③ 短期専門家（AIDS 検査キット製作）報告書

JICA／ケニア感染症研究対策プロジェクトの現地視察団（ミッション）に随行した短期専門家としてのケニア／ナイロビ出張報告

短期専門家　笠原　靖

【出張期間】1996 年 1 月 20 日（土）～1 月 30 日（火）

【目的】

JICA 派遣の短期専門家としてミッションに随行し、依頼された当社［富士レビオ(株)］の HIV-1PA の技術導出プロジェクトに関し、現地の状況、要求されている当社の貢献の仕方、また受入側の現地 JICA・ケニア日本大使館とケニア政府付属研究所（KEMRI ／ケニア医学研究所）の受入体制、設備、現地の技術、メンバー等を確認した。

【ミッションメンバー】

千葉峻三　（札幌医科大学医学部教授、団長）
栗村敬　（大阪大学微生物病研究所教授）
矢野右人　（国立長崎中央病院臨床研究部長）
三好克哉　（JICA）

【短期専門家】

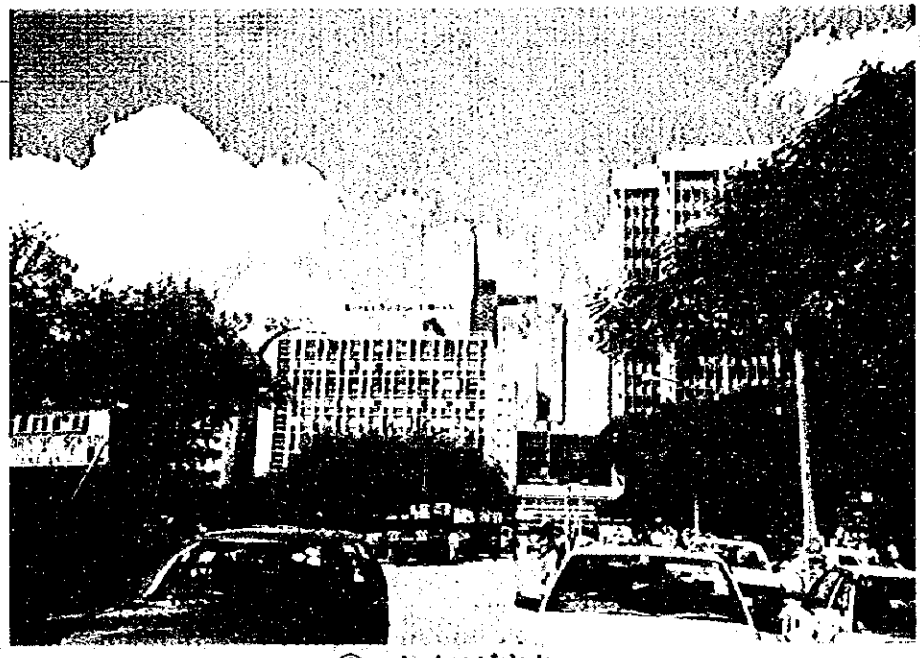
笠原靖　富士レビオ（株）

【現地でのスケジュール】

ミッションと現地関連機関との交渉等は割愛して、病院、血液センター及び疫学サーベイのフィールドとなるスラム、AIDS 孤児院等を精力的に回った。

ナイロビ市（写真①）

人口 120 万～130 万人（市内のスラムにプラス約 60 万人の住民がいる）。想像した以上の近代都市で、超高級邸宅から想像を絶するスラムまで、貧富の差が激しい。平均気温は 1 年を通して 21℃から 27℃と爽快で、標高



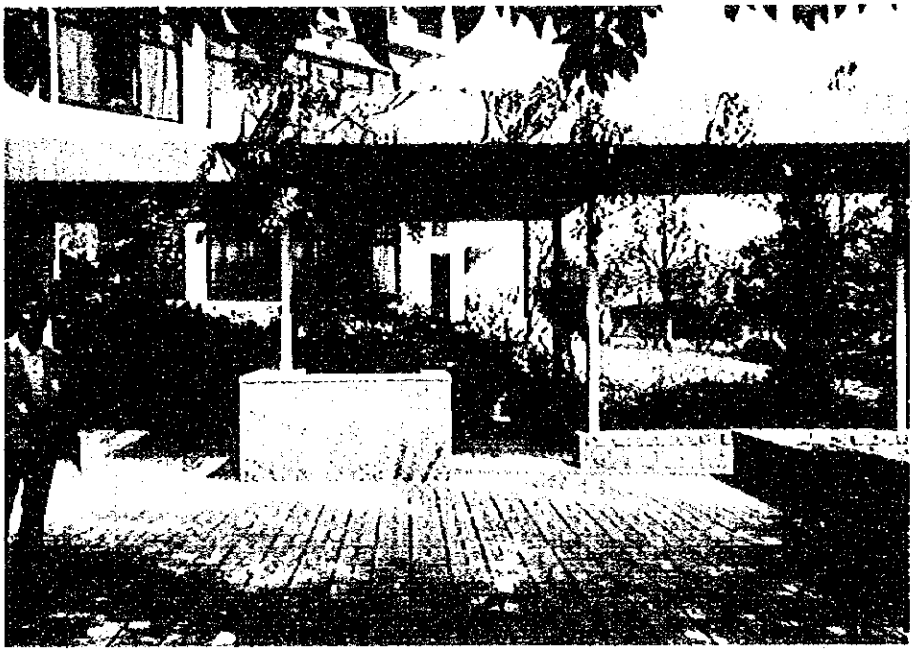
① ナイロビ市内

1,700～1,800メートルの高地に位置する。日本人は大使館関係が約50名、JICA関係250名、その他企業活動に携わっている人を含めて約800名の日本人が住んでいる。日本人は安全の完備した塀を施し守衛を配備した宅地に住み、運転手付きの車を通常、利用している。運転手の月収が約1万円、メイドは3,000～5,000円くらいである。スラムを除いて市街のあちこちを訪問したが、車で移動している限り、危険を感じるようなケースは1週間を通じてはなかった。

【現地関連機関訪問】

JICA事務所

まずJICAケニア事務所の田上実所長を訪問し、本プロジェクトの現地チームリーダーである赤井契一郎先生とともに経緯と状況を伺った後、日本大使館を表敬し、堀内特命全権大使、阪井一等書記官らと面会した。

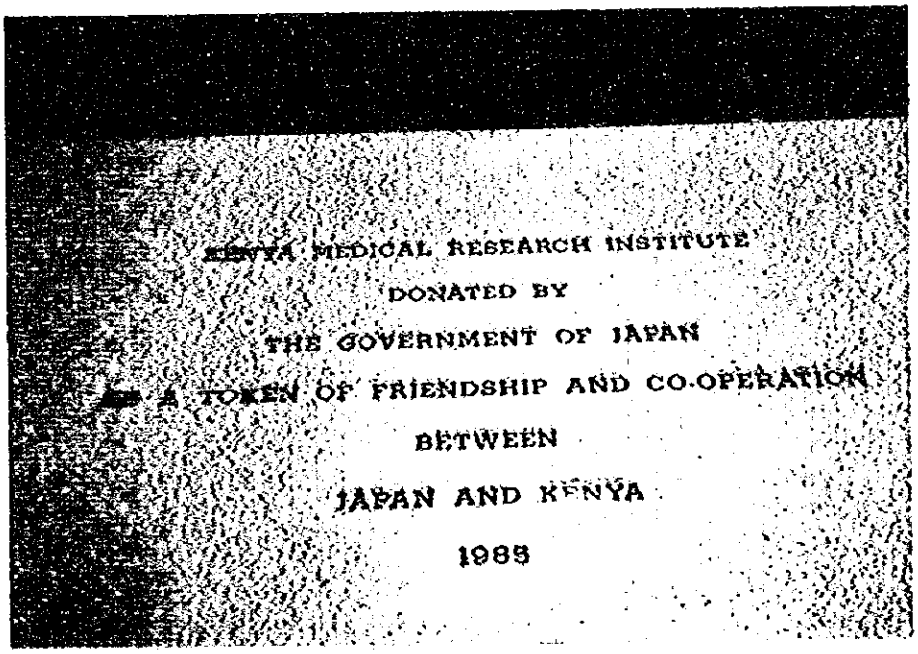


② KEMRI 正面玄関

KEMRI

(写真②、③)

次に訪問したKEMRIは、日本の無償資金協力により建設された医学研究所で、20ベッドの附属病院も併設してある。感染症中心に一通りの設備が整っている。またアフリカに存在する全植物種から抗ウイルス／抗AIDS薬等を抽出する専門の研究室があった。ミッションと現地JICAのスタ



③ KEMRI 定礎

ッフ及び研究所の所長以下全員で会議を持った。いくつかの意見の違いがあったが、この1週間以内に全ての案件を詰めて合意文書を作成するということで会議を終了した。設備については、クリーンベンチの使用法に問題があったり、新しい装置の使用法がわからない等の問題もみられ設備に対する研究員の能力不足、専門要員不足、あるいはセクション間の壁により、施設を有効に使いきっていない面がみられた。

個別ミーティング

・Dr.Tukei：VRC（Virus Research Center）部長

彼がHIV-1プロジェクト受入れの現場の責任者である。FRの技術の概要、アドバンテージを説明した後、将来P3ができるまではFRが品質を保証したPA粒子とHIV-1ウイルス抗原を提供し（P3ができれば抗原は現地生産できるが、PA粒子は技術的に困難であるため現地生産できない）、これにより現地の技術担当とともに測定系をセットアップし、技術移行する予定である。品質のcriteriaとしては、環境条件、諸因子を考慮し、日本における品質とイコールとならなくても、既存のELISAと同等程度を当初の目的とした方が合理的、経済的であるとの考えを述べておいた。Dr.Tukeiから、今回、富士レビオがJICAに協力した経緯を質問されたので、本件については同社の国際貢献の一環として位置づけている旨回答した。当社から派遣する専門家については、理論のみの科学者ではなく、現場の専門家の方が本業務に適していると考えているが、この点については先方の理解も同一であった。氏によるとKEMRIでも現場の受け皿として、Scientistだけではなく熱心で手の効くtechnicianを選んでいると言っていた。

・Dr.Kan：Principal Researcher of BSRC

彼女はDr.Tukeiの下の要となる人で、P3が設置された場合、そこのチーフになることが決定している。Scientistとしては今回会った中でベストで、凝集反応の理論なども説明するとよく理解してくれる。インド系のケニア人で、学部はスコットランドのグラスゴー大学、博士号はロンドン大学のBiochemistry、ポスドクを含めてMolecular Biologyのテクノロジーを身に付けたキャリアである。現在はPCRを用いた遺伝子解析等を試みている。

・Mr.Songoku：VRC 研究者

Technicianのチーフで、彼の麾下のCatharine及びSusanも同席して話をした。Catharinは日本に研修に来たことがある。Songokuは第9回国際エイズ学会において栗村先生と連名で「ケニアにおけるエイズスクリーニング」との題で当社のキットが他の2種のキットよりも特異性・感度で優れていることを発表してくれた人である。本プロジェクトに非常に情熱を持っており、十分な手応えを感じた。

・Mr.Kaiguri：VRC 主任技師

彼は矢野先生の指導の下でB型肝炎ウイルス抗原抗体測定のプロジェクトを担当し、ほぼ技術移転を完成させた。強陽性の血清や腹水からHIV抗原を精製し、抗体作成に苦労したようであるが、当社同様モルモットで成功した。ヒツジの血球を使った凝集反応であるが、現時点ではまだ凍結乾燥には至っておらず、液状で作ったキットを関連スクリーニング施設に供給している。矢野先生にも、長持ちをする訳はないので、どういうQCをしてどのくらいの期限があるのかとの質問をしたが、まだ良くわからないとのことであった。これから凍結乾燥のステップに入る。

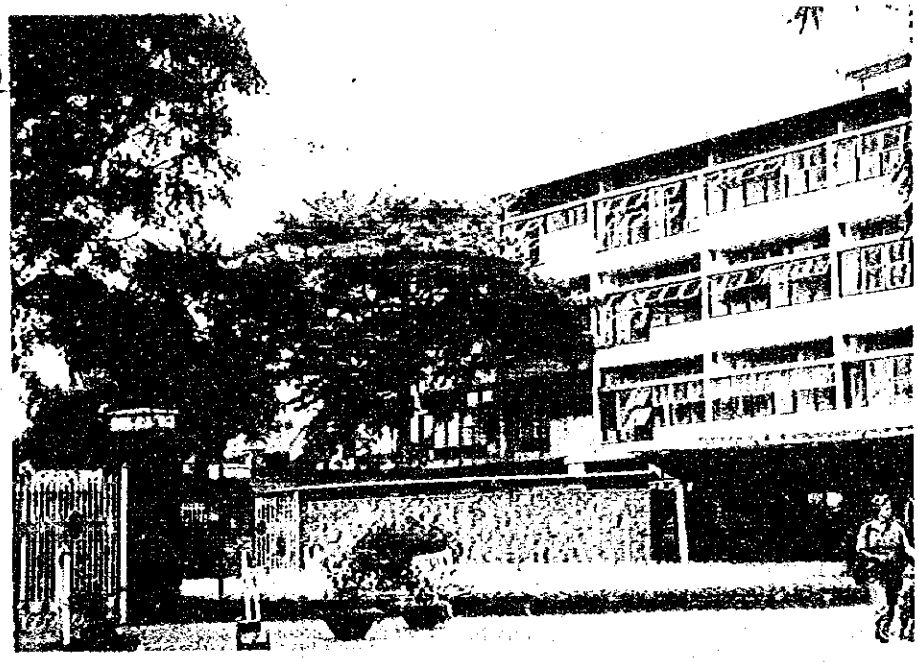
我々の関わるであろうHIVプロジェクトに先行しており、同じ血球で系を組めないかとの質問を受けた（矢野先生、JICA現地の人を含めて）が、当社の技術では無理であろうと伝えた。

ケニアの水を使ってアッセイ系の確立に問題は出なかったかどうかとの問いかけに対して、1回の蒸留水を使用しているが、パターンのしまり等でトラブルが生じた、しかしBuffer液を1回フィルターに通すことによって解決できた、との答えであった。

【関連施設の見学】

Agakan病院（写真④）

Pathologistの Dr. K.R.Radiaに案内をしてもらった。ベッド数220、72名の医者を擁する近代的な私立病院であり高額治療の病院である。患者が溢れ、サービスが追い付かない状態であるが、質の低下を防ぐため、施設の拡張は行わない方針という。HIVの検査はELISAだけで行っている。キットはBMのHIV uniform、Organon、Mulexの3種類を使用し、確認試験はキットを替えるだけの方法を採っている。検査数は約600テスト／月である。陽性率はblood donor≒6％、患者≒20%、新生児≒1～2％である。擬陽性と判定されたものが約0.6～0.8%である。今回訪問したそれぞれの中で、本病院の検査室が一番きちんと検査していると見受けられた。



④ Agakan病院

Kenyatta病院Blood Bank

国立ナイロビ大学付属病院に所属する施設で、責任者のDr.Nyamongoに説明を受けた。キットは上記病院と同じものを使っているという。試薬は十分ないようで、現在は月 30～200 検体しか検査をしていない。昔のデータ集をみせてもらったが、1992年ではBlood donor 5,676検体検査をし、3.4%が陽性、データはみていないが、1995年は7,000検体で4.2%の陽性率でやや上昇している。最近の30～200検体／月というのは少なくて数値が合わない気がするが、試薬がないから検査ができないのか詳細は不明である。また、視察した限りでは、検査室の機能は十分ではなかった。

AIDS 孤児院 Cottolengo Centre

1992 年に診療所から孤児院に変わり、広大な敷地と豪華な門と建物が印象に残る立派な施設である。運営責任者の Mrs.Lucy Thanga の説明を受けた。現在まで孤児 86 名を収容、現在の収容孤児数は 31 名で、対応するケアはナース 6 名プラス補助員で運営している。週 1 回と 1 日おきに勤務する医者 2 名とヘルパーを含めると収容孤児とほぼ同じ数になる。孤児は親が不明であったり死亡していたり、養子縁組み後に AIDS と判明して放置されたもの等であり、生後 2 カ月以降の子どもを受け入れている。受入基準は AIDS 抗体陽性であること、ドクターの責任者あるいはソーシャルワーカーからレターによる推薦を受けたものに限っている。

収容後母親から移入された抗体が消失して退院するケースが稀にあるが、いずれ 4 ～ 5 年で全員死亡する。既に 86 名中 11 名が死亡している。現在動けない子供が 2 名、死にかけている子が 1 名いた。抗体チェックは 6 カ月ごとに行っており、治療は十分な栄養補給と他感染防御の抗生剤の使用のみである。施設内はよく整理され、衛生的で完璧であるが、非常に冷たい印象を受け、孤児が非常に静かである。運営資金は潤沢とみたが、固定したスポンサーはない。現在イタリア系の大口義援金に依存している。閉鎖的なためか、近隣住民からのヘルプは全くないとのことであった。

⑤ AIDS 孤児院 Nyumbani

AIDS 孤児院 Nyumbani (写真⑤、⑥)

Founder で医者の Dagostino, S.T.MD (アメリカ人) がボラ

⑥ AIDS 孤児院 Nyumbani 敷地内

ンティアで運営する「家」を意味する名前のセンターで、昨年の4月からスタートしている。上記Cottolengoと比較して、みすぼらしくバラック状の施設であるが、写真撮影も自由で、非常にオープンな施設である。我々の訪問と同時に所長のDagostinoが到着したが、孤児達が「Father」と言って氏に飛びつき群がり、明るい雰囲気に感激した。氏は孤児1人1人に同じ目線で接触しているのがわかり、所内も手作りのおもちゃが散乱したり、クッキーが放置してあったり、雑然とした雰囲気であるけれども、大家族を拡大したような温かさがあった。昨年の4月から現在まで26名を収容し、現在20名である。経費節減のため、野菜を自家栽培したり、子供達のためにウサギを飼ったり、敷地内に勉強部屋としてテントの教室等が用意されたりしている。ヘルパーはナイロビ在住の外交官夫人など多様であるが、何とか運営しているようである。重症の2名を除き、子供達は非常に明るく、我々にも人見知りせず接触してきた。なお、氏はケニアにもPCRが必要と考え、帰国した時にアメリカから買って持参して、KEMRIのDr.Tukeiに提供している（PCR測定はまだ成功していない）。

⑦ KIBERAスラム居住区

KIBERAスラム居住地（写真⑦、⑧）

ナイロビ市内の極めて狭い居住地に推定60万人が生活するケニア最大のスラムである。危険もあるので車が通れる1本しかないスラム内市場を通り抜け、奥に位置する治療所のイスラム教会まで往復した。写真撮影はトラブルの原因となるので、ほんの中心部の一部のみを撮影した。車窓からかいま見る奥の様相は悲惨で、

⑧ KIBERAスラム居住区

便所はトタンあるいは木で囲ったものだけのものであり、悪臭がひどい。人口密度から言って全員横には寝られない面積で、一部重なるか棚をつっているようである。イスラム教会のDr.に会い、施設を見せてもらったが、患者が次から次へと来るにもかかわらず、治療薬が置いていないなど、状況は悲惨である。JICA専門家はこのスラムを疫学研究のフィールドにする考えを持っており、いずれここからも検体を集めるルートを確立する予定である。

【要旨】

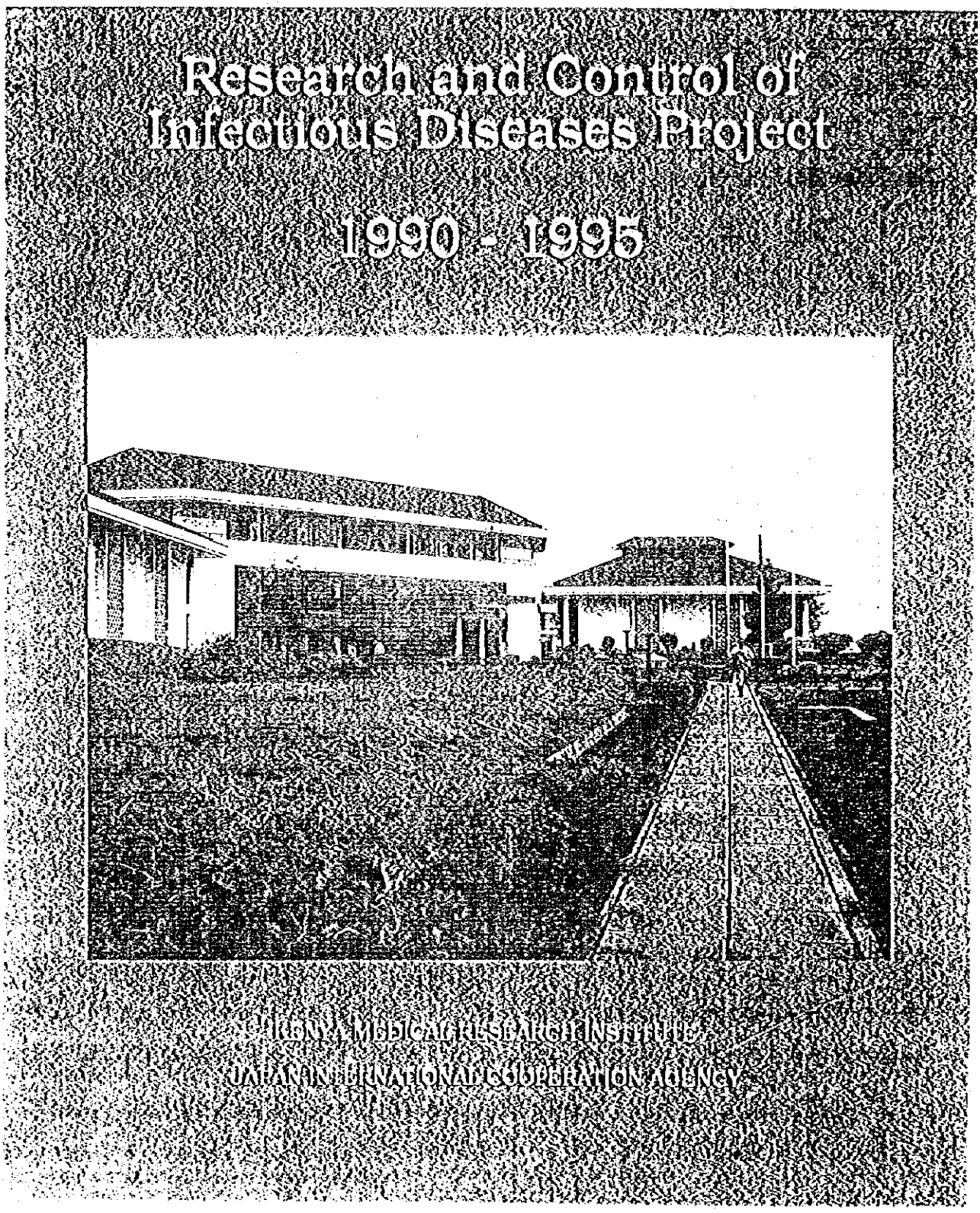
本感染症プロジェクトは肝炎、HIV、ARI（急性呼吸器疾患）等から構成される。肝炎については既に終結間近で、試薬の有効期限、保管、輸送条件の設定及び凍結乾燥と大量製造を残すだけである。今後はHIVが中心になる。今回のミッションで一応の事業計画は作成され、双方合意にこぎ着けたようである。P3に関しては設置が決定されたが、完成は早くても数年先になる予定である。予算措置についても実際の執行段階は手続き上、時間を要すると聞いた。

HIV-PA技術移行については、当社の技術者派遣を栗村先生のスケジュールでは7月に予定しており、栗村先生が1カ月前に再度具体的な技術移行計画、現地状況を把握することになっている。JICA専門家として赴任する際の携行機材の制度を使い、試薬、器具の類をある程度携帯することも考えている。

KEMRIの実験施設に関しては、凝集反応のアッセイ立ち上げには、肝炎グループの行った実績に基づく最低限の付属機器は揃っている。しかし研究開発状況は日本と異なり、かなりの環境因子による試薬機能への影響を覚悟すべきと感じた。巻き締めその他を考えてバイアルについては肝炎と共通のものを使ってほしいということで、確認のため、現在使用の2種の瓶を入手している。水についてはイオン交換、蒸留というプロセスが望ましいが、樹脂の補給が容易でないために、蒸留2回ということから始めることになりそうである。凍結乾燥機は現在2機種あり、1機種は新品、1つは整備が完了しており、肝炎グループが7月までの間にチェックをすることになりそうである。電源は240V/50Hzで、変圧調整機とスタビライザーが必要である。ディープフリーザーは何台も用意されている。液体窒素も一応使える設備が整っている。しかし全体としては、スペースを除いて少なくとも当社の現状よりははるかに粗末なものである。当社はあくまでも研究室レベルで（研究室規模で）HIV-1型PA凝集反応の作製技術を移行することを第1ステージとし、PA粒子・抗原は当社の供給したもので系を組むことを条件にした。P3完成後の製造のスケールアップ等は次のステージと考え、この場合もPA粒子は当社から供給とするが、これは別途協議して進める。現地作製のHIV-PA試薬の性能のcriteriaとしては、日本におけるそれはあくまでも目標とするが、現地の環境条件や経済性、緊急度も踏まえて、現在使用の各社ELISAと同等の性能で良しとすることが合理的・建設的アプローチと考える。

なお、HIV-1/2 combiについては当社はコミットしないと表明してあるが、ケニアでもHIV-2は今のところ問題ないとしている。

④ RESERACH AND CONTROL OF INFECTIOUS DISEASES PROJECT 1990 - 1995



Contents

Foreword

Everyday millions of people throughout the world fall ill while thousands of others die. Most of these illnesses and deaths can be prevented, alleviated or treated through the application of knowledge and technologies that are continuously being generated everyday.

In other diseases and health problems, the current knowledge is proving in adequate and the need for new tools and fresh strategies to tackle those health problems has never been in greater demand.

For more than a decade, KEMRI with sterling support from JICA has been in the forefront in the development of strategies, technologies and tools that can be applied in the treatment and control of diseases which cause suffering and death to thousands of people not only in Kenya but in other parts of the world.

Through an approach that seeks to provide solutions to health problems facing the people, KEMRI has been able to generate results that are now being applied in the management and control of major diseases and other health problems in Kenya and other parts of the world.

This collaboration has yielded impressive results in physical infrastructure, provision of equipment, development of human resources, and in the development of technologies, skills and knowledge now being applied in the prevention, control and treatment of diseases such as bilharzia, hepatitis and diarrhoea here in Kenya and elsewhere.

This alliance has also contributed to the transfer of relevant technology in health research from Japan to Kenya and has strengthened the spirit of cooperation and goodwill between the people of Japan and the people of Kenya.

This booklet captures the spirit of this cooperation which is now in its second decade of existence. As we continue into the nineties and beyond we are determined to build even stronger ties to make this world better for all of us.

Davy K. KOECH, *PhD,SS,OGW*
DIRECTOR, KEMRI

August 1992

Introduction

Prof. K. Akai.

The first phase of the KEMRI/JICA Project begun 12 years ago in 1979. During this phase KEMRI Headquarters and the central laboratories complex were constructed. It is now two years since the commencement of the third phase of the KEMRI/JICA Project.

The Project under the third phase which has the title of Research and Control of Infectious Diseases, consists of five sub-projects namely; bilharziasis, filariasis, viral diarrhoea, bacterial diarrhoea and viral hepatitis. The field projects are spread out widely in the country in areas such as Mombasa, Malindi, Kwale, Kitui, Nanyuki, Machakos, Garissa, Kisumu and Kakamega among others. On average, researchers cover more than 15,000 kms traversing the various research sites in the country every month.

The KEMRI/JICA Project fall within the health and medical cooperation programme of JICA. As an organization JICA was established in 1974 under the Ministry of Foreign Affairs and acts as the executing agency for all government-based technical cooperation with developing countries. Besides technical cooperation, JICA is also involved in other activities such as grant aid, dispatch of volunteers, development cooperation, emigration, recruiting and training of experts and dispatch of disaster relief teams to needy situations.

Our research in the current phase of the KEMRI/JICA Project is based on a multidisciplinary approach in which specialists with different background share and exchange information with the ultimate aim of devising methods and strategies for the control and prevention of infectious diseases.

At one time, Japan was also very troubled by infectious diseases such as tuberculosis, schistosomiasis, filariasis, viral hepatitis and many others which continue to be of public health importance in Kenya. When fighting these diseases Japan became experienced in prevention and control measures that may be helpful to Kenya. Unlike their Kenyan counterparts, Japanese scientists are not so familiar with tropical medicine. Consequently their interaction with Kenyan scientists will help them learn more about tropical medicine. This is because international collaboration in medicine should pool related scientific knowledge and encourage scientists to share what they know.

Although they may exist some differences on policy between two collaborating parties, the most important aspect of collaboration is mutual understanding, compassion and encouragement. Without the establishment of these qualities, nothing would be achieved in any collaborative work.

At the beginning of this project, a great deal of effort went into establishing good human relation between Kenyan and Japanese scientists based on mutual reliance. Owing to their sincere efforts and spirit of collaboration, cordial interpersonal relationship have been established at all levels and continue to grow in all spheres of our work. This has contributed immensely to the productivity of our collaborative projects.

Keiichiro Akai M.D.
Team Leader
KEMRI/JICA Project and
Professor of Pathology, Kyorin University
School of Medicine, Japan

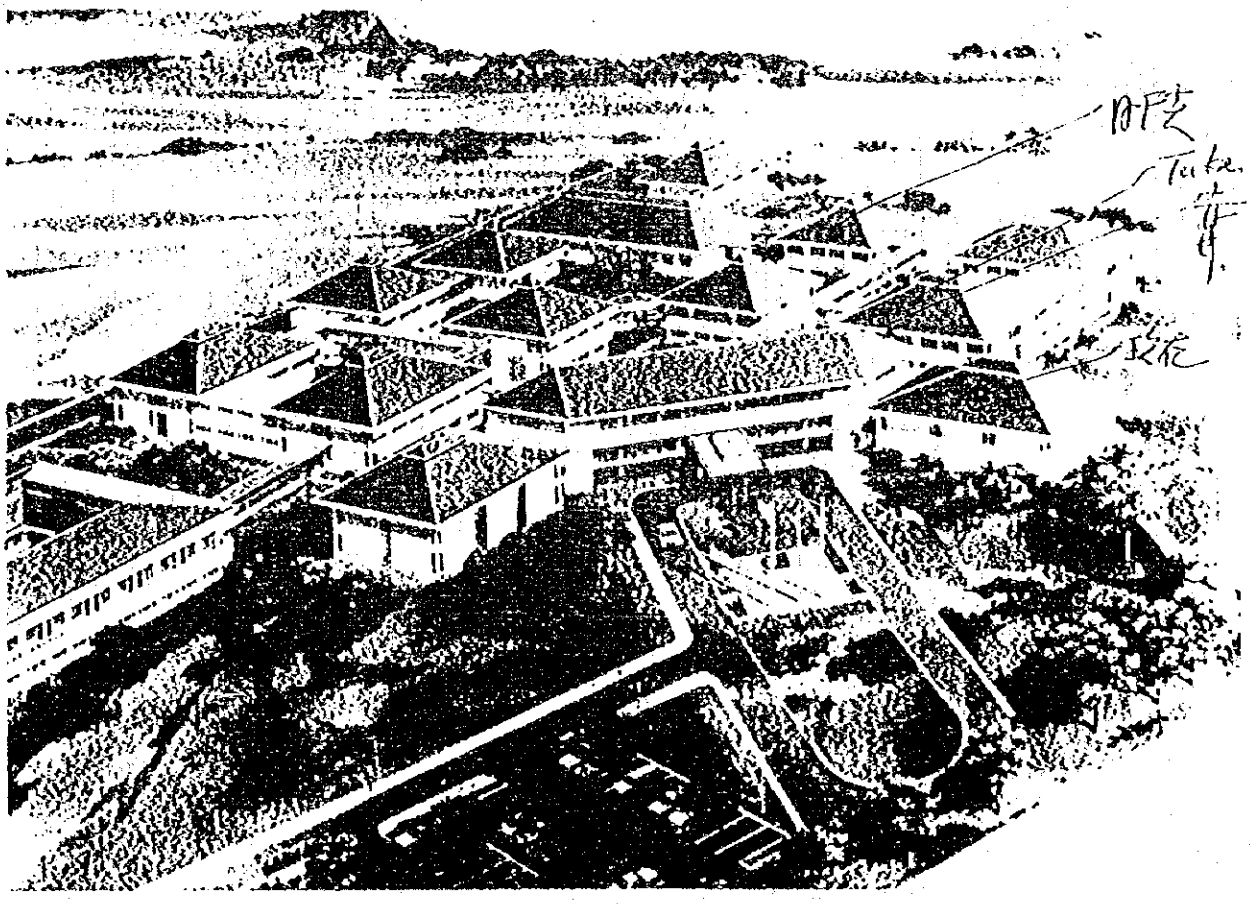
KEMRI - Structure and Organization

The Kenya Medical Research Institute is a statutory body that has been carrying out biomedical research in Kenya since 1979. As an institution, KEMRI was established by Parliament in 1979 under the Science and Technology (Amendment) act and charged with the responsibility of carrying out biomedical research in Kenya except on trypanosomiasis or sleeping sickness which is handled by a sister institute. KEMRI research progrmmes cover a wide range of diseases including leprosy, malaria, bilharzia, leishmaniasis, hydatidosis, diarrhoea, filariasis, tuberculosis, AIDS and sexually transmitted diseases among others.

The institute also has research programmes in traditional medicine, oral health, nutrition, environmental and occupational health, acute respiratory infections and human reproduction among others. Since its establishment, KEMRI has been in the forefront in finding better ways for the treatment and control of diseases that are of public health importance in Kenya and this region of Africa. Research projects are located throughout Kenya and are undertaken with an express view of providing practical solutions to problems facing the people.

Research is geared towards the development of simple preventive measures that can be applied in the treatment and control of diseases without sophisticated equipment or major investments. Through a practical approach that seeks to provide solutions to health problems facing the people, KEMRI has been able to generate results that are now being applied in the management and control of major diseases and

An aerial view of KEMRI headquarters and the Central Laboratories complex soon after completion in 1985.



other health problems in Kenya and other parts of the world. This is in addition to the provision of appropriate tools needed to develop better drugs, vaccines, technologies and concepts that are already providing relief for thousands of people suffering from diseases such as diarrhoea, hepatitis, malaria, AIDS and kala-azar among others.

Mandate of the Institute

The functions of the Kenya Medical Research Institute as stated in the Science and Technology (Amendment) Act, 1979, are as follows:- To carry out research in the field of biomedical sciences.

- To cooperate with other organizations and institutions of higher learning in training programmes 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 National Council for Science and Technology (NCST) and other such bodies in matters pertaining to research policies and priorities.
- To do all such things as appear to be necessary, desirable or expedient to carry out its functions.

Organization and Management

KEMRI has a Board of Management appointed by the Minister responsible for research for the time being that is responsible for all policy matters of the Institute. The Board is made up of a Chairman, six appointed members and representatives from various government ministries, departments and agencies.

The Board has a number of standing committees which carries out specialized functions on behalf of the Board. They are the Scientific Programmes Committee, the Staff Establishment and Appraisal Committee and the Finance Committee.

To fulfill its mission KEMRI has eight specialized research centres, each one conducting research into a specific area of health.

The Centres are:-

1. Alupe Leprosy and Skin Diseases Research Centre, situated near the Western town of Busia.

2. The Biomedical Sciences Research Centre in Nairobi.

3. The Centre for Microbiology Research in Nairobi.

4. The Clinical Research Centre in Nairobi.

5. The Medical Research Centre in Nairobi.

6. Traditional Medicines and Drugs Research Centre in Nairobi.

7. The Vector Biology and Control Research Centre, situated in the western Kenya town of Kisumu, and

8. The Virus Research Centre in Nairobi.

A ninth centre is under development at Kilifi, Coast Province.

KEMRI Secretariat

KEMRI has a Secretariat under the Director that is responsible for all administrative matters of the Institute. The Director is assisted by the Chief Administrative Secretary and the Technical Services Co-ordinator. The Secretariat is made up of the following departments:-

- Administration and Finance
- Technical Services

Shaping a healthy future

Collaboration between JICA and KEMRI is as old as the Institute itself having started in 1979 at the inception of KEMRI. In terms of scope of activities it is the largest collaborative project with any single organization.

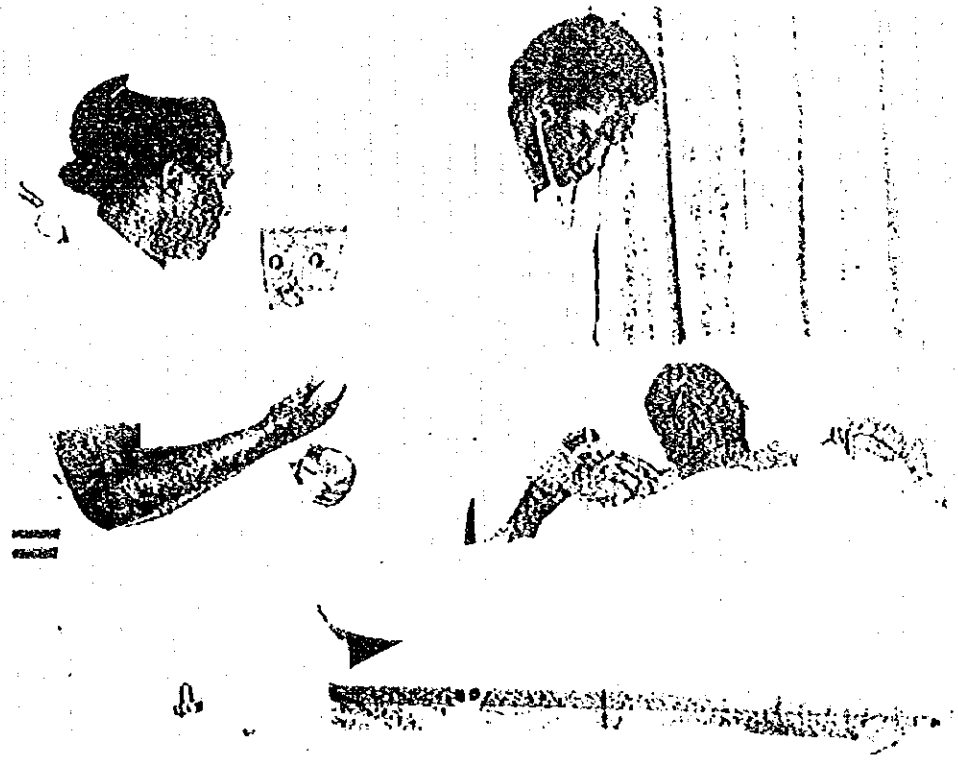
The partnership is one of the several project-type technical cooperation between the Government of Kenya and the Government of Japan. The cooperation started with a request from the Kenya Government for assistance in setting up a national institute to undertake medical research following the collapse of the East African Community.

Before the collapse of the East African Community, medical research was conducted on a regional basis under the umbrella of the East African Medical Research Council, then a specialized arm of the defunct East African Community.

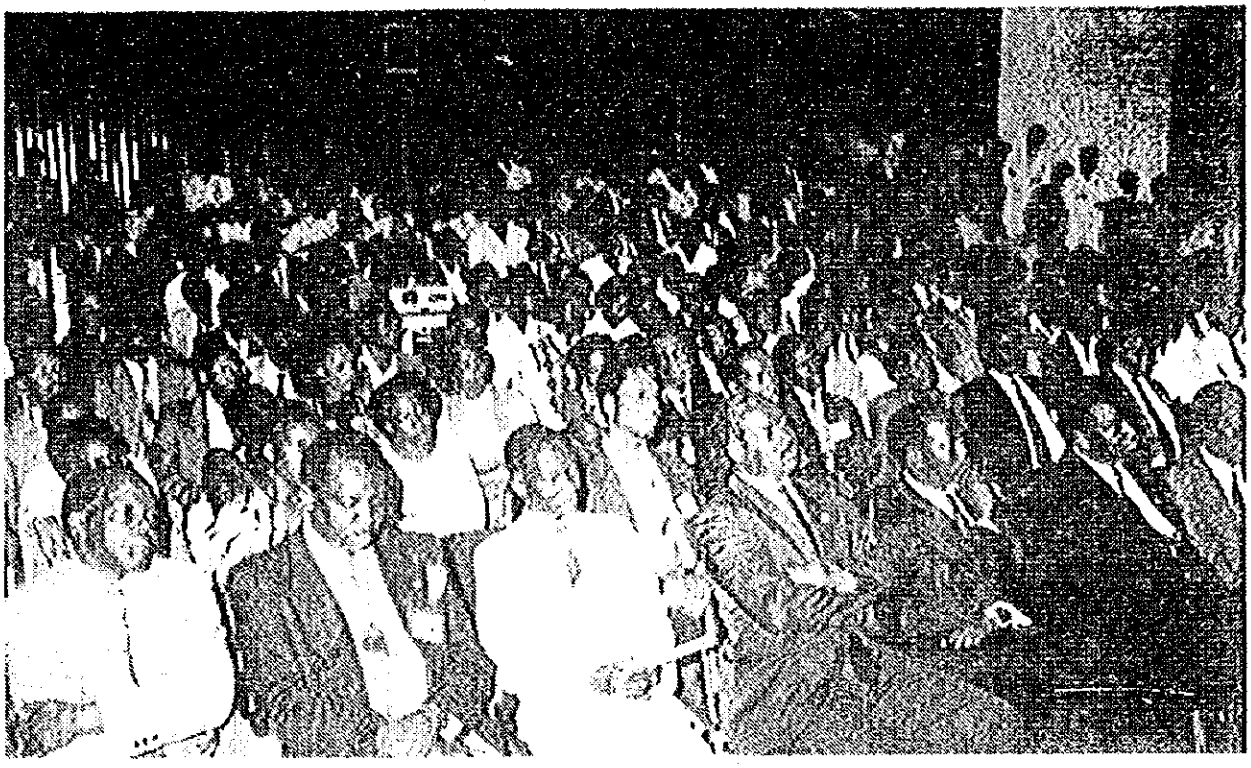
One of the most outstanding achievements of this cooperation was the construction of the present KEMRI Headquarters and Central Laboratories Complex completed in 1985 at a cost of about Shs400 million as a grant in aid project from the people and Government of Japan to the people and Government of Kenya.

The complex has several specialized research laboratories, a model 40-bed hospital, a library, a 250-seat conference hall, an engineering workshop, an electron microscopy room, a medical illustration unit, an animal house, numerous offices and other facilities.

The collaboration covers a wide range of activities in medical research and includes development



Examining a patient in one of the wards at the Clinical Research Centre model hospital.



A session during one of the many meetings held at KEMRI Conference Hall. Every year KEMRI hosts several national, regional and international meetings.

of human resources and transfer and development of appropriate technology in the field of virology, bacteriology and parasitology.

The projects are run in five-year cycles. The first phase covered the period 1979 to 1985 and was known as "Communicable Diseases Research and Control Project". The main research areas under this project were schistosomiasis and diarrhoeal diseases and helped to strengthen KEMRI's research capability in these two areas and in the control of communicable diseases in general.

Under this project, a number of KEMRI staff members received technical training in Japanese institutions while KEMRI benefited from the services of 28 Japanese experts in various fields.

In terms of infrastructure and equipment, a research laboratory which is today the main laboratory of KEMRI's Centre for Microbiology Research was put up at a cost of about KShs5 million and KEMRI received research equipment worth more than KShs10 million.

The completion of the first phase of the cooperation in 1984 prepared the ground for the second phase of the project whose broad title was "The Project of the Kenya Medical Research Institute" which covered the 1985-90 period.

The second phase helped consolidate what was gained during the early stages of the collaboration and laid a firm foundation for technology transfer and development of vital strategies and techniques some of which are today being used in Kenya's health care delivery system.

Under this phase of the project, progress was made in developing strategies and technologies for the control and prevention of viral hepatitis, viral and bacterial diarrhoea and urinary bilharzia.

A significant achievement made during this phase of the project whose main objective was to strengthen KEMRI's capability to develop widely applicable control measures against major communicable diseases in Kenya was the development of a test-kit that uses locally available material for the screening of hepatitis B virus in donated blood.

During this phase of the project, KEMRI also received equipment worth more than KShs44 million from JICA and 21 of her staff members undertook training in several Japanese institutions.

There were 57 Japanese experts who worked under the project for various durations.

The third and current phase of the project was launched in May 1990 and runs upto 1995. It is known as "Infectious Diseases Research and Control Project".

Although the overall objective has been the same throughout the successive five-year projects, the ongoing phase stresses a multi-disciplinary approach toward the prevention and control of infectious diseases.

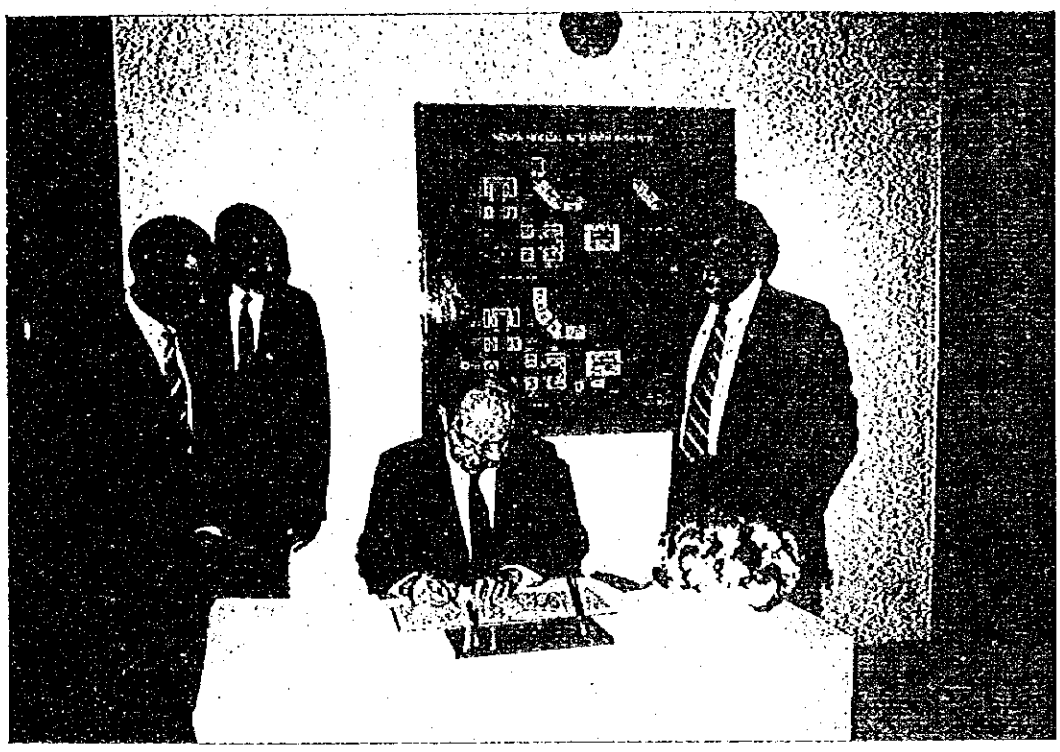
Besides focusing on the traditional areas of the KEMRI/JICA collaboration of virology, bacteriology and parasitology, research in the current phase is multi-disciplinary and incorporates other vital aspects of medical research such as public health, community mobilization and participation, clinical management and socio-economic aspects of health care delivery. Under this phase, filariasis has been included as an additional component of the project.

The current phase also covers new areas of support such as development of relevant diagnostic technology, organization of seminars and workshops in relevant areas and exchange visits.

In the following pages are highlights of activities in individual areas of the collaboration.

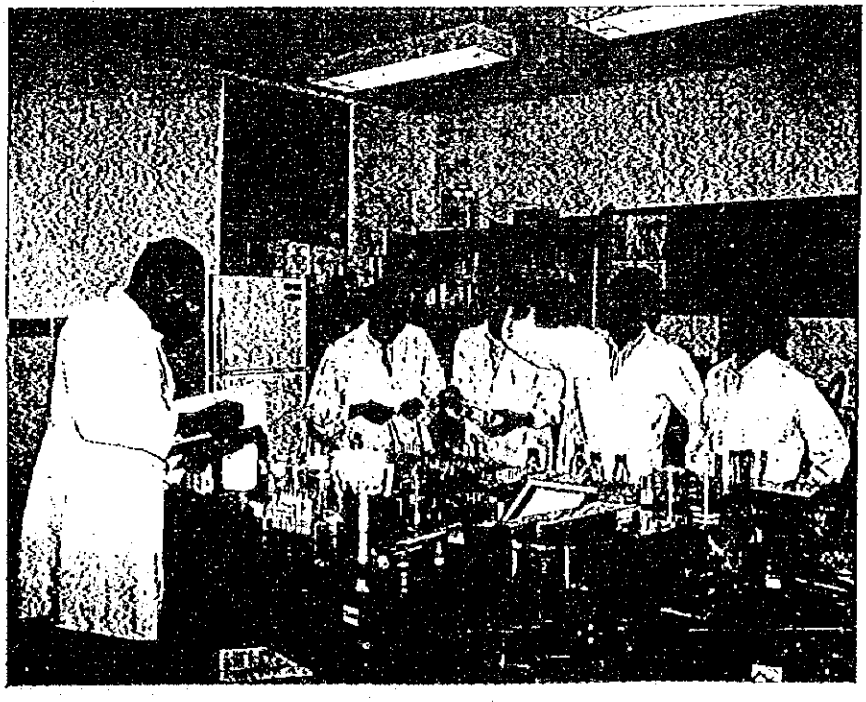
Artisans in the Engineering workshop. The Engineering and Maintanance Division is well-equipped for servicing and repairing of electric, electronic and other appliances in the offices and laboratories.

Partners in Progress



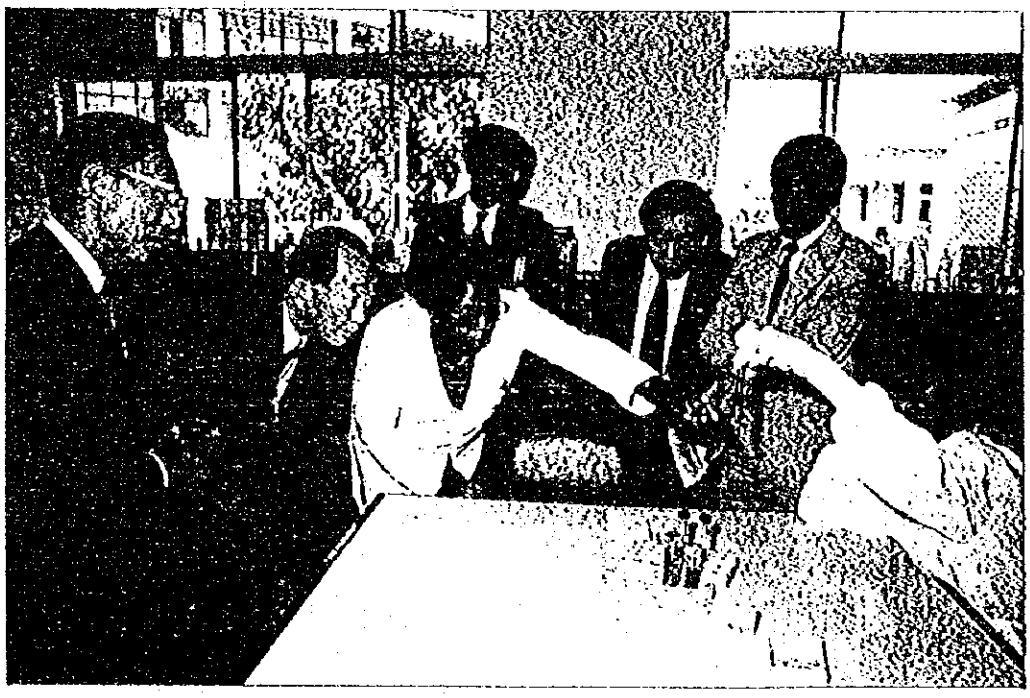
JICA President K. Yanagiya signs the visitors book when he visited the insititute. Looking on is the KEMRI . Board of Management Chairman Dr. Mohamed Abdullah, KEMRI's Director Dr. Davy Koech and Mr. Dunstan Ngumo, KEMRI's Chief Administrative Officer

JICA and KEMRI Scientists collaborate in the schistosomiasis research project



A scientist from the Virus Research Centre examining a specimen under the electron microscope, provided by the JICA

At a public baraza in Kwale. Much of the KEMRI-JICA collaborative work is community based, with frequent visits to the rural areas where the studies are carried out



K. Yanagiya, the JICA President, at the Molecular Biology laboratory in the Biomedical Science Research Centre

Viral Hepatitis

Studies on viral hepatitis under the KEMRI/JICA project started in 1985 under the second collaborative phase. Research into viral hepatitis have concentrated on hepatitis B, one of the world's commonest viral diseases and the major cause of primary liver cancer.

Hepatitis B is caused by hepatitis B virus which is transmitted through a range of body fluids mainly through sexual activity but also via contact with contaminated blood, by placental transmission from mother to unborn child, and through skin lesions, which are the main means of transmission in children.

In Kenya it is estimated that upto 70 per cent of the adult population have come into contact with the virus in one way or the other. Of those who get infected with the virus, it is estimated that between 10 and 20 per cent become chronic carriers while upto 10 per cent may succumb to the virus. The rest may clear the virus from their bodies and recover completely. Chronic infection leads to cirrhosis of the liver and primary liver cancer.

Since the disease is incurable, health programmes concentrate on preventive measures. Under the KEMRI/JICA project, several studies on the epidemiology, vaccination and control of hepatitis B have been undertaken while others are planned.

Population based studies on the epidemiology of the disease have established that intra-familial close

Launching of the hepatitis B diagnostic kit at the KEMRI conferrence hall in July 1991.

Attending to patients at a rural clinic during community studies on the epidemiology of hepatitis B infection.

contact accounts for a large number of transmissions especially among carrier mothers and children.

An important step in the area of prevention has been the development of a genetically engineered vaccine developed by the pharmaceutical industry. Studies using the vaccine in Kenya have shown that it can be incorporated into the country's Expanded Programme on Immunization. Based on the results of these studies carried out under the KEMRI/JICA Project a pilot mass vaccination programme was launched in a district in Central Kenya under the Kenya Expanded Programme on Immunization (KEPI) in early 1990. The vaccination project is set to run for four years and will provide baseline information that will be used to launch a national immunization programme against hepatitis B.

Immunization against HBV is particularly important in children as they are at greater risk of the disease than adults.

In the area of control, a test-kit for the screening of hepatitis B virus in donated blood has been developed with the collaboration of the National Public Health Laboratory Service. The test-kit which is produced from locally available reagents is cheap and easy to produce.

Following the launching of the test-kit at a workshop held at KEMRI for top medical personnel dealing with blood transfusion from all the provinces in July 1991, the kit is now being routinely used in screening for hepatitis B virus in donated blood in all provincial hospitals. Data collected from the provincial hospitals will help in mass production of the test-kit for use throughout the country.

Studies on the epidemiology of Hepatitis C virus and the development of a reliable diagnostic kit for hepatitis C is planned.

Under the KEMRI/JICA project, a diagnostic unit for liver diseases with the capacity to carry out liver function tests, perform ultrasonography and test for hepatitis A, B, C and D will be developed in the Virus Research Centre.

Schistosomiasis

Research into haematobia schistosomiasis under the KEMRI/JICA Project began under the first five-year project which was known as "Communicable Diseases Research and Control Project" which covered the 1979-84 period. The actual schistosomiasis studies started in 1981 and have been carried out in the Coast Province where the disease is endemic.

Schistosomiasis or bilharzia is a water-borne disease transmitted by certain species of freshwater snails and estimated to affect 2 million Kenyans. The disease-causing parasite is passed from humans via human excrement to freshwater snails and back again.

Two important species of the disease causing parasite infective to humans found in Kenya are *Schistosoma mansoni* and *S. haematobium*. *S. mansoni* is responsible for intestinal bilharzia while *S. haematobium* causes urinary bilharzia.

In both types of the disease, eggs from adult forms of the parasite living in veins around the bladder or the intestines or other locations cause scarring and tissue destruction leading to different pathological conditions.

Those who become infected develop debilitating illness and the disease contributes to malnutrition especially in children.

Under the KEMRI/JICA project, studies on the epidemiology, immunology, transmission, water contact and other aspects of *Schistosoma haematobium* have been undertaken and are set to continue.

The overall objective of the studies is to identify the most appropriate economic and effective method or methods of the control of schistosomiasis. Community-based studies have been carried out to develop better and feasible control measures against the disease.

Transmission studies carried out in the first phase of the project showed that children were potentially responsible for the transmission of the disease and that rates of infection in the community were high during certain months of the

Examining school-children for infection with schistosomiasis. Studies have shown that mass treatment of children is an effective way of controlling schistosomiasis in a community.

year.

Arising from these and other findings, treatment of infected persons with the drug metrifonate and provision of clean piped water were selected as a combined control measure against the disease. The provision of piped water through water kiosks and construction of a shower shed for the local primary school in the study area put up by JICA at a cost of Shs3 million were completed in 1984 and handed over to the local administration.

Follow-up studies showed reduction in the prevalence and intensity of *S. haematobium* infection in the area of study.

In the area of treatment, studies which compared praziquantel and metrifonate have shown praziquantel as a more superior drug which in mass treatment was found to reduce infection in the community by upto 80 per cent.

Studies to find simple and convenient methods of diagnosis and to develop immunological techniques that may lead to vaccine development have been undertaken under the project.

The current 1990-95 phase of the project involves modification of existing control methods and introduction of new measures in an attempt to further reduce infection in the community.

This is being done through the introduction of public health programmes such as health education, development of strategies to increase community participation and environmental modification such as reducing snail habitat and selected mass chemotherapy making existing water safe, and reducing contact with potentially contaminated water by introducing water contact facilities.

The worms which cause schistosomiasis as seen under a microscope.

Investigating the level of infestation with bilharzia-transmitting snails in a community dam in Coast Province.

Filariasis

Filariasis is a major health problem in Africa and other parts of the developing world. The disease is transmitted by the Culex mosquito and some species of the anopheles mosquito. The type common in Kenya is caused by the parasite *Wuchereria bancrofti*.

Infection with *W. bancrofti* leads to the most severe form of lymphatic filariasis affecting the limbs, breasts and genitalia. Adult worms of *W. bancrofti* live in the body's lymphatic system and make their home in the lymph nodes. The disease is rarely life-threatening in itself but it causes chronic suffering and disability. In its advanced stages the disease can lead to hugely swollen limbs and genitalia, a condition known as elephantiasis or hydrocele respectively.

Filariasis research is a new multi-disciplinary project within the KEMRI/JICA cooperation and involves four KEMRI research centres - Clinical Research Centre, Biomedical Sciences Research Centre, Centre for Microbiology Research and Medical Research Centre.

A site for field studies with filariasis prevalence of 20 per cent has been identified in the coast region where the disease is endemic.

The project covers epidemiology, animal models, transmission and drug trials.

Areas that will receive attention include comparison of the effectiveness of the provocative test done during the day, and night bleeding as a method of detecting microfilariae in blood.

Normally, filariasis-causing parasites in Kenya circulate in the peripheral circulatory system during the night and to detect them, therefore requires bleeding people at night, a practice that is often impractical and unacceptable among study populations.

In addition to studies on the application of the provocative test which would allow for daytime diagnosis, the possibility of using immunodiagnostic and serological techniques to screen filariasis will also be investigated.

Another area that will be covered by the project is the study of animal models in the study of filariasis. Towards this end, several breeding pairs of a rodent that has been found to be a suitable model for lymphatic developing filarial worms have been imported from Japan and will form the basis for studies in this area.

In the socio-economic sphere of the disease cultural factors associated with various aspects of the disease are being investigated by a social scientist within a community in the coast region where the disease is common. Aspects that are of interest include farming practices, mode of house construction, and the effect of climate on disease transmission.

The effectiveness of a new drug, ivermection, is being assessed in comparison with diethycarbamazine (DEC) which has been used for many years to treat lymphatic filariasis.

Examining a patient suffering from elephantiasis in an area in Coast Province where the disease is endemic.

Bacterial Diarrhoea

Studies on bacterial diarrhoea cover aetiology, ecology, serodiagnosis management and prevention of diarrhoea caused by bacteria.

Work in this area started in 1985 under the second phase of the KEMRI/JICA Project.

Under the project, community based studies on enteric infections and intestinal bacterial flora were carried out in a study site in Central Kenya. The study site however proved unsuitable due to lack of enough diarrhoea specimens and was shifted to Malindi in Coast Province during the third phase which started in 1990. Malindi has been found to be a suitable study site and a laboratory which serves as a study base was completed in 1992.

The primary objective of the project is to establish strategies for the reduction of morbidity and mortality caused by bacterial diarrhoea which is common among children below five years old. Preliminary results of studies carried out under the project show that bacterial infection accounts for upto 34 per cent of diarrhoea incidences.

Activities under this project include investigation of transmission routes such as water sources, sewerage systems, and toilet construction. The study will also incorporate aspects of parasitology and virology.

The bacteriology laboratory in Malindi soon after it was opened.

Viral Diarrhoea

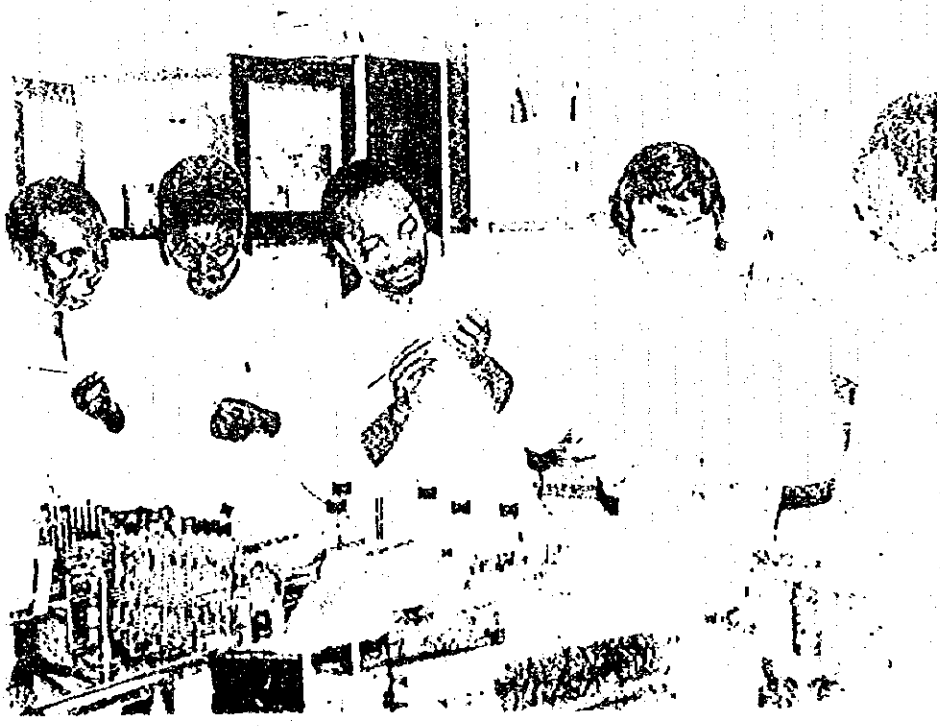
Research into viral diarrhoea is now in its third phase and the interest is the rotavirus as a causative agent of diarrhoea. Under this project, a community-based study has been carried out in Nakuru District in the Rift Valley Province which followed a cohort of children from birth to two years.

The study aimed at determining the role of rotavirus re-infections in gastroenteritis during the first two years of life and rotavirus serotypes involved in symptomatic and asymptomatic rotavirus infections. Various factors determining suceptibility to and severity in symptomatic rotavirus infections have been studied according to age, nutritional status and past infection record with different serotypes.

The Nakuru study also aimed at establishing a stable population of children in whom rotavirus vaccination trial can be carried out. The study found that in this population, rotavirus was not common and the group was, therefore, not ideal for vaccination studies. As a result, surveys to identify other sites were undertaken. The sites under the present phase where studies are being undertaken are hospitals in Nanyuki in the Rift Valley, Kitui in Eastern Kenya and the Infectious Diseases Hospital in Nairobi.

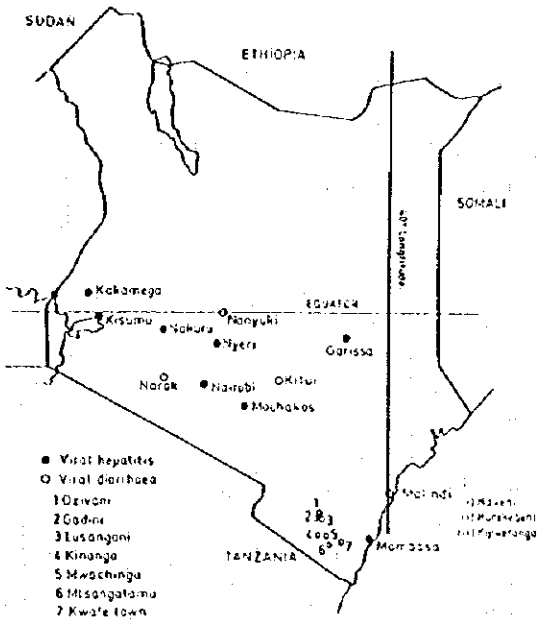
Samples collected from these sites are analysed by different virological methods in order to determine sub-group and serotypes of the rotaviruses. Identifying these antigenic characteristics is crucial since a rotavirus vaccine would be serotype-specific.

In the area of diagnosis, plans are underway to develop a cheap rotavirus detection kit for use in hospitals throughout the country. Besides establishing regional trends in rotavirus infection, the detection kit would minimize the present misuse of antibiotics in the treatment of diarrhoea.



KEMRI and JICA scientists collaborate in laboratory investigations in the viral diarrhoea research programme.

Map of Kenya showing the many areas where KEMRI - JICA collaboration projects are situated.



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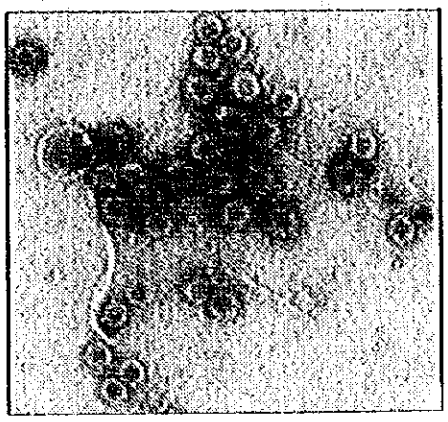
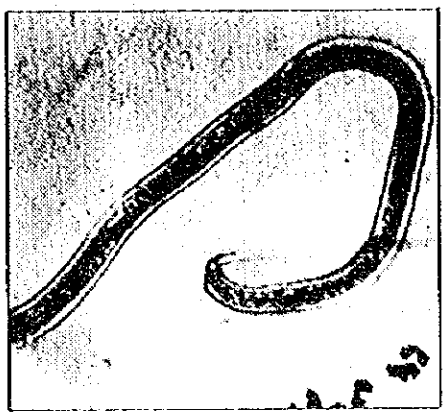
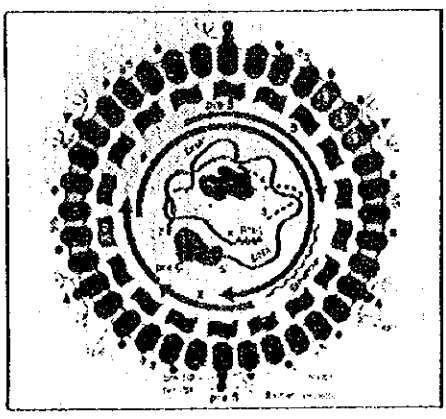
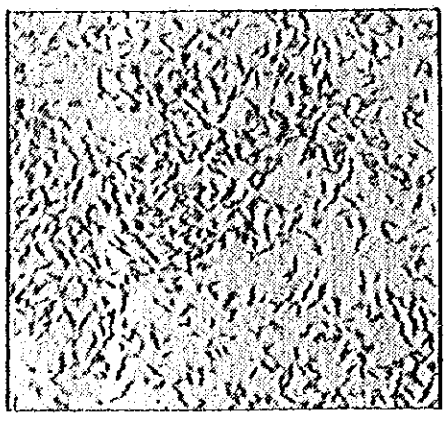


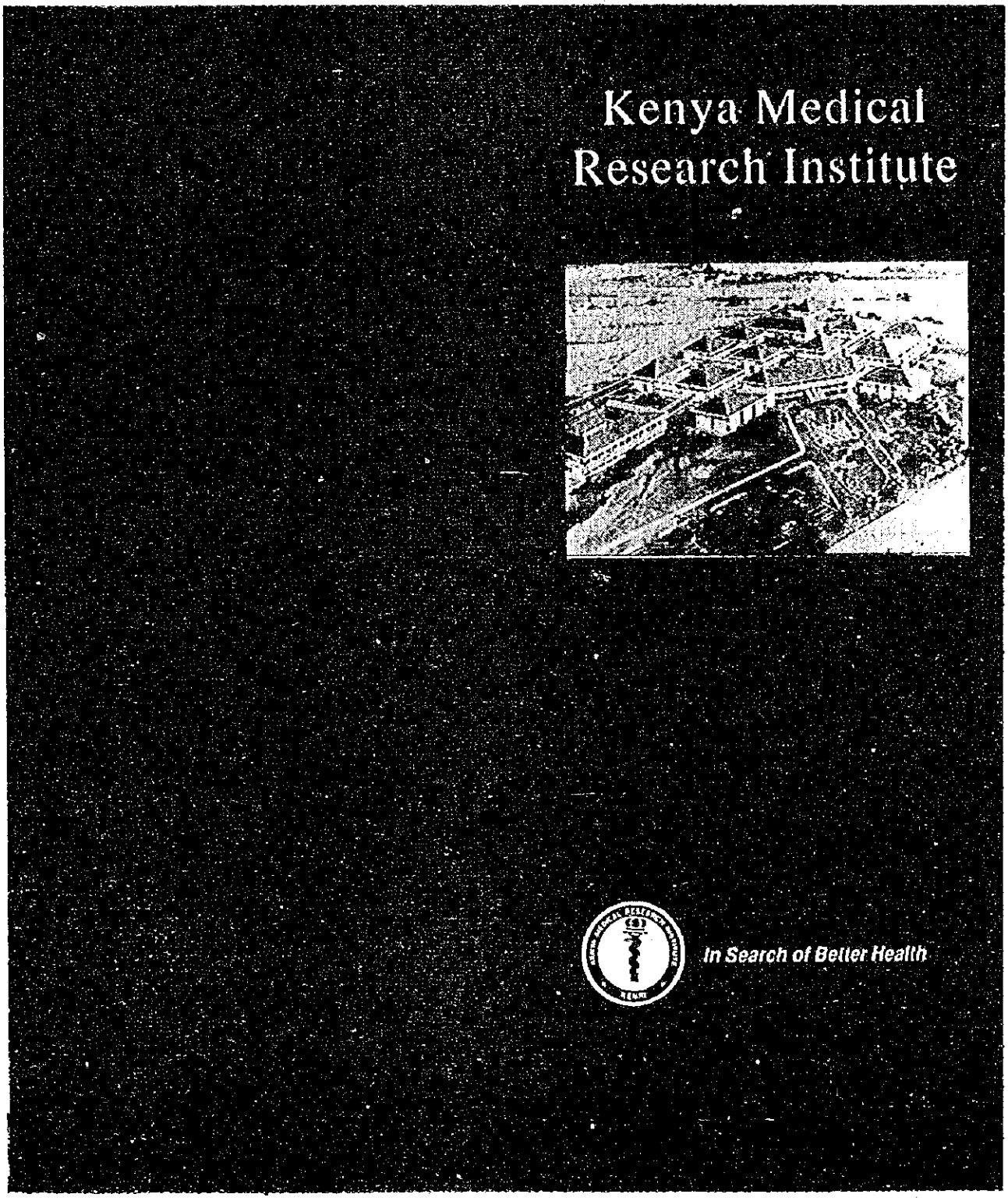


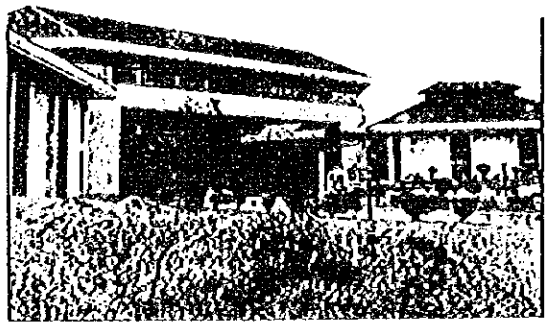
JICA





⑤ KENYA MEDICAL RESEARCH INSTITUTE





MANDATE

The Kenya Medical Research Institute (KEMRI) is a state corporation under the Ministry of Research, Technical Training and Technology. Its primary objectives are:

- carry out research in the field of biomedical sciences
- to cooperate with other research organizations and institutions of higher learning in training programmes and on matters of relevant research.
- 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 Science and Technology (NCST) and the Medical Science Advisory Research Committee in matters pertaining to research policies and priorities.
- to do all such things as appear to be necessary, desirable or expedient to carry out its functions

BACKGROUND

KEMRI was established through the Science and Technology (Amendment) Act of November 1979. Under this Act, biomedical research in Kenya except on trypanosomiasis, which is the domain of a sister institute, the Kenya Trypanosomiasis Research Institute (KETRI), was made the responsibility of KEMRI.

For about a decade or so, up to June 1977, medical research was conducted on a regional basis by the then East African Medical Research Council under the auspices of the East African Community.

Upon its creation, KEMRI immediately incorporated and consolidated most of the activities of the institutions of the former East African Community.

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.

COMMITTEES OF THE BOARD

The Board has the following committees that are responsible for its various functions:-

(a) Scientific Programmes Committee (SPC)
The Committee is responsible for policy direction and guidance on scientific activities of the Institute.

(b) Finance Committee (FC)
This Committee is responsible for policy direction and guidance on all financial functions and operations of the Institute. It also co-ordinates the physical development activities.

(c)Staff Establishment and Appraisal Committee (SEAC)
The Committee is responsible for policy formulation and direction on all staff matters including appointments, promotions, discipline, training, retirements etc.

OPERATIONAL STRUCTURE

The Institute comprises the secretariat and eight research centres or departments. The research centres are as follows:

- Alupe Leprosy and Skin Diseases Research Centre (ALSDRC) Busia
- Biomedical Sciences Research Centre (BSRC)
- Clinical Research Centre (CRC) (includes the Respiratory Diseases Research Unit, the Reproductive Health Research Unit and the Kilifi Research Unit)
- Vector Biology and Control Research Centre (VBCRC) Kisumu
- Virus Research Centre (VRC)
- Centre for Microbiology Research (CMR)
- Medical Research Centre (MRC)
- Traditional Medicines and Drugs Research Centre (TMDRC)

TECHNICAL COMMITTEES

The following are the technical committees of the Institute:-

(a) Centres' Scientific Committee
Each Centre has a scientific committee consisted of all the research and technical staff in a centre. The committee is responsible for development, implementation, monitoring and evaluation of the research activities in a Centre.

(b) Programmes Committees
There is a programmes committee for each approved research programme in the Institute. These are transcentre, inter-institutional, and multi-disciplinary committees whose work is to co-ordinate and facilitate the effective implementation of their respective research programmes, including the dissemination of research findings from work carried out in those programmes.

(c) Scientific Steering Committee
This is a trans-institute committee, consisted of all Directors of Centres whose function is to consider, co-ordinate, monitor, review and approve all research proposals. It also co-ordinates the organization of seminars, workshops and conferences in the Institute.

(d) Ethical Review Committee
This Committee looks into ethical issues of research. It clears any protocols of research dealing with human experimentation. Its members include eminent health consultants, lawyers, church leaders and laymen.

(e) Publications Committee
This Committee vets all manuscripts for publication. It advises on all matters regarding publication. It also co-ordinates all Institute publications including the *African Journal of Health Sciences*. It publishes and updates the abstracts booklet of KEMRI publications.

(f) Training Committee
This committee is responsible for coordinating all training functions of the institute. It approves internal training programmes and also explores opportunities and sources of funds for institute staff.

(g) Animal Care and Use Committee
This Committee looks into and advises on the care and use of research animals. It also looks into the management of the animal house.

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 Development and Planning. 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 responsible for 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 Development and Planning 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
The information services unit is an extension of the library, undertaking the duties of publishing, documentation and dissemination of the Institute's research results and activities. It is also the public relations arm of the Institute.

(b) Engineering and Maintenance Services Unit
The Engineering and Maintenance Services Unit maintains KEMRI's premises, installations, laboratory equipment and machinery and comprises the mechanical, electrical/electronics, carpentry and motor vehicles sections. It has workshops equipped with machine tools, testing and measuring instruments and a wide range of other equipment.

(c) Medical Illustration Unit
The Medical Illustration Unit is fully equipped and staffed to provide relevant professional services to the whole of KEMRI. It is responsible for technical and statistical drawings, graphs, tables, maps, charts and photographs. During conferences, workshops, seminars and other functions, the unit provides and co-ordinates audiovisual aids.

RESEARCH PROGRAMMES
The primary mission of KEMRI is to conduct health sciences research and generate research findings to be applied towards the improvement of the health status in Kenya and elsewhere in the world.

In its research investigations the Institute aims at providing solutions to urgent and pressing problems of health facing Kenyans in line with the priorities for promotion of health determined by the Government of Kenya. The primary objectives of health services in Kenya are to reduce health risks, to control diseases and to encourage better health styles in the community. In line with these objectives, KEMRI's research is targeted first and foremost towards generating new information on the prevention, control, management and treatment of diseases of public health importance in Kenya; and secondly, towards increasing the awareness of the individual Kenyans and the community in avoiding health risks and leading better health styles.

The leading causes of death and ill-health in Kenya are due to communicable diseases. The diseases with the highest mortality and morbidity are malaria, respiratory diseases and diarrhoeal diseases. The thrust of KEMRI's research work is consequently on communicable diseases that afflict the majority of Kenya's population. The Institute also directs significant attention to non-communicable diseases such as cancers and cardio-vascular diseases whose prevalence in the Kenyan population is rising.

Dictated by the above factors, the main research programmes in the Institute are shown below:-

(a) Acute Respiratory Infections Programme
In Kenya, acute respiratory infections (ARI) constitute a major public health problem especially in young children. The overall objective is to develop strategies for early diagnosis and appropriate management of ARI in children.

(b) Biotechnology Research Programme
Biotechnology is a powerful tool for advancement of health research and also for solving health problems. The programme focuses on the rapid diagnosis of infectious diseases, monoclonal antibody techniques, typing of infectious organisms, vaccine production, cancer research, genetic engineering, molecular hybridisation, nucleic acid research, among other aspects of health research interests. The programme aims at supporting and strengthening the Institute's research programmes on malaria, schistosomiasis, leishmaniasis, hepatitis, diarrhoea, HIV/AIDS and oncology. Special importance is attached to co-ordination and collaboration with other groups dealing with biotechnology in Kenya.

(c) Cancer Research Programme
The programme focuses on the aetiology, early diagnosis, prevention and management of cancers. It also aims at co-ordination of cancer research and the establishment of a National Cancer Registry.

(d) Cardio-Vascular Diseases Research Programme
The aim of the programme is to contribute towards cardio-vascular health of Kenyans. The programme focuses on the aetiology, early diagnosis, optimal management and intervention approaches against cardio-vascular diseases. There is co-ordination between the programme and other programmes dealing with cardio-vascular problems.

(e) Diarrhoeal Diseases Research Programme
The programme has mainly concentrated on aetiology, epidemiology, prevention, management and control of diarrhoeal diseases. One of the achievements of the programme is the development of cereal-based oral rehydration therapy using traditional cereals which have been found to be as effective as the glucose-based oral rehydration solution (ORS).

This has been one of the most active programmes in KEMRI and has been supported by many diverse organizations. These include the Ministry of Health, United States Agency for International Development, National Council for Science and Technology, Aga Khan Foundation, International Development Research Centre (IDRC) of Canada and Japan International Cooperation Agency (JICA) among others.

(f) Environmental and Occupational Health Research Programme
The programme focuses on priority areas in environmental and occupational health. Projects have been developed under this programme to address problems of health associated with use of agricultural chemicals, industrial pollutants and occupational hazards.

(g) Filariasis Programme
This programme aims at studying the prevention, management and control of filariasis. Intensive scientific investigations at KEMRI have led to the identification of two new filaria parasites. Clinical trials of the drug Ivermectin for the treatment of filariasis have shown it to be a potent microfilaricidal agent against Wuchereria bancrofti, the causative agent in East Africa. This finding may lead to control of transmission by mass treatment.

(h) Health Systems Research Programme
The management of health services has been recognized as a vital factor in health care delivery system. Research activities in this programme have been concerned with population organizational structures, their interactions and evaluation of health policies with a view to improving them. Results of feasibility studies conducted by KEMRI have been applied by the Ministry of Health and

others for the improvement of the national health care delivery system.

(i) HIV/AIDS Research Programme
The programme aims at strengthening the prevention and control of HIV infections and AIDS. The programme focuses on epidemiology of HIV/AIDS epidemic, therapeutics in HIV/AIDS, basic research, vaccine development and socio-cultural impact of HIV/AIDS. Special emphasis is directed to co-ordination with other groups involved with HIV/AIDS research locally and internationally and also with the National AIDS Control Programme (NACP). KEMRI also serves as a World Health Organization Reference Centre on AIDS.

(j) Human Reproduction Programme
Research studies in this programme are aimed at generating information on family planning, adolescent fertility, maternal mortality and other aspects relating to reproductive health. One achievement under this programme is the use of natural family planning techniques in the predetermination of the sex of the foetus.

(k) Hydatid Disease Research Programme
The main objective of this programme is to reduce the prevalence of hydatid disease. Parts of the Turkana District of Kenya have some of the highest rates of hydatidosis in the world. Through a collaborative research effort between KEMRI and the African Medical and Research Foundation (AMREF) it has been shown that Albendazole may be a safe alternative to surgery in the treatment of hydatidosis.

(l) Leishmaniasis Research Programme
Leishmaniasis is common in parts of Machakos, Bungoma, Laikipia, Baringo, West Pokot, Turkana and Kitui Districts. Studies being undertaken at KEMRI seek to establish the disease patterns in relation to the population at risk, diagnosis and treatment and an understanding of the biology of the phlebotomine sandfly vector and how it transmits the disease.

(m) Leprosy and other Skin Diseases Research Programme
The programme focuses on the epidemiology, treatment and control of leprosy and other skin diseases. The programme has contributed to development of better treatment regimen for leprosy and the use of BCG vaccine as a preventive tool for leprosy. In the treatment of other skin diseases work on ringworm has led to the development of a treatment schedule which costs a fraction of the current cost.

(n) Malaria Programme
This is the largest programme at KEMRI at the moment. It has drawn long-term collaboration from five of the Institute's Centres as well as from overseas institutions namely, the Centres for Disease Control (CDC), Atlanta, USA, Oxford University (through the Wellcome Trust Research Laboratories) and Walter Reed Army Institute of Research. Investigations are carried out to determine the biology of malaria in childhood medicine, drug sensitivity of malarial parasites, epidemiology of malaria, development of malaria vaccine, and the biology of vectors.

(o) Nutrition Research programme
The programme aims at studying the epidemiology of nutritional disorders in order to develop and apply appropriate preventive and control methods. Studies have revealed that there is a significant relationship between nutrition and infection. Another important area that is being investigated is the development of appropriate weaning foods during diarrhoea.

(p) Oral Health Research Programme
Under this programme, research projects have included studies on periodontal disease, dental fluorosis, oral lesions, epidemiology of dental caries and the prevention and control of dental diseases through primary health care.

(q) Schistosomiasis Research Programme
This is one of the oldest and high priority programmes in KEMRI. The programme focuses on vector and disease prevalence, water contact studies, immunology, treatment and control strategies. There is considerable intercentre, local and external collaboration in all research activities. Reduction of morbidity through a combined strategy of water and sanitation, health education and chemotherapy has been achieved. It has been established that there is an age dependent acquisition of immunity to Schistosoma mansoni leading to efforts towards vaccine development.

(r) Sexually Transmitted Diseases Research Programme
Emphasis is laid on the epidemiology, aetiology and control of sexually transmitted diseases. The programme also focuses on the development of treatment and

control methodologies.

(s)Traditional Medicines and Drugs Research Programme
Research on traditional medicines has sought to rationalise the use of herbal medicines in contemporary medical practice. Research activities have involved the evaluation of the medicines through a multidisciplinary approach. This has involved ethnomedical interactions with traditional practitioners, laboratory experimentation in phytochemical analysis and pharmacology and toxicology, and correlation of data using the medical know-how available in the Institute.

This unique approach has resulted in the identification of some useful medicines and substances that are currently under more entailed investigation. The medicines of current interest include those for asthma, hypertension, diabetes, epilepsy, gout, malaria and immunological diseases like myasthenia gravis. Work on conventional drugs is also carried out to establish their quality, safety and efficacy.

(t) Tuberculosis Research Programme
National control strategies, based on early diagnosis and shorter term chemotherapeutic regimens are being tested and further developed. Work has also been carried out on non-tuberculous respiratory problems relating mainly to industrial and environmental pollution. Studies have also been carried out to develop a profile of normal lung function indices for Kenyans living in various geographical areas. This has implications for the development of sports medicine.

(u) Viral Hepatitis Programme
Activities on hepatitis concentrate on developing simpler diagnostic methodologies for elucidating the total epidemiology of viral hepatitis. Strategies for vaccination are also being developed. Reagents for the screening of HB virus in donated blood have been developed and are in use in public hospitals. The programme also aims at producing an effective and safe vaccine against Hepatitis B. The realization of this goal will not only be a milestone in technology expertise, but will also have favourable economic implications for the country.

The research findings from KEMRI are routinely disseminated to Kenya's Ministry of Health and other users of health research information for application in the health delivery system.

FINANCIAL RESOURCES
The Institute is mainly funded by the Government of Kenya for both its recurrent and development operations. The financial allocation to KEMRI from the Kenya Government for both the development and recurrent budgets for 1981/82 financial year was Kenya pounds 852,800 rising to Kenya pounds 5,141,040 in 1991/92 financial year and to Kenya pounds 9,948,780 during the 1994/95 financial year.

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 organisations with which it has research collaboration linkages.

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

(a) Research Scientists
KEMRI has a large number of highly qualified and experienced biomedical scientists in a wide range of disciplines. Among them are microbiologists, clinicians, social scientists, pharmacists, epidemiologists, immunologists, virologists, bacteriologists and other specialist cadres. 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. Most masters degree holders are registered for their respective doctoral degree programmes and those with first degrees are in their graduate degree

programmes in various fields.

While their principal role is to conduct research at KEMRI, a good number of scientists in the Institute (especially those of the rank of Senior Research Officer and above) hold teaching positions in local and overseas universities and also supervise postgraduate students. Some serve as external examiners to masters and doctoral theses. Others have been visiting professors in foreign universities.

In addition to the Kenyan scientists, there are scientists from other parts of Africa as well as expatriates from Japan, Britain, United States of America and elsewhere among the staff of KEMRI. Several other external investigators work in KEMRI on collaborative projects.

(b) Technical Staff
The number of technical staff has increased considerably. From a mere 44 in 1982, the number has risen to 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.

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

TRAINING
Research and training are inseparable and each serves to enhance the other. The Institute recognizes that no tangible results can be realised without well-trained and qualified personnel and, therefore, training is accorded special priority. The whole idea behind research is to reveal what has not yet been found out.

To carry out research investigations successfully, KEMRI offers training to its scientific and supportive 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.

FACILITIES

(a)General Overview
At the time of its inception, KEMRI had a skeleton of facilities mainly inherited from the East African Community. Subsequently the Institute developed its own facilities designed to suit its specific research needs. The facilities are located in various laboratories throughout the Republic with most of them concentrated in Nairobi. In Nairobi there is the KEMRI Headquarters and the Central Laboratories Complex off Mbagathi Road. In addition there is the Medical Research Centre, the Centre for Microbiology Research and the Respiratory Diseases Research Unit of CRC within Kenyatta National Hospital complex. At Kisumu there is the Vector Biology and Control Research Centre while at Alupe, Busia, there is the Leprosy and Skin Diseases Research Centre. There are other peripheral facilities at Taveta, Kilifi, Malindi and Kwale.

(b) Specialized Research Laboratories
KEMRI has a wide range of specialized laboratories well tailored for the Institute's research needs and activities. Some of these facilities are:

- Virology laboratories
- Biomedical Science laboratories
- Traditional Medicines and Drugs laboratories
- Immunology laboratories
- Malaria laboratories
- Leishmaniasis laboratories
- Schistosomiasis laboratory
- Electron Microscopy laboratory
- Tuberculosis laboratories
- Human Reproduction laboratory

- Parasitology laboratories
- Bacteriology laboratories
- Computer Centre

(c) Model Clinic
The Institute has a 40 bed modern hospital within the KEMRI Headquarters Complex. It is equipped for care and monitoring of research patients and has its own complement of diagnostic services including laboratories, radiological services and endoscopic services. Research programmes here are mainly on tropical diseases and HIV but can be varied as need arises. The Kilifi Unit has specialized intensive care facilities for clinical research in tropical diseases.

(d) Animal House
At the KEMRI Headquarters Complex there is a modern animal house with facilities for experimental work on various types of laboratory animals which include primates, hamsters, rats, mice, rabbits and snails.

(e) Library
KEMRI has a health sciences research library. It has a wide collection of journals, research reports, conference proceedings, reference materials, books and other documents. The reading facilities cater for 20% of the total scientific and technical staff at a time. As one way of strengthening the library and information management system, KEMRI has CD-ROM services which enable the library to access any literature from outside sources. The KEMRI E-mail no. is kemrdib@ken.healthnet.org.

(f) Conference Theatre
KEMRI has a modern conference theatre, with a sound control system and audiovisual facilities. It can hold approximately 300 people and has become the venue for scientific ceremonies, conferences, seminars and other scientific functions that are held at the Institute.

(g) Other Facilities
There are various other conference and lecture room facilities spread throughout KEMRI. These are at the KEMRI Headquarters, Medical Research Centre, Respiratory Diseases Research Unit, Kilifi Unit and Kisumu. Additionally there are various common rooms in most Centres which are used for research group meetings.

LOCAL AND EXTERNAL COLLABORATION

In line with its mandate, KEMRI has developed very useful linkages with local, regional and international institutions and organizations that are involved in medical research. Within Kenya, the Institute works closely with several government ministries especially the Ministry of Health and the Ministry of Research, Technical Training and Technology.

The Institute also collaborates with the national universities and locally-based research institutions. KEMRI also collaborates with and receives support from a number of international organizations. These include the World Health Organization, Japan International Cooperation Agency, the International Development Research Centre of Canada, the United States Agency for International Development, the Wellcome Trust (UK), the Walter Reed Army Institute of Research (USA), the Centres for Disease Control (USA), the British Medical Research Council, the Royal Tropical Institute of Amsterdam, Netherlands and others.

REGIONAL SCIENTIFIC CAPACITY

Each year KEMRI organises and hosts a medical scientific conference. This is the premier scientific conference in the Eastern, Central and Southern African region and attracts medical scientists from Kenya, the East African region as well as from other parts of Africa and the world especially Japan, USA, Canada and the United Kingdom. The event has recently converted into the African Health Sciences Congress, organised by the African Forum for Health Sciences, with wider participation in its organization from the rest of Africa. KEMRI was also the initiator and sponsor of the *African Journal of Health Sciences* which is published under the auspices of the African Forum for Health Sciences. KEMRI is a reference centre for many WHO sponsored research activities in Africa.

THE FUTURE

KEMRI is a leading health research institute in Africa. It has a firm scientific foundation, the physical infrastructure, the manpower capability, the experience and the capacity to serve a centre of excellence in health research for Africa and for the rest of the world. This is a vision the Institute is working steadily and progressively to achieve for the good of humanity.

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