$1.40 per out-patient treated measles case  
                  \$12.00 per hospital treated measles case  
Assumptions: 10% of cases require hospitalization  
                  25% of cases require out-patient treatment

Lastly Table 5 compares (1) Medical Care Costs with no measles control program with (2) Costs of measles preventive program plus concurrent medical care costs associated with decreasing measles incidence produced by control program.

TABLE 5  
COMPARISON: MEASLES COST  
MEDICAL CARE ALONE  
AND WITH MEASLES CONTROL PROGRAM  
US.\$'000

		1976	1977	1978	TOTAL
HIGH	MED CARE ALONE	217	217	217	651
INCIDENCE	WITH CONTROL PROGRAM	485	297	228	1010
MEDIUM	MED CARE ALONE	186	186	186	558
INCIDENCE	WITH CONTROL PROGRAM	457	265	197	919
LOW	MED CARE ALONE	167	167	167	501
INCIDENCE	WITH CONTROL PROGRAM	420	251	192	863

## Malaria Control Program

No meaningful cost effectiveness analysis can be done at this point because there is no data on the endemicity of malaria in population groups in different parts of Kinshasa city, nor is there sufficient information concerning the extent and distribution of vector breeding sites. The initial planned base line data survey will provide this data. Cost effective analysis will then be done to compare the cost efficiency of varied control techniques (area spraying residual spraying of houses, chemoprophylaxis reduction or treatment of breeding sites etc.). The Plan of Operations will reflect the cost efficiency of selected techniques in relationship to their effectiveness in terms of program objectives.

The cost effectiveness analysis as well as the Plan of Operations will be incorporated into this document as an appendix.

## 2. Recurrent Budget Analysis

### Measles

There will be an investment of \$30,000 for essential vehicles and equipment. Upon completion of the three-year USAID Project the programs will have recurrent annual costs of \$120,000 a year. Approximately half (\$60,000) will require foreign currency mainly for purchase of measles vaccine. The remaining \$60,000 for recurrent operating costs (personnel, gas and oil, repair of vehicles, supplies etc.), require local currency.

Foreign currency demands may be more critical for the GOZ although the \$60,000 annual requirement is not large. USAID will assume the cost of the necessary vaccine only for FY 77

As the project progress in the following years, the GOZ will assume responsibility for vaccine purchases.

Malaria

For the duration of this commitment, implementing agencies will bear annually and bi-annually recurrent costs for commodities. The requisite tools and supplies for malaria control must be imported. Among the most important and expensive commodities are:

Equipment

- sprayers for DDT and spare parts
- sprayers for ABATE
- shovels, picks and other small tools
- vehicles and their spare parts, maintenance, repair and gasoline
- laboratory equipment including microscopes
- field entomology equipment

Supplies

- DDT insecticides for mosquitos
- ABATE insecticides for larvae
- liquid insecticides for adulticide through fogging
- chemoprophylactic drugs

All of the above, with the exception of vehicle purchases, are annually recurring costs. Vehicles are expected to be needed every other year.

Final totals for these yearly expenses are impossible at this point to estimate due to uncertainties about the techniques that will be employed.

3. Financial Plan/Budget Tables

a. Initial Two-Year Budget

Although this project is being planned for a total five-year period, specific funding is being requested for the first two years. After an appropriate evaluation occurs additional funding will be requested for the remaining three years. The total USAID support for the measles and other communicable diseases component will be for three years. The malaria and other endemic diseases component will be funded for five years. The following table indicates the initial two-year funding.

Initial Two-Year Budget

(\$000)

	FY 76						FY 77						TOTAL	
	Malaria/ Endemic Diseases		Measles/ Communic. Diseases		Total		Malaria/ Endemic Diseases		Measles/ Communic. Diseases		Total		\$	WM
	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM		
Technicians	90	16	140	24	230	40	130	24	150	26	280	50	510	90
<b>A. Long-Term</b>														
1. Malaria field oprns	70	12	-		70	12	70	12	-		70	12	140	24
2. Data Systems Development and Analysis	-		70	12	70	12	-		70	12	70	12	140	24
3. Epidemio- logist	-		70	12	70	12	-		70	12	70	12	140	24
<b>B. Short-Term</b>														
Malaria/Measles Logistics	20	4	-		20	4	60	12	10	2	70	14	90	18
Participants	15	14	13	14	28	28	15	13	20	22	35	35	63	63
<b>A. Long-Term</b>														
1. Malaria	10	11	-		10	11	9	10	-		9	10	19	21
2. Other	-		13	14	13	14	-		20	22	20	22	33	36
<b>B. Short-term</b>														
1. Malaria	5	3	-		5	3	6	3	-		6	3	11	6
2. Other	-		-		-		-		-		-		-	
<b>Commodities</b>	<u>42</u>		<u>100</u>		<u>142</u>		<u>100</u>		<u>30</u>		<u>130</u>		<u>272</u>	
<b>Inflation Factor</b>	-		-		-		24		21		45		45	
<b>TOTAL</b>	147	30	265	38	400	68	269	37	221	48	490	85	890	153

b. Projected Five Year Budget

The following budget projection indicates the total projected USAID funding for five years. The measles and other communicable disease component will phase out at the end of three years with the GOZ providing total support for this program at the end of three years.

TOTAL PROJECTED USAID BUDGET, 5 YEARS

(US \$ '000)

	FY 76						FY 77						FY 78						FY 79						FY 80						TOTAL	
	Malaria		Measles		Total		Malaria		Measles		Total		Malaria		Measles		Total		Malaria		Measles		Total		Malaria		Measles		Total		\$	WM
	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM	\$	WM				
<b>Technicians</b>	90	16	140	24	230	40	130	24	150	26	280	50	150	26	90	16	240	42	150	26	-	-	150	26	150	26	-	-	150	26	1000	180
<b>A. Long-Term</b>	70	12	-	-	70	12	70	12	-	-	70	12	70	12	-	-	70	12	70	12	-	-	70	12	70	12	-	-	70	12	350	60
1. Malaria field ops	-	-	70	12	70	12	-	-	70	12	70	12	-	-	70	12	70	12	-	-	-	-	-	-	70	12	-	-	70	12	210	36
2. Data Systems spec.	-	-	70	12	70	12	-	-	70	12	70	12	-	-	70	12	70	12	-	-	-	-	-	-	70	12	-	-	70	12	350	60
3. Epidemiologist	-	-	70	12	70	12	-	-	70	12	70	12	-	-	70	12	70	12	-	-	-	-	-	-	70	12	-	-	70	12	350	60
<b>B. Short-Term (Malaria &amp; Measles Logistics)</b>	20	4	-	-	20	4	60	12	10	2	70	14	10	2	20	4	30	6	10	2	-	-	10	2	10	2	-	-	10	2	140	28
<b>Participants</b>	15	14	13	14	28	28	15	13	20	22	35	35	15	13	20	22	35	35	18	18	-	-	18	18	13	12	-	-	13	12	129	128
<b>A. Long-Term</b>	10	11	-	-	10	11	9	10	-	-	9	10	9	10	-	-	9	10	9	10	-	-	9	10	4	4	-	-	4	4	41	45
1. Malaria	-	-	13	14	13	14	-	-	20	22	20	22	-	-	20	22	20	22	5	6	-	-	5	6	5	6	-	-	5	6	63	70
2. Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>B. Short-Term</b>	5	3	-	-	5	3	6	3	-	-	6	3	6	3	-	-	6	3	6	3	-	-	6	3	4	2	-	-	4	2	25	11
<b>Commodities</b>	42	-	100	-	142	-	100	-	30	-	130	-	75	-	75	-	150	-	75	-	-	-	75	-	75	-	-	75	-	572	-	
<b>Inflation Factor</b>	-	-	-	-	-	24	-	21	-	45	-	24	-	19	-	43	-	24	-	24	-	-	-	24	-	24	-	-	24	-	136	-
<b>TOTAL</b>	147	30	253	38	400	68	269	37	221	48	490	85	264	39	204	38	468	77	267	44	-	-	267	44	262	38	-	-	262	38	1887	213

c. Malaria and Other Endemic Diseases

The project input breakdown by donor for the Malaria and other Endemic Diseases Component is shown below:

MALARIA AND OTHER ENDEMIC DISEASES

Inputs by Donors

US.\$'000

<u>PROJECT INPUTS</u>	<u>FY 76</u>	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	<u>FY 80</u>	<u>TOTAL</u>
GOZ	220	290	450	670	890	2,520
USAID	147	269	264	267	262	1,209
UNDP	20	275	245	195	170	905
WHO	105	82	88	88	88	451
TOTAL	492	916	1,047	1,220	1,410	5,085

d. Measles and Other Communicable Diseases

The GOZ and USAID are the only contributors for the measles and other communicable diseases component. The budget is as follows:

MEASLES AND OTHER COMMUNICABLE DISEASES

Inputs by Donors

US.\$'000

<u>PROJECT INPUTS</u>	<u>FY 76</u>	<u>FY 77</u>	<u>FY 78</u>	<u>TOTAL</u>
USAID	253	221	204	678
GOZ	187	67	127	381
<b>TOTAL:</b>	<b>440</b>	<b>288</b>	<b>331</b>	<b>1,059</b>

NOTE: The GOZ has 600,000 units of measles vaccine on hand valued at \$120,000 - which will cover the first year program. Vaccine requirement in FY 77 decreases to 300,000 units at 20¢ per unit = \$60,000 - USAID is assuming costs of measles vaccine to be purchased in FY 76 (for use in FY 77) in order that the GOZ will have lead time to budget and appropriate funds for this item in FY 77 and thereafter - GOZ is assuming costs throughout the life of the project.

e. Total Project Costs

The summary table combines both functional components of the project and the contributions by all participants:

	<u>FY 76</u>	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	<u>FY 80</u>	<u>TOTAL</u>
GOZ	407	357	577	670	890	2,901
USAID	400	490	468	267	262	1,887
UNDP	20	275	245	195	170	905
WHC	105	82	88	88	88	451
<b>TOTAL</b>	<b>932</b>	<b>1,204</b>	<b>1,378</b>	<b>1,220</b>	<b>1,410</b>	<b>6,144</b>

C. SOCIAL SOUNDNESS ANALYSIS

1. Sociocultural Feasibility

The activities proposed in this project are feasible in Zaire's sociocultural milieu, particularly in the urban areas. Both mass immunization and vector control programs have been successfully carried out in the past, and the Zairian population, in general has accepted modern curative and preventive medical procedures when available. The success of the extensive colonial health care delivery system prior to its breakdown following independence, attests to the potential of both well-organized efforts which familiarize the population with practices and programs.

As in other African societies, the decline of morbidity and mortality in children is a desired goal in Zaire. To this end, Zairians have readily utilized health services and will support health activities if proper community education and leadership are provided. The high level of acceptance of past measles and smallpox vaccination campaigns can be expected to carry over to an ongoing measles control program. Similarly, the vector control program for malaria is expected to encounter little, if any, resistance since insect vectors are generally believed to be associated with disease by urban Zairians.

Neither the measles vaccination program or the malaria vector control program will demand extensive changes in the target population's lifestyle or use of time. The immunization program will require only a single visit to a dispensing site. Similarly, minimal disruption will be caused by the vector control program (i.e., vacating homes for a few hours while spraying is done). In addition, the effectiveness of the malaria control program will increase to the extent that small changes in living patterns are found to be acceptable. Changes would consist, largely of such things as identification and elimination of potential vector breeding sites such as cans of stagnant water or standing puddles.

Based on past experience, the motivation for and level of participation in such programs is generally high. As stated earlier, health care is recognized as desirable and Zairians will utilize such services when adequately accessible and well-publicized. The recognition and acceptance of modern techniques in combatting diseases and the desire for an improved health status and, especially, for healthy children should provide sufficient motivation for participation. The extent of participation can be expected to be substantially increased by an effective "advertising" campaign and should be

particularly high among those members of the population for whom medical care is not regularly or readily available.

2. Spread Effects

Within the initial target areas (i.e., mainly urban centers), there is little need to communicate the desirability of an improved health status in general, or the beneficial aspects of immunization in particular. Knowledge and experience gained in a vaccination and vector control program will be readily transferable in developing institutional capabilities for the implementation of similar programs for other endemic and communicable diseases in urban areas. Although technical requirements may vary (since spraying is not effective in schistosomiasis for example), the "lessons learned" in terms of program organization, administration and implementation will nevertheless have direct relevance to new programs. Similarly, acceptance and adaptation by the population of malaria control techniques and immunization procedures will tend to result in equal or greater ready acceptance of control techniques and immunization programs for other diseases. The demonstration effect of improved health itself can also be expected to have a marked impact on future immunization and vector control programs.

Representative program costs for sprays and chemoprophylactics for Kinshasa (1.5 million persons) and subsidiary rural areas (one million persons) are shown below:

Program Aspect

Spraying

Interdomicillary	Kinshasa: 4.54/yr/person*	\$ 810,000
Residual with some larvae control	Rural: \$50,000/yr/million person	50,000
		<hr/> \$ 860,000

Treatment

50% of 0-14 age group (500,000 persons) have 3 attacks/yr x 4 tablets/attack	50,000 persons; 3 million tablets/yr @ \$11/100 tablets	33,000
50% age group over 14 have one attack/ year.	1 million persons; 1 million tablets/yr @ \$11/1000 tablets	11,000
3 tablets/week chemoprophylaxis for pregnant women (from 5th month gestation)	25,000 persons; 1.2 million tablets/year @ \$11/1000 tablets	13,200
Chemoprophylaxis for 0-14 age group with 2 tablets/week assuming program reaches 20% of target group	10.4 million tablets/ year @ \$11/1000 tablets	114,400

	TOTAL	<hr/> 172,800
	Total Spraying	860,000
	Total Treatment	171,600
	Program Total	<hr/> <hr/> \$1,032,800

\*WHO estimates for African cities.

The project will also have geographical spread effects. If successful in the project area, both the malaria control and measles immunization programs are easily applicable to other urban areas. This is particularly important in Zaire, which, unlike most other African nations, has had a large number of urban growth poles. The direct applicability of developed techniques from urban to rural settings is less certain. In addition to increased problems of transportation, distribution and information dissemination, the rural populations tend to display a greater resignation to disease as an accepted part of life and to rely more on traditional methods when medical treatment is actually sought. Nonetheless, because much of the rural area of Zaire is very sparsely populated, the need for immunization to control potential or existing epidemics (of those diseases subject to immunization control) is less critical. In addition, past experience such as the successful Belgian control program for trypanosomiasis, indicates that at least some aspects of such programs can be adapted to the rural setting.

Finally, to the extent that the urban Zairian maintains village ties through his extended family, positive experiences in the urban areas can be expected to have a beneficial impact on the formation of opinions and attitudes in the rural areas.

3. Social Consequences and Benefit Incidence

Eighty percent of the total annual deaths in Zaire are infants and children; endemic and communicable diseases alone cause an estimated infant mortality rate of between 150 and 173 per 1000 live births and child mortality rates are probably in the range of 400 to 500 per thousand. The alteration of these rates will have far reaching social consequences.

As in most African cultures, children have a very important socio-economic role in Zaire. Not only are children desired to increase status and continue the family name; they are, more importantly, desired to increase the amount of labor available to the family and to provide for security in old age. The high infant mortality rate requires a high conception rate in order to assure this. Conversely, the lowering of the infant mortality rate would decrease the number of conceptions required to have offspring that survive to adulthood. The family would be able to focus on "desired births" which is a stated goal of the GOZ.

The long and short-term AID consultants will encourage the CNEV and the National Malaria Service to include women as major participants in program implementation as well as direct beneficiaries of the program. The role that women could play in the project would be consistent with Zaire's traditions and the government's high expectations for women in

development. Women perform a central role not only within the family (i.e., childbearing, child rearing, management of the household, raising of food crops) but also within the marketplace, both as traditional traders and merchants and as an important segment of the modern labor force. They are often community and interest group leaders and are quite active politically. The direct impact of the project of improving the health status of both women and their children, as well as the indirect impact of a lower birth rate will increase their ability to effectively and efficiently perform these various functions.

The potential for the involvement of women in this project, both as beneficiaries and as communicators, is great. Success of the project itself will depend quite heavily on the direct support it receives from women and their effective participation. Within the household, the woman's role is vital in child care and instilling good health and hygiene practices and attitudes in family members, in maintaining a sanitary household environment and in providing clean food and potable water.

Moreover, the experience of AID, the World Bank and a variety of other development organizations has shown that the training of women in the health field as "communicators" is not only well suited to their

capabilities but is also extremely effective in increasing the "spread effects" of a program beyond its immediate target population and its immediate health goals. In addition to promoting good health care practices within the home, the leading role of women in the community and small business provides a vital link in the informal communication and information network in Zaire, as in other African countries. They can provide information not only regarding the program itself but also with respect to newly learned techniques of sanitation, hygiene, food preparation, and child care.

Inclusion of women in the Endemic and Communicable Disease Control Project will be in keeping with the 1974 AID directive on women and health ("A Plan of Action for AID Implementation of the Percy Amendment", Section 113 of the Foreign Assistance Act, FY 1975). In that directive, AID stressed that health and family planning service programs for women can be more effective when women are given short-term training to assume participation and when women have access to a supporting group within their own communities.

D. ECONOMIC ANALYSIS

1. Benefits from the Program

A cost effectiveness analysis of the project has already been presented in Section B "Financial Analysis and Plan" under "Financial Rate of Return/Viability",

and will not be repeated here.

The non-quantified benefits are considerable and include such items as:

1. The prevention of some 300,000 cases of measles and an estimated 18,000 deaths in children 6 months to 36 months of age.
2. The reduction of several hundreds of thousands of cases of malaria in the Kinshasa Region every year and tens of thousands of deaths from this disease.
3. The political, sociological, psychological and economic benefits that would result from control of malaria in the capital city of a large and important central African country.
4. The effects that a reduction in deaths in early life will have on the present high conception and birth rates and the consonent effects that lower fertility rates would have on excessive population growth.
5. The increased capability of the GOZ health staff in monitoring, assessing and controlling communicable diseases and the long term benefits that could result from using this increased capability in extending health services throughout the country in the future.
6. The improved health of the people and the potential increase in work production and reduction of loss time due to sickness associated with

significant reduction in endemic diseases.

7. The improvement in learning readiness resulting from reduced sickness in early childhood.

2. Reliability of Donor Commitments

The total 5 year cost of the program is \$6,144,000 of which AID will provide \$1,887,000 or approximately 31 percent. The GOZ total input to the project is \$2,901,000 (47 percent) which is a credible share of the commitments to the program. The remaining 22 percent of the costs will come from the United Nations Agencies, about 7 percent from WHO and 15 percent from UNDP.

83 percent total cost for the program (5,085,000) is for the malaria control activities of which the GOZ total commitment through 1980 is \$2,520,000 (50 percent).

Annual recurrent cost which the GOZ must assume for Malaria Control after 1980 will be about \$1,000,000 per year, of which approximately \$335,000 per year will be required for foreign imported commodities (insecticides, sprayers, tools, vehicles and spare parts). The remaining approximate \$665,000 per year is for local expenses, the bulk of which will be for salaries and allowances of Zairian staff. The GOZ local expenditures will increase from only \$160,000 in 1976 to \$640,000 in 1980. Thus, this build up of GOZ expenses for local costs will be

gradual and should allow adequate time for the GOZ to anticipate and budget for their needs. In 1980, the GOZ will already be financing \$160,000 in malaria commodities. The increase to \$335,000 per year in foreign currency requirements thereafter should not pose a severe problem for continued Malaria Control for the Kinshasa Region. The availability of funds, particularly to meet foreign currency requirements may be a substantial deterrent in expanding measles control beyond the project area.

The United Nations Agencies inputs are entirely for the Malaria Control activities. The WHO commitments are small, averaging less than \$100,000 a year and should be realizable. The inputs from UNDP are less certain, particularly in view of anticipated budget cuts. The bulk of UNDP commitments are for malaria commodities (\$650,000 of a total \$905,000 planned input). If this commitment is reduced by 40 percent (which appears possible) this would leave a funding gap of about \$250,000 which would have to be provided by an alternate donor. This is not a large short fall and should not jeopardize the financial feasibility of the project. USAID's total inputs to Malaria will total \$1,402,000 of which the bulk (about \$1,000,000) is for technical assistance, training and consultation. These commitments are reasonable and no funding problems are anticipated at this level of inputs.

The total project cost for the measles control program is \$1,059,000 of which \$678,000 (about 64 percent) is contributed by USAID. The remaining \$381,000 (36 percent) is contributed by GOZ. About \$400,000 of total measles control will be for foreign imported commodities (mainly equipment, vaccines and vehicles - if necessary) of which the GOZ will contribute about \$200,000 and USAID \$200,000. The GOZ already has purchased \$120,000 in vaccine and the remaining funds required for purchase of commodities over a three year time span should pose no problem.

Annual continuing GOZ cost for the measles control program after 1978 will be about \$125,000 of which approximately one half will require foreign currency for purchase of vaccine, replacement vehicles and spare parts. The GOZ has already anticipated these recurrent continuing costs.

### 3. Conclusions

Despite a possible short fall of perhaps \$250,000 to \$300,000 in UNDP funding for imported commodities, the project appears economically sound and financially feasible.

PART IV - IMPLEMENTATION ARRANGEMENTS

A. RECIPIENT'S AND AID'S ADMINISTRATIVE ARRANGEMENTS

1. Recipient

On November 1974, President Mobutu established the National Health and Welfare Council which has been charged with the development coordination, planning and overall execution of health activities and health policy. The Council's request for AID assistance in endemic disease control is based on its recognition of the need for greater emphasis on preventive health programs including the control of the most serious communicable diseases. The NHC is the main GOZ organizational structure for the overall planning, monitoring, coordination and evaluation of the activities within this project.

The newly organized National Malaria Service within the Department of Health is charged with the responsibility of developing and executing a program for Malaria Control beginning with the City of Kinshasa and its surrounding areas. The malaria activities of this project will be executed through the National Malaria Service.

The Measles Control activities will be executed through the existing service within the Department of Health that was established for the eradication of Small Pox - La Campagne Nationale d'Eradication de la Variole (CNEV) - The CNEV has a proven capability which can be expanded and improved.

Both of these organizations will coordinate with the appropriate USAID technicians in designing and implementing control programs.

The epidemiological services within the Department of Health are presently rudimentary and not organized into a district functional unit. One of the objectives of this project is to organize and develop this capability within the Department of Health - the USAID provided epidemiologist will work through Dr. Ngwete, the GOZ Commissioner of State of Health and within the Department of Health.

The Health Systems Development Project that will be initiated in FY 1976 will provide assistance in health management and administration which will concurrently strengthen the capability of the GOZ National Health sector in planning and executing health programs.

The major AID objectives of this project will be highly focused and aimed at specific obtainable objectives. It should be recognized, however, that the project is developmental and should be judged in that light.

## 2. AID

This project is designed to complement the efforts of the GOZ, multilateral agencies, other bilateral donors and other USAID/Zaire development activities in the health field. In addition, it interlocks with the proposed projects on Health Systems Development and Basic Family Health Services which have been submitted to AID/W, the former for initiation in FY 1976 and the latter in FY 1977.

The project is closely correlated with efforts of the World Health Organization (WHO), and other United Nations Organizations particularly UNDP. The AID project will not duplicate the assistance provided by these agencies.

AID under this project will provide under contract arrangements four long-term USAID technicians - an epidemiologist, a malaria operations technician, a logistic management/transportation maintenance technician (short-term technician) and a data systems analyst. Other USAID inputs to the project will be coordinated by the USAID Public Health Officer who is the designated project manager. He will be assisted by an IDI or Assistant Health Officer. No further direct USAID staff commitment will be required for the success of the project.

Short-term technical experts will be called forward as required - particularly for annual joint evaluation and periodic assessments. For Malaria activities these will be drawn from Malaria Advisors in Office of Health TAB/AID Washington. For measles control these will be furnished by the Communicable Disease Center, of the United States Public Health Service. Other short term consultants for assessment of special problems may be drawn from other sources.

B. IMPLEMENTATION PLAN

The proposed implementation schedule of this project from onset through December 1977 is presented in the attached Project Performance Network Charts. The proposed activities for Malaria and for Measles are distinctly separate, involving different techniques, separate implementing agencies and disease activity-related targets. A project performance network chart has, therefore, been presented for each component separately. (See Appendix I).

No detail network charts have been attempted for beyond the end of FY 1977. Both activity elements are scheduled for extensive evaluation of progress at that time. Based on the results of evaluation, of the first two years experience, the implementation plans will be projected for the remaining three years (life of the project).

The agreement of the GOZ to move ahead with requests to WHO and UNDP for assistance with the malaria portion of the project are still to be accomplished. It has been agreed with the GOZ that such a request will be sent. In addition, it is necessary for the GOZ to complete action to assign a medical director to the Office of the Malaria Service. A nomination has been made for this post, but action has not been completed.

The GOZ understandably doesn't want to initiate these somewhat interlocked actions until they are sure of USAID's commitment to the project.

The technical services (4 technicians) will be provided through a contract between USAID/Kinshasa and a suitable contractor.

If necessary, two vehicles for use by the contractor's technicians will be procured through project commodity funds. They would, however, not arrive before February of 1977. In the event that these vehicles are needed, the GOZ will provide motor transportation for the project technicians during the interim (about 6 months) between the technicians arrival at post and the arrival of the first project vehicles.

The GOZ will be responsible for office space for the technicians. The USAID will provide a general work area where the technicians can collect mail, meet with other AID staff members and work on program documentation and special reports. Secretarial support for USAID program or official communications and documentation will be provided by the office of the USAID Public Health Officer.

The costs for housing, in-country travel, salaries and allowances, R&R travel and other logistic and administrative support for the technicians will be included as reimburseable items within the contract. USAID will not

be responsible for directly furnishing such support. Procurement of commodities and processing of participants will be through normal AID procedures using Project Implementation Orders (PIOs).

International travel and transportation of household effects and personal vehicles for the Contractor's employees will be in accordance with standard AID procedures (i.e., issuance of U.S. Government transportation requests) and as prescribed in standard U.S. Government travel regulations. Provisions for annual leave, sick leave, emergency leave, rest and recuperation travel and other fringe benefits for the contractors in Zaire employees will be in accordance with usual practices prevailing in AID and will be stipulated in the contract. APO privileges will not be extended to the contractor's employees at post.

C. EVALUATION ARRANGEMENTS FOR THE PROJECT

Day-to-day monitoring of the project activities will be done by the GOZ staff of the National Malaria Service with assistance from the WHO Malaria technicians and the USAID furnished technicians. The Department of Health, Government of Zaire will prepare monthly, quarterly and annual reports summarizing the results of progress, problems, service data and other relevant information pertaining to the activities within the project.

A copy of all such reports dealing specifically with malaria will be furnished to USAID, Kinshasa, the WHO Representative in Kinshasa, the Representative of UNDP in Zaire, and to the National Health Council. Specific Measles control reports will be submitted to USAID/Kinshasa and the National Health Council.

The National Health Council will establish an Endemic Disease Control Committee within the Council which will include, as a minimum, senior members of the GOZ Department of Health, the Director of the Malaria Control Service (or his designee), the Director of CNEV (or his designee) and representatives from WHO/Kinshasa, USAID/Kinshasa, and UNDP/Zaire.

The Endemic Disease Control Committee will meet quarterly to review progress. The timing of such meetings should be shortly after the distribution of the project's quarterly report.

There will be annual external evaluations of the program with joint participation of the GOZ, WHO, UNDP, and USAID. The data systems designed by USAID's technician will be of major value in this effort by storing information in retrievable form. This data will then provide the basis for program evaluations. The timing for such annual evaluation during CY 1976 and 1977 are detailed in the Project Performance Network Charts.

It is expected that both AID and WHO will furnish short-term consultants from outside Zaire to assist with the annual joint evaluation of the Malaria Control activities. On the part of AID these will be furnished from the Office of Health, TAB, AID/Washington. For the Measles Control program, USAID anticipates requesting annual consultation from the Communicable Disease Center (CDC) to participate in annual evaluation. The potential evaluation program and function of CDC has been described previously.

In addition to the above reports and assessments, the contractor will separately furnish USAID/Kinshasa quarterly and annual reports detailing expenditures under the contract and summarizing progress made towards achieving objectives in terms of planned activity targets. In case of delay in implementing any aspect of this project, the contractor will promptly send a "Report of Delay" to the Public Health Officer of USAID/Kinshasa describing the circumstances of the delay and giving specific recommendations for corrective measures.

The USAID Public Health Officer who is the project manager will be responsible for the preparation and submission of Project Appraisal Reports (PARs) as required by AID's program procedures.

D. CONDITIONS, COVENANTS AND NEGOTIATING STATUS

The major host-country actions which must be taken prior to the execution of the agreement are:

<u>ITEM</u>	<u>PRESENT STATUS</u>
1. Appoint National Director for Malaria.	1. Medical officer identified, Appointment in process.
2. Provide Office area for National Malaria Service.	2. Office area to be provided in the Bureau of Hygiene in Kinshasa. Needs expansion of laboratory facilities.
3. Request to WHO for assistance in Base-line Data Survey.	3. Agreement in principle established by exchange of letters documented April 17, 1975 by letter from Director General of Department of Health to WHO Representative/ Kinshasa.
4. WHO to assign Malariologist full time to project.	4. WHO Representative agrees to provide malariologist for CYs 76 and 77. Further assignment requires GOZ request in CY 1976.

<u>ITEM</u>	<u>PRESENT STATUS</u>
5. Agreement of GOZ to provide suitable counterparts.	5. GOZ informed of this requirement.
6. Agreement with UNDP to support project.	6. Agreement in principle. Matter under review because of cut in UNDP budget for Zaire.
7. Establishment of Endemic Disease Committee within National Health Council.	7. GOZ agreed in principle to establish Committee if project is implemented. (No rationale for committee without project assistance).

Further actions are needed in order to formalize the Malaria Service to assure that the service has a legal basis in order to enter private property. The project agreement should contain a covenant that USAID technicians assigned to the project or on assessment assignment have full access to official technical and administrative records and documentation concerning the project.

Numerous discussions have been held with representatives of the GOZ on the project and there is joint agreement on the scope, details, implementation and evaluation as described in this paper.

The World Health Organization and UNDP are expected to sign separate agreements with the GOZ consistent with the planned levels and type of support detailed in this paper. UNDP may have some problems with commitment due to reduced funds. However, UNDP has indicated priority support for the Malaria Control Program in Kinshasa and will make every effort to approximate the planned level of inputs.

**APPENDIX I:**  
**Project Performance Network Charts**

