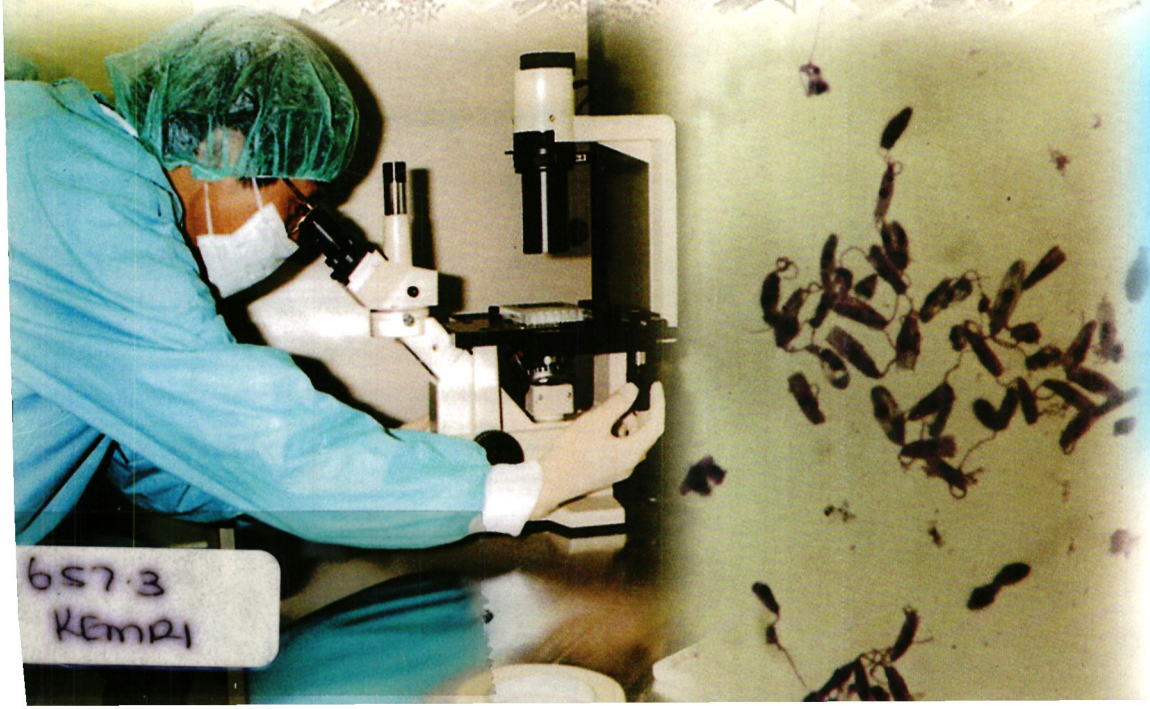
KEMRI

Kenya Medical Research Institute

1999 - 2000
Annual Report
And Statement of Accounts



KENYA MEDICAL RESEARCH INSTITUTE
KEMRI

In Search of Better Health

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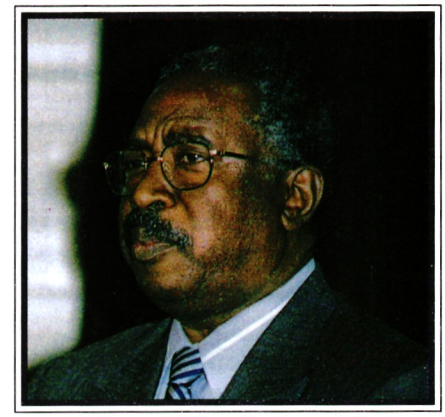


Dr. Mohammed .S. Abdullah

CHAIRMAN'S FOREWARD

Dear Sir,

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 financial year 1999/2000, in accordance with the Science and Technology (Amendment) Act of 1979 (Cap 250 of the Laws of Kenya).

In my previous report, I mentioned that Africa has entered the new millennium with a double burden of disease. While on one hand, we have to deal with the overwhelming threat of infectious diseases such as malaria, HIV/AIDS, tuberculosis and others, we have to inescapably address the growing menace of non-communicable diseases such as heart and renal diseases and the insidious lifestyles such as smoking that predispose people to ill-health. The year 1999/2000 was a year of greater internal review and re-examination in consolidating and re-focusing the Institute's efforts to address more profoundly the double challenge of disease and ill-health in Kenya and, indeed, in Africa. I am happy that the Institute is fully awake to this challenge and continues to provide leadership in health research in Africa.

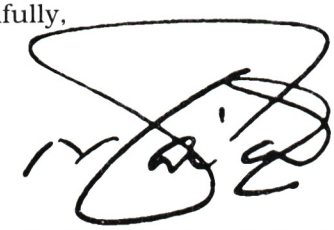
The Institute would not have achieved this status without the invaluable support it has continued to receive from the Government of Kenya and also from the various foreign governments and organizations that have continued to support the Institute in its work. The Board of Management is grateful for all this support and will continue to play its fullest role to strengthen the Institute's position as a leading center of excellence in health research nationally, regionally and globally.

The Board of Management is equally grateful to Dr. Davy K. Koech, the Director, KEMRI and all the staff of the Institute for their extraordinary dedication and selflessness in the service of the Institute.

With immense gratitude for the special honour bestowed to me.

I remain,

Yours faithfully,



Mohamed S. Abdullah, M Med, MBS
CHAIRMAN, BOARD OF MANAGEMENT

Dr. Davy K. Koech

DIRECTOR'S STATEMENT

The 1999/2000 financial year was a year of stocktaking and consolidation in the Institute's activities. After 21 years of existence, the Institute had to re-examine and re-strategise itself for the challenges of the future.
As in the previous years, change and enrichment continued to characterise all the Institute's activities.

The primary mandate of the Institute is to conduct health research and generate results to be applied to the improvement of the health status in Kenya. The Institute made enormous achievements in the promotion of this mandate during the year.

KEMRI has, in particular, continued to generate massive data and information towards better and improved disease prevention, control, diagnosis, treatment and management which has contributed profoundly to the improvement of the national health status.

Amongst other research interests, the Institute directed significant effort to research on Kenya's two biggest problems of public health importance - malaria and HIV/AIDS. The malaria programme is the largest in the Institute. The most significant achievement in malaria control during the period was the continuation of studies in the development of insecticide-treated bednets, in liaison with other Institute collaborators. The Institute also continued with studies on new anti-malarial drugs and vaccine development. In respect to HIV/AIDS, KEMRI continued research studies on the reduction of mother-to-child transmission of HIV, voluntary counselling and testing, clinical trials of drugs, and the development of a diagnostic kit, the Particle Agglutination (PA) test kit, for screening blood for HIV. In other research areas, the Institute continued to improve on its KEMRI HEPCELL II diagnostic kit for screening of blood against viral hepatitis and also to strengthen its capacity in the control of tuberculosis, filariasis, schistosomiasis and other diseases of public health importance in Kenya.
Great inroads were also made in research on herbal medicine and its use and application in disease treatment and management.

As an indicator of the Institute's leading role in research on tuberculosis and lung health, the Institute hosted during the year the 4th International Course on Research Methods for the Promotion of Lung Health. The Institute is gratified that the Africa Office of the International Union Against Tuberculosis and Lung Disease (IUATLD) is located at KEMRI. From the capacity developed in the Institute, KEMRI launched during the year, through the assistance of the Japan International Cooperation Agency (JICA), a regional training course in screening

blood for viral hepatitis and HIV/AIDS, towards the improvement of the blood safety capacity in the region. The Institute also continued with its national role in being the backbone institution for rapid response services in the surveillance of dangerous disease outbreaks such as the ebola, yellow fever, rift valley fever and others.

Today's world is one of partnership and mutual co-operation. It is through the efforts of KEMRI that the African Forum for Health Sciences (AFHES) was established. In collaboration with AFHES, the Institute has continued to play a leading role in the organisation of the African Health Sciences Congresses. The Institute was privileged during the year to host the 21st African Health Sciences Congress, alongside the 21st Anniversary Celebrations of the Establishment of the Institute, between 24th and 28th April, 2000. The Institute was honoured in a very special manner to have H.E. the Vice President, Hon. Prof. George Saitoti, as the guest of honour during those celebrations.

Similarly, the Institute made remarkable strides in the strengthening of its linkages with other institutions locally and internationally during the year. To this end, we continued to foster a closer and stronger working relationship with the Ministry of Health, the National Council for Science and Technology, the various other research institutions and universities as well as with the collaborative international organisations such as WHO, JICA, the Centres for Disease Control (CDC), the Walter Reed Army Institute of Research (WRAIR), the Wellcome Trust, the Institute of Virological Research (IVR) and many others. Our collaborators have made an invaluable contribution to the strengthening of the Institute's research capacity and we are profoundly grateful for all this support. We particularly hail the generous support and assistance we have continued to receive from the peoples and Governments of Japan, USA and United Kingdom over the years which has immeasurably contributed in making the Institute the indisputably leading centre of health research in Africa.

KEMRI is part and parcel of the international health research fraternity and is a designated WHO Collaborating Centre for Arboviruses and Viral Haemorrhagic Fevers, a WHO Network Inter-Country Laboratory for Polio Eradication (serving Kenya, Somalia, Eriteria and Southern Sudan), a WHO National Centre for Influenza Surveillance and also a global Centre for Research on Anti-microbial Resistance. The Institute was designated during the year by the Government of Japan as one of the three global centres for the control of parasitic diseases, the other two centres being Mahidol University in Thailand and the Noguchi Memorial Institute of Medical Research in Ghana.

On a very special note, we are grateful to the Ministry of Health and to the Government of Kenya for all the guidance, encouragement and support rendered to the Institute over the years. The financial allocations from the Treasury in the year totalled Kshs.282,737,024 and this greatly helped the Institute to cope with the rising operational costs. The research grants from external sources during the year amounted to KShs.247,025,917, thereby, raising the total recurrent budget, under the control of the Institute, during the year to KShs.529,762,941. We have always strived to live within our means and all the funds received from the Government and from our collaborators have been put to good use in the promotion of research development in the Institute.

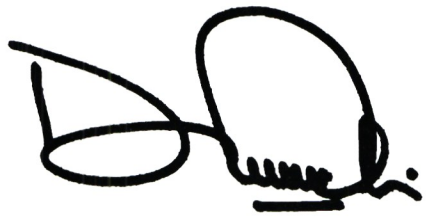
The Institute continues to direct special attention to the improvement of the terms and conditions of service so as to attract and retain high calibre staff. Through the support given by the Government, the Institute increased considerably the rates of personal allowances during the year, so as to cater for the rising costs of living. The Institute has always accorded special priority to human resources development and during the year we were able to place a record number of 53 officers on various forms of training, including PhD and masters degree programmes. We thank those who have continued to help the Institute in our staff development endeavours.

The Institute played host to a number of important dignitaries during the year. These included the Minister for Public Health, Hon. Prof. S. K. Ongeri, the Deputy Chief Cabinet Secretary of the Government of Japan, Mr. Muneo Suzuki, the U.S. Ambassador in Kenya, H. E. Mr. Johnn Carson, the Ambassador of Japan in Kenya, H. E. Mr. Morihisa Aoki and many others.

These visits have served to encourage and inspire the Institute in sustaining its profile as a leading global centre of excellence in health research.

On a very personal note, I wish to thank Dr. Mohamed Abdullah, the Chairman of the KEMRI Board of Management for his indefatigable energy, resourcefulness and vision in the guidance of the Institute. I also wish to thank all members of the Board of Management for their tireless efforts and inspirational commitment in the service of the Institute. Similarly, I am indebted to all our staff for their loyalty, dedication and continued commitment to the well being of the Institute. This is the spirit with which to recast our eyes into the future so as to sustain our leadership in health research towards the advancement of the health status in Kenya and globally.

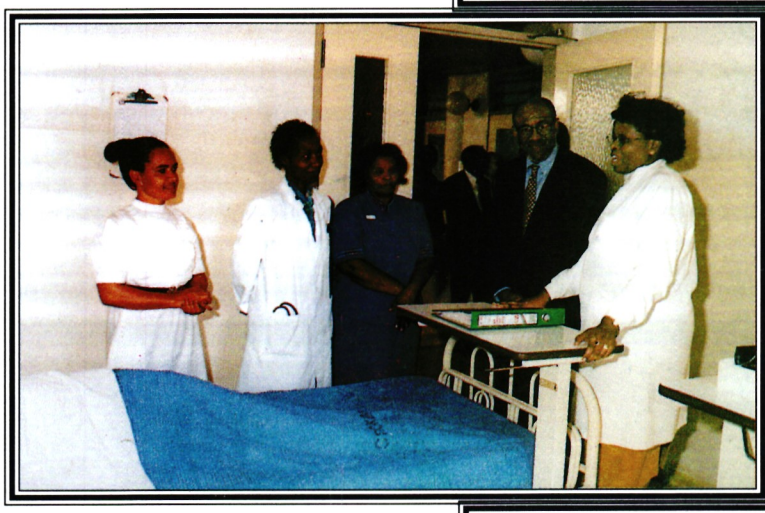
As shall be evident from the subsequent detailed report, the year was one of solid achievement and remarkable progress in the operations and development of the Institute. Once again, we wish to express our most profound gratitude to all who have, in one way or another, helped us or rendered any contribution, to make this possible.



DAVY K. KOECH, PhD, SS, OGW, MBS
DIRECTOR, KEMRI

(LEFT)Vice President, Prof George Saitoti cutting the cake During KEMRI's 21st Anniversary Celebrations of the establishment of the institute in April at the Institute.

(RIGHT)The Deputy Chief Cabinet Secretary of the Government of Japan,Mr. Muneo Suzuki receiving a gift from Director, KEMRI, Dr. Davy K. Koech during his visit to KEMRI.



(LEFT)The US Ambassador in Kenya, H. E. Mr. Johnnie Carson, touring the Centre for Clinical Research, fourty-bed Model Clinic during his Official visit to the Institute. On the far right is Dr. K.M. Wasunna, the centre Director.

(RIGHT)The Ambassador of Japan in Kenya, H.E.Mr. Morihisa Aoki and Hon. Kipkalia Kones Minister for Research and Technology receiving a briefing from Dr. Peter Tukei on the operations of the Biosafety (P3) laboratory.

BACKGROUND

The Kenya Medical Research Institute (KEMRI) was established in 1979 under the Science and Technology (Amendment) Act as the national body responsible for carrying out biomedical research in Kenya. Under this act, KEMRI was charged with the conduct of health sciences research, with the following specific mandates: -

Mandates

* To carry out research in the field of health sciences.
* To cooperate with other research organizations and institutions of higher learning and on matters of relevant research.
* To liaise with other research bodies within and outside Kenya carrying out similar research.
* To disseminate research findings.
* To cooperate with the Ministry of Health, the ministry for the time being responsible for research, the National Council for Science and Technology and the Medical Science Advisory Research Committee on matters pertaining to research policies and priorities.
* To do all such things as appear necessary, desirable or expedient to carry out its functions.

ORGANIZATION AND MANAGEMENT

KEMRI has a Board of Management appointed by the Minister for the time being responsible for research that is responsible for all policy matters. The Board has a Chairman, six appointed members and eleven ***ex-officio*** members representing various Government Ministries, including the National Council for Science and Technology and other relevant Government Institutions. The Director is the Chief Executive of the Institute.

The KEMRI Secretariat

The KEMRI Secretariat provides administrative and technical support to research services and also co-ordinates the various functions of the Institute. The Secretariat is under the Director of the Institute.

The Secretariat has two departments - one responsible for *Administration and Finance* and the other responsible for *Research and Development*. Each of the two departments is under a Deputy Director. The two departments are structured as follows:-

(a) ***Administration and Finance Department.*** This department is responsiblefor financial, personnel and general administrative affairs of the Institute. The Deputy Director (Administration and Finance) is assisted by two chief officers - the Chief Finance Officer and the Chief Administrative Officer in the running of the department.

(b) ***Research and Development Department.*** As the name implies, this department is responsible for research development and planning affairs of the Institute. The Deputy Director (Research Development and Planning) is assisted by two chief officers -the Chief Research Officer (Research Development) and the Chief Planning Officer in the running of the department.

Within the Secretariat are the following technical services units:-

(a) Information Services Unit..
(b) Engineering and Maintenance Services Unit.
(c) Medical Illustration Unit
(d) Library Service Unit

RESEARCH CENTRES:

The following are the ten research centres in the Institute

1) Centre for Biotechnology Research and Development (CBRD) Nairobi.
2) Centre for Clinical Research (CCR) Nairobi.
3) Centre for Public Health Research (CPHR) Nairobi.
4) Centre for Leprosy and Other Skin Diseases Research (CLSDR) Busia.
5) Centre for Microbiology Research (CMR) Nairobi.
6) Centre for Respiratory Diseases Research ((CRDR) Nairobi.
7) Centre for Traditional Medicine and Drug Research (CTMDR) Nairobi.
8) Centre for Vector Biology and Control Research (CVBCR) Kisumu.
9) Centre for Virus Research (CVR) Nairobi.
10) Centre for Geographic Medicine Research, Coast (CGMRC) Kilifi.

Parliamentarians from Japan who visited the Institute recently, pose for a group photograph with senior KEMRI staff among them Director, KEMRI Dr. Davy K. Koech (3rd right).

FINANCIAL RESOURCES

The Institute is mainly funded by the Government of Kenya for both its recurrent and development operations. The Institute also receives substantial financial support by way of research grants, amounting approximately to 40% of its total annual budget, from a number
of international organizations with which it has research collaborative linkages.

HUMAN RESOURCES

KEMRI has one of the highest concentration of staff involved in health research on full time basis in Sub-Saharan Africa. The Institute's human resources capacity is as follows:-

Research Scientists

KEMRI has a large number of highly qualified and experienced biomedical scientists in a wide range of disciplines. There are over 200 research scientists of whom over 100 hold a minimum of masters degrees, more than 50 of them with doctoral degrees, and a few with higher doctorates.

Technical Staff

The number of technical staff has increased from a mere 44 in 1982, to the current number of 250. This is a reflection of the rapid development of the Institute in respect of research capability.

The technical staff include laboratory technologists, public health officers, laboratory technicians, clinical officers, radiographers, nurses and pharmaceutical technologists.

Administrative and other Supportive Cadres

KEMRI has a complement of over 600 members of staff of various administrative and supportive cadres. These include administrative officers, accountants, doctors, engineers, maintenance staff, supplies personnel, medical illustrators and others.

Training

To carry out research investigations successfully, KEMRI offers training to its scientific and support staff to prepare and equip them with the skills necessary to enable them carry out their work competently and efficiently.

Training funds come either directly from the Government or from international aid. Similarly, KEMRI offers training for others at various degree levels upto PhD of local and external universities.

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 Insitute of Medical Research (Ghana), Japan International Cooperation Agency (JICA), International Development Research Centre (IDRC) of Canada, Wellcome Trust (UK), Walter Reed Army Insitute of Research (USA), Centres for Diseases Control (Atlanta) and Royal Tropical Insitute (Netherlands) among others.

Regional Scientific capacity.

KEMRI has made major contributions in the regional scientific capacity. The Insitute 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.

Participants of the Third Country Training during one of their practical sessions in a laboratory at KEMRI. The course exposed health personnel to new techniques on Blood safety.

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.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.

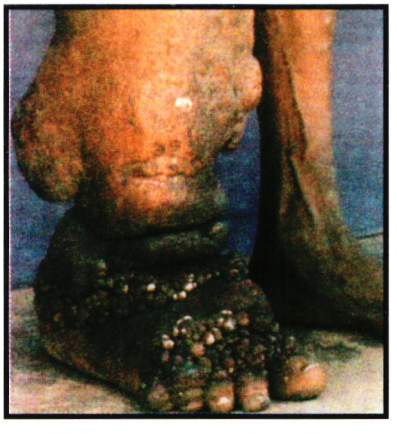
Infection with filarial parasites leads to elephantiasis, a profoundly disfiguring and disabling disease, usually causing lymphoendema of the arm, leg or breast; or hydrocele, an equally grotesque enlargement of the scrotum and enlargement of the female genitalia. In its acute form, the disease can cause 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 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 sequencial 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.



A human leg showing manifestation of elephantiasis a form of the disease caused by microfilariae worms.

The filariais 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 CRM 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%). Com-DT 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 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 socio-cultural 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.

Participants during an international training course on blood safety at the KEMRI Conference Hall.

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 nutritional 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 advantages over other kits in that its reagents are locally produced, does not require electric power, and can test many samples at the same time. The results can also be read visually with the naked eye.

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 infections, 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/AIDS 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

Leishmaniasis 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 characterized 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 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* wether that dominated to reporting period, could mean an upsurge of cases of leishmaniasis in this country.

Work done at the 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 Organization (WHO) for use globally.

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

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 disease 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 desensitized skin partches.

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 research elimination status as defined by WHO.

Stigmatization 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 *plasmodium* protozoa, transmitted by the bites of Anopheles mosquito. 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 kill 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 diseases. 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 in development of anti-malarial drugs policies and adequate disease management.

Recently, 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 Lab-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 metabolized, it is expected that it will produce much less of 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 programs 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 Changes, 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 earlier 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.

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.

A laboratory technologist preparing a TB smear at the KEMRI's Centre for Respiratory Diseases Research.

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 defense 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 may remain suspended in the air for several hours and are potentially infectious.

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. The centre has also identified the emergence of bronchial asthma as a public health problem in Kenya, with the condition being more prevalent in urban 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 afflicts some 200 million people, of whom about 20 million suffer clinical morbidity.

The disease rarely kills but its 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 favored the spread of bilharzia.

Africa carries about 90% of the global burden of schistosomiasis.

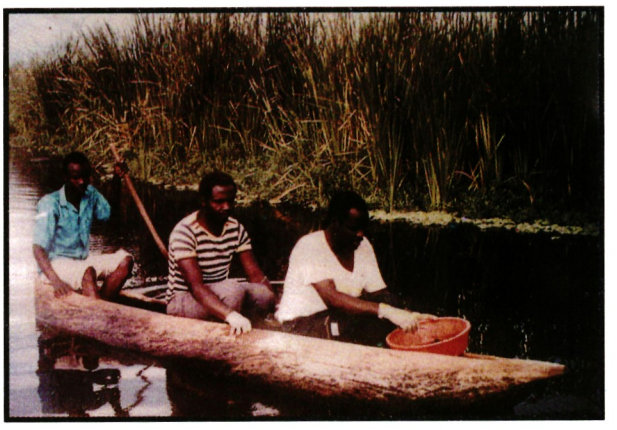
Schistosomes are transmitted through specific water-associated snails. In the snail hosts the bilharzia parasites multiply and develop into larval forms called cercariae. The cercariae are released into water and people become infected when these larval forms penetrate the skin.

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 waters that harbor parasite-infected snails. A key development in the control of schistosomiasis in the world has been the discovery of a safe and effective anti bilharzia drug, -Praziquantel- for the treatment of the disease .

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 persons, 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 and treatment of infected communities.



Research scientists collecting bilharzia infected snails from one of the swamps in Machakos District, Eastern Province

It is also looking for simple and inexpensive methods of control which include snail control using environment 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 schistosoma 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, plant 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 is an effective way of controlling bilhazia 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 MEDICINE AND DRUG PROGRAMME

It is well known that a great majority of people still depend on traditional methods of managing and treating diseases. 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 conventional drugs is derived from natural occurring 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, identify, 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 medicine 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 Organization estimates that 500 million people are chronic carriers in the World.
In Kenya, prevalence varies from region to region but Coastal, Western and North Rift (especially Turkana District) regions have the 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.

A Researcher at the hepatitis laboratory where blood screening for viral hepatitis is done.

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 vaginal 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. Training workshops for its use locally and in the East and Central African region are conducted each year.

The test kit, known as the KEMRI Hepcell, is already in use in all provincial hospital, 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 is low, immunization can be incorporated in the national immunazation programme.

NUTRITION PROGRAMME

The programme has been studying the epidemiology of nutrition disorders with the aim of developing and applying appropriate prevention and control methods. Available data from completed studies revealed significant relationships between nutrition and infection.

The KEMRI'S Centre for Public Health Research (CPHR) is conducting studies on the prevalence and severity of malnutrition with a view to confirming its contribution to productivity and coping capacity of Kenyans. Special consideration is being given to school performance, physical fitness and immunity to various diseases. The case for micronutrients deficiencies (hidden hunger) in relation to vitamin A, iron and iodine is receiving special attention.

The Centre had been conducting controlled studies on school age children, pregnant mothers and infants. Key findings from these studies indicate that the control of parasitic diseases and micronutrient supplementation, supplementation of most school age children is required to bring their nutrition status to normal levels. In this regard, supplemetns based on recommended daily allowance (RDA) are adequate to correct deficiency and maintain optimum values of vitamin A and iron deficits.

During the year the Centre completed a National Survey on Anaemia and Vitamin A, Iron and Zinc among under-five children, mothers and male adults. Findings from prevalence aspects of the study have confirmed major deficiencies that are associated with parasitic disease infections and inadequate dietary intake. Some of the solvent observations include:-

1. Anaemia is a national public health problem in which reduced dietary intake of micronutrients constitute the main background risk facator.
2. There are considerable regional disparities in the prevalence of anaemia. These variations were partly attributed to malaria among pre-school age children and women, and hookworm and bilharzia among older children and adults.
3. Vitamin A deficiency remains an important public health problem in Kenya.
4. High Risk of Zinc deficiency is evident in about half of the sampled population.

Results fromthe survey are also being used to formulate policies that will lead to control of iron deficiency anaemia and zinc deficiency and strengthen vitamin A deficiency control interventions in the country.

It is envisaged that the ongoing micronutrient interventions among post-partum mothers and infants will provide further understanding of the roles and effects of these nutrients and its implication to future vitamin A deficiency control policy strategies. The centre is also involved inthe assessment of specific nutrient formulations and their roles on health and quality of life of people living with HIV/AIDS.

STAFF PUBLICATIONS 2000

1. Arthur G, Bhatt MS, Muhindi D, Achiya GA, Kariuki SM, and Gilks FC: The changing impact of HIV/AIDS on Kenyatta National Hospital, Nairobi from 1988/89 through 1992 to 1997. (2000). *AIDS* 14: 1625-1631.

2 Aitman TJ, Cooper LD, Norsworthy PJ, Wahid FN, Gray JK, Curtis BR, McKeigue PM, Kwiatkowski D, Greenwood BM, Snow RW, Hill AV, and Scott J, Malaria susceptibility and CD36 mutation. *Nature;* 2000; **405:** 6790, 1015-6.

3. Ayisi JG, van Eijk AM, ter Kuile FO, Kolczak MS, Otieno JA, Misore AO, Kager PA, Steketee RW, Nahlen BL. Risk factors for HIV infection among asymptomatic pregnant women attending an Antenatal clinic in western Kenya. *Int J STD AIDS.* 2000 Jun; **11**(6): 393-401

4. Barber KE, Mkoji GM, Loker ES. PCR-RFLP analysis of the ITS2 region to identify *Schistosoma haematobium* and *S. bovis* from Kenya. *American Journal of Tropical Medicine and hygiene,* 2000; **62**(4): 434-440.

5. Brooker S; Guyatt H, Omumbo J; Shretta R, Drake, L. and Ouma J. Situation analysis of malaria in school-aged children in Kenya: what can be done? *Parasitology Today;* 2000; **16**: 183-186.

6 Brown GV, Beck HP, Molyneux M, and Marsh K., Molecular approaches to epidemiology and clinical aspects of malaria. *Parasitology Today;* 2000;**16:** 10, 448-51.

7. Bull PC. Kortok M, Kai O, Ndungu F, Ross A, Lowe BS, Newbold CI. and Marsh K, *Plasmodium falciparum-Infected* Erythrocytes: Agglutination by Diverse Kenyan Plasma Is Associated with Sever Disease and Young Host Age. *J. Infect Dis,* 2000; **182:** 1; 252-259.

8. Cabre P, Smedja D, Cabie A. and Newton CR, HTLV-1 and HIV infections of the central nervous system in tropical areas. *J Neurol Neurosurg Psychiatry,* 2000; **68**: 5, 550-7.

9. Chandre F. Darriet F, Duchon S, Finot L, Manguin S, Carnevale P, Guillet P Modifications of pyrethroid effects associated with kdr mutation in Anopheles gambiae. *Med Vet Entomol.* 2000 Mar; **14**(1):81-8

10. Collins FH, Kamau L, Ranson HA, Vulule JM, Molecular entomology and prospects for malaria control. *Bulletin of the World Health Organization,* 2000; **78**(12): 1412-1423

11. Corbett LC, Githui W, McGee L, Churchyard GJ, Benhamn M, Molloi N, De Cock KM, Butterwroth AE, Drobniewski FA, Blumberg L. Local homogeneity of disease associated *Mycobacterium kansasii* isolates in three high incidence gold mining workforces. *Am. J Respir Crit Care Med,* 2000

12. CrawleyJ, Kokwaro G, Ouma D, Watkins W, and Marsh K. Chloroquine is not a risk factor for seizures in childhood cerebral malaria *Trop Med Int Health,,* 2000; **5:**12, 860-4.

13. Crawley J, Waruiru C, Mithwani S, Mwangi I, Watkins W., Ouma D, Winstanley P., Peto T, and Marsh K. Effect of Phenobarbital on seizure frequency and mortality in childhood cerebral malaria: a randomized; controlled intervention study. *Lancet,* 2000; **355:** 9205, 701-6

14.Curtis CF, Mnzava AE. Comparison of house spraying and insecticide-treated nets for malaria control. *Bull World Health Organ.* 2000; **78**(12):1389-400. Review

15.Dobbie M, Crawley J, Waruiru C., Marsh K, and Surtees R Cerebrospinal fluid studies in children with cerebral malaria: an excitotoxic mechanism? *Am J Trop Med Hyg, .,* 2000; **62**: 2, 284-90.

16.Dobson MJ, Malowany M., and Snow RW, Malaria control in East Africa: the Kampala Conference and the pare- Taveta Scheme: a meeting of common and high ground. *Parasitologia,* 2000; **42**: 1-2, 149-66.

17. Doenhoff M, Kimani G, Cioli D.Praziquantel and the control of schistosomiasis. *Parasitology Today*, 2000; **16**(9): 364-366.

18.Dorman, EK, and Shulman CE. Malaria in pregnancy current *Obstetrics and Gynecology*: 2000; **10:** 4; 183-189.

19. Farrar J. and Newton C., Neurological aspects of tropical disease *J Neural Neurosurg Psychiatry*, 2000; **68**: 2, 135-6.

20.Githeko AK, Lindsay SW, Confalonieri UE, Patz JA. Climate change and vector-borne diseases: a regional analysis *Bull World Health Organ.*2000; **78**(9): 1136-47. Review

21.Githui WA, Hawken M, Juma ES; Godfrey-Fausett P., Swai OB; Kibuga DK., Porter J, Wilson SM., Brobniewski F. Surveillance of drug resistant tuberculosis and molecular transmission of resistant strains in refugee and non refugee populations in North Eastern Kenya. *A. Int J Tuberc Lung Dis;* 2000; **2**:235-241,.

22.Githui W, Issues facing TB control: Diagnositic Issue: problems of Diagnostic Facilities in developing countries. *Scot Med J*, 2000;**45** (supp 1) 44-46.

23.Glynn JR, Buve A, Carael M, Kahindo M, Macauley IB, Musonda RM, Jungmann E,Tembo F, Zekeng L.Decreased fertility among HIV-1-infected women attending antenatal clinics in Three African cities.*J Acquir Immune Defic Syndr.* 2000 **1**;25(4):345-52.

24.Guyatt HL, Brooker, S., Peshu N. and Shulman CE. Hookworm and anaemia prevalence. *Lancet*, 2000; **356**: 9247, 2101

25. Hart CA, Beeching NJ, Duerden BI, Curry A, French N, Kariuki S, Graham SM, Gordon MA, Hoggard PG, Kewn S, Back DJ, (2000). Infections in AIDS J. Med. Microbiol. 49(11) 947-967.

26.Hay SI, Toomer JF., Rogers DJ. and Snow, RW, Annual entomological inoculation rates (EIR) across Africa: Literature survey, internet access and review. *Trans. Roy. Soc. Trop. Med. Hyg.*, 2000; **94:** 113-127.

27.Hay SI, Omumbo J., Craig MH, and Snow EW., Earth observation, geographic information systems and *plasmodium falciparum* malaria in sub-Sahara Africa. *Advances in Parasitology*, 2000; **47**: 175-217

28.Hay SI, Myers MF., Burke DS., Vaughn DW., Endy T, Ananda N, Shanks GD., Snow RW, and Rogers DJ, Etiology of interepidemic periods of mosquito-borne disease. *Proc Nati Acad Sci U S A*, 2000; **97**: 9335-9

29. Hay S I. An overview of remote sensing and geodesy for epidemiology and public health application. *Advances in Parasitology*, , 2000; **47:** 1-35

30.Heyndrickx L, Janssens W, Zekeng L, Musonda R, Anagonou S, Van der Auwera G, Coppens S, Vereecken K, De Witte K, Van Rampelbergh R, Kahindo M, Morison L McCutchan FE, Carr JK, Albert J, Essex M, Goudsmith J, Asjo B, Salaminen M, Buve A, van Der Groen G. Simplified strategy for detection of recombinant human immunodeficiency virustype 1 group M isolates by gag/env heteroduplex mobility assay. Study Group on Heterogeneity of HIV Epidemics in Africa Cities *J Virol.*2000 Jan; **74**(1): 363-70

31. Horton J, Witt C, Ottesen EA, Lazdins JK, Addiss DG, Awadzik K, Beach MJ, Belizario VY, Dunyo SK, Epsinel M, Gyapong JO, Hossain M, Ismail MM, Jayakody RL, Lammie PJ, Maknde W, Richard-Lenoble D, Selve B, Shenoy RK, Simonsen PE, Wamae CN, Weeranooriya MV, 2000: Analysis of the safety of the single dose, two drug regimens used in Programmes to eliminate lymphatic filariasis. *Parasit.* **121:** 5147-5160.

32. Howard SC., Omumbo, J., Nevill, C., Some E., S., Donnelly, C.A. and Snow, R.W., Evidence for a mass community effect of insecticide treated bednets on the incidence of malaria on the Kenyan coast. *Trans R Soc Trop Med Hyg*, 2000; **94**: 4, 357-60.

33. Kariuki S, Gilks C., Revathi G, Hart CA, (2000) Genotypic analysis of multidrug resistant Salmonella enterica Serovar Typhi, Kenya. *Emerg. Infect. Dis.* **6**(6): 649-651.

34. Kariuki S, (2000) Our milk and meat: How safe are they? Editorial, *E. Afr Med J.* **77**(9): 461-462.

35. Kariuki S, Oundo JO, Muyodi J, Lowe B, Threlfall EJ, Hart CA, 2000. Genotypes of multidrug-resistant Salmonella enterica serotype typhimurium from two regions of Kenya. *FEMS immunol and Med Microbiol.* **29**: 9-13

36. Kakimoto K., and Songok EM., Influence of HIV infections on the infant mortality rate and feasibility of short-course zidovudine (ZDV) regimen for prevention of HIV vertical transmission in rural Western Kenya.*Acta. Obst. Gynae. Jpn* (Japanese) 2000; **52:**1623-1629.

37. Lawn SD, Karanja DM, Mwinzi PN, Andove J, Colley DG, Folks TM, Secor WE. The effect of treatment of schistosomiasis on blood plasma HIV-1 RNAConcentration in coinfected individuals *AIDS.* 2000 Nov 10; **14**(16): 2437-43

38. Lodenyo H. Schoub B., Ally R., and Kaibu S, Hepatitis B and C virus infections and liver function in AIDS patients at Chris Hani Baragwanath Hosptial, Johannesburg. *East African Medical Journal,* January 2000: **77**(1)13-15.

39. Mbati PA. Anjili CO, Odongo S, Tonui WK, *Leishmania major* infections in Phlebotomus duboscqi fed on murine models immunized with L. major subcellular antigens and sandfly gut antigens. *Ondersteport Journal of Veterinary Research.* 2000; **67**:57-63

40. Mberu EK, Mosobo MK,. Nzila AM., Kokwaro GO., Sibley CH., and Watkins WM, The changing in *vitro* susceptibility pattern to pyrimethamine/sulfadoxine in *Plasmodium falciparum* field isolates from Kilifi, Kenya. *Am J Trop Med Hyg,* 2000; **62**: 3, 396-401.

41. Mirza S., Kariuki S., Mamun KZ., Beeching, NJ., and Hart CA. Analysis of plasmid and chromosomal DNA of multidrug resistant salmonella enterica serovar typhi from asia. *J Clin Microbiol,* 2000; **38**: 4, 1449-1452.

42. Morgan U, Weber R, Xiao L, Sulaiman I, Thomson RCA, Ndiritu W, Lal A, Moore A, Deplazes P. 2000. Molecular charactyerization of Cryptosporidium isolates obtained from Human Immunodefficiency Virus Infected individuals living in Switzerland, Kenya and the United States. *J. Clinic. Microbiol;* 1180-1183

43. Mwandawiro C, Boots M, Tuno N, Suronkerd W, Tsuda Y, Takagi M, 2000. Heterogeneity in the host preference of Japanese encephlitis vectors in Ching Mai, Northern Thailand. *Trans. Royal Society Tropical Medicine and Hygiene;* **94:** 238-242

44. Mwobobia IK, Muniu EM, Kombe Y and Wamae CN: Hydorcelectomy: a proxy for hydrocele prevalence in coastal Kenya. *Ann.Trop. Med. And Parasit.* Vol. **94**, 5: 479-484, 2000.

45. Myers M F., Rogers DJ., Cox J., Flahault A and Hay SI., Forecasting disease risk for increased epidemic preparedness in public health. *Advances in Parasitology,* 2000; **47**: 309-330.

46 .Newton CR, Hien TT, and White N, Cerebral Malaria. *J Neurol Neurosurg Psychiatry,* 2000; **69**: 4. 433-41.

47. Ngare DK, Muttunga JN and Njonge E. Vitamin A deficiency in pre-school children in Kenya. *EAMJ* **77**(8): 421-424, 2000.

48. Njenga SM, Muita M, Kirigi G., Mbugua J, Mitsui Y., Fujimaki Y. and Aoki Y. *Bancroftain filariasis* in Kwale District, Kenya. *East African Medical Journal* (2000; **77** (5) 245-249.

49. Njenga SM, Wamae CN,2000. Evaluation of ICT filariasis card using whole capillary blood: Comparison with Knott's concentration and counting chamber methods. *J. Parasitol.*, **87**(5): 1140-1143.

50. Nzila AM, Nduati E, Mberu EK, Hopins Sibley C., Monks SA., Wistanely PA., and Watkins, WM; Molecular evidence of greater selective pressure for drug resistance exerted by the long-acting antifolate. Pyrimethamine/Sulfadoxine compared with the shorter-acting chlorproguanil/dapson on Kenyan *Plasmodium falciparum. J Infect Dis, 2000;**181:** 6, 2023-8..*

51. Nzila AM., Mberu EK., Sulo J., Dayo H, Winstanley PA., Sibley CH., and Watkins WM., Towards an understanding of the mechanism of pyrimethamine-sulfadoxine resistance in *plasmodium falicparum:* genotyping of dihydrofolate reductase and

dihydropteroate synthase of Kenyan parasites [In Process Citation] *Antimicrob Agents Chemother*, 2000; **44**: 4, 991-6.

52. Ogutu BR., Smoak BL., Nduati RW., Mbori-Ngacha DA., Mwathe F., and Shanks GD The efficacy of pyrimethamine-sulfadoxine (fansidar) in the treatment of uncomplicated *Plasmodium falciparum* malaria in Kenyan children [In Process Citation]. *Trans R Soc Trop Med Hyg;* 2000; **94**: 1, 83-4

53. Oketch-Rabah HA., Mwangi JW., Lisgarten J., and Mberu EK., A new antiplasmodial coumarin from Toddalia asiatica roots. *Fitoterapia*, 2000; **71**: 6; 636-40.

54. Omumbo J., Information technology tools for malaria control in Kenya. *Christian Health Association of Kenya (CHAK) Times* 2000; **4**: 7-8

55. Ondimu KN, Severe anaemia during pregnancy in Kisumu District of Kenya:prevalence and risk factors. *Int J Health Care Qual Assur Inc Leaders Health Serv.* 2000; **13**(4-5) 230-4.

56. Orwa JA, Roets E, Busson and Hoogmartens J,. Isolation and charaterization Pf some minor components of clistin. *The 9th Forum of Pharmaceutical Sciences*, 6-7 April 2000, Blakenberg, Belgium.

57. Orwa JA , Roets E, and Hoogmartens J, Investigation of stability of Polymyxin B,. *24th International Symposium on High Performance Liquid Phase Seperations and Related Techniques HPLC* 2000, 26-30 June 2000, Seattle, Washington, U.S.A.

58. Oundo,JO., Kariuki S, Maghenda JK., andLoweBS., Antibiotic susceptibility and genotypes of non-typhi Salmonella isolates from children in Kilifi on the Kenya Coast [In Process Citation] *Trans R Soc Trop Med Hyg*, 2000; **94**: 2, 212-215.

59. Raahauge P, Kristensen TK A comparison of Bulinus africanus group species (Planorbidae; Gastropoda) by use of the internal transcribed spacer 1 region combined by morphological and anatomical characters.*Acta Trop.* 2000 Feb 25; **75**(85-94.

60. Radwen HC, Kokwaro GO, Ward SA. and Edwards G. Relative contribution of cytochrome P-450 flavin-containing monoxygenases to the metabolism of albendazole by human liver microsomes. *British Journal of Clinical Pharmacology*, 2000; **49**: 313-322.

61. Rana FS, Hawken M P., Mwachari C, Bhatt SM. Abdallah F, Ng'anga LW., Power C., Githui WA., Porter JDH., and Lucas SB., Autopsy Study of HIV-1-Positive and HIV-1-Negative Adult Medical Patients in Nairobi, Kenya. *JAIDS*, ,2000. **24**: 23-29.

62. Reimert C.M. Mshinda HM, Hatz CF, Kombe Y, Nkulila T, Poulsen LK, Christensen NO, and Vennervald BJ, Quantitative assessment of eosinophilia in schistosoma haematobium infections: A new marker of infection and bladder morbidity. *Am.J. Trop. Med. Hyg.*, 62(1) 19-28, 2000.

63. Roberts DJ., Pain A., Kai O., Kortok M., and Marsh K., Autoagglutination of malaria-infected red blood cells and malaria severity [letter] *Lancet*, 2000; **355**: 9213, 1427-8.

64. Rowe JA., Rogerson SJ., Raza A., Moulds JM. Kazatchkine MD., Marsh K., Newbold CI., Atkinson JP., and Miller LH., Mapping of the region of complement receptor (CR) I required for *Plasmodium falciparum* rosetting and demonstration of the importance of CR1 in rosetting in field isolates. *J Immunol*, 2000; **165**: 11, 6341-6.

65. Rukunga GM., Kofi-Tsekpo WM, Mkoji GM., Ofulla AVO., Chege GMK., GithureJI., An *in-vitro* anti-malarial activity of the extracts obtained from Aadirachta indica. *The 8th International Centre for Insect Physiology and Ecology (ICIPE)* Neem (Azadirachta indica) workshop on the way forward: "Contributing to Wealth Creation in Africa"., Nairobi, 1-5 May 2000.

66. Rukunga GM., The potential of Kenya plants as source of drugs. Presented at the *Commonwealth Secretariat Medicinal Plants forum for Commonwealth Africa* held in Cape Town, South Africa, 3-6 December, 2000.

67. Rukunga GM.,The Multidisciplinary approach in evaluating traditional medicines. Presented at the *International Conference on Traditional Medicines*,

Medicinal Plants & Local Communities in Africa held at ICRAF, Nairobi, 16-19 May 2000.

68. Schoone GJ, Oskam L, Kroon NC, Schaling HD, Omar SA. Detection and quantification of *Plasmodium falciparum* in blood samples using quantitative nucleic acid sequence-based amplification. *Journal of Clinical Microbiology*, 2000; **38**(11): 4072-4075.

69. Scott JA., Hall AJ., Muyodi C., Lowe B., Ross M., Chohan B., Mandaliya K., Getambu E., Gleenson F., Drobniewski F., and Marsh K., Aetiology outcome, and risk factors, for mortality among adults with acute pneumonia in Kenya. *Lancet*, 2000; **355:** 9211, 1225-30.

70. Scott JA., Hall AJ. and Leinonen M., Validation of immune-complex enyme immunoassays for diagnosis of pneumococcal pneumonia among adults in Kenya. *Clin Diagn Lab Immunol*, 2000; **7:** 1, 64-7

71. Senthabutr O, Venkatesan M, Yam S, Pang LW, Smoak BL, Sang WK, Escheverria P, Taylor DN, Isenberger DW., 2000. Detection of PCR products of the ipah gene from Shigella and entero-invasive Escherichia coli by Enzyme Linked Immunosorbent Assay. *Diagnost microbiol. Infect Dis.* **37**: 11-16.

72. Shanks GD., Biomndo K Hay SI., and Snow RW. Changing patterns of clinical malaria since 1965 among a tea estate population located in the Kenyan highlands *Trans R Soc Trop Med Hyg*, 2000; **94**: 3, 253-5

73. Shretta R, Omumbo J., Rapuoda B. and Snow RW., using evidence to change antimalarial drug policy in Kenya. *Trop Med Int Health*, 2000; **5**: 11, 755-64

74. Shretta R., Brugha R., Robb A., Snow ES., Nevill C., Donnelly CA.and show RW., Sustainability, affordability and equity of corporate drug donations: the case of Malarone. *Lancet*, 2000; **355:** 1718-1720

75. Sirgel FA, Donald PR, Odhiambo J, Githui W, Umapthy KC, Paramasivan CN, Tam CM, Kam KM, Sole CW, Mitchison DA, and EBA Collaborative study Group. A multi-centre study of early bactericidal activity of anti-tuberculosis drugs. *J. Antimicrobial Chemo* 2000; **45**, 859-870,

76. Snow RW., Hoard SC., Mung'ala-Odera V., English M., Molyneux CS., WaruiruC., Mwangi I., Roberts DJ., Donnelly CA., and Marsh K., Paediatric survival and re-admission risks following hospitalization on the Kenyan coast. *Trop Med Int Health*, 2000; **5**: 5, 377-83

77. Snow RW., The burden of malaria: understanding the balance between immunity, public health and control. *J. Med Microbiol.* 2000; **49**: 12, 1053-5

78. Sowunmi A. Newton CR., Waruiru C., Lightman S., and Dunger, DB., Arginine vasopressin secretion in Kenyan children with severe malaria. *J. Trop Pediatr*, 2000; **46:** 4, 195-9.

79. Wamae CN and Mbugua GG. Intergrated parasitic diseases control programme and the community role in sites with multiple spacies of helminth infections. (letter) 2000. *East Afr Med J*, Nov, 2000, **631.**

80. Wamae CN, Mwanza J, Makam S. 2000. Palmor pallor as an indicator for anthelmintic treatment for ill children aged 2-4 years in Western Kenya. *MMWR* **49**: 13, 278-281.

81. Wamae CN, Njenga SM, Mukoko DN, Gyapong J, Gyapong M, Owusu Bonahene G., 2000. Community directed treatment of lymphatic filariasis in Africa. *Report of a multi-centre study in Ghana and Kenya.* TDR/IDE/RP/CDR/00.2

REPORT OF THE AUDITOR GENERAL (CORPORATIONS) ON THE ACCOUNTS OF KENYA MEDICAL RESEARCH INSTITUTE FOR THE YEAR ENDED 30TH JUNE 2000.

I have examined the Accounts of Kenya Medical Research Institute for the year ended 30th June 2000 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 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 matters set out here below, the Accounts, when read together with the Notes thereon, present fairly the financial state of affairs of the Institute as at 30th June 2000 and of its excess of expenditure over income for the year then ended.

1. STAFF HOUSING PROJECT

In the reports for previous years reference was made of the unsatisfactory manner in which the Institute handled a staff housing project on Plot No. LR 209/10683, Mbagathi Road, Nairobi which was then estimated to be completed by February 1991 at a cost of Kshs. 165 million. The project was, thereafter, abandoned but after the contractor, had been paid a total of Kshs. 101,727,177. It was also indicted that Government paid a further amount of Ksh 280 million to the developer's account in respect of the same Project and on behalf of KEMRI on 20 April 1993 which brought total payments on the project to Kshs. 381,727,177. A review of the position in 2000/2001 showed that the Project has still remained stagnant even though an amount of Kshs 142,000,000 was released by Government to KEMRI in the year 2000 towards settlement of the outstanding debt with National Bank of Kenya and, therefore, revival of the Project. Out of Kshs. 142,000,000 received from the Government the Institute deposited Kshs. 120,000,000 with its lawyers for onward transmission to the National Bank of Kenya but after the correct pending amount payable to the Bank on behalf of the developer had been agreed. Todate the deposit of Ksh 120 million is still held by the lawyers out of which Ksh 27,327,697 was reportedly and irregularly spent to pay City Council rates and land rent in April, 2000. In the cirucumstances, therefore, and apart from the fact that immediate revival of the Project continues to remain doubtful, when releasing the amount of Kshs. 142 million to KEMRI, Government intended to not only get the dispute between the Bank and the developer resolved and the Project revived and completed but also to avoid further escalation of the cost of the Project arising from further interest charges on the outstanding loan. It is, however, understood that as per the Public Investment Committee's directive during its last sitting and discussion on KEMRI's Accounts that the issue be resolved speedily, the matter is now under active negotiation between the Bank, the developer and KEMRI and that a solution, including release to KEMRI of the title deed for the property is expected.

2. PENSION SCHEME CONTRIBUTIONS

Between the period 01 July 1983 and 30th April 1996 the Institute remitted Staff Pension Scheme contributions amounting to Kshs. 97,930,600 to the Kenya National Assurance Company Limited (now in Receivership). The Institute has, to date, neither received payment of these contributions from the Receivers of Kenya National Assurance Company Limited nor has it provided details of the pensioners and their respective balances in relations to the above contributions.

3. ABANDONED PROJECT

The Balance Sheet Fixed Assets figure of Kshs 1,089,033,849 includes Kshs 5,375,472, being the Institute's contribution towards a joint project with Kenya Trypanosomiasis Research Institute (KETRI) which in 1987 was contracted at a cost of Kshs 28,785,039 but which was later abandoned when it was only 37% complete. A review of the Project's position during the year 1999/2000 showed that the Project was still stalled even though KEMRI had reportedly taken over their portion of the houses. In the meantime, the stalled Project continues to deteriorate and may have to cost much more than originally planned when eventually revived and completed.

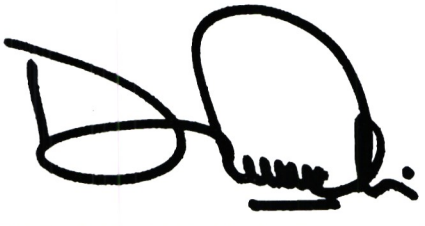
S.M. MALUKI
AUDITOR GENERAL (CORPORATIONS)

11 January, 2002.

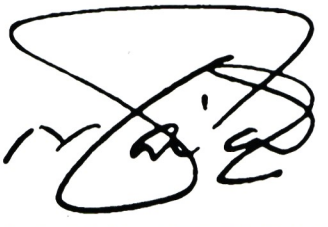
KENYA MEDICAL RESEARCH INSTITUTE

BALANCE SHEET AS AT 30TH JUNE 2000

	Notes	1999/2000 (Ksh.)	1998/1999 (Ksh.)
Assets Employed			
Fixed Assets	1	1,061,579,088	1,066,776,556
Current Assets:			
Debtors	4	121,526,583	2,581,151
Standing Imprest	6a	289,790	194,790
Temporary Imprest	6b	394,736	779,544
Unexpended Balance on Special Accounts & Grants	7	60,646,656	33,892,684
Cash & Bank Balance	8	25,751,814	14,610,167
Total Current Assets		**208,609,579**	**52,058,336**
Less:			
Current Liabilities			
Creditors	5	2,237,935	5,986,942
Deposits, Special Accounts & Grants	7	**60,646,656**	**33,892,684**
Total current Liabilities		**62,884,591**	**39,879,626**
Net current Assets		**145,724,988**	**12,178,710**
		1,207,304,076	**1,078,955,266**
Financed by:			
Accumulated Fund	9	**1,207,304,076**	**1,078,955,266**



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



DR.M.S. ABDULLAH
CHAIRMAN

September 25, 2000

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30TH JUNE 2000

	1999 / 2000 (Ksh.)	1998 /1999 (Ksh.)
MOH Grants	282,737,024	297,768,830
Special Accounts and Grants	228,555,070	99,665,458
JICA Operational Grants	18,470,847	12,385,544
	529,762,941	**409,819,832**
Personal emoluments	134,282,054	132,732,158
Pension and Gratuity	6,452,329	18,041,899
House Allowance	23,097.665	22,884,681
Other Allowances	14,648,383	14,919,825
Medical Allowances	12,575,202	12,657,318
Passage & Leave Expe.	787,264	953,158
Medical Expenses	2,912,850	5,857,935
Refund of Medical Exp. -Ex-Gratia	1,332	2,133
Transport Operating Expenses	9,841,277	11,314,895
Travelling and Accommodation	1,339,992	1,727,160
External Travel & Accommodation	567,485	1,251,914
Postal and Telegrams Expenses	361,527	413,305
Telephone Expenses	5,994,276	8,849,357
Official Entertainment	1,808,027	1,233,620
Exp. Of Board, Committees & Conferences	2,547,027	1,511,036
Electricity Expenses	11,792,993	8,478,493
Water & Conservancy	7,946,206	4,527,303
Laboratory Reagents and Supplies	59,516	17,029
Purchase of Drugs and Dressings	2,214,188	2,606,321
KEMRI /JICA Project	3,748,085	3,840,227
Food and Rations	65,751	322,494
Feeds for Animals	369,739	319,409
Publishing & Printing Exp.	301,367	540,503
Uniforms and Clothing	339,960	170,430
Library Expenses	191,067	323,087
Purchase of Stationery	6,608,652	5,680,164
Advertising & Publicity	147,438	707,108
Rents and Rates	20,408,330	17,194,186
Computer Expenses	905,358	250,462
Miscellaneous & Other Charges	530,530	1,112,337
Special Accounts & Grants	228,555,070	99,665,458
Insurance Expenses	6,504,551	6,438,665
Fees, Commission & Honoraria	-	22,000
Training Expenses	254,970	281,293
Purchase of Medical Equipment	-	59,277
Purchase of Office Equipment	-	41,562
Maintenance of Plant Machinery & Equipment	2,757,564	3,241,793
Maintenance of Building & Stations	4,470,685	3,195,904
Minor Works	-	16,400
Office Building Expenses	-	77,805
JICA Operational Cost	8,470,847	12,385,544
Loss on disposal (NBV)	583,000	464,000
Total expenses before depreciation	**534,442,557**	**406,329,648**
Excess of Exp. over Income Before Depreciation	**(4,679,616)**	**3,490,184**
DEPRECIATION EXPENSES		
Office Buildings	3,347,643	
Residential Buildings	1,860,446	
Motor Vehicles	2,732,309	2,605,722
Office & Laboratory Equipment	8,838,591	8,654,022
Office Furniture	222,036	214,673
	17,001,025	**11,474,417**
Excess of Expenditure over Income	**(21,680,641)**	**(7,984,233)**

CASH FLOW STATEMENT
FOR THE YEAR ENDED 30TH JUNE 2000

	NOTE	1999/2000 (Kshs)	1998/1999 (Kshs)
Cash Flows from Operating Activities			
Deficit for the year		(21,680,641)	(7,984,233)
Adjustments for:-			
Depreciation		17,001,025	11,474,417
Loss on Disposal		583,000	464,000
Deficit before working capital changes		**(4,069,616)**	**(3,954,184)**
Increase in Debtors		(118,945,432)	(1,696,874)
(Decrease) /Increase in Standing Imprest		(95,000)	548,210
Decrease in Temporary Imprest		384,808	472,046
(Increase)/Decrease in creditors		(3,749,007)	3,358,331
Net cash (used up by) generated from Operating Activities		**(126,501,247)**	**6,635,897**
Cash Flows from Financing Activities Motor Vehicle Purchase Grant		560,000	-
Capital Grants and grant in aid from donors		150,060,951	162,756,794
Net Cash From Financing Activities		**150,620,951**	**162,756,794**
Cash Flows From Investing Activities			
Purchase of Fixed Assets		(13,078,057)	(164,829,672)
Motor Vehicle Sale Proceeds		100,000	-
Net Cash From Investing Activities		**(12,978,057)**	**(164,829,672)**
Net Increase in Cash and Cash Equivalent		11,141,647	4,563,019
Cash and cash equivalent at the beginning of the year		14,610,167	10,047,148
Cash and Cash equivalent at the end of the year		**25,751,814**	**14,610,167**

SCHEDULE OF FIXED ASSETS.

ITEM	LAND (KSHS)	OFFICE BUILDINGS (KSHS)	RESIDENTIAL BUILDINGS (KSHS)	MOTOR VEHICLES (KSHS)	OFFICE & MEDICAL EQUIPMENT (KSHS)	OFFICE FURNITURE (KSHS)	TOTAL (KSHS)
Cost B/F	131,175,500.00	334,764,308.00	300,065,136.00	52,114,428.00	346,160,861.00	8,587,050.00	1,172,867,283.00
Additions	-	-	1,439,105.00	3,961,750.00	7,382,818.00	294,384.00	13,078,057.00
Disposals	-	-	-	(1,430,000.00)	-	-	(1,430,000.00)
	131,175,500.00	**334,764,308.00**	**301,504,241.00**	**54,646,178.00**	**353,543,679.00**	**8,881,434.00**	**1,184,515,340.00**
DEPRECIATION							
Accumulated	-	17,925,680.00	4,320,992.00	20,248,280.00	59,631,794.00	3,963,981.00	106,090,727.00
Charge for the yr	-	3,347,643.00	1,860,446.00	2,732,309.00	8,838,591.00	222,036.00	17,001,025.00
Disposals	-	-	-	(155,500.00)	-	-	(155,500.00)
	-	**21,273,323.00**	**6,181,438.00**	**22,825,089.00**	**68,470,385.00**	**4,186,017.00**	**122,936,252.00**
Net Book Value							
30-6-2000	131,175,500.00	313,490,985.00	295,322,803.00	31,821,089.00	285,073,294.00	4,695,471.00	1,061,579,088.00
30-6-1999	131,175,500.00	316,838,628.00	295,744,144.00	31,866,148.00	286,529,067.00	4,623,069.00	1,066,776,556.00

NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 30TH JUNE 2000

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 Accrual 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.

Building	- Office and Residential	1.0%
Equipment	- Office and Medical	2.5%
Office Furniture	-	2.5%
Motor Vehicles	-	5.0%

2. ACQUISITIONS

(a) Donor Funded

(i) During the year ended 30th June 2000 the Institute received medical and other equipment worth Kshs. 6,560,951.25 of which Japan International Cooperation Agency's contributions was Kshs. 1,131,760.00. The contributions are as classified below:

	Item	Amount (Kshs)
*	Office Furniture	204,704.95
*	Medical equipment	6,356,246.30
		6,560,951.25

(ii) A replacement vehicle for KIT Project was acquired for Kshs. 560,000.00 from sale proceeds of a vehicle previously owned by the same project.

(b) Exchequer Funded

Capital expenditure incurred by the institute from exchequer funds was as follows:

Item	Amount (Kshs)
* Office Furniture	89,679.05
* Medical Equipment	1,026,571.70
* Motor Vehicles	3,401,750.00
* Residential Buildings	1,439,105.00
Total	**5,957,105.75**

3. APPROPRIATION IN AID

As at 30th June 2000, Kshs. 496,944.80 had been received being economic rent from Institutional leased houses occupied by staff and from miscellaneous sources.

4. DEBTORS

Included in the balance is Kshs. 120,000.00 deposited with our advocates as commitment to settlement of outstanding accounts on the Staff Housing Project. The balance also includes personal and medical advances, deposits to hospitals and office rent due from the Commission of Inquiry into The Education System in Kenya.

5. CREDITORS

Creditors include SACCO's, SAYE, NSSF, PAYE, NHIF, KESWA, LASC and other Creditors.

6. IMPRESTS

a) Temporary Imprest outstanding as at 30th June 2000 amounted to Kshs. 394,736.35

b) Standing Imprets to Centres stood at Kshs. ,289,790.35.

7. SPECIAL ACCOUNTS AND GRANTS

The unexpended balances on Special Accounts and Grants totaling Kshs. 60,646,656.00 represent donor funds held on their behalf at the balance sheet date.

8. CASH AND BANK BALANCE

The closing balance is composed of cash at hand of Kshs. 17,877.90 and cash at bank of Kshs. 25,733,936.60.

9. ACCUMULATED FUND

The fund is build and analysed as follows:

	Ksh.
¨ Balance brought forward 1.7.1999	1,078,955,266.00
¨ Excess Expenditure over Income	(21,680,641.00)
¨ Reduction in capital employed	(31,500.00)
¨ Support from Donors (Acquisition)	6,560,951.00
¨ Capital Grants	1 43,500,000.00
Total	**1,207,304,076.00**

10. EXCHEQUER ISSUES

During the year the institute received **Kshs. 282,737,024.00** towards meeting revenue expenditure and **Kshs. 143,500,000.00** as development funds.

11. BUILDINGS

During the year, the Institute spent **Kshs.1, 439,105.00** on residential buildings. This cost is recognized in the accounts.

UNEXPENDED BALANCES ON SPECIAL ACCOUNTS AND GRANTS.

	Balance at 1-7-99 (Kshs)	Received During the year (Kshs)	Expenditure During the year (Kshs)	Balance at 30-6-2000 (Kshs)
US Embassy - USAMRU Project	2,347,033.95	60,704,377.70	49,891,252.95	13,160,158.70
US Embassy-CDC Project	3,632,055.00	65,535,813.50	56,122,206.10	13,045,662.40
US Government Treasury-other	441,502.20	21,925,612.55	14,087,368.50	8,279,746.25
Case Western University	483,843.45	2,653,964.25	3,487,807.55	(349,999.85)
Commonwealth Secretariat	(138,780.10)	1,312,288.65	268,754.40	904,754.15
World Health Organization	13,776,449.65	29,827,489.65	32,593,640.00	11,010,299.30
Carnegie Corporation	26,257.60	-	26,257.60	-
UNICEF	441,481.60	5,418,383.50	4,887,228.25	972,636.85
Royal Tropical Institute	1,100,549.60	9,314,166.25	9,085,610.65	1,329,105.20
University of New Mexico	(364,774.00)	3,580,220.10	3,660,945.70	(445,499.60)
African Medical Services Trust	-	3,530,000.00	4,704,298.05	(1,174,298.05)
Glaxo Smithkline	-	4,950,148.55	3,293,521.95	1,656,626.60
Miscellaneous	12,147,065.50	46,556,574.85	46,446,176.70	12,257,463.65
TOTALS	**33,892,684.45**	**255,309,039.55**	**228,555,068.40**	**60,646,655.60**