# KEMRI

Kenya Medical Research Institute

# KEMRI 1998/99 Annual Report and statement of Accounts

# Kenya Medical Research Institute

## 1998 - 1999

## Annual Report
## and
## Statement of Accounts

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***Editorial Production***
*Bernard Muthaka*
*Davies Mkoji*
*Andrew Koske*
*Moses Yegon*
*Anthony Wambugu*

***Wordprocessing***
*Rose Odera*

***Published by***
*Kenya Medical Research Institute*
*P.O. Box 54840*
*Nairobi*
*Tel: 722541*
*Fax: 720030*
*E-mail: kemrilib@ken.healthnet.org*
*www.kemri.org*

# Chairman's Foreword

*Dr. Mohamed S. Abdullah*

I hereby submit, on behalf of the Board of Management of the Kenya Medical Research Institute, the Annual Report and Statement of Accounts for the year ended 30th June 1999, in accordance with the provisions of Section 20 of the Science and Technology (Ammendment) Act of 1979 (Cap 250 of the Laws of Kenya).

As is generally recognised, Africa has entered the millennium with a double threat of ill-health. On one hand we have the overwhelming threat of infectious diseases such as malaria, TB and HIV/AIDS. On the other we have a growing menace of non-communicable diseases such as heart and renal diseases, diabetes and "lifestyle" habits such as smoking and substance abuse which predispose people to ill-health.

As an Institute, we are proud that we have continued to make an impact by producing research information that is now being used to guide policy and practice of health care delivery both nationally and regionally.

As will be seen in the financial information in this report, KEMRI's stature continued to be enhanced, and the increase in the government's allocation signifies increased confidence in our ability to deliver. The Exchequer increased its allocation to the Institute from Ksh.252,514,580 in 1998 to Ksh.297,768,830 in 1999.

During the year, a new Board of Management was appointed. We bade farewell to three members who had served the Board with distinguished dedication - Prof. Judith Bahemuka, Prof. Nimrod Bwibo and Dr. Joyce Gikunda. While thanking them for their service, we welcomed Prof. Gerishom Sande, Dr. Rashid Aman and Mrs. Monica Mueni.

We are grateful to the Government and the Ministry of Health for continued support. Similarly we are grateful to the National Council for Science and Technology and the various foreign governments for their steadfast confidence in the Institute.

Finally the Board commends the Director Dr. Davy Koech and the entire staff for maintaining KEMRI's position as the leading health research institute on the continent. I wish all members of staff even greater achievements in the new millennium.

Mohamed S. Abdullah, *MBChB, MMed*
**CHAIRMAN, BOARD OF MANAGEMENT**

*Dr. Davy K. Koech*

# Director's Report

The financial year ending 30th June 1999 was a period of increasing stability and progress in the Institute. With gratitude and humility we are understandably proud of the achievements we have made over the last 20 years of our existence. We also realize that the coming years will bring challenges that are quite different from those we have faced in the past, and we shall need to mobilize ourselves even more to meet those challenges.

The challenge facing most organizations in these coming times will be to remain relevant, especially because of the technological advances that have rendered many processes and technologies obsolete.

At KEMRI, we can proudly say that we have continued to be awake to the need to constantly re-think the reasons behind our being, and to shift our orientation and strategies to suit current trends. Thus we have already assumed the notion that for us to survive, a corporate, business-like approach will help us to stand on our own, especially with development assistance at an all-time low.

To this end, we are now full-steam ahead in commercialisation of our products and services. These include diagnostic kits for hepatitis and HIV as well as opening up of our out-patient clinic.

In the first quarter of the year, the Institute welcomed a new Board of Management, with the appointment of three new members and retiring of three others. Those who joined the Board were Prof. Gerishom Sande, Dr. Rashid Aman and Mrs. Monica Mueni, while Prof. Judith Bahemuka, Prof. Nimrod Bwibo and Dr. Joyce Gikunda left after dedicated service to the Institute. We thank those who have left us for their invaluable contribution, as we welcome the new members. Dr. Mohamed Abdullah was once again appointed to lead the Board. We are proud that Dr. Abdullah is one of the longest serving Chairmen among state corporation boards.

The two major departments of KEMRI - Research and Administration - continued to work harmoniously to fulfil the Institute's mission of contributing towards better health for all. Research creates value; administration attends to organisation of the value thus created.

In research, our approach continued to be the development of new information, skills and tools for greater efficiency in disease prevention and control and also better methods of exploiting existing technologies. We have also focused on development of new technologies towards the improvement of health care systems aimed at developing drugs, vaccines, diagnostic tests and innovative control methods.

The focus of our research programmes is still on communicable and infectious diseases with the aim of

improving health, through public health education and other relevant intervention strategies.

During the period under review, the Government of Japan chose KEMRI, alongside two other institutions, to establish a centre for human resource development, research and training in the control of parasitic diseases. Known as the Hashimoto Initiative, some of the aspects of the undertaking will include rehabilitation of lost skills, dissemination of new techniques, third country training and institutional capacity building. The programme will be implemented in collaboration with the World Health Organisation's Roll Back Malaria initiative.

In the same year, the Institute established, with the assistance of JICA, a P3 level biosafety laboratory. The Sh. 130 million laboratory gives the country the capacity to research on highly infectious diseases that require high levels of safety precautions.

In the coming year, KEMRI will launch an annual regional training course for blood safety screening products. The course will provide African countries with new techniques in screening blood for hepatitis B and HIV. The course will be organised under JICA's Third Country Training Programme and will be attended by personnel working in blood safety programmes in East, Central and Southern Africa. KEMRI and JICA have developed two screening kits for HIV and hepatitis B that are locally produced, cheap and effective for use in the countries in the region.

KEMRI researchers also took part in the 20th African Health Sciences Congress that took place in Ghana in April 1999. KEMRI continues to take pride in its role in the growth of the Congress. The Institute took the leading role in establishing the African Forum for Health Sciences, the body that organises the Congress and also publishes the *African Journal of Health Sciences*. It is expected that KEMRI will host next year's Congress to coincide with the 21st anniversary celebrations of the Institute.

In staff matters, the year saw the return of downsizing in the public sector, in government efforts to maximise the utilisation of the limited resources. We opted for visionary and staff-friendly approach in which the Institute decided to right-size its personnel through natural attrition.

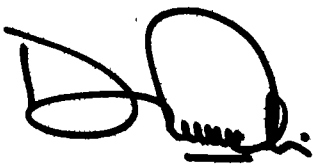
Similarly, we have institutionalised a regular system of annual staff appraisal in which the Institute upgrades the capacity of its staff towards enhancing its overall performance.

We have continued to encourage our staff to be goal-oriented, sharply focused and self-motivated towards their professional growth as well as efficient realisation of the goals and mission of the Institute.

To conclude, we wish to thank the Government of Kenya for its continued support and encouragement. We are also indebted to all our research collaborators for their invaluable assistance and support during the period under review. Today's world is one of cooperation and partnership, and we hope to strengthen this cooperation with our partners in the coming years.

I wish to also thank most sincerely the Chairman of the Board of Management, Dr. Mohamed Abdullah, and the entire Board for the way they have continued to marshall the development of the Institute.

Finally I wish to acknowledge with immense approval the worthy contribution rendered by all our staff towards contributing to the well-being of the Institute. I look forward to continued cooperation and hard work by all the Institute's stakeholders towards the realisation of the vision of the Institute, which is to be a leading global centre of excellence in health research in the new millennium.



Davy K. Koech, *Phd, SS, OGW, MBS*
**DIRECTOR, KEMRI**

### *Background*

The Kenya Medical Research Institute was established in 1979 through the Science and Technology (Ammendment) Act. Its mission is to conduct health sciences research and generate research findings to be applied towards the improvement of the health status of the nation. The Institute's motto, *"In search of Better Health"*, is targeted to the realisation of this mission.

### *Mandates*

The mandates of KEMRI are as follows:

- To carry out research in human health;
- To cooperate with other research organisations and institutions of higher learning on matters of relevant research and training;
- To work with other research bodies within and outside Kenya carrying out similar research;
- To cooperate with the Ministry of Health, the National Council for Sciences Advisory Research Committee in matters pertaining to research policies and priorities;
- To do all things as appear to be necessary, desirable or expedient to carry out its functions.

### *Organisation and Management*

KEMRI has a Board of Management appointed by the Minister responsible for health. The Board guides all policy matters. It has a chairman, six appointed members and eleven *ex-officio* members representing various government ministries. The Director is the chief executive of the Institute.

### *KEMRI Secretariat*

The KEMRI Secretariat provides administrative and technical support to research services and also coordinates the various functions of the Institute. The Secretariat has two departments headed by Deputy Directors: Research & Development and Administration & Finance.

*Administration & Finance*

This department is responsible for financial, personnel and general administrative affairs. The Deputy Director is assisted by two chief officers - Chief Finance Officer and Chief Administrative Officer.

*Research & Development*

The department is responsible for research and development affairs. The Deputy Director is assisted by three Chief Research Officers who are in charge of Production & Marketing, Research Collaboration & Consultances and Communications.

Within the department are the following technical units:

(i) Engineering and Maintenance
(ii) Information/Public Relations
(iii) Medical Illustration
(iv) Library Services.

### *Research Centres*

The following are the ten research centres in the Institute:

(1) Centre for Biotechnology Research Development (Nairobi)
(2) Centre for Clinical Research (Nairobi)
(3) Centre for Public Health Research (Nairobi)
(4) Centre for Leprosy and Skin Diseases Research (Busia)
(5) Centre for Microbiology Research (Nairobi)
(6) Centre for Respiratory Diseases Research (Nairobi)
(7) Centre for Traditional Medicine and Drug Research (Nairobi)
(8) Centre for Vector Biology and Control Research (Kisumu)
(9) Centre for Virus Research (Nairobi)
(10) Centre for Geographic Medicine Research, Coast (Kilifi)

### *Financial Resources*

The Institute is mainly funded by the Government of Kenya for both its

***American Ambassador H.E. Jonnie Carson visits KEMRI'S model hospital at the Centre for Clinical Research.***

recurrent and development operations. The Institute also receives substantial financial support by way of research grants amounting to approximately 40% of its total annual budget from a number of international organisations.

### *Research Facilities*

KEMRI has a wide range of modern facilities for research and training. These include specialized research laboratories, lecture rooms, an electron microscopy unit, a conference hall, a 40-bed hospital, animal house, herbal garden and visiting scientists' flats.

There is also an out-patient clinic which is open to the public, and is run by highly qualified Institute physicians and other medical personnel.

### *Human Resources*

KEMRI has one of the highest concentrations of staff involved in full-time research. Its human resources capacity is as follows:

*Research scientists*

There are close to 200 biomedical scientists involved in a wide range of disciplines including microbiologists, clinicians, social scientists, parasitologists, epidemiologists, virologists, pharmacists and other specialized cadres.

*Technical staff*

The Institute has about 250 technical staff. These include laboratory technologists, public health officers, laboratory technicians, clinical officers, radiographers, nurses and pharmaceutical technologists.

*Administrative and other staff*

KEMRI has a complement of over 600 members of various administrative and supportive cadres. These include administrative officers, accountants, engineers and maintenance staff, supplies, public relations staff, librarians, graphic designers among many others.

### *Training*

KEMRI offers training to its scientific and support staff to equip them with the skills necessary for efficient performance of their duties. Funds for training come either from the government or from international sponsors. KEMRI is also recognised as a training institution by many organisations.

### *Collaboration*

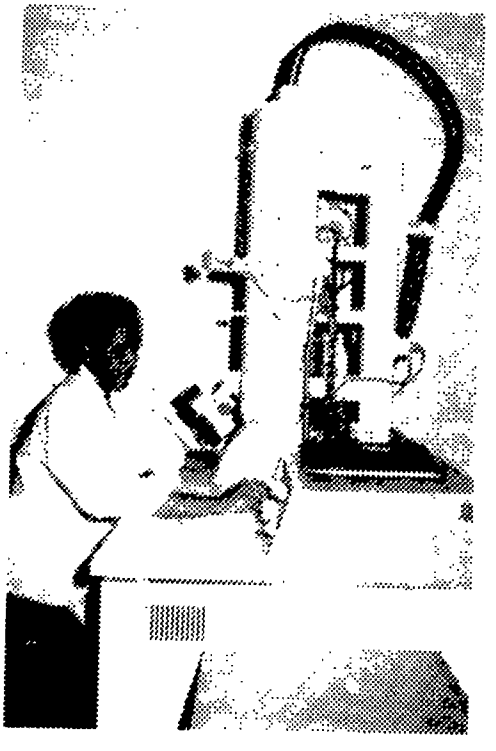
In line with its mandates, KEMRI has developed very useful linkages with local, regional and international institutions that are involved in health research. Within Kenya, the Institute works closely with government ministries, national universities and local research bodies.

KEMRI also collaborates with the South African Medical Research Council, Noguchi Memorial Institute of Medical Research (Ghana), Japan International Cooperation Agency (JICA), International Development Research Centre (IDRC) of Canada, Wellcome Trust (UK), Walter Reed Army Institute of Research (USA) and Royal Tropical Institute (Netherlands) among others.

### *Regional Scientific Capacity*

KEMRI has made major contributions in the regional scientific capacity. The Institute played a pivotal role in the establishment of the African Forum for Health Sciences (AFHES), and is indeed the Forum's Secretariat. The Forum organises the African Health Sciences Congress which is held in different African countries every year.

AFHES also publishes the *African Journal of Health Sciences*, the continent's premier peer-reviewed medical journal. KEMRI enjoys a unique position as a reference centre for many WHO-sponsored research activities in Africa.



***The electron microscopy room is one of the specialised facilities at the Institute***

# Research Programmes

## *ARI Programme*

Acute respiratory infections are defined as infections in any area of the respiratory tract, including the nose, middle ear, throat, windpipe and lungs. The programme on ARI is mainly concentrated on the infections in children.

Most children have four to six infections each year, with urban areas showing higher frequencies than rural areas. Some infections such as measles, whooping cough and diptheria are prevented by vaccines, but others such as pneumonia rely on chemotherapy.

Pneumonia is the most serious among all ARIs, and without treatment is often fatal. Of all children under five years of age who die in developing countries, one out of four succumb to pneumonia. It is estimated that in Kenya, 70 children die daily from pneumonia.

KEMRI's research activities under the programme have three main components: epidemiological studies, clinical studies and laboratory studies. Most of these are KEMRI-JICA collaborative projects.

Most efforts are in methods of reducing morbidity and mortality, determination of causative agents and community based health education.

The epidemiological studies involve the determination of the prevalence and risk factors for ARI which is being done in Kibera, a slum residential area in Nairobi.

***A nurse at the Centre for Clinical Research observes children admitted in the hospital. KEMRI's focus in Acute Respiratory Infections has mainly been on children***

About 1,600 children were recruited in the study, with preliminary results incriminating ARIs for 50% of childhood deaths.

At the Centre for Respiratory Diseases Research, studies showed that over 80% of children with severe infections, including pneumonia, could be treated effectively with antibiotics such as amoxycillin and erythromycin.

In Western Kenya, the interaction between ARI and malaria is being studied to determine the best methods of discriminating between the two infections. In many children, symptoms of the two often mimic each other, resulting in wrong diagnosis and treatment. Diagnostic tests such as the PCR, which are now being set up will facilitate this endeavour.

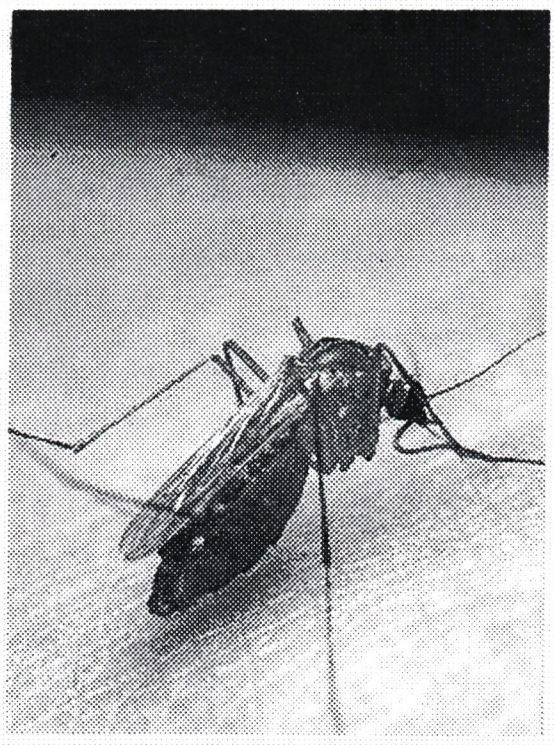
## *Filariasis Programme*

Infection with filarial parasites leads to elephantiasis, a profoundly disfiguring and disabling disease, usually causing lymphoedema of the arm, leg or breast; or hydrocele, an equally grotesque enlargement of the scrotum and enlargement of the female genitalia. In its acute form, the disease can cause episodic fevers associated with damaged lymphatic and renal systems.

Added to this disease burden are serious psychosocial consequences, including the sexual/social dysfunction of men with hydroceles and women with lymphoedema of the breast or genitals.

Among the three human filarial parasites, *Wuchereria bancrofti* is the most widespread and the only known form in Kenya. The parasites are transmitted by mosquitoes of the *Anopheles* and *Culex* species.

An infective mosquito transmits the larval stages of the parasites through the punctured wound during a blood meal. Transmitted larvae take 8 - 12 months to mature and settle in the lymphatic vessels where they can survive for



*The Culex quinquefasciatus mosquito, one of the species that transmits lymphatic filariasis, taking a bloodmeal through human skin*

many years. Mated female worms produce large numbers of microfilariae which escape into the blood stream. While in the blood stream, the microfilariae may be ingested by a vector mosquito, undergo a period of sequential larval developments and reach the infective larvae stage.

The bulk of the work in this project was conducted in Kwale District, Coast Province, where microfilariae prevalence has been shown to be about 17% or twice as high when using the more sensitive immunodiagnostic tests.

The filariasis programme involves three KEMRI Centres, CMR, CPHR and CCR, with a lot of support from the World Health Organization. In the reporting period, its major activities centred around a drug efficacy study conducted by CMR and CCR. Although diethylcarbamazine (DEC) has been shown to be an effective antifilarial drug for many years, its antifilarial activity was enhanced when combined with albendazole. The combination therapy was also useful for clearance of intestinal helminths (hookworms, pinworms and whipworms).

Another area of activity was the Community Directed Treatment (Com-DT) for control of lymphatic filariasis. Treatment coverage by a method of mass drug administration using the official health system was compared to the Com-DT in 44 villages in both Malindi and Kilifi districts. Treatment coverage by Com-DT was significantly higher (88%) than by the official health system (46.5%).
ComDT is now being promoted by the WHO as an effective, inexpensive and sustainable method of treating lymphatic filariasis in Africa

Another study conducted by the three centres compared a new immunodiagnostic test, the Immunochromatographic Card Test (ICT) using capillary-drawn daytime whole blood to both the conventional Knott's technique and the counting chamber method. Besides identifying all persons (100% sensitivity) identified parasitologically as antigen positive, ICT also identified an extra 24.7% whom the latter two tests had identified as amicrofilaraemic. Therefore, ICT was recommended as a simple, sensitive, rapid and convenient diagnostic method in field settings.

## HIV/AIDS Programme

At least 500 persons die daily from HIV/AIDS in Kenya. In economic terms, this may mean a loss of resources, opportunities and facilities worth about two billion shillings daily in investments occasioned by those deaths.

Major components of the programme in the Institute are epidemiology of HIV/AIDS, basic research vaccine development and the sociocultural impact of HIV/AIDS.

The Institute's research on HIV/AIDS dates back to when the first case of AIDS was diagnosed in this country. These studies included a first National survey on HIV infection in Kenya conducted from the Institute's Centre for Virus Research and Centre for Microbiology Research .

The Institute has since participated in the diagnosis and screening of blood and also pioneered the investigation of low-dose sublingual interferon alpha for the management of the disease. There is evidence that currently the drug, when given in combination with other anti- infective drugs, gives significant improvement of the patient's health.

Other drugs that are being tested or developed at KEMRI include Viron 50 (a cocktail that includes interferon alpha), VIUSID (a nutri-

tional product) and a trioxolane derivative. With the establishment of a P3 biosafety laboratory, the Institute can now characterize the HIV virus and provide a basis for vaccine development using local virus strains.

In a major development, the Institute collaborated with Japan International Co-operation Agency (JICA) to develop an easy to use diagnostic kit known as Particle Agglutination (PA). The kit has advantage over other kits in that its reagents are locally produced, it does not require electric power, it can test many samples at the same time and the results can be read visually with the naked eye.

*A researcher works inside the P3 biosafety laboratory. The new laboratory gives the country the capability to handle highly infectious pathogens*

Under the same KEMRI/JICA Project, the Institute's Centre for Biotechnology Research and Development continues to use a technology known as flow cytometry to measure the CD4 and CD8 cells in HIV infected patients in order to monitor their progress.

During HIV infection, the virus preferentially infects and multiplies in the CD4 cells. Their numbers gradually fall as the disease progresses. On the other hand, CD8 cells are produced in large numbers in response to a viral infection. Disease progress can be monitored by decrease in CD4 cells and increase in CD8 cells. Enumeration of cells is also useful in determining the efficacy of drugs used in the management of HIV/AIDS patients.

Under the same project, training of staff involved in the diagnosis and screening of blood for HIV is done to help in the establishment of screening centres in the country. Similarly collaborative studies are going on to identify traditional herbal properties that may have anti-HIV properties.

Arising out of studies done at the Centre for Respiratory Diseases Research, HIV positive partners who also have tuberculosis are now being treated with drugs that exclude thiacetazone. The change in government policy was effected after studies established that severe skin reactions were associated with the use of thiacetazone in treatment of HIV associated TB.

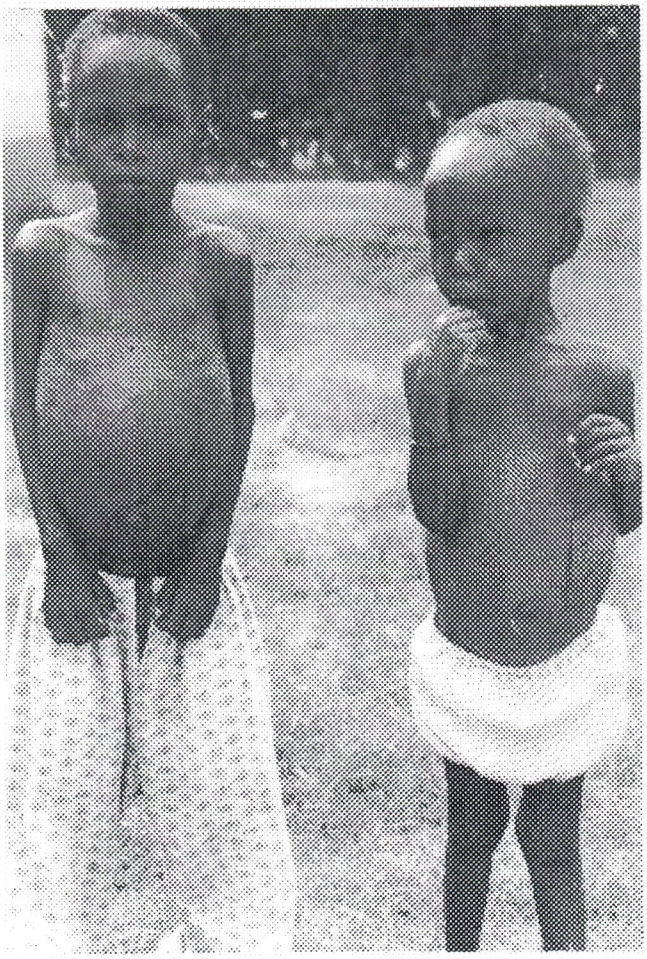
In Kisumu, scientists are studying the role of malaria in enhancing transmission of HIV from infected mothers to the foetus. KEMRI is also studying the anti-retroviral drug AZT in the prevention of HIV transmission from an infected pregnant mother to her child.

## *Leishmaniasis Programme*

Leishmaniases form a whole group of parasitic tropical diseases spread by bites of many different species of infected sandflies, which in turn pass on leishmania parasites of many different species, producing at least five distinct diseases with different symptoms.

About 20 species of Leishmania are known to infect man leading to symptoms ranging from simple self healing skin ulcers to severe life threatening forms of the disease. Cutaneaus leishmaniasis is the most common form and transmitted by *Leishmania major* or *L. tropica.* The symptoms, skin lesions and ulcers, though they tend to heal after a few months, can leave ugly scars.

The other form is known as visceral leishmaniasis (kala-azar) and is caused by *L. donavani.* It affects the soft internal organs such as the spleen, liver and lymph nodes. It is characterised by fever, weight loss, anaemia, swelling of the affected organs and depressed immune systems. Visceral leishmaniasis is often accompanied by other diseases like tuberculosis, pneumonia, diarrhoea and has a



*Kala-azar manifests itself in an enlarged spleen, and is mainly found in parts of the Rift Valley and Eastern Provinces*

very high mortality rate if treatment is delayed.

Recently, scientists identified the disease as one of the opportunistic infections in AIDS cases. Research has shown that migration coupled with the *El-nino* weather that dominated to reporting period, could mean an upsurge of cases of leishmaniasis in this country.

Work done at Centre for Biotechnology Research Development has indicated that a vaccine that works by "blocking" the transmission of the leishmania parasite can be developed .

A better, rapid sensitive technique for splenic aspiration, which is the gold standard in the diagnosis of visceral leishmaniasis has been developed at the Institute's Centre for Clinical Research. Following the development, thousands of splenic aspirates have been carried out at the Centre with no adverse results. The technique is being currently recommended by the World Health Organisation (WHO) for use globally.

The Centre, which is recognised by WHO as a Centre of Good Clinical Practice, also developed the current recommend treatment dose of pentostam at 20 mg/kg/day for 28 days in treatment of visceral leishmaniasis.

KEMRI has made major contributions to the understanding of the immune mechanisms in leishmaniasis, especially in the development of a simple diagnostic test known as Direct Agglutination Test (DAT) and in learning the biological characteristics of the leishmania parasites in the country.

In the year, the Centre for Clinical Research completed a multi-centre trial of lipid-associated Amphotericin B in treatment of visceral leishmaniasis. The Centre also began dose-ranging studies on another drug known as Sitamaquine, which is being developed by Smithkline Beecham.

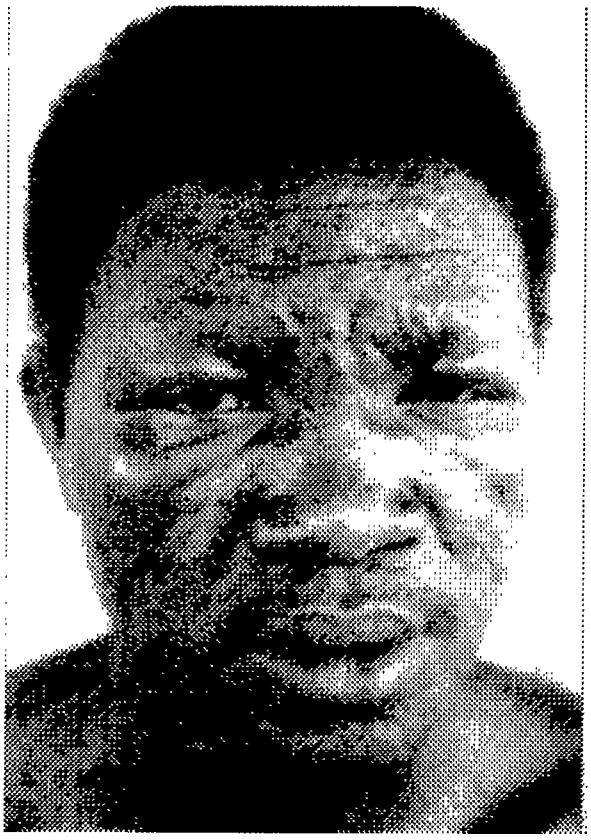
In collaboration with the USA Army Medical Research Unit, the Institute is a leader in sandfly biology research, and it maintains the only sandfly colony in sub-Sahara.

## Leprosy Programme

Leprosy is a chronic communicable disease caused by the bacillus *Mycobacterium leprae*, which is related to the *M. tuberculosis* bacilli that causes tuberculosis. Both diseases are believed to be transmitted through bacterial droplets from the nose and throat, and have been treated with the same or related drugs.

Leprosy treatment has been lengthy, compliance has been a problem and the development of drug resistance has threatened control.

Leprosy affects mostly the skin and peripheral nerves. There are two main forms of leprosy infection: lepromatous leprosy and tuberculoid leprosy. In the former, the bacilli multiply uncontrollably leading to damage to mucous membranes, eyes and peripheral nerves, and ultimately deformity. In the latter, the symptoms are mild and often take the form of desensitised skin patches.



*A leprosy patient before multi-drug therapy (MDT) treatment...*

*The same patient after treatment*

KEMRI has been involved in studies that introduced multi-drug therapy for leprosy, especially after resistance developed with use of dapsone, which was for long the drug of choice. The new combination of dapsone, rifampicin and clofazimine has managed to reduce the period of medication, as well as brought down the incidence. Prevalence levels now stand at less than one person per 10,000 people, compared to 10% in the early 1950s. This means that the country has reached elimination status as defined by WHO.

Stigmatisation of leprosy is now reduced and patients are now being rehabilitated in their homes. The Centre for Leprosy and Skin Diseases in Busia is now offering treatment services and health education in a bid to have patients coming forward in good time for treatment.

## *Malaria Programme*

Malaria is a serious infection of the blood by the *Plasmodia* protozoa, transmitted by the bites of *Anopheles* mosquitoes. There are several kinds and combinations of *Plasmodia* and *Anopheles*, resulting in different physiological and ecological patterns of disease. But the real drama and tragedy of the disease is caused by the combination of *Plasmodium falciparum* transmitted by extremely persistent and efficient *Anopheles gambiae* complex of mosquito vectors, which is responsible for the deaths of some one million children in Africa each year.

Most attention concentrates therefore on the *P. falciparum* form of the disease which kills through cerebral malaria, anaemia, kidney failure and other complications.

Over years of exposure to malaria, individuals who survive the onslaught develop a considerable degree of tolerance to infection, which they maintain at a low level without symptoms of the disease. This is described as "immunity to disease". A degree of actual immunity to infection (the potential to eliminate parasites completely) also builds up, but is unstable, disappearing after a year or so unless a person is constantly re-infected.

One of the greatest challenges facing malaria control worldwide is the spread and intensification of the parasite resistance to anti-malarial drugs. Unfortunately the limited number of such drugs has led to increasing difficulties

*American Ambassador H.E. Johnnie Carson at the Walter Reed Project's malaria laboratories when he visited the Institute for a familiarisation tour*

in development of anti-malarial drugs policies and adequate disease management.

Recent reports from Kenya and Tanzania suggest that changes to parasite susceptibility to sulfadoxine/pyrimethamine have occurred and may presage clinical resistance.

In the malaria programme, research activities mainly focus on three major factors: people, the mosquito and the parasite.

At the Centre for Geographic Medicine Research in Kilifi, clinical studies continue to form the focus of malaria research.

In conjunction with the Wellcome Trust of UK, the Centre concentrates on severe malaria research, with studies seeking to understand the mechanisms of the disease and to develop and assess better ways of treating very sick children.

The development of a new anti-malarial combination drug known as Lap-Dap was one of the major developments at the Centre. The drug has a similar mode of action to fansidar but due to the way it is metabolised, it is expected that it will produce much less of a resistance problem. Research has also shown that it can be used to treat fansidar-resistant parasites. The development of this short half-life drug promises to be one of the most significant health advances for Africa.

Scientists at the Centre also carried out studies that attempted to predict the seasonality of clinical malaria using remote sensing technology. Previously, remote sensing has helped to identify mosquito densities and habitats.

Images from satellite sensors have enabled the prediction of incidence and prevalence of malaria, and researchers hope that this information can have implications for clinical and epidemiological control. Changes in the climate have been known to have an impact on vector distribution and abundance, and this has reflected in features of clinical malaria in Africa.

Predictions from such studies will assist in drawing up programmes for seasonally-targeted mass chemoprophylaxis.

In other climate-related studies, the Centre for Vector Biology and Control Research in Kisumu undertook a collaborative study into the effect of the *El-nino* phenomenon on malaria in Western Kenya. A senior researcher at the Centre was appointed to sit on the International Panel for Climate Change, which looks at the impact on health of factors such as ozone depletion, loss of biodiversity, emergence of resistance and natural disasters.

Research continues to evaluate the efficacy of old and new anti-malarial drugs in order to improve the management of patients with chloroquine resistant *Plasmodium falciparum*.

An important research finding from Kilifi clarified that cerebral malaria is not a single condition but may be the end point of a range of pathophysiological processes. In many children with the disease, the resulting coma is seen as a protective mechanism where the brain is turned off in the face of an unfavourable environment.

Studies from Kilifi have also resulted in recommendations for the management of cerebral malaria, which have been incorporated into the national guidelines for treatment of malaria.

Operational research is also going on to evaluate potential interventions such as impregnated bednets and education of shopkeepers. Incorporation of shopkeepers in the management of fever in rural communities has attracted wide international interest. Since a vast majority of fevers are first treated with

over-the counter drugs, the ability to influence treatment at the earliest opportunity is of crucial importance, especially since a large percentage of malaria deaths occur within 48 hours of first symptoms.

At the Centre for Vector Biology and Control Research in Kisumu, a study on the effects of sisal strands curtains on morbidity and mortality in Western Kenya was completed in collaboration with UNDP, World Bank and WHO/TDR.

In Kilifi, a study was carried out to assess the impact of insecticide-treated bednets on child survival. The introduction of the nets led to significant reductions in childhood mortality by 33% and severe, life-threatening malaria by 44%.

A study to determine the value of sulphadoxine pyrimethamine to prevent severe anaemia secondary to malaria in pregnancy showed that intermittent treatment with pyrimethamine-sulphadoxine has a major protective effect against parasitaemia and severe anaemia.

The Institute is also working with manufacturers of various malaria diagnostic kits to evaluate their reliability in comparison with light microscopy, which is the gold standard for malaria diagnosis.

Other studies on disease mechanisms and the way in which people become immune to malaria and other diseases are going on as part of long term drug and vaccine development strategies.

## *Respiratory Diseases*

The programme on respiratory diseases has continued to focus mainly on tuberculosis, but studies have also been carried out on asthma and smoking.

Tuberculosis causes the most deaths among infectious diseases, and with the emergence of HIV/AIDS, the disease is receiving unprecedented attention from health care providers worldwide.

Out of every three people who are infected with HIV, one dies of TB. Every year, as many as 3 million people, roughly the population of Nairobi, succumb to the disease.
In a country with a high TB disease burden, it is to be expected that most of us will have come into contact with the bacteria, usually by late childhood. However, the bacteria is controlled by the defence system and rendered dormant. This small amount hardly causes any sickness, but when the immunity is compromised (such as when one has HIV), chances of developing active TB are increased considerably.

An infected person expels microorganisms into the air in tiny droplets when coughing, laughing or sneezing. These small droplets dry rapidly, becoming nuclei-carrying microorganisms and they may remain suspended in the air for several hours. They may then be inhaled by another person who enters the room.

KEMRI's research activities on TB have been directed towards limiting transmission and promoting treatment. In collaboration with Wellcome Trust, the Institute has carried out studies to ascertain how HIV affects the epidemiology, presentation and diagnosis of TB in Kenya.

Preliminary studies into the level of resistance of the bacterium to commonly-used drugs such as isoniazid, streptomycin and rifampicin have been conducted. Strains of drug-resistant TB have rendered treatment difficult, costly and often ineffective.

A PCR-based technique for diagnosis of TB is currently being investigated at the Centre for Respiratory Diseases Research. The centre has also described the emergence of bronchial asthma as a public health problem in Kenya, with the condition being more prevalent in urban than rural areas.

## *Schistosomiasis Programme*

Schistosomiasis (also known as bilharzia) results from infection with parasitic trematode worms known as bloodflukes or schistosomes. By current estimates, the disease affects some 200 million people, of whom about 20 million suffer clinical morbidity and disability. The disease rarely kills but its sapping chronic effects and associated morbidity makes it a problem of great public health importance. The continued creation of water resources development projects to boost agricultural and industrial growth has also favoured the spread of bilharzia. Africa carries about 90% of the global schistosomiasis burden.

*People who come into constant contact with snail-infested water are at highest risk of shistosomiasis*

Schistosomes are transmitted through specific water-associated snails. In the snail hosts the bilharzia parasites multiply and develop into larval forms called cercariae. The cercariae are released into water and people become infected when these larval forms penetrate the skin.

In the human body, the parasites mature, mate and produce eggs. Mature parasite eggs are discharged into the environment with urine or faeces and on coming into contact with water, they hatch into miracidia, the larval forms that infect snails. Thus, human beings play a major role in the transmission of the bilharzia parasites, and contact with parasite-infested water is crucial for the perpetuation of the infection.

Bilharzia is associated with malnutrition especially in children, with people at greatest risk being those whose daily activities bring them into contact with contaminated water that harbours parasite-infected snails. A key development in the control of schistosomiasis in the world has been the discovery of an effective drug called praziquantel, which eliminates the bilharzia parasites in infected individuals, with minimal side effects.

Developed countries which used to be endemic for bilharzia such as Japan have eradicated the disease through concerted efforts in environmental management and treatment of infected people, sustained by government involvement and inter-sector collaboration.

The Institute has over the years conducted bilharzia control research with emphasis on the importance of safe water use and regular examination of infected communities. It is also looking for simple and inexpensive methods for diagnosis and control which include environmental modification and biological control.

The Institute's Centre for Biotechnology Research and Development is also part of an international initiative to evaluate candidate vaccine molecules, in addition to continuing with efforts to better understand schistosome and snail biology. Such efforts will assist in designing new strategies for bilharzia control.

Among the strategies developed in recent studies include the use of crayfish as biological agents for control of snails that transmit schistosomiasis. Crayfish are exotic lobster-like freshwater crustaceans found in streams and ponds in Kenya. Also, plants species that can be used as molluscicides (toxins for killing snails) have been identified in collaboration with local universities.

Studies have shown that environmental modification and supply of clean water reduces schistosome infection rates in the affected community. In one particular study in Coast Province, such control measures, supplemented with treatment using praziquantel, brought infection levels down from 92% in 1984 to 27% in 1998.

Control of vector snails by clearing plants in the river has also been shown to be of value in reducing the transmission of schistosomiasis. Similarly, provision of safe water and introduction of health education has been shown to tremendously reduce transmission of urinary schistomiasis in a community in coastal Kenya.

## *Traditional Medicines and Drugs Programme*

It is well known that a great majority of people still depend on traditional methods of managing and treating disease. This is mainly because of prohibitive distance from conventional health services, culture or apparent failure of conventional drugs to treat especially chronic illnesses. Moreover, it is estimated that close to 60% of what is known as conven-

tional drugs is derived from natural occuring substances, especially plant materials.

If integrated into the conventional health care system, the potential of traditional medical practice can be exploited to supplement the health requirements of society.

The programme in KEMRI aims at establishing the origin, identity, safety and efficacy of traditional medicinal preparations, in order to develop a scientific rationale for incorporating them into the national health care system, and probably develop a pharmacopoea based on these drugs.

Over the years, the Institute has established a scientific basis for the activity of some plant medicines including those used to treat asthma, malaria, psoriasis and for fertility regulation. The Centre for Traditional Medicine and Drug Research is also involved in evaluating conventional drugs for their quality, safety and efficacy.

## *Viral Hepatitis*

Viral hepatitis is the term reserved for infections of the liver by one or more of the distinct hepatitis viruses. The terms hepatitis A, B, C, D and E are used to categorise the viruses.

The KEMRI programme focuses mainly on hepatitis B, which is a common medical problem in Kenya The World Health Organisation estimates that 500 million people are chronic carriers in the world.

In Kenya, prevalence varies from region to region but Coast, Western and Turkana areas have highest prevalence rates.

Epidemiological studies show that almost half of the Kenyan population will have been infected with hepatitis B by the age of 30 to 40 years. Out of those infected, about 10% become carriers of the virus while in the majority, the body's immune system eliminates the virus.

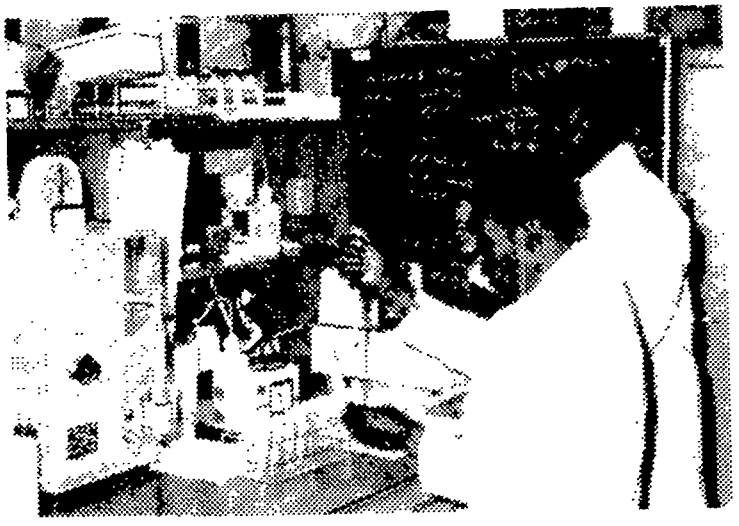
Carriers not only infect others but risk coming down with chronic hepatitis, liver cirrhosis and liver cancer later in life. Transmission is primarily through blood and sexual contact, though other methods of transmission have been suggested.

The hepatitis B virus is found primarily in the blood of infected individuals. It has also been detected in other body fluids, including urine, saliva, semen and menstrual fluids.

Symptoms during the onset of acute hepatitis B infection vary. Many people never show any discernible symptoms. Most experience a certain level of jaundice, preceded by mild fevers, fatigue, malaise, loss of appetite and nausea. Acute infection may lead to liver trouble.

Since there is no effective treatment against liver cirrhosis and liver cancer, prevention is vital. KEMRI has developed a test kit for screening blood for the hepatitis B virus, and training workshops for its use locally and in the East and Central African region are held each year.

The test kit, known as the KEMRI Hepcell, is already in use in all provincial hospitals, whose personnel undergo annual training workshops. Plans are going on to begin commercial preparations of the kit.



KEMRI was also involved in local studies of the hepatitis B vaccine. The studies showed that the vaccine is safe and effective even when administered at birth. The studies recommended that since the risk of infection starts immediately after birth, any immunisation programme should start at this age.

***Researchers at the hepatitis laboratory, where the KEMRI Hepcell kit used in screening blood for hepatitis B virus is produced***

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# REPORT OF THE AUDITOR-GENERAL (CORPORATIONS) ON THE ACCOUNTS OF KENYA MEDICAL RESEARCH INSTITUTE FOR THE YEAR ENDED 30 JUNE 1999

I have examined the Accounts of Kenya Medical Research Institute for the year ended 30 June 1999 in accordance with Section 29 (2) of the Exchequer and Audit Act (Cap 412). I have obtained all the information and explanations considered necessary for the purpose of the audit. Proper books of account have been kept by the Institute and the Accounts, which have been prepared under the historical cost convention, are in agreement therewith and comply with the Science and Technology Act (Cap 250).

In my opinion, and except for the reservations set out herebelow, the Accounts, when read together with the Notes thereon, give a true and fair view of the financial state of affairs of the Institute as at 30 June 1999 and of its excess expenditure over income for the year then ended.

## 1. KEMRI PLOT OF LAND

The Institute's fixed assets Balance Sheet figure of Kshs. 1,066,776,556 as at 30 June 1999, excludes an undetermined value of five (5) plots of land, two of which are located in Nairobi and the other three at the Coast, measuring a total of 19.898 ha. but which have not been valued. The Institute has also not obtained title deeds in respect of four (4) of the five plots and only holds a title of ownership for one plot. Due to the exclusion of the value of these parcels of land from these Accounts and in the absence of title documents for the four of the plots, it is not possible to confirm the correctness of the Institute's fixed assets as reflected on the Balance Sheet as at 30 June 1999 or even to confirm the ownership by the Institute or the security of the plots.

## 2. PURCHASE OF RECONDITIONED VEHICLE - KAL 935E

During the year 1998/99, the Institute spent Kshs.1,150,000 out of funds donated by Ms Royal Tropical Institute of Netherlands to purchase a seven year old reconditioned Subaru Legacy, Station Wagon, registration No. KAL 935E. Although the proposal by the donor was to purchase a small pick-up for its Respiratory Disease Department, the Institute has explained that approval of the donor was obtained for the procurement of the reconditioned vehicle. However, no record of any such agreement has been seen.

**S. M. MALUKI**
**AUDITOR-GENERAL (CORPORATIONS)**

27 December 2000

# KENYA MEDICAL RESEARCH INSTITUTE

## BALANCE SHEET AS AT 30TH JUNE 1999

| | Notes | 1998/99 (Kshs) | 1997/98 (Kshs) |
|---|---|---|---|
| **Assets Employed** | | | |
| Fixed Assets | 1 | **1,066,776,556** | **508,662,840** |
| **Current Assets** | | | |
| Debtors | 4 | 2,581,151 | 884,278 |
| Standing Imprest | 6 | 194,790 | 743,000 |
| Temporary Imprest | 6 | 779,544 | 1,251,590 |
| Unexpended Balance on Special Accounts & Grants | 7 | 33,892,684 | 26,867,201 |
| Cash & Bank Balance | 8 | 14,610,167 | 10,047,148 |
| **Total Current Assets** | | **52,058,336** | **39,793,217** |
| **Less:** | | | |
| **Current Liabilities** | | | |
| Creditors | 5 | 5,986,942 | 2,628,611 |
| Deposits, Special Accounts & Grants | 7 | 33,892,684 | 26,867,201 |
| **Total current Liabilities** | | **39,879,626** | **29,495,812** |
| **Net Current Assets** | | 12,178,710 | 10,297,405 |
| | | **1,078,955,266** | **518,960,245** |
| **Financed by:** | | | |
| **Accumulated Fund** | 9 | **1,078,955,266** | **518,960,245** |

DAVY K. KOECH, Ph.D., Finst PM, SS, OGW
**DIRECTOR**

DR.M. S. ABDULLAH
**CHAIRMAN**

*26 September, 1999*

## INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30TH JUNE, 1999

| | 1998/99 (Kshs) | 1997/98 (Kshs) |
|---|---|---|
| **MRT Grants** | 297,768,830 | 252,514,580 |
| Special Accounts and Grants | 99,665,458 | 94,792,645 |
| JICA Operational Grants | 12,385,544 | 46,452,070 |
| | 409,819,832 | 393,759,295 |
| Personal emoluments | 132,732,158 | 125,357,888 |
| Pension and Gratuity | 18,041,899 | 10,900,404 |
| House Allowance | 22,884,681 | 21,458,261 |
| Other allowances | 14,919,825 | 13,151,327 |
| Medical allowances | 12,657,318 | 13,855,319 |
| Passage and Leave expenses | 953,158 | 826,096 |
| Medical expenses | 5,857,935 | 494,529 |
| Refund of Medical Exp. - Ex-Gratia | 2,133 | 1,400,000 |
| Transport operating expenses | 11,314,895 | 10,637,194 |
| Travelling and accommodation | 1,727,160 | 742,560 |
| External travel and accommodation | 1,251,914 | 619,681 |
| Postal and Telegrams expenses | 413,305 | 213,350 |
| Telephone expenses | 8,849,357 | 6,400,288 |
| Official entertainment | 1,233,620 | 459,360 |
| Exp. of Board, Committees and Conference | 1,511,036 | 859,011 |
| Electricity expenses | 8,478,493 | 4,138,473 |
| Water and conservancy | 4,527,303, | 2,450,980 |
| Laboratory Reagents and Supplies | 17,029 | 195,748 |
| Purchase of drugs and dressings | 2,606,321 | 1,963,668 |
| Purchase of research animals | -- | 11,475 |
| KEMRI/JICA Project | 3,840,227 | 1,879,823 |
| Food and Rations | 322,494 | 161,822 |
| Feeds for animals | 319,409 | 289,245 |
| Publishing and Printing Expenses | 540,503 | 950,782 |
| Uniforms and Clothing | 170,430 | 643,325 |
| Library expenses | 323,087 | 246,207 |
| Purchase of stationery | 5,680,164 | 2,149,579 |
| Advertising and Publicity | 707,108 | 493,533 |
| Rents and Rates | 17,194,186 | 13,509,439 |
| Computer expenses | 250,462 | 304,175 |
| Miscellanous & Other Charges | 1,112,337 | 120,697 |
| Special Accounts and Grants | 99,665,458 | 94,792,645 |
| Insurance Expenses | 6,438,665 | 4,635,445 |
| Feeds, Commission and Honoraria | 22,000 | -- |
| Training Expenses | 281,293 | 711,669 |
| Purchase of Medical Equipment | 59,277 | 316,359 |
| Purchase of Office Equipment | 41,562 | 102,947 |
| Maintenance of Plant Machinery & Equipment | 3,241,793 | 2,087,023 |
| Maintenance of Building & Stations | 3,195,904 | 1,705,893 |
| Minor Works | 16,400 | -- |
| Research Materials | -- | 3,060 |
| Office Building Expenses | 77,805 | 101,280 |
| JICA Oprational Costs | 12,385,544 | 46,452,070 |
| Loss on disposal of M/vehicals | 464,000 | -- |
| **Total before depreciation** | 406,329,648 | 387,792,630 |
| Excess of Income over Exp. Before Depeciation | 3,490,184 | 5,966,665 |
| **Depreciation Expenses** | | |
| Motor Vehicles | 2,605,722 | 1,879,099 |
| Office & Lab. Equipment | 8,654,022 | 4,587,904 |
| Office Furniture | 214,673 | 198,942 |
| | 11,474,417 | 6,665,945 |
| Excess of Expenditure over Income | **(7,984,233)** | **(-699,280)** |

## SCHEDULE OF FIXED ASSETS

| ITEM | LAND (KSH.) | OFFICE BUILDINGS (KSH.) | RESIDENTIAL BUILDINGS (KSH.) | MOTOR VEHICLES (KSH.) | OFFICE & MEDICAL EQUIPMENT (KSH.) | OFFICE FURNITURE (KSH.) | TOTAL (KSH.) |
|---|---|---|---|---|---|---|---|
| Cost B/F | 1,175,500 | 261,026,324 | 170,827,107 | 39,619,504 | 197,100,444 | 8,151,207 | 677,900,086 |
| Additions | 130,000,000 | 268,578,200 | 163,041,587 | 14,014,924 | 149,060,417 | 435,843 | 725,130,971 |
| | | (194,840,216) | | (1,520,000) | – | – | (230,163,774) |
| | | | (33,803,558) | | | | |
| | **131,175,500** | **334,764,308** | **300,065,136** | **52,114,428** | **346,160,861** | **8,587,050** | **1,172,867,283** |
| DEPRECIATION | | | | | | | |
| Accumulated | – | 83,944,977 | 12,167,929 | 18,048,558 | 50,977,773 | 3,749,308 | 168,888,545 |
| Change for the year | – | – | – | 2,605,722 | 8,654,021 | 214,673 | 11,474,416 |
| Disposals | – | (66,019,297) | (7,846,937) | (406,000) | – | – | (74,272,234) |
| | **–** | **17,925,680** | **4,320,992** | **20,248,280** | **59,631,794** | **3,963,981** | **106,090,727** |
| Net Book Value | | | | | | | |
| 30.6.99 | 131,175,500 | 316,838,628 | 295,744,144 | 31,866,148 | 286,529,067 | 4,623,069 | 1,066,776,556 |
| 30.6.99 | 1,175,500 | 177,081,347 | 158,659,178 | 21,570,946 | 145,773,970 | 4,401,899 | 508,662,840 |

## CASH FLOW STATEMENT FOR THE YEAR ENDED 30TH JUNE, 1999

| | 1998/99 (Kshs) | 1997/98 (Kshs) |
|---|---|---|
| **FROM OPERATIONS** | | |
| Excess of Expenditure over Income | (7,984,233) | (699,280) |
| Depreciation | 11,474,417 | 6,665,945 |
| Loss on Disposal (NBV) | 464,000 | -- |
| Funds generated from own operations | 3,954,184 | 5,966,665 |
| **WORKING CAPITAL CHANGES** | | |
| (Increase) in Debtors | (1,696,874) | (124,582) |
| (Increase) decrease in Temporary Imprest | 472,046 | (752,120) |
| Decrease in Standing Imprest | 548,210 | -- |
| (Increase) in Special Acc. & Grants | (7,025,483) | (9,626,388) |
| Increase in Creditors | 3,358,331 | 1,429,968 |
| Increase in Special Acc. & Grants | 7,025,483 | 9,626,388 |
| | **6,635,897** | **6,519,931** |
| **INVESTING ACTIVITIES** | | |
| Acquisition of fixed Assets | (164,829,672) | (69,734,130) |
| **FINANCING ACTIVITIES** | | |
| Grants in Aid from Donors | 162,756,794 | 65,350,129 |
| Net Income in Cash & Cash Equivalent | 4,563,019 | 2,135,930 |
| Cash & Cash Equivalent at Beginning of Period | 10,047,148 | 7,911,218 |
| Cash & Cash Equivalent at end of Period | 14,610,167 | 10,047,148 |

## NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 30TH JUNE 1999

### 1. ACCOUNTING POLICIES

(a) Basis of Accounting

(i) The accounts are prepared under the historical cost convention modified to include the revaluation of assets

(ii) The Accounts have been prepared on Cash Basis as opposed to Accruals Basis

(b) Depreciation

Depreciation of Fixed Assets is calculated to write off their cost over their estimated useful lives on a straight line basis at the following rates:

| | | | | |
|---|---|---|---|---|
| Buildings | - | Office and Residential | - | Nil |
| Equipment | - | Office and Medical | - | 2.5% |
| Office Furniture | | | - | 2.5% |
| Motor Vehicles | | | - | 5% |

### 2. ACQUISITIONS

During the year to 30th June 1999 the Institute received furniture/equipment worth Kshs. 16,189,594 and Motor Vehicles worth Kshs. 6,114,924 from Japan International Cooperation Agency. JICA also constructed a P3 Laboratory at a cost of Kshs. 131,047,020. Similarly, other collaborators contributed furniture/equipment worth Kshs. 1,505,255 and Motor Vehicles worth Kshs. 7,900,000. The Institute, through its own resources, acquired Capital items worth Kshs. 2,722,879.00.

### 3. APPROPRIATION IN AID

As at 30th June 1999, Kshs. 235,455 had been received being economic rent from Institutional leased houses occupied by staff and from miscellaneous sources.

### 4. DEBTORS

The debtors include outstanding balances on personal advances, Medical Advances, Net Salary Advances and Deposit to Hospitals and collection of Kshs. 794,000 made from sale of Motor Vehicles but deposited in local grants account

### 5. CREDITORS

The creditors include cooperatives, SAYE, NSSF, PAYE, NHIF, KESWA, LASC and other Creditors.

### 6. IMPREST

(a) Temporary Imprest outstanding as at 30th June 1999 amounted to Kshs. 779,544.

(b) Standing Imprests to our Centres stood at Kshs. 194,790.

### 7. SPECIAL ACCOUNTS AND GRANTS

The unexpended balances on Special Accounts and Grants represent donor funds held on their behalf at the balance sheet date

### 8. CASH AND BANK BALANCE

The closing Cash and Bank Balance at Headquarters of Kshs. 14,610,167 is composed of cash at hand of Kshs. 154,317 and Cash at Bank of Kshs. 14,455,849.

## 9. ACCUMULATED FUND

The fund is build and analysed as follows:

| | |
|---|---|
| Balance brought forward 1.7.1998 | 518,960,245 |
| Excess of Expenditure over Income | (7,984,233) |
| Support from Donors (Acquisitions) | 162.756.794 |
| Revaluation Reserves | 405,222,460 |
| **Total** | **1,078,955,266** |

## 10. REVALUATIONS

Land at headquarters has been valued at **Ksh. 130,000,000**. Office Buildings and Residential Buildings whose cost was **Kshs. 194,840,216** and **Kshs. 33,803,558** respectively were valued at **Kshs. 268,578,200** and **Kshs. 161,421,800**.

## UNEXPENDED BALANCES ON SPECIAL ACCOUNTS AND GRANTS

| | Balance at 1.7.98 | Received During the year | Expenditure During the year | Balance at 30.6.99 |
|---|---|---|---|---|
| US Embassy - USAMRU | 4,730,991.00 | 23,053,119.45 | 25,437,076.50 | 2,347,033.95 |
| US Embassy - CDC Project | 5,442,928.00 | 26,468,718.15 | 28,279,591.15 | 3,632,055.00 |
| US Govt. Treasury-Others | NIL | 914,042.35 | 472,540.15 | 441,502.20 |
| Case Western University | NIL | 2,010,557.10 | 1,526,713.65 | 483,543.45 |
| Commonwealth Secretariat | NIL | 1,452,033.35 | 1,590,813.45 | (138,780.10) |
| WHO | 11,855,207.00 | 19,475,770.25 | 17,554,527.60 | 13,776,449.65 |
| Carnegie Corporation | 339,876.00 | 434,469.00 | 748,087.40 | 26,257.60 |
| UNICEF | (202,045.00) | 4,551,105.00 | 3,907,578.40 | 441,481.60 |
| Royal Tropical Institute | NIL | 3,698,737.10 | 2,598,187.50 | 1,100,549.60 |
| University of New Mexico | NIL | NIL | 364,774.00 | (364,774.00) |
| Miscellaneous | 4,700,244.00 | 24,632,389.30 | 17,185,567.80 | 12,147,065.50 |
| **TOTALS** | 26,867,201.00 | 106,690,941.05 | 99,665,457.60 | 33,892,684.45 |

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