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Thematic Evaluation on Communicable Disease Control in Africa

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Japan International Cooperation Agency
Planning Coordinatin Department

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Preface

Japanese cooperation activities in Africa through Official Development Assistance (ODA) in the field of health and medicine have focused on infectious diseases control, which has strengthened cooperation in the establishment of research institutes combined with capacity development in such countries as Ghana, Kenya, and Zambia.

While the research capabilities of the institutes in these countries have been enhanced, the focus of cooperation has shifted from strengthening research capabilities towards cooperation that targets the nation as a whole. Under this situation, the need to reconsider the functions and role of research institutes for infectious diseases has continued to arise.

In the analytical process of the Thematic Evaluation on Communicable Diseases Control in Africa, an examination of the contribution to infectious diseases control of JICA's cooperation with research institutes and an analysis of the expected functions and roles of such institutes has been conducted through an evaluation of cooperation with medical research institutes in Ghana, Kenya, and Zambia and this has led to consideration of the direction for future project implementation.

The report on the Thematic Evaluation on Communicable Diseases Control in Africa has now been completed, based on discussions regarding the framework of the evaluation, the evaluation methodology, and the results of the evaluation by the evaluation investigative committee composed of Professor Hiroshi SUZUKI of the Niigata University Graduate School, Doctor Yasuo MORITSUGU, ex-Deputy Director, National Institute for Infectious Diseases (former the National Institute of Health), and Professor Koichi MIYOSHI of the Graduate School of Ritsumeikan Asia Pacific University. In addition, in order to ensure the quality and objectivity of the evaluation, a separate external evaluation by intellectuals from Kenya and Zambia was also conducted. The results of their evaluation are attached at the end of the analysis.

Recommendations from the evaluation analysis will be put to practical use in project formulation and implementation in the area of communicable diseases control. Finally, I would like to express my sincere appreciation for the cooperation and support of all those involved in this evaluation survey.

Seiji KOJIMA, Vice-President
Japan International Cooperation Agency
September 2005

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(One of several health centers supported by the JICA HIV/AIDS and TB Control Project for external quality assurance of TB microscopy)

List of Abbreviations

used throughout the Report

Abbreviation	Proper Name
AFP	Acute Flaccid Paralysis
AIDS	Acquired Immunodeficiency Syndrome
ARI	Acute Respiratory Infection
ART	Anti-Retroviral Therapy
ARV	Anti-Retroviral（drugs）
ASIPAC	Asia Centre of International Parasite Control
CBO	Community Based Organization
CDC	Centers for Disease Control and Prevention
C/P	Counterpart
DANIDA	Danish International Development Agency
DFID	Department for International Development (UK)
DPT	Diphtheria/Pertussis/Tetanus Vaccine
DOTS	Directly Observed Treatment, Short-course
ELISA	Enzyme-Linked Immunosorbent Assay
E/N	Exchange of Notes
EPI	Expanded Programme on Immunization
ESACIPAC	Eastern and Southern Africa Centre of International Parasite Control
EU	European Union
FP	Family Planning
F/U	Follow-Up
GPCI	Global Parasite Control Initiative
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit German Development Corporation
G Ⅱ	Global Issues Initiative on Population and AIDS
HBV	Hepatitis B Virus
HIV	Human Immunodefiency Virus
IFPRI	International Food Policy Research Institute
IMCI	Integrated Management of Childhood Illness
IMR	Infant Mortality Rate
INSERM	Institut National de la Santé et de la Recherche Médicale (France) National Institute for Health and Medical Research
I-PRSP	Interim Poverty Reduction Strategy Paper
ITN	Insecticide Treated Net
IVM	Ivermectin
JICA	Japan International Cooperation Agency
JICC	Joint Interagency Coordination Committee
KEMRI	Kenya Medical Research Institute
MCH	Maternal Child Health
MDGs	Millennium Development Goals

NMIMR	Noguchi Memorial Institute for Medical Research
MMR	Maternal Mortality Rate
MTCT	Mother to Child Transmission
MOU	Memorandum of Understanding
NGO	Non-governmental Organization
NIDs	National Immunization Days
ORT/ORS	Oral Rehydration Therapy /Oral Rehydration Salts
OTCA	Overseas Technical Cooperation Agency (Japan)
PEPFER	President Bush's Emergency Plan for AIDS
PMTCT	Prevention of Mother to Child Transmission
PHC/PHS	Primary Health Care /Primary Health Services
PRSP	Poverty Reduction Strategy Paper
P3	Physical Contaminant 3
Sida	Swedish International Development Cooperation Agency
SP	Sector Programme
STD	Sexually Transmitted Diseases
SWAps	Sector Wide Approaches
TB	Tuberculosis
TBA	Traditional Birth Attendant
TICAD	Tokyo International Conference on African Development
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
UTH	University Teaching Hospital (Zambia)
U5MR	Under 5 Mortality Rate
VCT	Voluntary Counseling and Testing
VPD	Vaccine Preventable Diseases
WACIPAC	West African Centre for International Parasite Control
WFP	World Food Programme
WHO	World Health Organization
WWF	World Wide Fund for Nature

Chapter 1 and 2

Abbreviation	Proper Name
CAMR	Centre for Applied Microbiology and Research (UK)
CDC	Centers for Disease Control and Prevention (USA)
CDSC	Communicable Disease Surveillance Centre (UK)
DHHS	Department of Health and Human Services (USA)
FDA	Food and Drug Administration (USA)
IUMS	International Union of Microbiological Societies
NCHS	National Center for Health Statistics (USA)

NCHSTP	National Center for HIV, STD, and TB Prevention (USA)
NCID	National Center for Infectious Diseases (USA)
NHS	National Health Service (UK)
NIAID	National Institute of Allergy and Infectious Diseases (USA))
NIBSC	National Institute for Biological Standards and Control (UK)
NICE	National Institute for Clinical Excellence (UK)
NIH	National Institute of Health (USA)
NIP	National Immunization Program (USA)
WHO/EURO	WHO Regional Office for Europe

Chapter 4

Abbreviation	Proper Name
ASIPAC	Asia centre of International Parasite Control
CSRPM	Centre for Scientific Research into Plant Medicine
ESACIPAC	Eastern and Southern Africa Centre of International Parasite Control
GAC	Ghana AIDS Commission
GHS	Ghana Health Service
GPRS	Ghana Poverty Reduction Strategy
HIMS	Health Information Management System
HRU	Health Research Unit
KCCR	Kumasi Centre for Collaborative Research in Tropical Medicine
MDBS	Multi-Donor Budgetary Support
MFEP	Ministry of Finance and Economic Planning
NACP	National AIDS Control Programme
NMCP	National Malaria Control Programmes
NMIMR	Noguchi Memorial Institute for Medical Research
NPHRL	National Public Health Laboratory
NTCP	National Tuberculosis Control Programme
OCRC	Onchocerciasis Chemotherapy Research Centre
PHD	Public Health Division/MOH
PHLs	Public Health Laboratories
PPME	Policy, Planning, Monitoring and Evaluation /MOH
WACIPAC	West African Centre for International Parasite Control
WHO/TDR	Special Programme for Research and Training in Tropical Diseases

Chapter 5

Abbreviation	Proper Name
AFHES	African Forum for Health Science
AMREF	African Medical and Research Foundation
ASIPAC	Asia Centre of International Parasite Control
CBRD	Centre for Biotechnology Research and Development/KEMRI
CCR	Centre for Clinical Research/KEMRI

CGIAR	Consultative Group on International Agricultural Research
CGMRC	Centre for Geographic Medicine Research/KEMRI
CMR	Centre for Microbiology Research/KEMRI
CPHR	Centre for Public Health Research/KEMRI
CPIDR	Centre for Parasitic and Infectious Disease Research/KEMRI
CRDR	Centre for Respiratory Diseases Research/KEMRI
CTMDR	Centre for Traditional Medicine and Drug Research/KEMRI
CVBCR	Centre for Vector Biology and Control Research/KEMRI
CVR	Centre for Virus Research/KEMRI
DVBD	Division of Vector-Borne Diseases/MOH
ESACIPAC	Eastern and Southern Africa Centre of International Parasite Control
FC	Finance Committee
ICIPE	International Centre of Insect Physiology and Ecology
ILCA	International Livestock Centre for Africa
ILRAD	International Laboratory for Research on Animal Diseases
ILRI	International Livestock Research Institute
IPR	Institute of Primate Research
ITROMID	Institute of Tropical Medicine and Infectious Diseases
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KEMRI	Kenya Medical Research Institute
KEMSA	Kenya Medical Supplies Agency
KETRI	Kenya Trypanosome Research Institute
KMTC	Kenya Medical Training College
NACC	National AIDS Control Council
NASCOP	National AIDS and STDs Control Programmes
NMCP	National Malaria Control Programmes
NPHLS	National Public Health Laboratory Services
NTBCP	National AIDS and STDs Control Programmes
NTP	National Tuberculosis Control Programme
PPHS	Department of Preventive and Promotive Health Services/MOH
SEAC	Staff Establishment and Appraisal Committee
SPC	Scientific Programmes Committee

Chapter 6

Abbreviation	Proper Name
CBoH	Central Board of Health
CDL	Chest Disease Laboratory
DHB	District Health Boards
HMIS	Health Management Information Systems
HMB	Hospital Management Boards
ICU	Intensive Curative Unit
IEC	Information, Education, and Communication
NAISP	National HIV/AIDS/STI/TB Intervention Strategic Plan

NAC	National Aids Council
NMCC	National Malaria Control Centre
NCH	Ndola Central Hospital
NTP	National Tuberculosis Programme
TDRC	Tropical Diseases Research Centre
ZANARA	Zambia National Response to HIV/AIDS Project

Executive Summary

1 Background and Objectives of the Study

Japanese cooperation with Africa through Official Development Assistance (ODA), in the field of health and medicine has focused on infectious diseases control, which has strengthened cooperation by combining the establishment of research institutes with capacity development in such countries as Ghana, Kenya, and Zambia. While the research capabilities of the institutes in these countries have been enhanced, the focus on cooperation has shifted from the enhancement of research capabilities to cooperation targeting the respective nations as a whole. Under this situation, the need to reconsider the functions and role of research institutes for infectious diseases has continued to arise.

In this evaluation study, the Noguchi Memorial Institute for Medical Research (NMIMR) in Ghana, the Kenya Medical Research Institute (KEMRI), and the Zambia University Teaching Hospital (UTH) have been selected as evaluation targets of Japan's cooperation in the field of infectious diseases control in Africa and their respective series of cooperation activities have been evaluated. In the process of the evaluation study, the outcomes of research on infectious diseases by the institutes and their ripple effects on public health were examined by comparing the positioning, functions and expecting roles of the institutes in order to extract recommendations for project planning and implementation. In this evaluation, the analysis was conducted in terms of research, human resources development, and contribution to health services, which constitute the functions of the present and expected roles of the research institutes in infectious diseases control in the health and medical sectors of Ghana, Kenya, and Zambia.

2 Functions of Research Institutes for Communicable Diseases in Developed Countries

Before examining the functions and role of the target institutes, those of the following research institutes for infectious diseases control in developed countries were analyzed as examples: NIID, the National Institute of Infectious Diseases in Japan, CDC, the Centers for Disease Control and Prevention in the United States, and CDSC, the Communicable Disease Surveillance Centre in the United Kingdom. As a result of this analysis, the functions of the research institutes can be identified in relation to the three aspects of 1) Research, 2) Human Resources

Development, and 3) Contribution to Health Services.

In the evaluation study, the functions and roles of the three research institutes in Ghana, Kenya and Zambia were analyzed based on the functions of research institutes in these developed countries in terms of research, human resources development, and contribution to health services (surveillance, reference, national control and other tests and research on medical materials) were utilized as the framework for the analysis.

3 Noguchi Memorial Institute for Medical Research: NMIMR

In 1968, the Overseas Technical Cooperation Agency (OTCA), the predecessor of JICA, started to dispatch experts to the Korle Bu Hospital (Ghana College of Health Services) for the purpose of promoting research on virology. After the completion of the facilities of the NMIMR, technical cooperation provided at the Korle Bu Hospital was transferred to the institute. Since then, JICA has continuously cooperated with the NMIMR to improving its research capacity over a period of 28 years. Meanwhile, the Japanese government supported the development of the facilities and equipment of the NMIMR through the execution of grant aid projects, namely, the Noguchi Memorial Institute Rehabilitation and Extension Project in 1997 and so on.

The objectives of the series of JICA cooperation activities can be roughly divided into two stages. During the initial stage from 1968 to 1991, JICA focused on strengthening the capabilities of the university-affiliated institutions. Although the first project type technical cooperation, the Noguchi Memorial Institute Project, which started in 1986, included some activities related to infectious diseases control, such as quality control of vaccines, its focus was to transfer technical skills to the NMIMR. The second stage started in 1991 after Noguchi Memorial Institute Project Phase II. It aimed to strengthen the research capabilities of the NMIMR and to enhance the capacity of its health/medical personnel through technical training. This stage was intended to enhance and strengthen infectious diseases control in Ghana through capacity building of the health/medical personnel based on the NMIMR, which had acquired the appropriate research capacity during the period of the first stage of JICA technical cooperation. A series of JICA technical cooperation activities targeted Vaccine Preventable Diseases (VPD), HIV/AIDS and Sexually Transmitted Diseases (STD), Diarrhoeal Diseases, TB, and Schistosomiasis.

JICA has supported research activities on various infectious diseases since the

establishment of the NMIMR. As mentioned above, the NMIMR has extensively contributed to infectious diseases control in Ghana and the Africa region as a research institute and reference laboratory. For example, the NMIMR has been designated as the national reference laboratory for HIV and has established a position as a core referral laboratory, which deals with polio, yellow fever, tuberculosis, and so on. Moreover, as a core research institute for infectious diseases, the NMIMR contributes to infectious diseases control in the West African region as well as in the country by functioning as a WHO reference laboratory for Polio and conducting third country training for the surrounding countries.

In general, the role of the research institute is to develop techniques for infectious diseases control. A series of JICA cooperation activities involved carrying out research to improve health services, such as the distribution system of vaccines and improving the accuracy of diagnoses. These activities are therefore evaluated as having contributed to improving the health of the population indirectly through the improvement of health services.

However, a dichotomy between the needs of NMIMR and JICA assistance through technical cooperation aimed at technology transfer has accompanied the enhancement of the independence of the NMIMR through the strengthening of collaborative research with foreign institutes, although JICA's technical cooperation met the needs of the NMIMR in the initial stages of cooperation. It is concluded that a new cooperation scheme that treats the NMIMR as an equal partner is required to improve future cooperation.

Through a series of analyses based on the positioning, functions, and effects of JICA cooperation with the NMIMR, the expected future roles of the NMIMR can be summarized as follows in terms three functions. (1) To maintain the strengthen of its research on infectious diseases that should be eradicated in West Africa and throughout Africa by promoting joint research with foreign universities and research institutes, as well as conducting leading research on infectious diseases control in Ghana as a research institute equipped with advanced diagnostic techniques that are indispensable for infectious diseases control through molecular level analysis and genetic analysis, (2) To serve as a center for human resources development as an executing agency for the in-service training of medical personnel in Ghana and third country training for the surrounding countries, and to establish a position as a research base for infectious diseases control in West Africa under the framework of the West African Centre for International Parasite Control Project, (3) To expand health services that lead to

enhanced public health, including the quality control of vaccines, research on drug resistance in malaria, and information transmission as a reference laboratory through coordination with the Ministry of Health

4 Kenya Medical Research Institute: KEMRI

JICA started project-type technical cooperation on infectious diseases control, namely, the Communicable Disease Research and Control Project, in cooperation with the Division of Vector Borne Diseases (DVBD), the Ministry of Health, and the National Public Health Laboratory Services in March 1979, based on a request from the Government of Kenya. The KEMRI has been the main partner for JICA projects since its main facilities were completed with Japanese Grant Aid in 1981. JICA has continuously implemented project-type technical cooperation with the KEMRI, and there were seven projects implemented up to 2004. The Government of Japan further supported the development of the facilities and equipment of the KEMRI through the implementation of grant aid projects, including the Project for Improvement of the Kenya Medical Research Institute in the Republic of Kenya in 1997.

This series of JICA cooperation activities have aimed at strengthening the research capacity of the KEMRI. Human resources development in the health sector has formed an additional objective of JICA's cooperation, and workshops/seminars aimed at disseminating the research outputs to other medical organizations were started in 1990. A series of JICA technical cooperation activities targeted diarrhoea, acute respiratory infection (ARI), hepatitis, HIV/AIDS, schistosomiasis, and filariasis.

A characteristic of JICA's cooperation with the KEMRI is that the activities have concentrated on two main functions - blood screening and parasite control. Blood screening activities, in particular, enabled the test kits developed by the KEMRI to be disseminated nationwide through coordinated research and training activities. In addition, as a research institute and a WHO collaborating center, the KEMRI has greatly contributed to infectious diseases control in Africa as well serving as an educational and training institute.

Under a series of hepatitis control activities conducted by the KEMRI, hepatitis control has been implemented with the focus on protection from hepatitis B through JICA support for epidemical surveys and the development and diffusion of testing kits for hepatitis B, which has brought about a significant improvement in the screening rate of the blood supply, and the enhancement the blood-testing techniques through training.

Moreover, the KEMRI disseminates diagnostic and experimental techniques by conducting third country training on blood screening (hepatitis B and HIV/AIDS).

On the other hand, as with the NMIMR, the KEMRI had also acquired sufficient capacity as a research institute. In view of the fact that cooperation between JICA and the KEMRI is proceeding to the next stage, JICA should consider the validity of cooperation that has the primary aim of technology transfer. It is, therefore, necessary to establish a new cooperation framework for the KEMRI with the activities consisting of mainly collaborative research with foreign institutes.

Through a series of analyses based on the positioning, functions, and effects of JICA cooperation with the KEMRI, the expected role of the KEMRI in the future can be summarized as follows in terms three functions. (1) To strengthen the functions of infectious diseases control comprising research, human resources development, and contribution to health services through the research and development, production, and dissemination of several blood testing kits, such as an HIV/AIDS testing kit that is low in price and can be produced in Kenya, (2) To serve as a center for human resources development as an executing agency for the in-service training of medical personnel in Ghana and third country training for the surrounding countries, and to establish and expand epidemiological databases on emerging and re-emerging infectious diseases, and expand its reference functions, such as information transmission

5 Virology Laboratory and Tuberculosis Laboratory of the University Teaching Hospital: UTH

JICA started the University of Zambia Medical School Project with the purpose of enhancing technology in the areas of neonatal care and paediatric surgery from 1980. When the University of Zambia Medical School Project was closed in 1989, the importance of prevention, diagnosis, and care for infectious diseases in infants was emphasized as a recommendation of the final evaluation of the project. In response to the request of the Zambian government, after the year 1989, JICA designated the UTH as an implementing agency and carried out three technical cooperation projects aimed at infectious diseases control. The Virology Laboratory and the Tuberculosis (TB) Laboratory, which belong to the laboratory services department of the UTH, served as counterparts for these projects, and JICA conducted technical cooperation to establish the diagnostic capacity for infectious diseases in Zambia. Moreover, in order to develop the infrastructure for research activities, JICA constructed a building for the

Virology Laboratory in 1991, and a building for the TB Laboratory using the budget for project-type technical cooperation.

A series of cooperation activities was initiated with the aim of establishing the diagnostic capacity for infectious diseases in Zambia. These focused on the establishment and capacity building of the Virology Laboratory of the UTH in the initial stage of cooperation. After the Virology Laboratory acquired the necessary technology and facilities, the target of the cooperation was expanded nationwide through its participation in the EPI Programme, Polio Eradication Programme, and HIV sentinel survey. A series of JICA technical cooperation activities targeted Viral Diarrhoea, Acute Respiratory Infections (ARI), Hepatitis, Polioviruses and other Enteroviruses, Measles, HIV/AIDS, and TB. As a result of the evaluation of the Infectious Diseases Control Project, JICA judged that the Virology Laboratory and the TB Laboratory had already acquired the diagnostic technology for the target diseases in the initial stage of cooperation, namely, for diarrhoea, ARI, Hepatitis, polio, and measles. Thus, since 2001, JICA has focused the targets of cooperation on HIV/AIDS and TB, which have comprised the foremost public health problem in Zambia.

Both laboratories have worked to establish a national surveillance network for measles through JICA assistance and have contributed to establishing the diagnostic capability for infectious diseases in Zambia; for instance, by conducting external quality assurance for HIV and tuberculosis tests. In addition, they contribute to infectious diseases control with respect to health services, including the provision of training for medical personnel in regional laboratories, the diagnosis of specimens, external quality assurance, and so on. Moreover, the Virology Laboratory has an important role in infectious diseases control as the WHO inter-country reference laboratory for Polio and a reference laboratory for measles and influenza, not only for the nation, but also for the surrounding countries. Through a series of analyses based on the positioning, functions, and effects of JICA cooperation with the UTH Virology Laboratory and Tuberculosis Laboratory, the expected roles of the UTH Virology Laboratory and Tuberculosis Laboratory in the future can be summarized as follows in terms of three functions. (1) To strengthen research on HIV and tuberculosis, which is a type of opportunistic infectious disease, at a time when the diffusion of anti-retrovirus therapy has become an increasingly critical issue, by adopting the global 3 by 5 ART, in addition to its existing research on related diseases in the Expanded Programme on Immunization, (2) To hasten the provision of medical personnel dealing with HIV testing in provincial and county hospitals and VCTs as part of human resources development for HIV/AIDS

control, and, moreover, to establish an experimental and diagnostic system capable of contributing to HIV/AIDS control with ART, in cooperation with the research and human resources development mentioned above.

6 Conclusions

6.1 Effects of Cooperation with the Three Target Research Institutes

In reviewing the relationship between each research institute and the respective supervising agency, the NMIMR is a semi-autonomous institution under the University of Ghana, the KEMRI is directly under the jurisdiction of the Kenyan Ministry of Health, and the UTH, which is the parent organization of the UTH Virology and Tuberculosis Laboratories, is under the jurisdiction of the Ministry of Health (hospital facilities) and the Ministry of Education (school of medicine facilities). As a result of the evaluation study, it has been found that the three institutes contribute to infectious diseases control through their similar functions comprising research/diagnosis, human resources development, and surveillance/reference services under the framework of the functions of infectious diseases control, although their positioning as research institutes differs.

According to the past project evaluation reports, the objects of JICA cooperation have been the three research institutes and the expected effects of cooperation have not gone beyond research and human resources development. However, as can be seen, the fact that each research institute dispatches researchers to health programmes and committees organized by the health ministries and provides technical advice, and representatives of the health ministries are engaged in the management of the research institutes, the JICA cooperation has had an affect on administrative decision-making through the research institutes and the institutes conduct personnel training with respect to public health.

The following describes the commonality of the effects of JICA cooperation with the three research institutes elucidated in the evaluation study.

- At the beginning of JICA cooperation, the collaborative relationship between the two institutes and the Ministry of Health was weakened and the administrative routes for reflecting the results of research in communicable disease control initiated by the Ministry of Health were not sufficiently established. At present, the three research institutes conduct research in collaboration with their respective Ministries of Health, and they are regarded as major research institutes involved in infectious diseases control in each country.

- The NMIMR, the KEMRI, and the UTH Virology and Tuberculosis Laboratories conduct testing and quality assurance in the process of infectious diseases control as reference laboratories, which cannot be replaced by any other laboratory in their respective countries or in the surrounding countries. In particular, the UTH Virology Laboratory has contributed to eradicating polio in Zambia in cooperation with the Polio Eradication Programme.

- The research facilities provided through Japanese cooperation were essential for the acquisition of the advanced technology transferred by the Japanese counterparts. In addition, the establishment of a foundation for advanced research has made it possible to carry out joint research activities with overseas research institutions. Moreover, conducting joint research activities with overseas institutions has in turn further enhanced the research capacity of each institute. These institutes, which are dependent on external research subsidies, have also become able to strengthen their financial base through such joint research activities with overseas research institutions.

- All three research institutes, the NMIMR, KEMRI, and UTH, are top-level institutes in their respective countries, and function as not only research institutes, but also training facilities in the field of health and medicine. Each institute conducts technical training activities for health and medical personnel, as well as graduate and undergraduate students. Moreover, the researchers at the NMIMR and the KEMRI lecture at national universities in their respective countries.

- Each research institute dispatches researchers to health programmes and committees organized by their Ministries of Health, and give advice to these ministries. The achievements of JICA cooperation have contributed to infectious diseases control by the governments in the form of technical assistance to health programmes and committees beyond the scope of the research institutes, although this was not originally anticipated as an effect of the cooperation.

6.2 Roles of the Research Institutes

The three research institutes are expected to continue basic and applied research based on the needs derived from health policies. Research should be strengthened in the following areas.

(1) Research

- To strengthen practical applied research in priority areas
- To strengthen research on emerging/re-emerging infectious diseases and parasitic diseases
- To strengthen research on infectious diseases control based on regional characteristics through operational research in order to develop preventive methods and medical cures in Africa
- To strengthen operational research through participatory approaches in order to increase the effects of infectious diseases control

(2) Reference Laboratory/ Surveillance Tasks

- To strengthen the establishment and expansion of epidemiological databases and information transmission capacity for HIV/AIDS and emerging / re-emerging infectious diseases
- To participate in epidemiological surveys by the governments as representative surveillance institutions in their respective countries and to strengthen and provide quality control for subordinate testing institutions
- To introduce advance infectious diseases testing and diagnostic techniques and to strengthen the dissemination of techniques to related domestic medical institutions
- To strengthen infectious diseases control within the region by providing reference services to the surrounding countries that do not have sufficient diagnostic techniques

(3) Human Resources Development

- To develop the capacity of medical researchers in the region by conducting research on infectious diseases control
- To contribute to human resources development in the field of medicine among the next generation by providing medical education and opportunities for research on infectious diseases to graduate and undergraduate students from home and abroad
- To strengthen infectious diseases control by the transfer of techniques through third country training to medical personnel from the surrounding countries as a base for JICA cooperation in the region

(4) Joint Research

JICA has implemented technical cooperation for the purpose of enhancing the research capacity of the institutes, which has been sufficiently fulfilled. For the future, an examination should be made of how to utilize the research capabilities of the research institutes as development partners in the field of medicine and health in Africa. In African countries, health projects for the purpose of the examination of effectiveness of surveillance and medical cures can be executed efficiently and effectively by entrusting them to the research institutes familiar with local conditions.

(5) Cooperation to Maintain Functions as Reference Laboratories

It is important that each research institute participate in the survey activities implemented by health ministries and the WHO aimed at improving the health sector and for their testing and diagnostic capabilities to be effectively utilized. It is desirable for JICA to review the institutes' requirements and to provide assistance in terms of maintaining research facilities and human capacity development for renewing the facilities and equipment as needed.

(6) Utilization as Research Institutes

An issue that must be reviewed in future is how JICA will utilize the training functions of the NMIMR, the KEMRI, and the UTH Virology and Tuberculosis Laboratories. Possible uses include functioning as training facilities for health projects implemented in other African countries, as support for training activities carried out independently by each institute, or consigning third country training activities to each institute as part of South-South Cooperation.

On the other hand, Japanese research institutes and universities can also utilize the research institutes as a training facility for Japanese health personnel. As Japan is located in a temperate zone, it has environmental limitations in its study of tropical diseases. With JICA assistance, Japanese students and young researchers can utilize these three research institutes, which have established deep ties with Japan. It is also effective to further exchanges between Japan and African countries in the medical research field in order to promote infectious diseases research in Japan.

(7) Strengthen Regional Networks

After completing the establishment of regional networks based on the three research institutes, it is desirable to promote the dispatch of third country experts and south-south cooperation. From now on, the mainstream of cooperation in the field of health is expected to be support for ART and participatory approaches to regional public health. Examination should be made of how to promote cooperation effectively by utilizing the personnel who have research experience in the three research institutes.

JICA has been implementing long term cooperation in terms of technical transfer and facility development since the establishment of the research institutes. It has been verified by the evaluation survey that as a result of JICA cooperation, each institute is acknowledged internationally as a centre for research in the health and medical field and has sufficient research capabilities. From now on, JICA is expected to examine the orientation of cooperation with these research institutes to ensure effective contributions to infectious diseases control in the Africa region through proactive engagement with these research institutes.

Section 1

Framework of the Evaluation

Section 1 Framework of the Evaluation

1 Outline of the Study

1.1 Background to the Study

The foremost causes of mortality in Africa are malaria, tuberculosis, diarrhea, HIV/AIDS and other infectious diseases. One of Japan's priorities for cooperation in health and medical care in Africa is to implement preventive measures against infectious diseases. As costly investments are required in order to procure equipment and basic technical facilities to carry out examinations and research on infectious diseases, and administrative and maintenance expenses for such facilities are high, it is difficult for African countries in vulnerable economic circumstances to acquire research institutions and laboratories. However, by creating core reference laboratories in a designated region, a regional testing network can be established that can efficiently handle the demands of the region.

Based on this concept, Japan has provided long-term cooperation in the three countries of Ghana, Kenya, and Zambia in the form of assistance to research institutions to conduct research and the examination of infectious diseases, as well as the implementation of human resources development programmes. For example, technical cooperation was provided for the College of Health Services, University of Ghana, in 1968; the Noguchi Memorial Institute for Medical Research was created under the grant aid scheme in 1977; project type technical cooperation has been implemented since 1986; and Third Country Training Programmes have been conducted since 1991. Japanese cooperation has not been confined to Ghana alone, but assistance to foster health care personnel as well as research cooperation has been carried out in neighboring countries. In addition, technical cooperation aimed at human resources development and research on infectious diseases control has been implemented based on facilities constructed under the grant aid and technical cooperation scheme in such countries as Kenya and Zambia.

As a result of the establishment of research institutes and subsequent long-term cooperation in Ghana, Kenya and Zambia, the research capacity of these institutes has been strengthened in terms of human and institutional resources. On the other hand, the priority for cooperation in the health and medical sector has been shifting to cooperation targeting the nation from assistance provided to research institutes, with the expectation of ripple effects for the nation as a whole through the enhancement of overall research capacity. Under the circumstances, it is necessary to examine the functions and roles of research institutes for communicable diseases control in order to progress with cooperation in the area of infectious diseases control.

1.2 Objects and Objectives of the Evaluation

The Noguchi Memorial Institute for Medical Research (NMIMR) in Ghana, the Kenya Medical Research Institute (KEMRI), and the Zambia University Teaching Hospital (UTH) have been selected as evaluation targets of Japan's cooperation in the field of infectious disease control in Africa and their respective series of cooperation activities are evaluated here. In the process of the evaluation study, the outcomes of research on infectious diseases by the institutes and the ripple effects in the field of public health are examined in comparison with the positioning, functions and expected roles of the institutes in order to derive recommendations for project planning and implementation.

The evaluation questions are as follows.

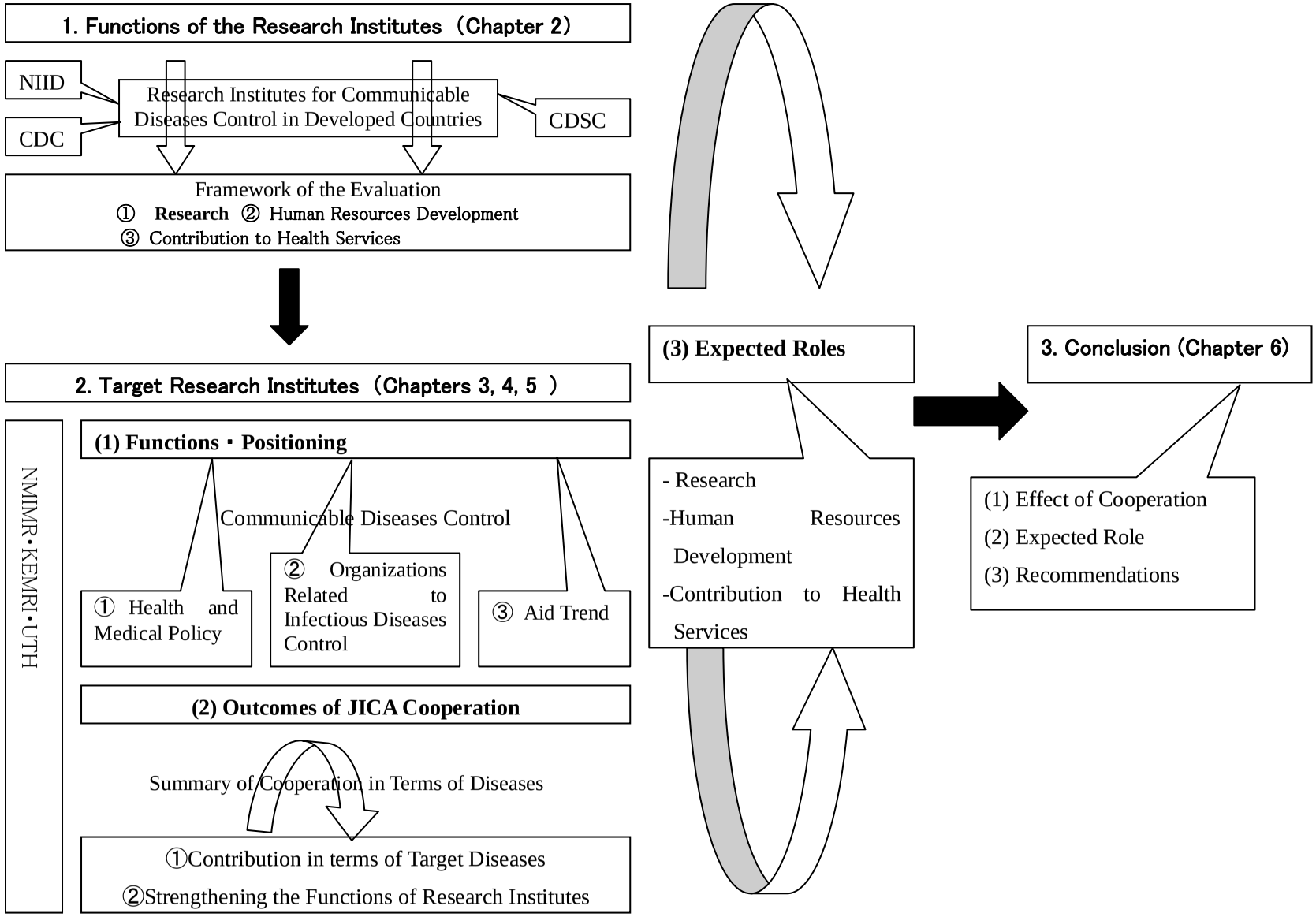
"How do the research institutes function and what ripple effects have they brought to the field of public health in comparison with the positioning and functions of the institutes under the health sector of the target countries and neighbouring countries through Japanese cooperation with representative research institutes for communicable diseases control in Africa?"

"In addition, how should the institutes be positioned and how should they fulfil their role in infectious diseases control in the health sector of the target countries?"

1.3 Evaluation Methodology

The study was conducted through the following steps (see Figure 1.1 Conceptual Diagram of the Evaluation Methodology).

Figure 1.1 Conceptual Diagram of the Evaluation Methodology



1.3.1 Functions of the Research Institutes

Before examining the functions and role of the target institutes, research institutes related to infectious diseases control in the developed countries, such as NIID: National Institute of Infectious Diseases in Japan, CDC: Centers for Disease Control and Prevention in the United States, and CDSC: Communicable Disease Surveillance Center in the United Kingdom, are analyzed so that the functions of such research institutes can be identified according to the three aspects of 1) Research, 2) Human Resources Development, and 3) Contribution to the Health Services. In this study, these three functions are utilized as the framework for analysis.

1.3.2 Examination of the Target Research Institutes

The expected role of the target research institutes is clarified by examining how JICA cooperation has had an effect on strengthening the functions of the research institutes and how it has contributed to infectious diseases control in comparison with the functions and position of the respective target research institutes in infectious diseases control.

(1) Examination of the Functions and Positioning

The current functions of the respective research institutes are analyzed with reference to the general functions of research institutes for communicable diseases defined in 1.3.1. Subsequently, the positioning of the respective target research institutes in their countries is clarified taking into consideration the specific circumstances of the target countries, including health and medical policies, aid trends, and relations with related institutions for infectious disease.

(2) Evaluation of JICA Cooperation

Project activities executed by each research institution are sorted according to the target diseases, and an examination is made on how JICA assistance has contributed to infectious diseases control. The overall cooperation goal is established for the study based on what JICA and the respective governments are trying to achieve through a particular series of cooperation activities. The evaluation study is conducted by assessment of how the outcomes of each series of cooperation activities have contributed to infectious diseases control in the target countries and how long the impact of the contribution lasted after the termination of JICA cooperation.

(3) Expected Role

To provide a summary of the analysis mentioned above, the expected roles of the research institutes in infectious diseases control are identified in terms of the framework of the evaluation, which are 1) Research, 2) Human Resources Development, and 3) Contribution to the Health Services.

1.3.3 Recommendations

As a result of the analysis described in 1.3.2, an overall summary of the effects of cooperation by JICA is examined and common factors promoting continued cooperation are derived from this. Consequently, the direction of future cooperation is presented with a table of the expected roles of the research institutes.

1.4 Process of the Evaluation Study

1.4.1 Evaluation Investigative Commission

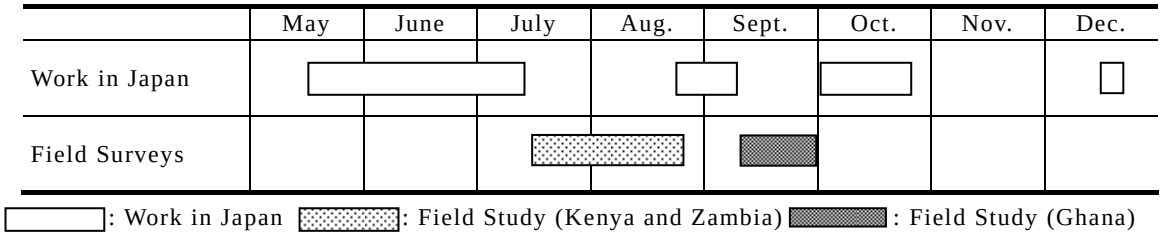
The Evaluation Investigative Commission was established in order to discuss evaluation questions, the framework, the scope of the evaluation, the strategy for the field study, and the method of compiling the results of the study. The members of the Evaluation Investigative Commission are shown in table 1.1.

Table 1.1 Members of the Evaluation Investigative Commission

Name	Affiliation
＜Advisors＞	
Hiroshi Suzuki	Professor and Chairman, Division of Public health, Department of Infectious Diseases Control and International Medicine, Niigata University Graduate School of Medical and Dental Sciences
Yasuo Moritsugu	Ex-Deputy Director, National Institute for Infectious Diseases (former National Institute of Health)
Koichi Miyoshi	Professor, Graduate School for Asia Pacific Studies, Ritsumeikan Asia Pacific University
＜JICA staff＞	
Gen Usui	Infectious Diseases Control team, Group Ⅳ (Health Ⅱ), Human Development Department, Japan International Cooperation Agency
Satoshi Kadowaki	South Africa Team, Regional Department Ⅳ (Africa), Japan International Cooperation Agency
Satoko Miwa	Director, Office of the Evaluation, Planning and Coordination Department, Japan International Cooperation Agency
Kazuaki Sato	Evaluation Planning and Coordination Team, Office of the Evaluation, Planning and Coordination Department, Japan International Cooperation Agency
Ayumu Ohshima	Country and Thematic Evaluation Team, Office of the Evaluation, Planning and Coordination Department, Japan International Cooperation Agency (as of Nov. 2005)
Muneyuki Kozu	Country and Thematic Evaluation Team, Office of the Evaluation, Planning and Coordination Department, Japan International Cooperation Agency
＜ Consultants ＞ Shigeru Kobayashi	System Science Consultants inc.
Keiko Muramatsu	System Science Consultants inc.

1.4.1 Schedule of the Study

Figure 1.2 Schedule of the Study



1.4.2 Members of the Study

Following the analysis in Japan from May 2004, information collection and site visits were carried out in Kenya (from 17th July to 6th August) and in Zambia (from 7th to 25th August) as the initial field surveys. The field survey for Ghana took place from 11th to 30th of September as the second field survey, in addition to

the first field survey. The schedule of the evaluation study is shown in Figure 1.3.

Table 1.2 Members of the First Field Survey (Kenya and Zambia)

Name	Sector	Position	Survey period
Prof. Hiroshi SUZUKI	Team leader	Department of Infectious Diseases Control and International Medicine Niigata University Graduate School of Medical and Dental Sciences	Kenya 1st to 6th August Zambia 7th to 18th August
Mr. Shigeru KOBAYASHI	Evaluation Analysis	System Science Consultants INC.	Kenya 17th to 6th August Zambia 7th to 25th August
Ms. Keiko Muramatsu	Analysis of Research Institutes	System Science Consultants INC.	Kenya 17th to 6th August Zambia 7th to 25th August
Mr. Muneyuki Kozu	Evaluation Planning	Associate Expert, Office of the Evaluation, Planning and Coordination Department, Japan International Cooperation Agency (JICA)	Kenya 17th to 6th August Zambia 7th to 14th August

Table 1.3 Members of the Second Field Survey (Ghana)

Name	Sector	Position	Survey period
Ms. Satoko MIWA	Team leader	Director, Office of the Evaluation, Planning and Coordination Department, Japan International Cooperation Agency (JICA)	11th to 19th September
Prof. Hiroshi SUZUKI	Communicable Diseases Control	Department of Infectious Diseases Control and International Medicine Niigata University Graduate School of Medical and Dental Sciences	10th to 20th September
Mr. Shigeru KOBAYASHI	Evaluation Analysis	System Science Consultants INC.	11th to 30th September
Ms. Keiko Muramatsu	Analysis of Research Institutes	System Science Consultants INC.	11th to 30th September

2 Functions of Research Institutes for Communicable Diseases in Developed countries

This chapter examines the functions of typical research institutes for infectious diseases in Japan, the United States, and the United Kingdom in order to clarify the functions generally played by such research institutes. Reference is made to the functions confirmed here as forming a framework for the analysis of the functions and roles of the research institutes that are the targets of this study in three African countries; Ghana, Kenya, and Zambia.

2.1 Functions of Research Institutes for Communicable Diseases in Japan

2.1.1 Implementing Agencies for Communicable Diseases Control

In Japan the Health Services Bureau of the Ministry of Health, Labour and Welfare (MOHLW) and the Specific Diseases Control Division and the Tuberculosis and Infectious Diseases Control Division under this bureau are in charge of infectious diseases control. The implementing agencies and their role at each administrative level (national, prefectural and city/ward levels) are defined by the "Law on Infectious Diseases Prevention and Treatment for Infected Patients (came into effect in 1998, with the latest revision in 2005)".

As the responsible ministry for infectious diseases control at the national level, the MOHLW formulates the basic policy for infectious diseases control, and prepares and publishes preventive guidelines for specific infectious diseases that should be treated according to comprehensive control measures. In addition, the MOHLW supports the implementing agencies in their execution of infectious diseases control at the prefectural and district levels.

Based on the national policy, implementing agencies at the prefectural level draw up prevention plans and action plans. These plans regarding infectious diseases control are implemented by Health Departments and Health Divisions, and Health Centres at the city/ward level. Health Divisions and Health Centres in each city/ward also offer health services, such as information on outbreaks of infectious diseases and immunization, as the executive bodies for infectious diseases control.

2.1.2 Functions of the Research Institutes for Communicable Diseases Control

As mentioned above, the infectious diseases control system consists of institutions at the national, prefectural and city/ward level. At the national level, research institutes specialized in the field of infectious diseases, such as the National Institute of Infectious Diseases (NIID), are attached to the MOHLW. Besides these, there are also some organizations, such as the Japan Public Health Association, that carry out research and studies in specific fields. The major organizations related to infectious diseases control and their objectives are summarised in Table 2.1.

Table 2.1 Major Organizations for Communicable Diseases Control

Organization	Objectives
National Research Institutes	
National Institute of Infectious Diseases (NIID)	NIID aims to carry out extensive and original research projects on a variety of contagious diseases from the standpoint of preventive medicine, improving human health and welfare by suppressing infectious diseases, and clarifying and supporting the scientific background for the health and medical administration of the country.
National Institute of Health and Nutrition (NIHN)	NIHN provides leadership for the public by conducting surveys and research on the maintenance and promotion of health as well as nutrition, diets, and lifestyles.
National Institute of Health Sciences (NIHS)	NIHS is responsible for conducting basic research to ensure the quality, efficacy and safety of a wide range of products that directly and indirectly affect the populace. In addition, NIHS investigates the manufacture of medicines and medical devices, gives approval for imports, and conducts the re-examination and revaluation of drugs.
International Medical Center of Japan (IMCJ)	IMJC contributes to social health and welfare from the global viewpoint through the provision of the best medical treatment that is available based on the dignity of human beings and the execution of education and research.
Related Organizations	
(Foundation) Japan Public Health Association	JPHA is an incorporated foundation to promote public health and is devoted to enhancing the quality of the health of the nation.
(Foundation) Japan Anti-Tuberculosis Association	JATA aims to enhance the health of Japanese citizens through cures and prevention for TB and other diseases, and executes international cooperation for TB control.
(Foundation) Blood Products Research Organization	The objectives of BPRO are to collect and analyze information on blood products generated domestically and overseas, and to conduct the necessary research and surveys in order to promote appropriate processing practices for, and national self-sufficiency in, blood products (including alternative products) derived from domestically donated blood.
(Foundation) Viral Hepatitis Research Foundation of Japan	VHRFJ contributes to enhancing public health and the welfare of the nation by promoting research and disseminating diagnostic and preventive measures regarding hepatitis, cirrhoses, and liver cancer, which originate from the hepatitis virus, and the development of cooperation with academic societies in Japan and overseas.
Quarantine Stations (Ministry of Health, Labour and Welfare)	The quarantine service aims to protect life and human health from the threat of urgent issues, such as outbreaks of emergent and re-emergent infectious diseases and health security in relation to imported goods.
National Institute of Animal Health (Ministry of Agriculture and Fishery)	NIAH has established a network and shares information on zoonotic infections.

Prepared by the investigation team

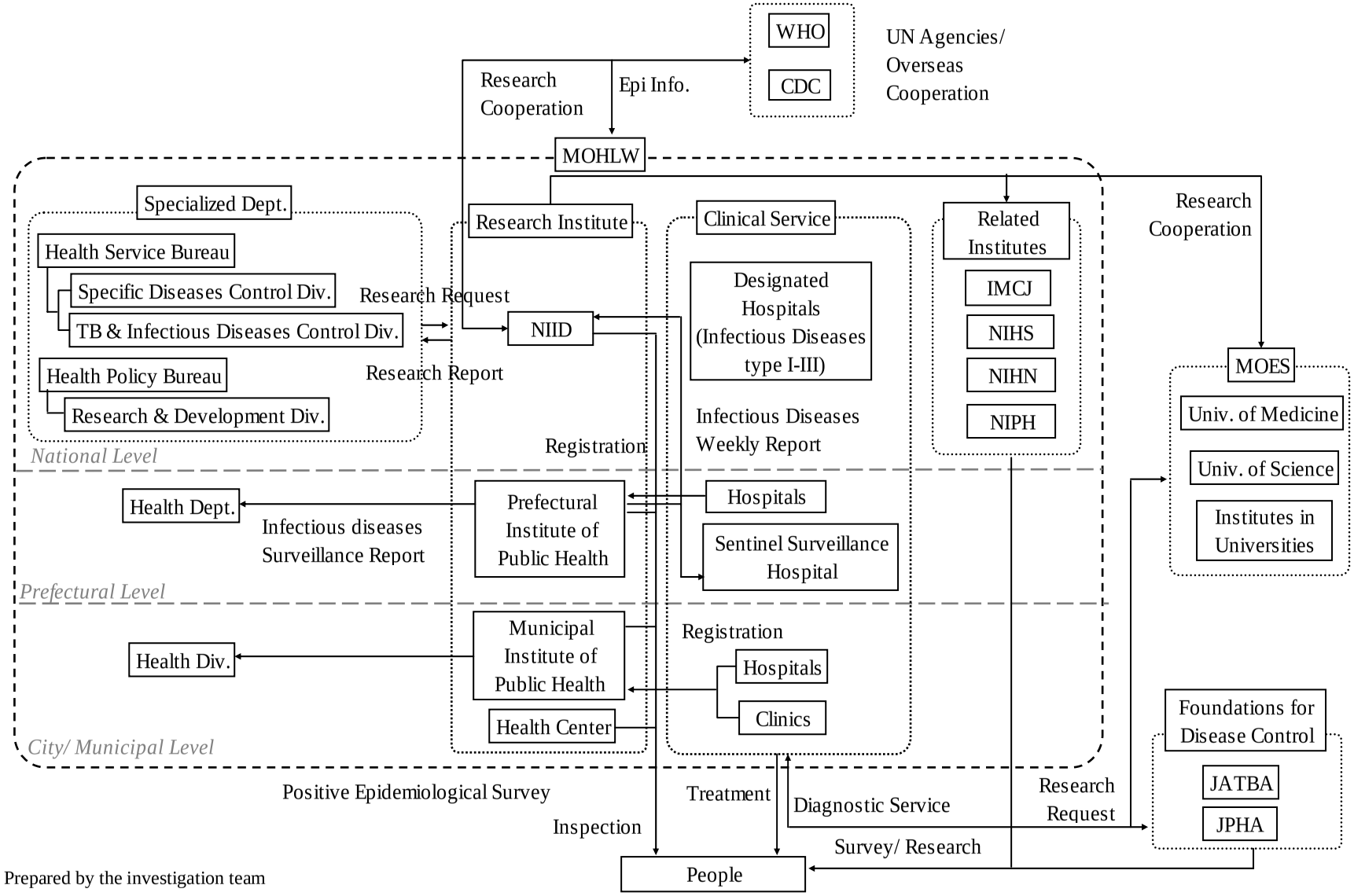
On the other hand, prefectural and municipal institutes for public health collect epidemiological information and data at the local level. Information collected by local public health institutes is accumulated at the Infectious Disease Surveillance Centre of NIID and is then disseminated regularly to prefectural and municipal institutes for public health and related organizations throughout the nation. In the event of an outbreak of an infectious disease in a local area, the local medical facilities ask the municipal institutes for public health to examine and determine the endemic causes. Nevertheless, when local institutes for public health have more work than they can manage, NIID supports the diagnosis of any referred pathogens. Endemic

information collected through local public health institutions is referred to the MOHLW and WHO.

In addition to the public organizations mentioned above, basic and applied research on various diseases, including infectious diseases, is conducted by research institutes affiliated to science and medical colleges.

The interactions among organizations related to infectious diseases control are shown in Figure 2.1.

Figure 2.1 Interelationship between Organizations related to Communicable Diseases control



Prepared by the investigation team

2.1.3 Functions of NIID

As mentioned above, NIID is the main research institute for infectious diseases control in Japan and is obliged to conduct research to meet national priority targets in the health sector, and its research outcomes are expected to contribute to proven social benefits.

The functions of NIID can be divided into research activities, reference services for infectious diseases, surveillance of infectious diseases, national assays, international cooperation, and training activities. Reference services aim to provide the testing systems for infectious diseases; the surveillance services aim to collect, analyse, and distribute information on infectious diseases, and the national assays aim to conduct national tests to guarantee the quality of biological products (vaccines and blood products) and provide reference standards for such biological and antibiotic products that are required for national assays. Unlike the research activities and training activities conducted by the research institute itself, such services including reference services, surveillance services, and national control tests and other tests conducted in cooperation with other affiliated institutes of the MOHLW as part of a national programme. Therefore, in this report, these services are categorized as “health care services”.

International cooperation comprises surveillance activities, such as isolation and identification of pathogens and epidemiological investigation and diagnosis; reference services such as the preparation and supply of standard materials, the improvement of diagnostic antigens; and training activities for overseas trainees. All of these activities are functionally categorized into surveillance, reference, national control tests and other tests, and training activities. Therefore, in this report the activities under international cooperation are re-categorised into surveillance, reference, national control tests and other tests, and training activities.

From these viewpoints, the functions of NIID are categorised into research, human resources development and contributions to the health service, such as reference services, surveillance, and national control tests and other tests as shown in Table 2.2.

Table 2.2 Basic Concepts and Activities of NIID

Basic Concepts	Activities
Research	➢ Basic and applied research on infectious and other intractable diseases associated with the immune system. ➢ Molecular biological analyses of the etiological agents as well as the development and application of rapid diagnostic methods for important diseases emerging or re-emerging and also other traditional diseases ➢ Vaccine development and applied research. ➢ Development of vectors and safety evaluation of gene therapy
Human Resources Development	➢ Various group and individual technical training courses on AIDS, poliomyelitis and leprosy for overseas trainees. ➢ Planning and execution of training programs for workers at domestic research institutes
Health Care Services	【Surveillance Services】 ➢ Collection of reports on the detection of infectious agents from prefectural public health institutes and on incidents of infectious diseases from sentinel clinics throughout the country. This information is made accessible to the public. ➢ Conducting epidemiological investigations in the event of an epidemic or the outbreak of an infectious disease. ➢ Exchange of information with infectious disease surveillance organizations in other countries. 【Reference Services】 ➢ Storing and supplying pathogenic agents ➢ Standardizing the reagents, preparing and supplying reference materials required for the diagnosis and surveillance of infectious diseases ➢ Organizing communication network systems in cooperation with prefectural public health institutes 【National control and other tests and research on the quality control of biological products and antibiotics】 ➢ National control tests to guarantee the efficacy, safety and homogeneity of biological products (various vaccines and blood products) for the prophylaxis, therapy and diagnosis of infectious and certain noninfectious diseases ➢ Requested tests on biological products, antibiotics, disinfectants, insecticides, and a variety of viruses and sera ➢ Production of reference materials, such prophylactics, diagnostic antigens, and anti-sera that are anticipated in accordance with future progress in research are being produced on a trial basis.

Prepared by the investigation team

Under assignment from WHO as collaborating centers, some departments of NIID have an important international role as top reference institutes for the Western Pacific area in the isolation and identification of pathogens, epidemiological investigations and diagnosis, the preparation and supply of standard materials, improvement of diagnostic antigens, preserving and supplying type cultures, education of technicians, guidance for prevention, and information exchanges (see Table 2.3).

Table 2.3 WHO−Designated Collaborating Centers in NIID

Department of Bacteriology	Enteric Phage-typing Center (IUMS assigned center) Shigella/ Salmonella Center (WHO-assigned national center in Japan)
Department of Bacterial and Blood Products	Collaborating Center for the production of Immunological Products
Department of Virology I	Collaborating Center for Influenza
Department of Virology II	Collaborating Center for Enteroviruses
Infectious Disease Surveillance Center	National Serum Reference Bank
Division of Experimental Animal Research	Collaborating Center for Small Laboratory Animals

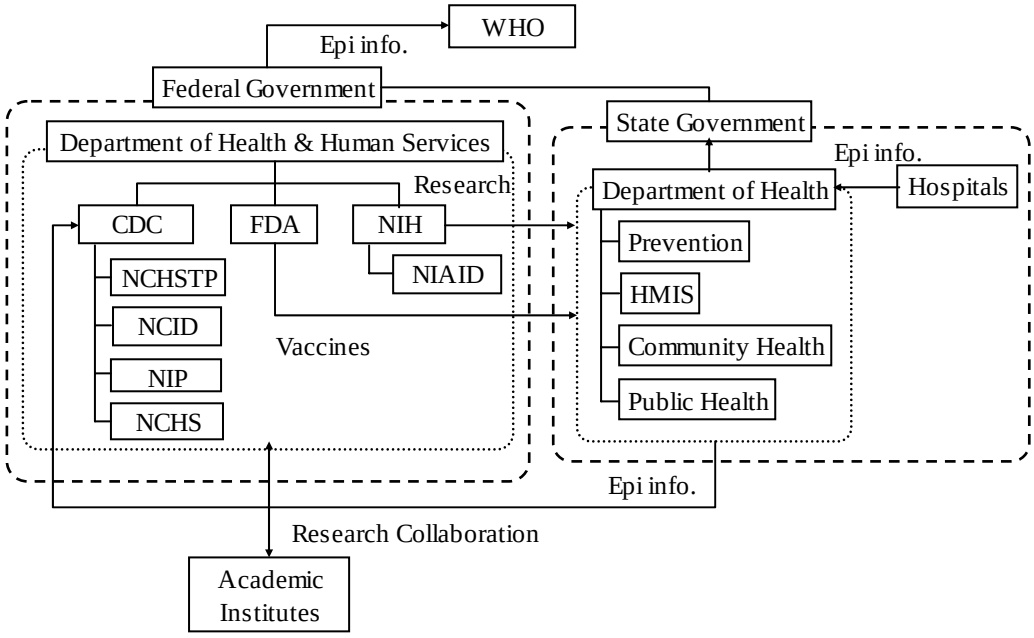
Source: NIID (2005), http://www.nih.go.jp/niid/welcome/index.html

2.2 Functions of Research Institutes for Communicable Diseases in the USA

The US Department of Health formulates primary policies to control infectious diseases, but the health care measures of one state differ from those of another, including the constitution of the laws. For this reason, each state government refers to the federal regulations as the guidelines and formulates infectious disease prevention policies that characterize the particularities of each region.

The organizational components of the Department of Health and Human Services mainly consist of the Centers for Disease Control and Prevention (CDC), which are responsible for preventing and controlling diseases, injuries, and disability; the Food and Drug Administration (FDA), which is responsible for assuring the safety of food and medicines; and the National Institutes of Health (NIH), which conduct research related to public health (see Figure 2.2).

Figure 2.2 Interelationship between Organizations Concerned with Communicable Diseases Control in the USA



Prepared by the investigation team

CDC is comprised of 12 centers and institutions, such as the National Center for Infectious Diseases (NCID), the National Center for Chronic Disease Prevention and Health Protection (NCCDPHP) and the National Center for Health Statistics (NCHS). Out of 8,500 employees, over 2,000 work at health agencies or quarantine offices in each state, as well as at 10 facilities throughout the nation and 45 facilities in other countries. CDC, the leading federal agency for developing and applying disease prevention, not only for the people in the US, but also for those overseas, seeks to accomplish its mission by working with partners throughout the nation and the world.

Out of the 12 centers within CDC, the National Center for Infectious Diseases (NCID) and the National Center for HIV, STD and TB Prevention (NCHSTP) in particular undertake comprehensive measures for infectious diseases. Both centers conduct surveillance, investigations, and laboratory research, training and public education programs to develop, evaluate, and promote prevention, and control strategies for infectious diseases. There are other components, such as the National Immunization Program (NIP), which provides advice and guidance to prevent vaccine-preventable diseases, and the National Center for Health Statistics (NCHS), which provides statistical information, a vital part of the activities to prevent infectious diseases. CDC's activities to control and prevent diseases are also categorised into laboratory research, human resources development, and health care services, which are listed in Table 2.5.

Table 2.4 Basic Concepts and Activities of CDC

Basic Concepts	Activities
Research	➢ Basic and applied research on infectious diseases ➢ Development of diagnostic methods for important diseases and emerging or re-emerging diseases
Human Resources Development	➢ Technical training for overseas trainees ➢ Planning and execution of training programs for NIH staff and domestic medical personnel
Health Care Services	【Surveillance and Information Services】 ➢ Collection of reports on the detection of infectious agents from public health institutes in rural areas and incidences of infectious diseases from sentinel clinics nationwide This information is made available to the public. ➢ Conducting of epidemiological investigations in the event of the occurrence of an epidemic or outbreak of an infectious disease ➢ Exchange of information with infectious disease surveillance organizations in other countries 【Reference Services】 ➢ Storage and supply of pathogenic agents ➢ Standardization of reagents, preparation and supply of reference materials needed for the diagnosis and surveillance of infectious diseases ➢ Organizing communication network systems in cooperation with the Departments of Health in the state governments ➢ Exchange of information with organizations in other countries 【National control and other tests and research on the quality control of biological products and antibiotics】 ➢ National control tests for guaranteeing the efficacy, safety and homogeneity of biological products ➢ Inspection for food sanitation and toxins 【Promotion of Prevention】 ➢ Establishing vaccination systems, surveillance and information service ➢ Indoor infections control

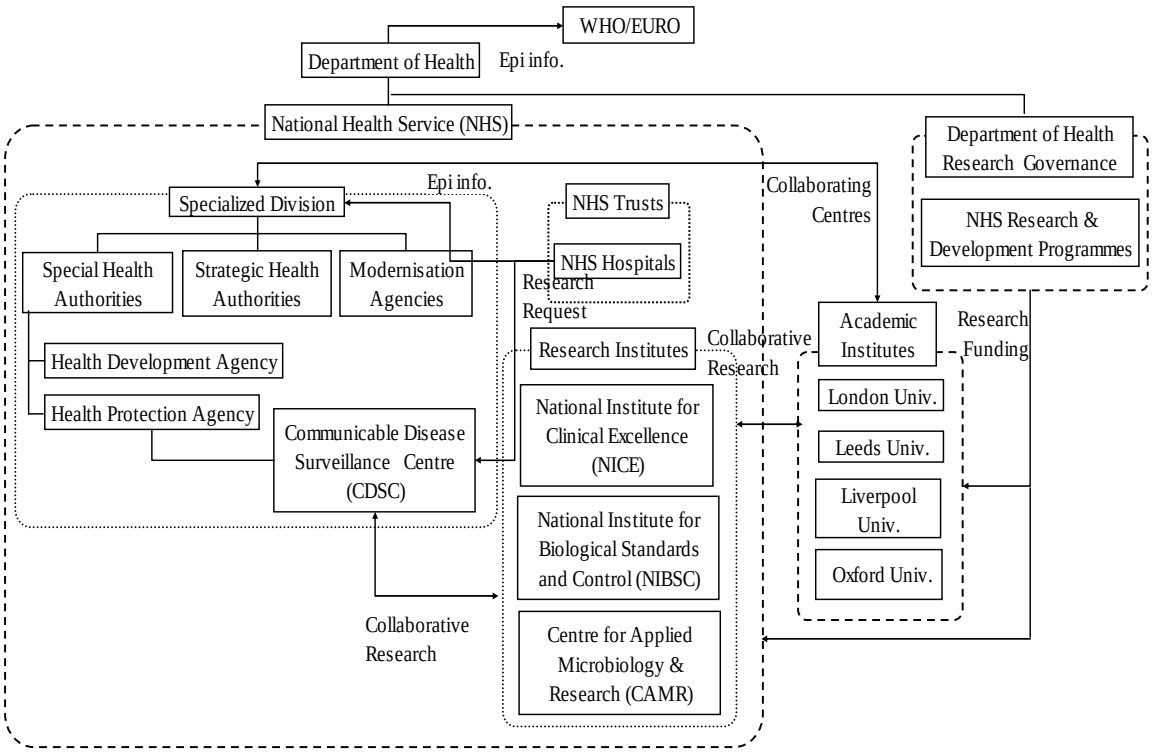
Prepared by the investigation team

2.3 Functions of Research Institutes for Communicable Diseases in the UK

In the UK, the Department of Health sets the national standards, controls social care services, and works with key partners (including investment decisions), and the National Health Service (NHS), which is separately run as an independent agency, is responsible for delivering the services on behalf of the Department of Health. Under the NHS, there are 28 specialized Special Health Authorities and, in 11 districts, 11 Strategic Health Authorities.

In protecting people from infectious diseases, the Health Protection Agency, one of the Special Health Authorities, plays a key role in formulating detailed policies. The Health Protection Agency collects disease information from each health institution, through the Special health Authorities, under the Strategic Health Authorities, which is submitted from the local Communicable Disease Surveillance Centre. The relationships between the organisations in the UK for the prevention of infectious diseases are shown in Figure 2.3.

Figure 2.3 Interelationship between the Organizations Concerned with Communicable Diseases Control in the UK



Prepared by the investigation team

In the UK, the Communicable Disease Surveillance Centre (CDSC) functions as the main agency for preventing and controlling infectious diseases. CDSC conducts laboratory research, coordinates control measures, controls surveillance, supports national policy and provides expert advise, collaborates with other nations and provides public health information collected from the local laboratories affiliated with the Special Health Authorities (HPA) to those responsible for controlling infectious diseases.

Services and activities, such as research, human resources development, health services that contribute to the prevention and control of infectious diseases by the CDSC are listed in Table 2.6.

Table 2.5 Basic Concepts and Activities of CDSC

Basic Concepts	Activities
Research	➢ Basic and applied research on infectious diseases ➢ Academic research for important diseases and emerging or re-emerging diseases
Human Resources Development	➢ Technical training for overseas trainees ➢ Planning and executing of training programs for NHS staff and domestic medical personnel
Health Care Services	【Surveillance and Information Services】 ➢ Collection of reports on the detection of infectious agents from public health institutes in rural areas and the incidence of infectious diseases from sentinel clinics throughout the country This information is made available to the public. ➢ Conducting epidemiological investigations in the event of the occurrence of an epidemic or outbreak of an infectious disease ➢ Exchange of information with infectious disease surveillance organizations in other countries. 【Reference Services】 ➢ Storage and supply of pathogenic agents ➢ Standardization of reagents, preparation and supply of reference materials required for the diagnosis and surveillance of infectious diseases. ➢ Organizing communication network systems in cooperation with local laboratories affiliated with the HPA ➢ Exchange of information with foreign organizations (WHO, CDC, developing countries, etc.) 【National control and other tests and research on the quality control of biological products and antibiotics】 ➢ National control tests for guaranteeing the efficacy, safety and homogeneity of biological products (various vaccines and blood products) for prophylaxis, therapy and diagnosis of infectious and certain non-infectious diseases 【Promotion of Prevention】 ➢ Establishment of vaccination systems, surveillance and information services ➢ Indoor infections control ➢ Maintenance of wards for infectious diseases and re-classification of the types of infectious diseases, including emerging and re-emerging infectious diseases

Prepared by the investigation team

In addition, among the national research institutes in specialized fields, there are the Centre for Applied Microbiology and Research (CAMR), an applied microbiological research laboratory that undertakes research on vaccine development and pathogenic organisms, and the National Institute for Biological Standards and Control (NIBSC), an independent national biological institute responsible for controlling and evaluating biological medicine and antibiotics at the national level. These institutes work closely with the Communicable Disease Surveillance Centre (CDSC) for research and evaluation when needed.

2.4 Functions of Research Institutes for Communicable Diseases in Developed Countries

The roles played by the NIID in Japan, CDC in the US, and CDSC in the UK are quite similar; they conduct research and training for overseas and domestic healthcare professionals, as well as surveillance, and also set standards and provide expert advice on medicines (see Table 2.7). These activities represent the role of research institutes in controlling infectious diseases.

As mentioned above, the roles of research institutes in infectious diseases control are rather similar among the institutes, namely, the NIID in Japan, CDC in USA and CDSC in the UK. Unlike the CDC and CDSC, the NIID does not undertake the role of prevention as one of its basic concepts. In fact, the Infectious Disease Information Centre, a division of NIID, conducts activities related to prevention, such as integrated research on the effectiveness of vaccinations, monitoring and reporting on the effects and sub-reactions to vaccinations, and so on. However, these activities are classified into research, surveillance services, reference services, and national control and other tests. The prevention activities of CDC and CDSC are also classified in a similar way.

This confirms that, in addition to research activities, these three institutes conduct training for medical personnel both in and outside the country, surveillance services, reference services and national control and other tests (see Table 2.7).

Table 2.6 Functions of Each Research Institute in Communicable Diseases Control

	NIID (Japan)	CDC (USA)	CDSC (UK)
【Research】			
Research	○	○	○
【Capacity Development】			
Training	○	○	○
【Health Services】			
Surveillance	○	○	○
Reference	○	○	○
National control and other tests	○	○	○

Prepared by the investigation team

In the evaluation study, the functions of research institutes in Ghana, Kenya, and Zambia will be examined based on these general functions, derived from this analysis of research institutes for infectious diseases in Japan, the USA, and the UK.

Section 2

Evaluation Analysis

Section 2 Evaluation Analysis

3 Trends in Japanese Cooperation with Research Institutes for Communicable Diseases

In Africa, 17 nations successively became independent during the 1960s, which is referred to as the era of the “Independence of African Nations”, set off by Ghanaian independence in 1957. However, African nations immediately after independence suffered from various problems including development issues, conflicts, infectious diseases, and so on, which remain major challenges to this day. Japanese Official Development Assistance (ODA) commenced from 1954, around the same time as the Independence of African Nations, but with the focus on support to the Asia region. In Africa, JICA started extending technical cooperation to the Korle Bu Hospital, Ghana College of Health Services (later the Noguchi Memorial Institute for Medical Research), which is regarded as the forerunner of Japanese development assistance to Africa. Subsequently, technical cooperation with the Kenya Medical Research Institute began, while Japanese assistance to Africa rose sharply in order to implement the first ODA-doubling plan.

Even in the 1980s, a “Lost Decade” during a time of severe economic crises in Africa, Japanese ODA to Africa steadily rose from US$223 million in 1980 to US$884 million in 1988. Technical cooperation with the Zambia University Teaching Hospital was launched around the same time. Subsequently, support for African nations, including cooperation in the health and medical sector, expanded under the agreements made by the international community at the first Tokyo International Conference on Africa Development (TICAD I), which jump-started the expansion of assistance to Africa. In addition, as can be seen in the declaration of the Global Issues Initiative on Population and AIDS (GⅡ) in 1994 and the Okinawa Infectious Diseases Initiative (IDI) in 2000, support for infectious diseases control in developing countries came to be focused on by the international community.

A general description of cooperation extended to NMIMR, KEMRI, and UTH is shown in Table 3.1, which functions as the base of support for infectious diseases control through Japanese cooperation.

Table 3.1 Trends in Japanese Cooperation for Research

Year	'65	'70	'75	'80	'85	'90	'95	'00	'05
Notable Events	Independence of African Nations	Development based on BHN		"Lost Decade"		TICAD Ⅰ TICAD Ⅱ		TICAD Ⅲ IDI	
Ghana		**Korle Bu Hospital (Dispatch of experts)** ➢ Virology and Electron microscope ➢ Undernutrition and Infectious diseases ➢ Pathologic physiology and Undernutrition ➢ Diarrhea and Undernutrition			**NMIMR Project** ➢ Virology ➢ Epidemiology ➢ Nutrition	**NMIMR Project・F/U** ➢ Vaccines ➢ Diarrhea ➢ HIV/AIDS ➢ Schistosomiasis	**Infectious Diseases Control Project** ➢ HIV/AIDS/STD ➢ Tuberculosis Control ➢ VPD ➢ Schistosomiasis	**WASIPAC** ➢ Parasitic Diseases Control ➢ ICTP and TCTP	
Kenya			**Communicable Diseases Research and Control Project** ➢ Viral Diarrhoeal Diseases ➢ Bacterial Diarrhoeal Diseases ➢ Parasites	**Project of KEMRI** ➢ Viral Diarrhoeal Diseases ➢ Bacterial Diarrhoeal Diseases ➢ Parasites	**Project on the Research and Control of Infectious Diseases** ➢ Viral Diarrhoeal Diseases ➢ Bacterial Diarrhoeal Diseases	**Research and Control of Infectious Diseases Project Ⅱ** ➢ HIV/AIDS ➢ ARI ➢ Viral Hepatitis	**Research and Control of Infectious and Parasitic Diseases Project**	**Research and Control of Infectious Diseases Project** ➢ HIV/AIDS **International Parasite Control Project** ➢ Parasitic Diseases Control ➢ ICTP and TCTP	
Zambia						**Infectious Diseases Project Phase Ⅰ・F/U** ➢ Establishment of the diagnostic methods ➢ Nosogenesis analysis from patient samples	**Infectious Diseases Control Project** ➢ Enhancement of diagnostic techniques ➢ Epidemiological and clinical research ➢ Strengthening surveillance	**HIV/AIDS and TB Control Project** ➢ Improvement of diagnosis quality, data management and laboratory management ➢ Introduction of diagnosis and surveillance techniques for HIV/AIDS and TB	

Prepared by the investigation team

4 Analytical Findings on the Noguchi Memorial Institute for Medical Research in Ghana

In this chapter, first of all the background and an outline of cooperation with the Noguchi Memorial Institute for Medical Research are given in section 4.1 Summary of JICA Cooperation with the NMIMR, and based on the field survey the positioning and functions of the NMIMR in relation to communicable diseases control in Ghana comprise four sections, and an analysis of the contribution of the Noguchi Memorial Institute for Medical Research (NMIMR) is presented in relation to infectious diseases control and the effects of JICA's cooperation that made possible this contribution of the NMIMR. Section 4.2 provides an outline of infectious diseases control in Ghana, including the functions and roles of the NMIMR. Based on these findings, the effects of JICA cooperation that enabled the NMIMR to contribute to infectious diseases control are analysed and described in section 4.3. The results of the analysis are summarized in section 4.4 as the expected role of the NMIMR.

4.1 Summary of JICA Cooperation with the NMIMR

4.1.1 Background History to the Cooperation

Following its independence in 1957, former President Nkrumah carried out major reforms under the banner of Pan Africanism that targeted economic development, the promotion of education, and public health improvements. However, Ghana's mortality rate for children under five years of age was extremely high at 215 deaths per 1,000 infants due to infectious diseases, notably tuberculosis (TB), measles, smallpox, pneumonia, and malaria. Malnutrition was another major cause of the high mortality rate.

The Government of Ghana (GoG) judged that there was a need to improve nutritional and other environmental conditions and to conduct virological research to protect the population of Ghana. Thus, the GoG requested the Overseas Technical Cooperation Agency (OTCA), the predecessor of JICA, to dispatch experts to the Korle Bu Hospital (Ghana College of Health Services). Based on this request, OTCA dispatched experts from 1968. In 1969, the Ghana College of Health Services became a part of the University of Ghana and Japan continued to dispatch experts to the Korle Bu Hospital until 1978.

In 1977, the Ghanaian Government enacted a plan to establish a medical complex comprising a Basic Medical Sciences Department, Undergraduate Medical School, Teaching Hospital, Postgraduate Medical Institute, Paramedic Training School and other units at the University of Ghana in the Legon district, in the capital, Accra. Based on a request from the GOG, the Japanese government provided grant aid assistance, "Project for Construction of the Postgraduate Medical Research Institute, University of Ghana, Medical School" (Phase1-2), to establish the Noguchi Memorial Institute for Medical Research (henceforth referred to as the NMIMR) as a postgraduate research institute in the complex.

After the completion of the facilities of the NMIMR, technical cooperation provided at the Korle Bu Hospital was transferred to the institute. JICA continued to dispatch experts to enhance the research capacity and organizational structure of the NMIMR,

and it began project-type technical cooperation[1] following a request by the GOG to improve the technical capacity of the NMIMR in virology, epidemiology, and nutrition. JICA has continuously cooperated with the NMIMR to improve its research capacity over a period of 28 years. Meanwhile, the Japanese government has supported the development of the facilities and equipment of the NMIMR through the execution of grant aid projects, such as the Noguchi Memorial Institute Rehabilitation and Extension Project in 1997 and so on.

4.1.2 Outline of the NMIMR

(1) Mandate of the NMIMR

The NMIMR was established by the Council of the University of Ghana in 1979 as a semi-autonomous institute of the university. According to the annual report of the NMIMR, the institute's mission is to become a centre both for the training of researchers, as well as for tackling and solving the myriad medical problems facing the country. It aims at becoming a centre of excellence for research into diseases of importance for public health, especially in Ghana, and to contribute to human resources development for scientific research and the health services.

The broad objectives and mandate of the NMIMR are:

i) To research into the problems of communicable diseases and malnutrition;

ii) To provide training opportunities for post-graduate students in medical research;

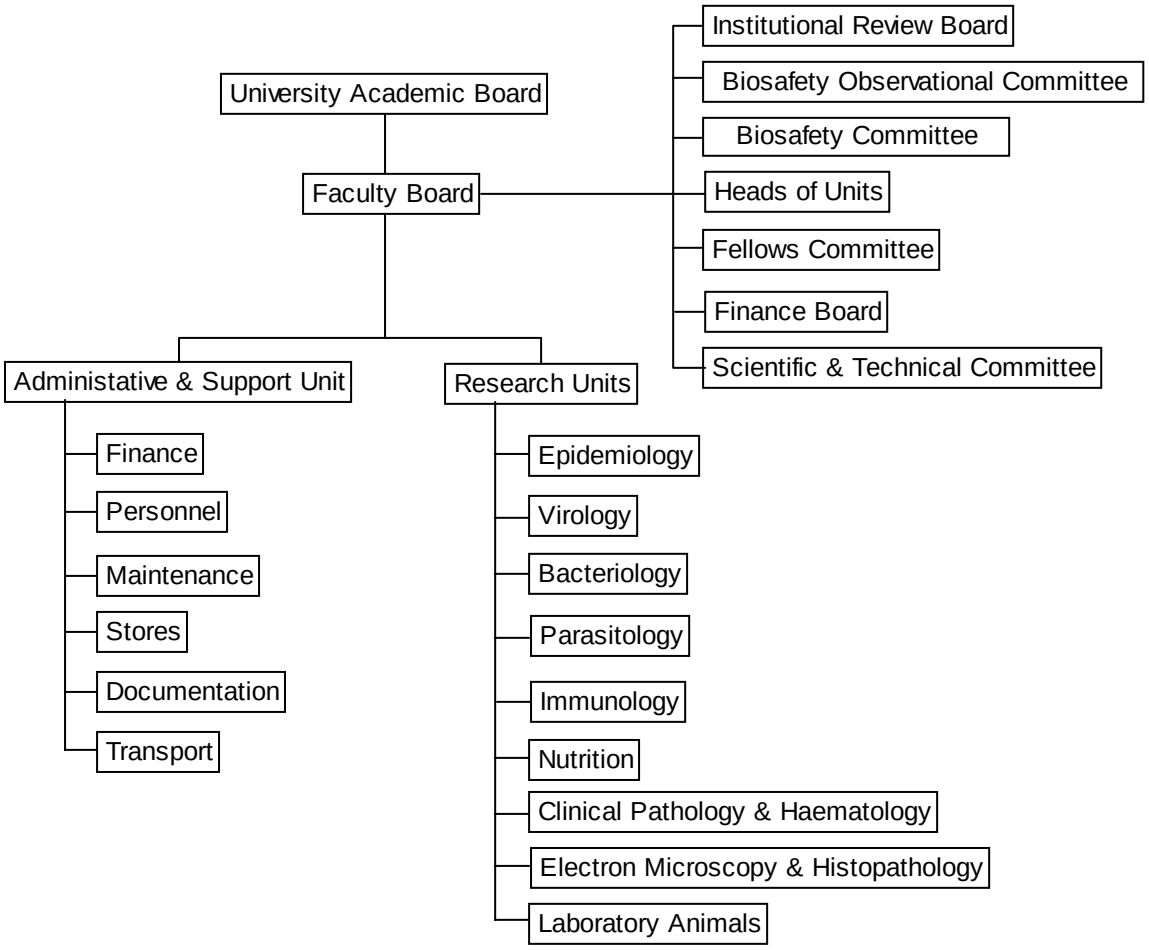
iii) To provide specialized diagnostic and monitoring services in support of public health programmes.

(2) Organizational Structure of the NMIMR

As a research institute under the jurisdiction of the University of Ghana, the Council of the University of Ghana and various committees manage the NMIMR. The internal organization of the NMIMR consists of six major administrative sections and research departments (nine units covering eleven fields) with the Faculty Board playing a central role (see Figure 4.1).

1 To strengthen its cooperative approach for each country and region, JICA has integrated all technical cooperation schemes, project-type technical cooperation, the dispatch of individual experts, the provision of equipment and the acceptance of trainees in Japan under the category of technical cooperation projects from 2002. In this report, the terminology that was used for cooperative activities prior to 2002 has been used for projects implemented during that period and all activities after 2002 are referred to as technical cooperation projects.

Figure 4.1 Organizational Chart of the NMIMR



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The head of each research unit is responsible for planning and implementing research plans. The staff members of each unit include research fellows, research assistants, technicians, and other staff.

4.1.3 Outline of JICA's Cooperation with the NMIMR

(1) Objectives and Components of JICA's Cooperation

Based on the results of studies, the objectives of the series of JICA cooperation activities can be roughly divided into two stages. During the initial stage from 1968 to 1991, JICA focused on strengthening the capabilities of university-affiliated institutions. Although the first project-type technical cooperation, the Noguchi Memorial Institute Project, which started in 1986, included some activities related to infectious diseases control, such as the quality control of vaccines, its main objective was to transfer technical skills to the NMIMR. The second stage started in 1991 after "Noguchi Memorial Institute Project Phase II". This stage aimed to strengthen the research capabilities of the NMIMR and to enhance the capacity of health/medical personnel through technical training. This stage intended to enhance and strengthen

infectious diseases control in Ghana through capacity building for the health/medical personnel based on the NMIMR, which had acquired the appropriate research capabilities during the period of the first stage of JICA technical cooperation.

As shown in Table 4.1, JICA dispatched experts to the Korle Bu hospital and the NMIMR over a period of 18 years from 1968 to 1985. As of July 2004, when this evaluation study was being carried out, JICA had implemented a total of four project-type technical cooperation activities since 1985. In addition to technical cooperation, since 1991, JICA has implemented third-country training programmes (TCTP) three times with the NMIMR as a counterpart institution. This evaluation study considers these technical cooperation and third-country training programmes to be part of the series of assistance activities for the NMIMR, and hence this evaluation is conducted accordingly.

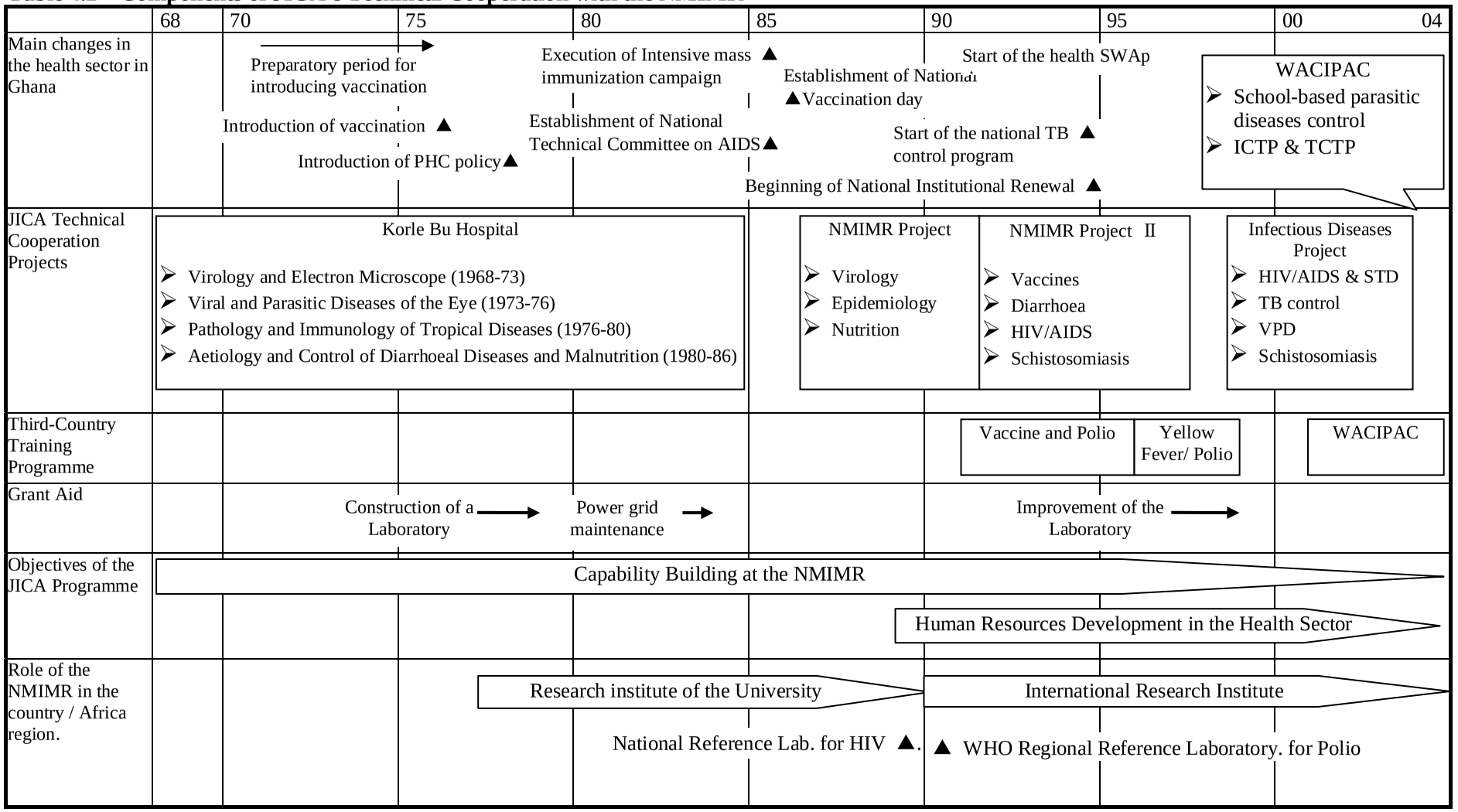
Table 4.1 Target Projects for Evaluation

Project title	Scheme	Execution (fiscal years)
Dispatch of individual experts	TCP	1968.07～1985.03
Noguchi Memorial Institute Project	TCP	1986.10～1991.09
Noguchi Memorial Institute Project Phase Ⅱ and F/U	TCP	1991.10～1997.09
Infectious Diseases Project at the Noguchi Memorial Institute for Medical Research	TCP	1999.01～2003.12
West African Centre for International Parasite Control Project	TCP	2004.01～2008.12
Vaccine Potency Testing and Polio Diagnosis Procedures	TCTP	1991～1995
Laboratory Diagnosis of Yellow Fever and Other EPI Viral Diseases (Polio and Measles)	TCTP	1996～1998
West African Centre for International Parasite Control	TCTP	2004～2008

Legend: TCP Technical Cooperation Project
TCTP Third-Country Training Programme
Prepared by the investigation Team

The components of JICA's cooperation are summarised in Table 4.2.

Table 4.2 Components of JICA's Technical Cooperation with the NMIMR



Prepared by the investigation team

(2) Components of JICA Cooperation according to the Diseases

As shown in Table 4.2, each project targeted several diseases and research on specific diseases occurred over a period covering several projects. In consideration of this situation, project activities were rearranged on the basis of the incidence or occurrence of diseases.

A series of JICA technical cooperation targeted Vaccine/Vaccine Preventable Disease (VPD), HIV/AIDS and Sexually Transmitted Diseases (STD), Diarrhoeal Diseases, TB, and Schistosomiasis. The components of JICA technical cooperation are summarized below: (the activities of each project, inputs by JICA such as the dispatch of experts, C/P training and equipment provision are described in the Annexes).

1) Vaccines/VPD

In Ghana, a full-scale vaccination program was started in 1976, although the low vaccination rate and the deterioration in vaccine quality became a problem.

The NMIMR started activities related to the quality control of vaccines, vaccine potency testing for polio, measles and yellow fever, and the effectiveness of cold chains for vaccines from 1986. In addition, clinical trials of the heat stable Acellular Pertussis Diphtheria Tetanus (APDT) vaccine were also carried out in three communities in the Gomoa district from 1991.

This research was discontinued after the conclusion that the NMIMR had acquired the necessary technology for the quality control of vaccines at the end of the Noguchi Memorial Institute for Medical Research Project Phase II in 1997. Then new research on serologic testing to examine viral hemorrhagic fever was started from 1999.

2) HIV/AIDS･STD

Forty-two AIDS patients were reported for the first time in Ghana in 1986, and the total number of the AIDS patients was 10,285 by 1992 with the number of HIV-carriers estimated at 150,000. It was estimated that there was an average 3.6% prevalence rate as a result of a sentinel survey conducted in 2003.

JICA recognises that HIV/AIDS is a critical disease, and started to include research activities on HIV/AIDS from 1991. Initially, the establishment of diagnostic methods, infection routes and mother-to-child transmission (MTCT) were the primary focus. However, JICA took the next step to establish a standardized diagnostic method and the preparation of a manual in cooperation with the Ministry of Health (MOH). In addition, JICA worked to establish testing techniques for detecting trachoma, one of the most prominent STDs in Ghana.

As JICA cooperation included research on dangerous infectious agents such as HIV/AIDS and drug resistant TB bacteria, a high security laboratory (P3 lab) was also established using grant aid from the Government of Japan. In tandem with this, a biosafety committee to manage the P3 lab in order to handle dangerous infectious agents was established, and biosafety countermeasures were also established at the NMIMR.

3) Tuberculosis (TB)

In 1991 the GOG started full-scale TB control, and thus a National TB Control Programme (NTP) was established in 1994. The NTP conducted training for TB laboratory from 1994 to 1995 with financial support from DANIDA. However, the MOH and DANIDA reviewed the NTP in 1998, and pointed out that TB speculum services were the weakest component of the DOTS Control Strategy in Ghana. Nevertheless no assistance to TB control was being provided by other donor agencies after the termination of financial assistance by DANIDA for the training of microscopy centres from 1994 to 1995, since many donor agencies had pooled their funds into a health fund under the Sector-wide Approaches (SWAps).

Through the establishment of the role of the NMIMR as a reference laboratory, JICA started to improve its capacity in order to enhance the poor state of the TB speculum centers that was pointed out by the MOH and DANIDA. The required techniques for smear preparation, culture, mycobacterium species identification, and drug susceptibility testing were transferred at first since the Bacteriology Unit of the NMIMR had no facilities, equipment or experience in TB diagnosis in those days. Subsequently, activities to establish external quality assurance were conducted. The NMIMR trained 30 experts from 10 regional hospitals in Ghana, and a national TB speculum quality assurance manual was prepared and submitted to the NTP.

4) Parasite Control

a. Schistosomiasis

Schistosomiasis prevalence in Ghana erupted when the Lake Volta was constructed to provide a dammed lake for the Akosombo hydroelectric power station. The prevalence of this disease, which until then was only observed in certain areas, has now spread to many communities along the Lake Volta.

With cooperation from JICA, the NMIMR conducted studies on schistosomiasis in eight villages along the Densu River. This study included parasite control using chemotherapy, and facilities for safety water supply were built. These activities in the villages were terminated in 1997, and the development of a potential vaccine candidate molecule(s) was conducted from 1999 to 2003.

b. International Parasite Control

The Japanese government submitted a proposal (Hashimoto initiative) at the Birmingham G7 Economic Summit in 1998 to establish centres to foster personnel and to create a network in Asia and Africa aimed at strengthening international countermeasures to deal with human parasites. Three centres in Thailand, Kenya, and Ghana were proposed. Based on the proposed plan, the Asia Centres of International Parasite Control was established in Thailand in 2000, the Eastern and Southern Africa Centre of International Parasite Control (ESACIPAC) was established in Kenya in 2001.

In Ghana, the Infectious Diseases Control Project launched a package of third-county training for de-worming activities through school health education. Then, the GOG and the Government of Japan agreed to establish the West African Centre for

International Parasite Control (WACIPAC), which was designated as a technical cooperation project, and was started in January 2004.

5) Improvement of Public Health Care

In cooperation with JICA, the NMIMR conducted field surveys for EPI, malaria and diarrhoeal diseases in four villages from 1986 to 1991. In addition, the NMIMR also conducted a series of activities to improve primary health care such as health education, vaccination sessions, treatment of childhood diseases and child birth delivery systems, etc too. A health facility was also established as a part of the activities.

6) Malaria

Malaria is a parasitic disease and has the highest prevalence rate for diseases in Ghana. In the Central region, Volta region and Brong Ahafo region, JICA conducted studies on malaria that aimed to find out the sensitivity status of *Plasmodium falciparum* to chloroquine and other anti-malaria drugs. In addition, malaria infection, morbidity and antibody levels in infants were studied in the Fetteh, Onyadze/Otswe, Jukwa and Mprumen villages in Gomoa.

However, JICA's cooperation activities on malaria closed down in 1991 after the termination of the Noguchi Memorial Institute Project. The NMIMR has continued to conduct research activities on malaria control, including the level of drug resistance, in cooperation with WHO/TDR, NIH, EU, Welcome Trust and the US Navy.

7) Diarrhoeal Diseases

Diarrhea is the next greatest ailment that plagues the population of Ghana following malaria and respiratory diseases, and infant health countermeasures against diarrhea have been widely adopted. JICA's cooperation activities related to research on diarrhea were implemented from 1980 to 1997. Initially, the pathogen was identified followed by work to clarify the causes and work to prepare oral re-hydration salts (ORS) using materials that could be supplied domestically.

4.2 Outline of Communicable Diseases Control in Ghana

An outline of infectious diseases control in Ghana is given below to clarify the roles and functions of the NMIMR as a research institute for infectious diseases control in Ghana.

4.2.1 Diseases Structure

The epidemiological situation in Ghana is similar to other sub-Saharan countries. The predominant diseases are communicable diseases such as malaria, respiratory diseases, diarrhoea, and parasites, with malnutrition and anaemia also prevailing. Malignant neoplasm, diabetes and cardiovascular diseases that are often observed in the disease patterns of developed countries are also increasing rapidly

Among infectious diseases, malaria is the most important cause of mortality and morbidity. It is reported by the MOH that 40% of outpatients in public health facilities are infected with malaria, and almost 20% of child deaths are caused by malaria. In addition, less than 50% of the population in rural areas have access to safe water. As a result, diarrhoeal diseases are still a major cause of mortality and chlorella often re-emerges in the rainy season.

TB accounts for 250,000 new cases each year in combination with HIV/AIDS, and the MOH has reported that almost half of the adult population have experience of being infected. The sentinel survey in 2003 indicates an average national HIV prevalence of 3.6%. Under these circumstances, the priority targets for Ghana are malaria, TB and HIV/AIDS.

On the other hand, there are outbreaks of yellow fever and cerebral meningitis in the northern regions. Guinea Worm Disease is a target for elimination among parasitic diseases. Water borne infectious diseases such as leishmaniasis, schistosomiasis and onchocerciasis are also problems.

4.2.2 Communicable Diseases Control by the MOH

(1) Development Plan for the Health Sector

The MOH conducted its “First Five-Year Health Sector Programme 1997-2001” based on Ghana's Comprehensive Program of Economic and Social Development (known as Vision 2020). In 2002, the GOG formulated the Ghana Poverty Reduction Strategy (GPRS) as the actual national development plan. The “Second Five-Year Health Sector Programme 2002-2006” is based on the GPRS; it considers that improving the health of the poor is crucial for reducing poverty, especially the poverty gap between the wealthy southern coastal area including the capital and the northern depopulated desert area. Therefore, the activity plan addresses the control of infectious disease as a priority target. Table 4.3 shows the priority targets to be achieved.

Table 4.3 Targets to be Achieved by the Second Five-Year Health Sector Programme

Priority Target	Measures	2000	GPRS (2004)	2nd 5-Year Programme (2006)
Health Status	U5MR per 1,000	107.6	95	95
	IMR per 1,000	56.7	50	50
	MMR per 100,000	214	160	160
	Life expectancy	58	58	58
HIV/AIDS/STI: HIV/AIDS control in health sector	HIV prevalence	3	3	2.6
Malaria: Strengthening malaria control	Percentage use of ITN for pregnant woman and U5MR			
Tuberculosis: DOTS strategy	Cure rate Case detection rate	43%		60%
Guinea Worm Disease: Elimination of Guinea worm	Number of cases	7,402	0	0
Strengthen EPI and Eradication of Polio		—		
Reproductive Health Mother and Child Health	Ante natal care	47		70
	Coverage, % with supervised delivery	44		50
	Family planning	14.3		40
Surveillance: clinical, pharmaceutical and laboratory practice	Percentage meeting international quality standards	66%		80%

Source: Government of Ghana (2003), Ghana Poverty Reduction Strategy
Ministry of Health (2001), Second 5-Year Health Sector Programme of Work 2002-2006

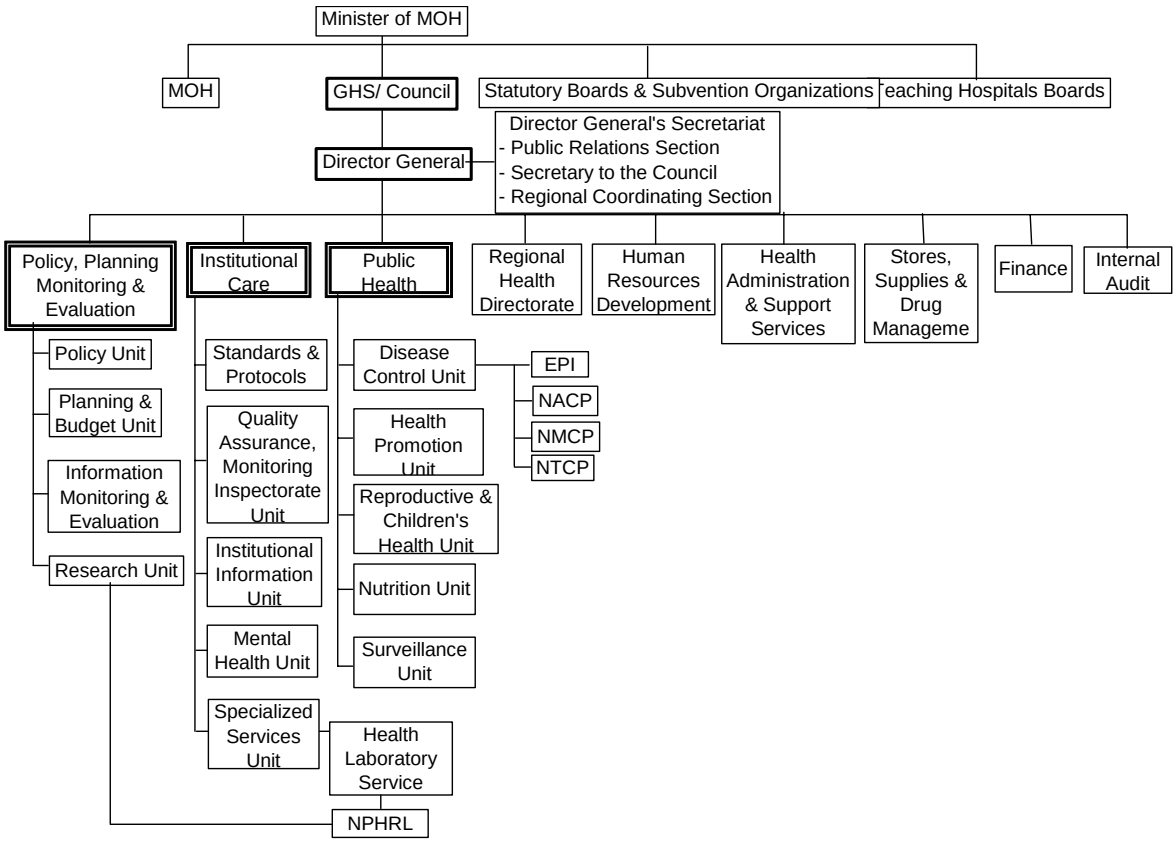
The Second Five-Year Health Sector Programme sets forth specific target indicators; to reduce the rate of infant/child mortality by two-thirds by 2015; to cut the rate of maternal mortality by three-quarters by 2015; to reduce the HIV infection rates by 25% among those 15-24 years old by 2015, and to decrease TB and malaria mortality by 50% by 2010.

(2) Implementation System for Communicable Diseases Control

Based on the health reforms introduced by the GOG in 1996, the MOH was separated into two independent entities, namely the MOH, which is responsible for policy legislation, budget appropriation and allocation, and ordinances and the Ghana Health Service (GHS), a policy implementation agency. The GHS created health divisions in each regional administrative district and is responsible for implementing national health policies.

The Disease Control Unit of the Public Health Division in the GHS is implementing a special program mentioned before to combat malaria, TB, and HIV/AIDS. In addition, the Health Surveillance Unit prepares health statistics based on epidemiological data collected from health facilities. The Health Research Unit conducts the research (including on non-infectious diseases) that is needed to implement the programs (see Figure 4.2).

Figure 4.2 Organizational Chart of the GHS



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All of the laboratories under the jurisdiction of the MOH are supervised by the Institutional Care Division of the GHS. However, the NPHRL, the foremost public health reference laboratory under the jurisdiction of the MOH, is supervised by both the Institutional Care Division and the Public Health Division of the GHS.

The first screening for tests and examinations is undertaken at the hospital and clinics and the results are sent to the NPHRL. As the reference laboratory, the NPHRL retests the samples if necessary. However, tests for polio, yellow fever, TB, and Buruli ulcer are conducted at the NMIMR. The CD4 counts and viral load analysis for HIV/AIDS are also carried out by the NMIMR as the country's foremost public research laboratory. The NMIMR also retests, identifies, and diagnoses samples that the NPHRL is unable to handle.

(3) National Communicable Diseases Control

As mentioned above, the Disease Control Unit of the Public Health Division in the GHS is implementing special programs to combat malaria, TB, and HIV/AIDS. The contents of each program are as follows:

1) Malaria Control

In 1992, the MOH initially developed the "National Malaria Action Plan 1993-1997". Within the adoption of the "Roll Back Malaria" Initiative in 1998, the MOH formulated a "Medium Term Strategic Plan for Malaria Control in Ghana 1998-2001" to improve the coverage of malaria control activities by adopting an inter-sectoral approach involving other government sectors and partnership with the private sector and twelve communities.

There is limited information and material on the resistance of the malaria vector to insecticides in Ghana. The availability of nets is limited due to the fact that there is no in-country manufacturing capacity in Ghana. Bed net usage varies widely from 4.4% in northern areas to 50-80% in southern areas. Thus, the use of insecticide-treated mosquito nets (ITN) is a major intervention promoted under the Medium Term Strategic Plan for Malaria Control, and ITN promotion between the MOH and the commercial sector has developed. There is a report from an NGO that deals with ITN provision under a UNICEF program which states that more than 50% of households spend some money on anti-mosquito measures, such as coils and aerosols, when they are aware of ITN. For example, when they find dead mosquitoes beside the net in the morning.

2) AIDS Control

Since the first HIV/AIDS case was detected in Ghana, the HIV/AIDS epidemic seems to have spread slowly but steadily. Accordingly, in 1987, the GOG established the Ghana National AIDS/STI Control Programme under the Disease Control Unit of the MOH to be responsible for issues related HIV/AIDS. However, in the absence of a multi-sectoral arrangement, the NACP has not been able to reach its goals due to the extensive demands on it. In 2002, the Ghana AIDS Commission (GAC) was established under the leadership of the president to coordinate the implementation of a multi-sectoral response.

According to the results of the HIV sentinel survey by the NACP, the mean prevalence rate of the population aged 15 to 49 years has fluctuated between 2.8 and 3.9%. The implementation of the "National Strategic Framework on HIV/AIDS for 2001-2005" by the GAC consists of the following five key areas of intervention.

- Prevention of new transmission
- Care and support for people living with HIV/AIDS
- Reducing individual and societal vulnerability and susceptibility to HIV/AIDS through the creation of an enabling environment
- Decentralized implementation and institutional arrangements
- Research, monitoring and evaluation

To achieve these objectives, activities have recently been launched for the prevention of mother to child transmission (PMTCT) and Anti-Retroviral Treatment (ART) for opportunistic infections in Voluntary Counselling and Testing (VCT) centres. This framework also considers the human rights of females and children in accordance with

the high prevalence rate among females. In addition, it is also concerned with mutual health promotion between HIV/AIDS and malaria control programs due to the high risk of malaria transmission from HIV/AIDS carriers.

3) Tuberculosis Control

Ghana has been ranked as having the highest prevalence rate for TB of any endemic country and is at the 13th position among African countries according to the established number of TB cases reported to WHO. The report of the MOH mentions that 6,407 new cases were found in 1990 and this number increased to 10,449 in 1996. It is assumed that the factors causing this growth are malnutrition, overpopulation, deterioration in sanitation conditions, drug resistance and HIV-positive pulmonary TB cases. The implementation of the National Tuberculosis Control Programme started in 1994, and the emphasis of this program is on the early diagnosis and treatment of smear-positive pulmonary patients who are a major source of infection in the community. Currently, the Tuberculosis Control Strategic Plan for Ghana is operated as major program under the Second Five-Year Health Sector Programme 2002-2006. Main objectives are as follows:

- Detect 70% of TB cases and, of these, attain at least a 85% cure rate among all cohorts of smear-positive cases enrolled in short-course chemotherapy.
- Decrease the prevalence rate and mortality rate of tuberculosis by 50% by 2010.
- Eliminate the threat of TB threat by 2050.

4) Guinea Worm Eradication

Ghana has the second highest prevalence rate of Guinea Worm Disease (GWD) next to Sudan. Thus, a guinea worm eradication programs was launched in 1987 by the MOH, and the major activities/interventions that have been carried out are as follows.

- House to house surveillance for guinea worm cases by village volunteers
- Case management, including occlusive bandaging and worm extraction
- Filter distribution and/or replacement
- Abatement application for treatable water sources
- Health education
- Training of volunteers and health workers (case management, filter use)

Despite these actions, the number of GWD cases has increased due to re-infection over the last few years; from 4,739 in 2001 to 5,611 in 2002. This situation is quite worrying and demands concerted effort through inter-sectoral policy making.

5) EPI Programme

After the MOH formulated the Universal Childhood Immunisation Programme in 1984, the vaccination rate rose from approximately 60% to over 80% currently. Vaccination in childhood has become a part of the Integrated Management of Childhood Illness (IMCI) activities since 1996, and new strategies such as vaccination for infants and combination with vitamin A provision on national immunization days (NIDs) for polio have been strengthened. In addition, measles and neonatal tetanus are mentioned as an objective of EPI and NID.

(4) Implementation Structure for Research on Infectious Diseases

Table 4.4 lists four other research institutes for infectious diseases control under the jurisdiction of the MOH.

Table 4.4 Research Institutes for Infectious Diseases Control in Ghana

Organization	Activities
National Public Health Reference Laboratory (NPHRL)	The NPHRL belongs to the Public Health Division and Institutional Care Division of the GHS. NPHRL is positioned as the central top referral laboratory and manages health information referred from district laboratories. The NPHLS has three of its own public health laboratories (PHLs) in Kumasi, Tamale and Sekondi -Takundi to collect data and prepare samples to send to the NPHLS. The NPHRL and these three PHLs are not equipped with sophisticated diagnostic apparatus, therefore the NMIMR is charged with advanced research. Thus, there is a clear research demarcation between the NPHRL and the NMIMR. For example, on HIV/AIDS testing, the NPHRL works on rapid tests and the ELIZA method on the national HIV/AIDS screening, and the NMIMR conducts examinations using CD4 counting and PCR for virus determination. The NPHRL is defined as the national reference laboratory for TB too. However, the NMIMR conducts most of the work of the national reference laboratory due to the insufficient number of staff members and inadequate facilities of the NPHRL.
Health Research Unit (HRU)	The HRU was set up by the MOH in 1990, and belongs to the Policy, Planning Monitoring and Evaluation of the GHS. The primary mandate of the unit is to coordinate and conduct research into health issues to facilitate policy formulation and program implementation. Also the training of technologists and monitoring and evaluation of programs are part of its task. The HRU has three field research centres, but these centres are not equipped with a laboratory, so they are more or less district branch offices of the HRU. Hence, the HRU coordinates with in-country research and academic institutions such as the NMIMR, KCCR in Kumasi and the School of Medicine at Ghana Univ. to obtain field data and research outputs. The major task of the HRU is to prepare data and strategic papers that translate research into policy
Centre for Scientific Research into Plant Medicine (CSRPM)	The CSRPM has three research divisions for botanical specimens, plant sciences, and pharmacology. It conducts research on pharmaceutical products from herbs and plants and identifies plants of medicinal and scientific importance. The CSRPM researches the efficacy of traditional, herbal preparations for the treatment of opportunistic infections and malaria therapy working in collaboration with the NMIMR. The CSRPM is also supplied with experimental animals from the NMIMR.
Onchocerciasis Chemotherapy Research Centre (OCRC)	The OCRC was established in Hohoe, Volta Province, to conduct research on onchocerciasis. The OCRC cooperates with the University Ghana and the Bernhard-Nocht Institute in Germany who assists KCCR on the topic of onchocerciasis treatment.

Prepared by the investigation team

The NPHRL is the focal research institute behind Ghana's infectious diseases control programs. However, as explained earlier, a realistic approach has been adopted to eradicate each disease based on the technical levels and implementation system of the NPHRL and the NMIMR. Although the HRU is also a research institute, it is mainly involved in conducting administrative tasks related to commissioning research work from outside research institutions. The CSRPM and the OCR are both involved in specialized fields and their activities do not overlap with other research institutions.

Thus, work on infectious diseases control is appropriately demarcated. The NMIMR is assigned as a reference laboratory for HIV/AIDS, polio and TB, and is also a responsible institute for EQA of HIV and TB testing. Thus, the research activities of other institutions do not overlap with those of the NMIMR.

4.2.3 Assistance provided to Communicable Diseases Control by Other Donors

(1) Type of Assistance

There are three types of other donor assistance consisting of the pooling of capital in a common basket fund using the SWAps, earmarked finance assistance where separate deliberations are carried out with the MOH and regarding funds are directly provided, and direct earmarked assistance for donor led projects.

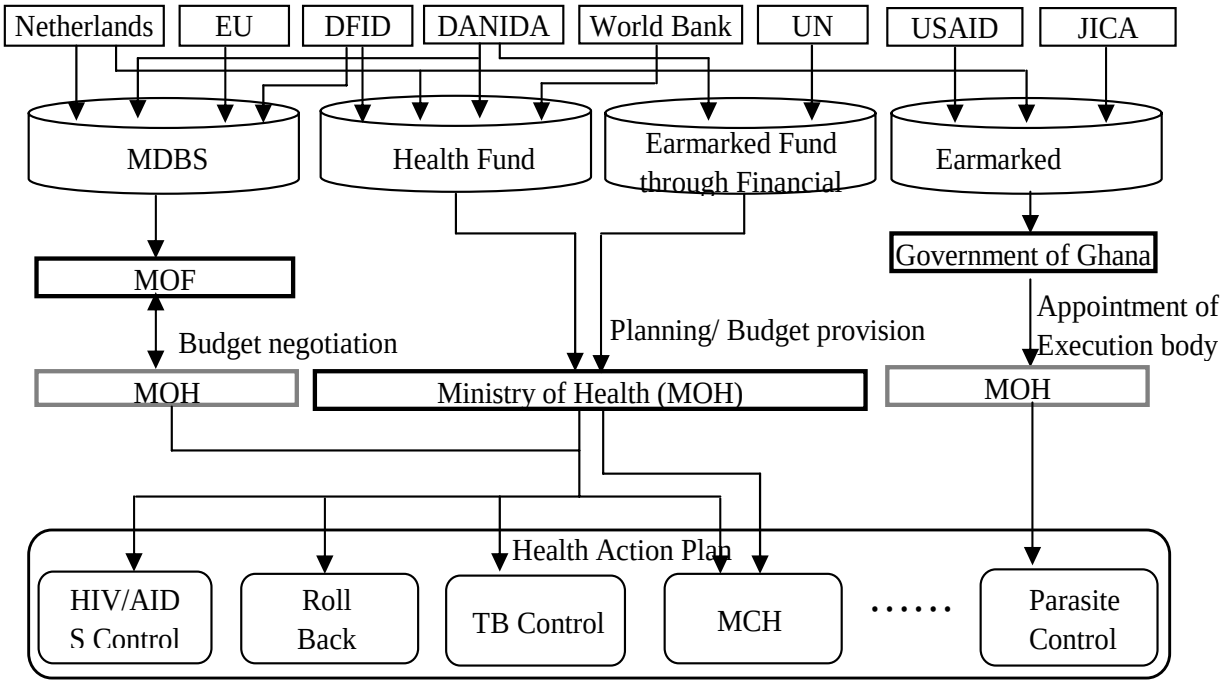
Ghana is one of the most successful examples of SWAps for the planning and implementation of health sector programs. The DFID, DANIDA, the World Bank, and various UN agencies have pooled their capital in a health fund and provided earmarked assistance. In the area of overall development assistance, Multi-Donor Budgetary Support (MDBS) is rapidly becoming a preferred means of provision. The EU and the Netherlands have shifted to the MDBS and by 2006 the DFID plans to completely shift over to MDBS.

In contrast to the health fund and earmarked financial assistance that can be used for the MOH's active operations to implement programs, MDBS must undergo budgetary negotiations between the Ministry of Finance and the MOH. Consequently, there is a possibility that the health sector may be affected in terms of the budget, since donors are transferring regular financial assistance to MDBS.

However, the GoG has left open the option of directly earmarked assistance by not limiting the assistance provided by assistance organizations to the health fund or earmarked financial assistance. Presently, JICA and the USAID are the only two donors that carry out directly earmarked assistance. Figure 4.3 shows the financial assistance schemes operated by the donor agencies.

According to the MOH and GHS, they have shown understanding towards JICA's directly earmarked assistance. JICA has not being participating in the SWAps, which has no significant influence on relations between JICA and other donors.

Figure 4.3 Financial Assistance Schemes by Donor Agencies



Prepared by the investigation team

(2) Contents of Development Assistance

The MOH gives priority to infectious diseases control, and many donor agencies also assist in infectious diseases control, particularly the control of malaria and HIV/AIDS.

Many donor agencies such as DFID, WHO, UNAIDS, and USAID assist HIV/AIDS control programs. In addition to contributions to the health fund, DFID contributed 20 million pounds as bilateral assistance from 2003 to 2006, and assists VCT activities carried out by NGOs, the expansion of surveillance and HIV/AIDS care by WHO, and the activities of the GAC though USAID.

For malaria control, UNICEF, DFID and USAID assist in expanding the distribution activities of ITN, whereas WHO and the Dutch Embassy formulate pharmaceutical laws for anti-malaria drugs and promote appropriate medication.

Among UN organizations, WHO and UNICEF focus more on technical cooperation than financial assistance. UNAIDS coordinates HIV/AIDS control; and UNFPA assists in the prevention of mother-to-child transmission in the context of reproductive health. Table 4.5 below shows assistance programs by donor.

Table 4.5 Major Donor Health Programmes（2003）

Organization	MDBS	SWAps	Earmarked funds	Program
DFID	○	○	○	District health system Communicable diseases control (including EPI/NID) National AIDS control
Embassy of the Netherlands	○	○	○	National drug policy program Communicable diseases control (including EPI/NID) Research partnerships
DANIDA	○	○	○	District health system Communicable diseases control (including EPI/NID)
EU	○	（○）		HIMS National AIDS control
World Bank		○		Communicable diseases control (including EPI/NID) MCH program（PMTCT for HIV/AIDS）
WHO			○	Child health program, District health system Communicable diseases control (including EPI/NID) Revolving fund for guinea worm eradication
UNICEF			○	Communicable diseases control (including EPI/NID) Child health IDD Micro nutrients (Vitamin A) control PHC
UNFPA			○	MCH（PMTCT for HIV/AIDS） Child health
UNAIDS				National AIDS control program
USAID			○	Communicable diseases control (including EPI/NID) Child health National AIDS control program

Prepared by the investigation team

4.2.4 Position and Roles of the NMIMR in Communicable Diseases Control

The NMIMR does not have an official role in infectious diseases control implemented by the MOH since the NMIMR is a semi-autonomous research institute of the University of Ghana. However, the NMIMR is recognized as a centre of excellence by the MOH. The MOH recognises the NMIMR as a semi-autonomous research institute that can independently and objectively assess the infectious diseases control programs of the MOH.

The position of the NMIMR in the main disease control programs is as follows. In addition, the NMIMR also provides technical advice to the MOH and GHS through the dispatch of staff members for the organisation of Rapid Response Teams for national preparedness in the event of a major disease outbreak

(1) Malaria

The NMIMR has conducted research on the drug resistance of malaria in collaboration with WHO/TDR, NIH, the Wellcome Trust, and the US Navy after the termination of JICA assistance to research on malaria in 1991. Based on the results of the research by the NMIMR, the GoG decided to replace chloroquine with other anti-malaria drugs. In addition, the director of the NMIMR, Dr. Ofori, is assigned as the chairperson of the National Malaria Control Programme.

(2) HIV/AIDS

The NMIMR is Ghana's one and only laboratory that has the capacity and facilities to conduct CD4 counts and viral load tests among the official institutes in Ghana. The MOH recognizes the NMIMR as a reference laboratory and an EQA institute for HIV/AIDS. Under the NACP, the NMIMR conducts external quality assurance of HIV screening tests examined by provincial and district hospitals. In 2003, the NMIMR conducted demographic and health surveys (DHS) in collaboration with the Ghana Statistics Service and the Ghana Health Service (GHS). Furthermore, the NMIMR was in charge of external quality assurance for the HIV sentinel survey conducted by the NACP in 2003.

In addition, all HIV test kits imported into Ghana have to be evaluated by the NMIMR and NPHRL. Based on technical evaluations by both institutes, the GoG approves these imported kits.

(3) TB

The MOH recognizes the NMIMR as a reference laboratory and EQA institute for TB. As of September 2004 when this field survey was conducted, the NTP explained that the NMIMR conducts most of the work of the national reference laboratory since the NPHRL, the other national reference laboratory for TB does not have a sufficient number of staff or adequate facilities.

(4) EPI

The NMIMR is a regional reference laboratory for polio in West Africa. The NMIMR also conducts potency tests for EPI vaccines based on requests from the MOH.

As a research institute for infectious diseases, the NMIMR conducts various research activities including those related to the aforementioned diseases, such as HIV/AIDS and TB. The research areas of the NMIMR cover not only infectious diseases, but also other areas such as food security, antioxidants, and environmental pollution.

The NMIMR also has an important role as a training institute for infectious diseases control. Since the NMIMR belongs to the University of Ghana, all the senior staff members of the NMIMR have to allocate a maximum of 25% of their working time to teaching at the university. In addition, the NMIMR holds health training courses for medical technicians in Ghana, and also holds training courses on infectious diseases control nationally and regionally.

The NMIMR also trains undergraduate and post-graduate students from other universities in Ghana and in foreign countries. The NMIMR has two types of training courses, one is a short-term course for vacation students, called attachment students, and the other is a long-term course for Masters and PhD students, called project students. The NMIMR has accepted new students every year (see Table 4.6).

Table 4.6 Number of Students Newly Accepted at the NMIMR

	2000	2001	2002	2003	2004
Attachment	3	1	13	20	24
Project	28	8	3	10	15

Prepared by the investigation team

As mentioned above, the MOH recognizes the NMIMR as a reference laboratory and EQA institute for HIV/AIDS and TB. As a member of health programs/committees of the MOH, the NMIMR also provides technical advice to the MOH.

The roles of the NMIMR in infectious diseases control are summarized in Table 4.7.

Table 4.7 Main Roles of the NMIMR on Infectious Diseases Control

Main Role	Activities
Research	Principal research areas : Malaria, Schistosomiasis, Onchocerciasis, Filariasis, Diarrhoeal diseases, Buruli ulcer, TB, HIV/AIDS, STD, Food security micronutrients, Parasite immunology, Viral haemorrhagic fevers, EPI diseases, Sickle-cell diseases, Plant medicines, Antioxidants, Environmental pollution.
Human Resources Development	Medical research training for undergraduate and post-graduate students, and medical and diagnostic training for technicians.
Contribution to Health Services	Information services as a reference laboratory, QA for TB and HIV testing, Dispatch of staff to the national response systems for emerging and re-emerging infectious diseases, Technical advice on health programs and committees

Prepared by the investigation team

As mentioned in Table 4.8, 11 research areas out of the 18 mentioned above relate to infectious diseases, and JICA cooperates in research on 9 diseases out of these 11.

Table 4.8 Target Diseases of JICA Projects

Target Diseases of JICA Projects	Non-Target Diseases
EPI diseases	Onchocerciasis
HIV/AIDS	Buruli ulcer
STD	Sickle-cell diseases
TB	Food security
Schistosomiasis	micronutrients
Diarrhoeal diseases	Parasite immunology
Filariasis	Plant medicines
Malaria	Antioxidants
Viral haemorrhagic fevers	Environmental pollution

Prepared by the investigation team

4.2.5 Relationship of the NMIMR to Other Organizations Involved in Communicable Diseases Control

In Ghana, the GHS mainly conducts infectious diseases control. Their research unit collects data for the research and studies needed for infectious diseases control. The NMIMR helps by submitting data upon request. Using this data, each unit prepares countermeasures and disseminates them to hospitals and health facilities. When an

infectious disease occurs in a rural region, the NPHRL will test the specimens sent from the rural hospitals. If a diagnosis is difficult to obtain through the NPHRL, the NMIMR will be requested to identify and diagnose the specimen. The epidemiological data thus obtained is disseminated to the MOH and WHO.

Aside from this system, the NMIMR is also involved in developing personnel through collaborative research with overseas research institutes as well as educational instruction in the medical institutions of the university.

The relationhip between the NMIMR and other organizations involved in infectious diseases control in Ghana is shown in Figure 4.4.

Figure 4.4 Relationship of the NMIMR to Other Organizations related to Infectious Diseases Control

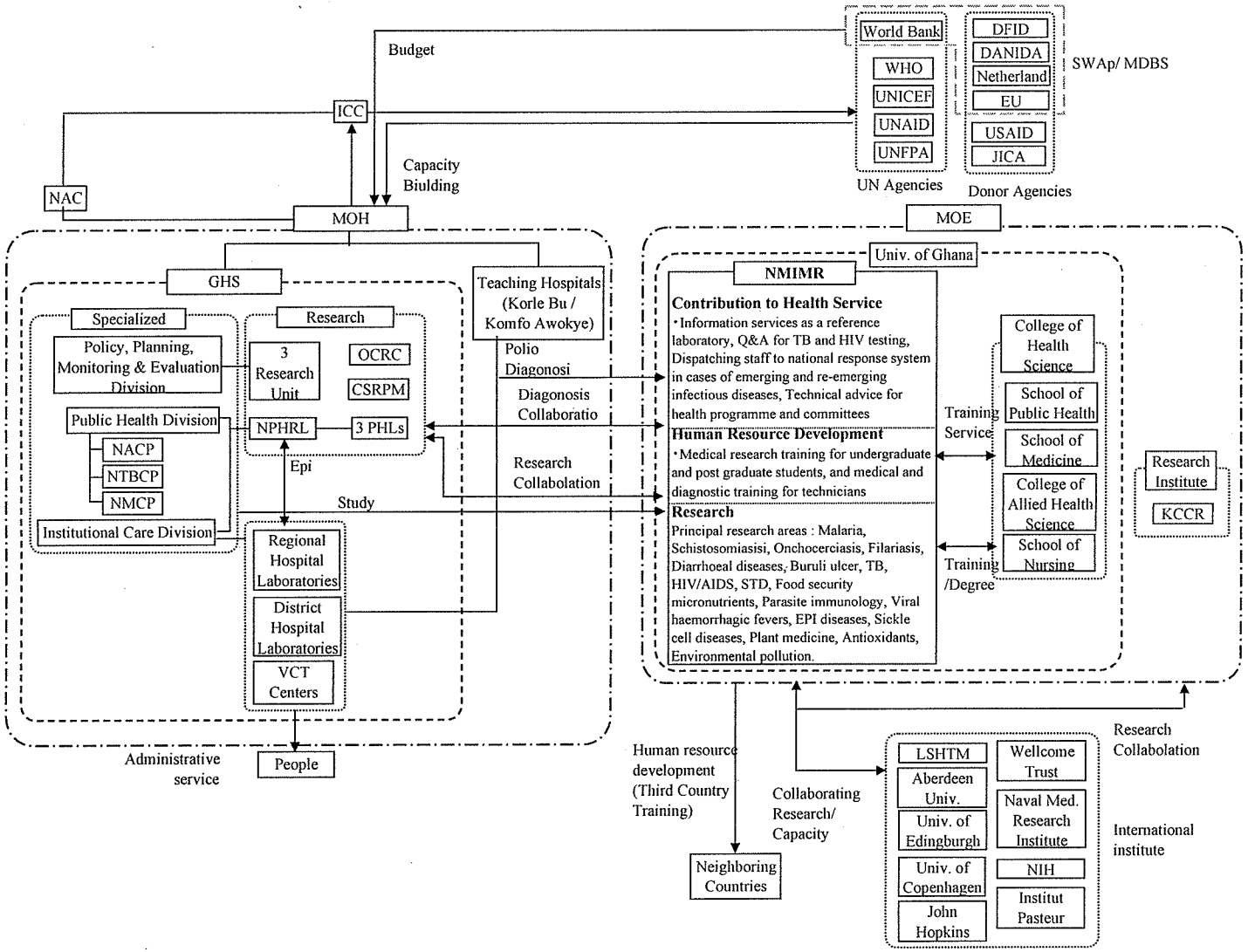


Fig. 4.4 Relation of NMIMR and Other Organizations for Infectious Disease Control

4.3 NMIMR's Contribution to Communicable Diseases Control Based on the Cooperation Provided by JICA

The NMIMR has largely developed its research infrastructure and research capacity in cooperation with JICA. Collaboration on research with foreign institutes has been promoted simultaneously with the capacity development of the NMIMR. The NMIMR is now ranked as one of the top research institutes in Africa.

The NMIMR has contributed to improving infectious diseases control in Ghana through the dissemination of research outputs among the medical personnel or by having research outputs reflected in the health services of the GoG. In particular, the NMIMR has contributed substantially to improving the control of vaccine preventable diseases and TB.

The research outputs that contributed to human resources development or health services are summarized below according to the diseases.

4.3.1 Contribution According to Each Disease

(1) Vaccines/Vaccine Preventable Diseases

Techniques for EPI diseases diagnosis and vaccine potency tests were transferred to the NMIMR from the initial stage of JICA's cooperation. Then the NMIMR started its research activities using the transferred techniques in collaboration with WHO from 1986.

The NMIMR contributed to improving the health services through the evaluation of cold chains for EIP vaccine transportation and also as a regional reference laboratory using techniques that the NMIMR acquired from JICA projects. In addition, the NMIMR also contributed to improving the EPI techniques in neighbouring countries as a training institute.

1) Potency Testing of EPI Vaccines

In Ghana, EPI vaccines were transported inappropriately in the late 1980s due to the undeveloped cold chain system.

To support WHO's polio eradication program, the NMIMR monitored the distribution process of imported EPI vaccines and conducted potency tests on the vaccines. The results showed that imported vaccines had deteriorated; the vaccine potency was lower than the WHO standard. WHO has recognised the inappropriate transportation conditions for EPI vaccines. Subsequently, WHO established a tracing system for quality control of the transported vaccines.

The NMIMR contributes to the effective implementation of EPI through the quality control of EPI vaccines by conducting monitoring and potency testing of the EPI vaccines. The NMIMR still conducts potency testing of EPI vaccines based on requests from the MOH.

2) Polio Surveillance

All suspected polio cases collected in Ghana are sent to and tested by the NMIMR. Based on the results of diagnosis, the NMIMR provides technical advice to the GHS. In 2003, the NMIMR has recognized an increase in the number of polio cases among suspected cases sent from the districts, thus the NMIMR conducted polio and other enterovirus surveillance and isolated poliomyelitis from 15 stool samples. Based on this result, the NMIMR advised the GHS of the immediate need for immunization as a response to a polio outbreak, and in 2003 the GHS implemented the National Immunization Campaign for polio in 2003. The GHS plans to implement the same campaign again in October 2004. The NMIMR contributed to the accurate implementation of infectious diseases control through the technical advice given to the GHS based on their study results.

3) Technical Extension using Third-Country Training Programmes

The NMIMR has held two forms of technical training sessions, namely, on Vaccine Potency Testing and Polio-related Diagnosis Procedures and the Laboratory Diagnosis of Yellow Fever and Polio infection as Third-Country Training Programmes (TCTP). There have been 71 participants from 12 countries and 32 participants from 10 counties trained in the Vaccine Potency Testing and Polio-related Diagnosis Procedures and Laboratory Diagnosis of Yellow Fever and Polio infection training, respectively (see Table 4.9).

Table 4.9 Number of TCTP Participants in PVD

Unit: Person

	Vaccine Potency Testing and Polio Diagnosis Procedures							Laboratory Diagnosis of Yellow Fever and Other EPI Viral Diseases			
	1991	1992	1993	1994	1995	1996	Sub-total	1997	1998	1999	Sub-total
Cameroon	1	0	0	0	1	0	2	1	1	0	2
D. C. Congo	0	0	1	1	0	0	2	0	0	0	0
Ethiopia	1	1	0	0	0	1	3	0	1	2	3
Gambia	1	0	1	0	0	0	2	2	0	0	2
Ghana	3	2	2	2	1	2	12	2	1	2	5
Kenya	1	1	1	1	2	2	8	1	1	1	3
Nigeria	1	3	3	3	1	2	13	2	2	3	7
South Africa	0	0	0	0	2	1	3	0	0	0	0
Tanzania	0	1	1	1	2	0	5	0	1	1	2
Uganda	1	1	1	1	1	2	7	1	2	2	5
Zambia	0	2	1	1	1	1	6	0	1	1	2
Zimbabwe	2	1	1	2	1	1	8	1	0	0	1
Total	11	12	12	12	12	12	71	10	10	12	32

Note: The training course in 1991 was held by WHO without JICA assistance.
Prepared by the investigation team based on the data provided by the NMIMR

The TCTP on "Vaccine Potency Testing and Polio-related Diagnosis Procedures" and "Laboratory Diagnosis of Yellow Fever and Polio infection" were held in collaboration with WHO. According to a WHO evaluation study on training in 1995, the majority of the opinions of the participants was that the main objectives of the courses were met, and the curriculum level was appropriate. This study also reported

that participants from five countries out of the nine utilised the trained techniques in their countries.

The NMIMR contributed to improving the laboratory diagnosis of polio in neighbouring countries by implementing the TCTP. WHO also sees this training as being successful and it established a new training course for French-speaking countries in central Africa.

The NMIMR also held a training course on laboratory diagnosis procedures for polio in 2000, after the termination of JICA's assistance to the TCTP on EPI in 1999. In this training, there were 12 participants from the WHO EPI African Laboratory Network, excluding Ghana. For this training, JICA only assisted in providing equipment.

As a training institute, the NMIMR continuously contributes to technical improvement in the neighbouring countries after the termination of JICA's assistance to TCTP on EPI.

(2) HIV/AIDS

Control of HIV/AIDS is one of the priority tasks in the Ghana health sector, though the prevalence rate of HIV/AIDS in Ghana is relatively low at 3.6% in 2003 compared to other African countries. The National HIV/AIDS control plan in cooperation with Family Health International (NGO) has just started a pilot project since 2003.

The NMIMR has contributed to the control of HIV/AIDS by improving testing techniques, providing new technology and technical evaluation of imported test kits; although the impact is barely visible and not yet reflected in the health services.

1) Improving HIV Testing Techniques

Under the NACP, the NMIMR conducts external quality assurance for the HIV screening tests examined by provincial and district hospitals. In 2003, the NMIMR conducted a demographic and health survey (DHS) in collaboration with the Ghana Statistics Service and the Ghana Health Service (GHS). Furthermore, the NMIMR was in charge of the external quality assurance for the HIV sentinel survey conducted by the NACP in 2003.

As a part of the ICTP, national and regional workshops on Quality Control/Assurance (QCA) in HIV testing were also held by the NMIMR in collaboration with the MOH and GHS (see Table 3.10).

Table 4.10 Number of Trainees of the ICTP for HIV/AIDS

Title	Period	No. of participants
National Stakeholders workshop on Quality Control/Assurance (QCA) in HIV testing	Feb. 2001	72 from 39 institutions of the 10 regions.
Regional Level workshops on QCA in HIV testing	2001, 2002	74 laboratory technicians

Prepared by the investigation team

In addition, the NMIMR confirmed that the knowledge acquired from the workshops was well utilized by the participants through a follow-up survey on all 74 participating district laboratories. These participants were assigned as technicians of the HIV/AIDS sentinel survey and other surveillance programs.

Through these activities, the NMIMR contributes to improving the capabilities of diagnostic institutes and also provides accurate HIV testing for other nations.

2) Providing New Technology

The NMIMR is Ghana's only laboratory that has the capacity and facilities for conducting CD4 counts and viral load analysis among the official institutes in Ghana. The NMIMR also conducts molecular level and genetic analysis that the NPHRL is not capable of. In addition, the NMIMR provides diagnostic services (CD4 counts and viral load analysis) for the ART pilot project mentioned above.

The NMIMR contributes to improving HIV control programs by providing such new technologies for HIV diagnosis. These new technologies, such as CD4 counts and viral load analysis will be fully utilised by the GoG when the ART is being promoted in the future.

3) Technical Evaluation for Imported Test Kits

All HIV test kits and anti-snake venom serum test kits imported into Ghana have to be evaluated by the NMIMR and NPHRL. Based on the technical evaluation by both these institutes, the GoG approves these imported kits.

This technical evaluation by the NMIMR enables the GoG to introduce adequate diagnostic kits in accordance with the HIV strain in Ghana.

(3) Tuberculosis

As mentioned above, the MOH and DANIDA review of the NTP in 1998 found that the TB Microscopy services was the weakest component of the DOTS Control Strategy in Ghana. Regular supporting/monitoring visits to the laboratories at all levels were not carried out, there was no National TB Laboratory Manual and Quality Assurance of the TB Microscopy Services was not in existence.

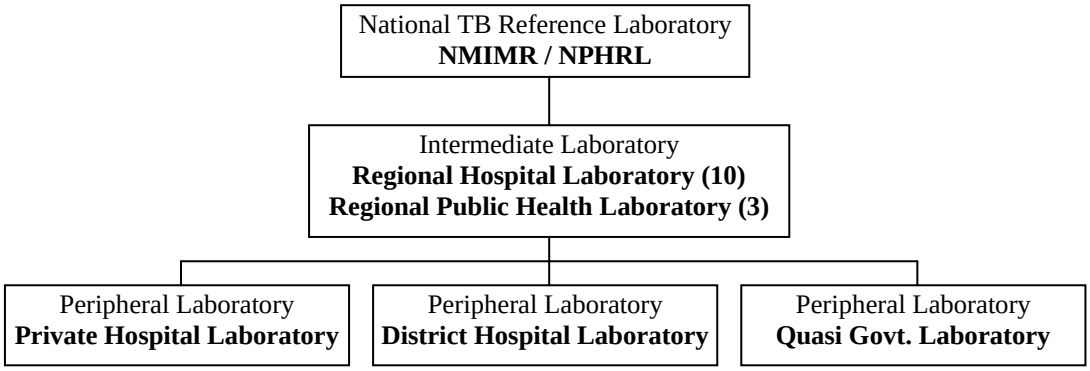
The NMIMR introduced an EQA system into the TB Microscopy centres and prepared a manual for resolving these problems. As a result, significant improvements were recognized in the review by WHO in 2002. The NMIMR contributed to improving TB control by improving the diagnostic accuracy of TB Microscopy services.

According to the NTP, most of the work for QA is carried out by the NMIMR due to the fact that the NPHRL does not have sufficient human resources and facilities for the TB sector.

1) Introducing EQA for TB Testing to the Public TB Microscopy Centres

The NTP established a quality assurance system in TB microscopy in cooperation with JICA. The framework of the QA system is shown on Figure 4.5.

Figure 4.5 QA Framework for TB Microscopy Diagnosis in Ghana



Source: National Tuberculosis Control Programme (2001), Tuberculosis Microscopy: a Laboratory Manual for Ghana

Intermediate laboratories periodically collect slides from peripheral laboratories for evaluation, then feed back the results to the peripheral laboratories. The NMIMR dispatches staff to the intermediate laboratories once a year for QA in both the intermediate and peripheral laboratories. Regarding the private sector, microscopy centres in Accra and Kumasi were covered by the QA system, and the NMIMR and the NTP plans to expand this to nationwide coverage.

The NMIMR is responsible for following items as a national reference laboratory on TB.

- All the functions of an intermediate laboratory.
- Updating and distribution of protocols for TB microscopy.
- Development and distribution of guidelines on TB supporting visits and QA.
- Collaboration with the NTP in making technical recommendations for the purchase of equipment, reagents and other laboratory supplies.
- Training of regional laboratory staff in smear techniques, QA, biosafety measures and the maintenance of equipment.

As shown on Table 4.11, the NMIMR held two training courses, namely, training on TB microscopy and training on quality assurance in TB microscopy, to introduce the EQA system into public microscopy centers.

Table 4.11 Number of Trainees in ICTP on TB Control

Title	Period	No. of participants
Middle-level manpower-training program on TB microscopy	10-14 Sept. 2001	14 Laboratory personnel and regional TB coordinators from Upper-West, Upper-East, Northern Centers, including 1 from a private laboratory in the Greater Accra Region.
Middle-level manpower-training program on TB microscopy	24-28 Sept. 2001	11 Laboratory personnel and regional TB coordinators from the Brong-Ahafo and Ashanti regions and 1 from a private laboratory in the Greater Accra Region.
Middle-level manpower-training program on TB microscopy	21-25 Jan. 2002	14 Laboratory personnel and regional TB coordinators from the Volta, Western, and Central regions
Middle-level manpower-training program on TB microscopy	18-22 Feb. 2002	16 Laboratory personnel and regional TB coordinators from the Eastern, Greater Accra, and Ashanti regions
Middle-level manpower-training program on quality assurance in TB microscopy	6-15 Jan. 2003	13 Laboratory personnel and regional TB coordinators from the Eastern, Greater Accra, Upper-East and Upper-West regions
Middle-level manpower-training program on quality assurance in TB microscopy	1-10 Feb. 2003	13 Laboratory personnel and regional TB coordinators from Volta, Western and Brong-Ahafo regions and four staff of the bacteriology unit of NMIMR
Middle-level manpower-training program on quality assurance in TB microscopy	7-16 April 2003	13 Laboratory personnel and regional TB coordinators from the Ashanti, Northern and Central regions and three new staff of the bacteriology unit of the NMIMR and a new private sector coordinator of the NTP.

Source: NMIMR (2003), National Training Course Tuberculosis Microscopy Final report

The specific objectives of the training on TB microscopy were to strengthen the skills for sputum smear examinations at various levels of laboratory personnel in the country, to impart the necessary techniques in biosafety in TB microscopy and to introduce a system of quality assurance (QA) in order to strengthen the microscopy network in the country. This training was conducted as a part of the MOH in-service training.

The specific objectives of the training on quality assurance in TB microscopy were to introduce the concept of QA into TB microscopy centres in the country, to impart the necessary techniques to laboratory personnel and regional TB coordinators in order to strengthen regional capacity

Both training courses targeted technicians and TB coordinators at the regional level, and trained 94 persons between 2001 and 2004. These regional technicians held training courses for district technicians with the assistance of the NMIMR. About 250 district technicians were trained by the regional technicians who had been trained by the NMIMR.

Thus, the NMIMR has contributed to improving the capabilities of the TB microscopy centers and also provided accurate TB diagnosis for other nations by introducing EQA into public microscopy centers.

2) Introducing the EQA system into Private Hospitals

The EQA system mentioned above was introduced into public microscopy centers as a part of the Infectious Diseases Project.

However, the National Tuberculosis Programme (NTP) estimated that close to 50% of all TB patients visit private clinics/hospitals and laboratories before finally being diagnosed in the public sector facilities. Many suspected TB cases and actual patients prefer to seek health care at private health facilities, among other reasons for the assurance of privacy and the avoidance of stigmatisation, especially as TB is increasingly being associated with HIV/AIDS. However, the management of TB in the private sector lags behind that of the public sector, hence the need to strengthen this sector.

Based on the experience of the Middle-Level Manpower Training sessions, the NMIMR and the NTP with the support of the Global Fund against Tuberculosis, AIDS and Malaria initiated a training program for private laboratory personnel from Accra and Kumasi (see Table 4.12).

The specific objectives of the course were:

- To strengthen the skills of private laboratory personnel in sputum smear microscopy.
- To impart the necessary biosafety techniques in TB Microscopy.
- To introduce a TB Microscopy Quality Assurance System.

Table 4.12 Number of Private Laboratory Personnel Trained

Training period	No. of trainees	
20-25 Oct. 2003	20	Accra
27 Oct. - 1 Nov. 2003	16	Accra
10-15 Nov. 2003	22	Accra
13-18 Oct. 2003	17*	Kumasi
Total	75	

Note: *Including 2 trainees from the NTP and Regional TB coordinator.
Source: Training course on TB Microscopy and QA for Private Laboratory Personnel from the Accra Metropolis, Training course on TB Microscopy and QA for Private Laboratory Personnel from the Kumasi Metropolis

In addition, follow-up visits were paid to participants by the NMIMR in March and April 2004. Staff members of the NMIMR conducted a slide evaluation for blinded rechecking as a part of QA during the period of these follow-up visits.

The TB microscopy centres in private hospitals in Accra and Kumasi are able to provide accurate diagnosis for other nations through the contribution of the NMIMR.

(4) Improvement of Public Health in the Communities

The NMIMR conducted a series of activities to improve primary health care such as health education, vaccination sessions, treatment of childhood diseases, etc. in communities in the Gomoa district from 1986 to 1991. It was reported that significant changes were observed in the increase in the vaccination rate among children, a reduction in malaria mortality, and a lower maternal death rate in these communities.

The health facilities established by the JICA project have also been well managed through cooperation between the district government and the communities. In addition, the NMIMR reported that the communities recently constructed accommodations for doctors and nurses. The NMIMR contributed to improving the health condition and knowledge of community residents through these activities.

(5) JICA's Cooperation with the NMIMR

As mentioned above, JICA has supported various kinds of research activities on infectious diseases. The research capacity of the NMIMR established through technical cooperation with JICA has been utilized for the implementation of surveillance and reference services. Diagnostic techniques training by JICA has been disseminated to medical personnel inside and outside the country.

As mentioned in section 4.2.4, 11 research areas out of 18 are related to infectious diseases, and JICA has cooperated in research activities on 9 diseases of the 11. It was confirmed that the NMIMR has conducted activities in human resources development and the improvement of health services for 4 diseases out of the 9 (see Table 4.13).

Table 4.13 JICA's Cooperation with the NMIMR

Target diseases	Research	Human Resources Development	Contribution to the Health Services		
			Surveillance	Reference	Direct Contribution to the Population
EPI diseases	○	○	○	○	―
HIV/AIDS	○	○	―	○	―
STD	○	―	―	―	―
TB	○	○	―	○	―
Schistosomiasis	○	―	○	―	○
Diarrhoeal diseases	○	―	―	―	―
Filariasis	○	―	―	―	―
Malaria	○	―	―	―	―
Viral haemorrhagic fevers	○	―	―	―	―

Prepared by the investigation team

4.3.2 Achievements of JICA's Cooperation

As mentioned in section 4.3.1, the NMIMR has contributed to infectious diseases control in cooperation with JICA. JICA contributed not only to diseases control, but

also to the capacity development of the NMIMR. The achievements of JICA's cooperation in capacity development with the NMIMR are as follows.

(1) Capacity Development of the NMIMR

As mentioned in section 4.1.3, it was expected that technical cooperation provided by JICA since 1968 aimed to strengthen the research capacity of the NMIMR and also strengthen the capacity of medical personnel engaged in infectious diseases control though training.

The NMIMR has implemented collaborative research with foreign institutes such as WHO/TDR, DANIDA, and NIH after establishing its research capacity through technical cooperation with JICA. Case examples of this collaborative research by the NMIMR that were confirmed in this study are shown on Table 4.14.

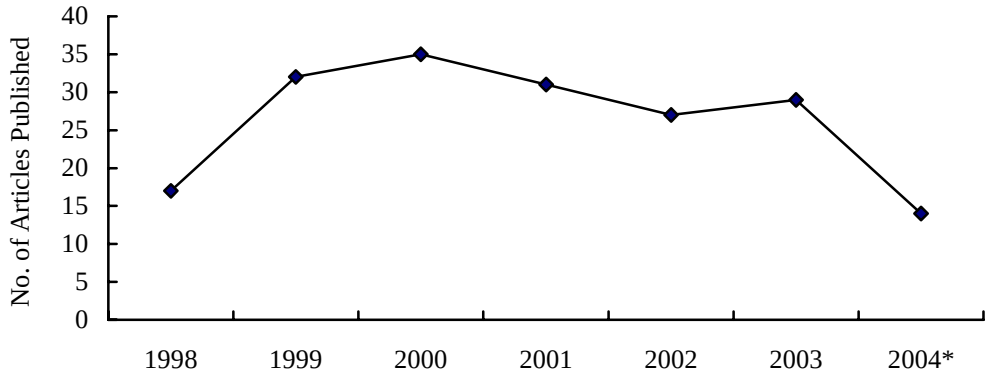
Table 4.14 Case Examples of Collaborative Research by the NMIMR

Overseas Research Institutes	Research Content
USAID and EU	Monitoring and operational research for HIV/AIDS
Aberdeen University (Scotland)	PMTCT in IMMPACT(Initiative for Maternal Mortality Programme Assessment)
Centre for Medical Parasitology, University of Copenhagen	Parasitology research（malaria and filariasis）
International Atomic Energy Agency (IAEA)	Research on food contamination（Nutrition Unit）
Institute for Stem Cell. Research, University of Edinburgh (Scotland)	Research on animal experiments
NIH (USA)	Research on sickle-cell anaemia (Epidemiology Unit）
Institut Pasteur (France)	Malaria research
London School of Hygiene and Tropical Medicine (England)	Malaria research（Epidemiology Unit）
Naval Medical Research Institute	Malaria research（Clinical Pathology and Haematology Unit）

Source: NMIMR (1997 – 2003), Annual Report

These research outputs have been regularly reported through Annual Research Meetings and also published in internal/external journals (see Figure 4.6).

Figure 4.6 Number of Publications by NMIMR (1998～2004)



Note: Number of publications as of July 2004.
Source: NMIMR (1997- 2003), Annual Report

The NMIMR has reglarly published a certain number of articles, although the number has fluctuated. It seems from this that the NMIMR has continuously conducted sophisticated research.

Besides these research activities, the NMIMR has been designated as a National Reference Laboratory for HIV/AIDS since 1989. In addition, the NMIMR has also been designated as a Regional Reference Laboratory for Polio diagnostics since 1992 by WHO. Thus, the diagnostic capacity of the NMIMR has been recognized by WHO.

Regarding the technical development of staff members, all units of the NMIMR have a staff development plan to improve the educational background and working experience of the staff members. The staff of the NMIMR are able to take training courses for PhD and Masters' degrees using scholarships. There were 37 staff members in training or who were trained in the period 1999 to 2003 (see Table 4.15).

Table 4.15 Number of Staff in Training or who were Trained during the Period 1999 to 2003 (full-time and project related)

Unit: person

	PhD		Mphil, MPH, MSc		Total
	Completed	In Progress	Completed	In Progress	
Bacteriology	-	2	1	1	4
Clinical Pathology	-	1	1	2	4
Electron Microscopy	-	1	-	1	2
Epidemiology	-	1	3	-	4
Immunology	1	1	-	3	5
Laboratory Animals	-	1	1	1	3
Nutrition	1	1	-	1	3
Parasitology	-	2	-	5	7
Virology	-	2	2	1	5
Total	2	12	8	15	37

Source: NMIMR (1997- 2003), Annual Report

The staff members of the NMIMR strive to improve their own capacity by participating in these training sessions.

It seems that the NMIMR has developed a sophisticated research capacity since it has regularly published research articles and has been designated as a National and Regional Reference Laboratory. In addition, the NMIMR maintains the appropriate technical level of its staff through the implementation of staff development plans.

(2) Infrastructure Development

Japan contributed to the improvement of the capacity of the NMIMR in various aspects of technology transfer and also infrastructure development. The buildings of the NMIMR and a large quantity of equipment were procured through Japanese assistance. The NMIMR highly values this advanced infrastructure and the technology transferred by JICA, which has enabled them to implement collaborative research activities with foreign institutes. These collaborative research activities with other foreign institutes have also improved the research capacity of the NMIMR.

Japanese cooperation, which combines technical cooperation with development assistance for the research infrastructure, has resulted in a major effort to ensure successful results for the NMIMR.

(3) Strengthening the Capacity for Research Implementation

As mentioned above, the NMIMR has acquired the capacity to conduct research that enables it to be an equal partner in collaborative research with foreign institutes through the technical transfer and infrastructure development supported by Japan. This capacity has also enabled the NMIMR to continuously obtain research grants from foreign institutes as well as to strengthen the financial base of the NMIMR.

The financial resources of the NMIMR consist of the budget allocations from the GoG, research grant from foreign institutes, and earnings from income-generating activities. The NMIMR relies for its development expenditures on grants from foreign donors.

The budget allocation from The GoG covers recurrent expenditures such as personnel costs, administrative costs, and investment (repair) costs. The GoG also allocates servicess cost when the GoG requests the NMIMR to provide a laboratory service. Personnel costs accounted for 80 to 90% of the total budget allocation from the GoG during the period between 1997 and 2003. Due to inflation, personnel costs increased by about 30% per year, thus the budget allocation from the GoG increased from 775 million Cedis in 1997 to 4,506 Cedis in 2003.(see Table 4.16).

Table 4.16 Budget from the Government of Ghana

Unit: 1,000 Cedis

	1997	1998	1999	2000	2001	2002	2003
Personnel	649,750	879,877	1,226,055	1,860,264	2,302,027	2,922,949	3,973,041
Administration	124,990	98,271	147,335	154,100	142,614	146,578	69,466
Services	0	0	40,583	0	0	181,261	345,341
Investment	0	0	0	0	0	28,422	118,580
Total	774,740	978,148	1,413,973	2,014,364	2,444,641	3,279,210	4,506,428

Note: Electricity and water charges are paid by the Government directly.
1 US Dollar = 8,754 Ghanaian Cedi (as of January 2003)
Prepared by the investigation team based on the data provided by the NMIMR

As a leading institute in Africa, the NMIMR, which has a sophisticated technology and infrastructure, conducts many collaborative research projects with foreign research institutes. Case examples of collaborative research carried out by the NMIMR and foreign research institute are shown in Table 4.14.

The amount of the research grants has also increased constantly since 1997, although there was no increment in grants from JICA. Due to the increment in grants from other donors, the proportion of JICA assistance towards research grants decreased rapidly from 50% in 2000 to 15% in 2003 (see Table 4.17).

Table 4.17 Composition of Research Grants

Units: US$

	1996	1997	1998	1999	2000	2001	2002	2003
Others	381,006	401,823	440,262	552,843	321,515	957,304	1,309,270	1,887,895
JICA				379,100	435,000	499,000	337,429	337,243
Total	381,006	401,823	440,262	931,943	756,515	1,456,304	1,646,699	2,225,138

Prepared by the investigation team based on the data provided by the NMIMR

The NMIMR also generates income based on limited clinical laboratory services to the public and laboratory programs of other institutions and organizations such as the MOH, UNICEF and private companies, although the amount of income from these activities could not be confirmed during the evaluation study period.

It is considered that the financial sustainability of the NMIMR is very high due to its regular collaborative research with foreign institutes and stable financial support from the GoG.

On the other hand, the appropriateness of the technical cooperation system of JICA aimed at technical transfer should be considered along with strengthening the sustainability of the NMIMR.

The heads of the units interviewed also enumerated the following shortcomings of JICA's technical cooperation system in comparison with collaborative research with other foreign institutes.

- The research budget for JICA's technical cooperation was managed only by the Japanese side, and not open to the Ghanaian side. Hence, it has prevented the development of Ghanaian ownership in terms of the planning of the research.
- Generally, researchers in the NMIMR gain an additional allowance for taking part in collaborative research funded by other institutes. However, project-type technical cooperation through JICA has no similar system of payment to C/Ps. Therefore, researchers in the NMIMR have low motivation to participate in JICA projects due to lack of this allowance system,.

The above shortcomings were frequently pointed out by the Ghanaian side when the evaluation study was being conducted for each project. JICA has worked to improve this shortcoming.

(4) Strengthening the Relationship with the MOH

The NMIMR is an affiliated research institute of the University of Ghana, and belongs to the Ministry of Education (MOE). Therefore, it was pointed out that it was difficult for the research outputs of NMIMR to be reflected in the infectious diseases control programs of the MOH. However, the NMIMR has held annual research meetings that seek to bridge the "Research – Policy Divide" since 2001. These meetings bring together policy makers from the MOH, Directors and Programme Managers of the GHS, academics and other health partners to discuss research findings and identify the research needs of public health programs, with the aim of integrating relevant research findings into policy and implementation programs.

Due to these meetings, communication between the NMIMR and the MOH has improved, and it became easier to the reflect research outputs of the NMIMR in the infectious diseases control programs of the MOH.

It was also pointed out that JICA's cooperation focused on research activities and only in a few cases included activities to enable the research outputs to be reflected in the health services. Such cases were mostly in initial stages of the cooperation period. It seems that the projects at the initial stage of JICA's cooperation aimed at the capacity development of the NMIMR, and could not afford to develop a collaborative structure with related organizations.

The MOH explained to the evaluation team that the NMIMR is recognized as a centre of excellence by the MOH. The MOH also appoints staff of the NMIMR as members of its health programs and committees and receives technical advice from them (see Table 4.18).

Table 4.18 List of Committees / Programs that the NMIMR is Appointed to as a Member

Name of Committee / Program	Unit	Name of Committee / Program	Unit
National Malaria Control Programme	Director General	National BCT Guidelines Committee	Virology
National Polio Expert Committee	Virology	National Task Force on Lymphatic Filariasis	Parasitology
National PMTCT Taskforce	Virology	WHO Scientific and Technical Committee on the Insect Vectors of Diseases	Parasitology
National Vaccine Advisory Committee	Virology	National Task Force on Leishmaniasis	Parasitology
National Technical Committee on ARV	Virology	National Malaria Technical Committee	Parasitology
National HIV Testing and Evaluation Guidelines Committee	Virology	National Task Force on Trypanosomiasis	Parasitology
National HIV Quality Assurance Guidelines Committee	Virology	National TB Advisory Committee	Bacteriology
National Opportunistic Infections Guidelines Committee	Virology	National Buruli Ulcer Advisory Committee	Bacteriology

Prepared by the investigation team

During the initial stage of JICA's cooperation, research outputs were not readily reflected in the infectious diseases control programs due to the lack of clarity concerning the role of the NMIMR in infectious diseases control and the lack of a system of cooperation with related organizations. However, this situation was improved by having annual meeting and with the participation of the NMIMR in the health programs and committees of the MOH. Furthermore, JICA's technical cooperation projects have made a point of developing a relationship with the MOH since the "Infections Diseases Project of the Noguchi Memorial Institute for Medical Research (1999-2003)", and it has increased research activities that have directly contributed to improving the health services, such as by introducing QA for HIV/AIDS and TB, and de-worming through school health activities. These changes have contributed to the reflection of research outputs in infectious diseases control.

4.3.3 Conclusions

JICA has implemented cooperation with the expectation that the health services would be improved through the effect of the NMIMR functioning as a base for research and diagnosis on infectious diseases control, as well as a base for the human resources development. As mentioned above, the NMIMR has contributed extensively to infectious diseases control in Ghana and the African region as a research institute and reference laboratory. In addition, the NMIMR has also contributed to infectious diseases control as an education and training institute. The dissemination of research outputs among medical personnel in the country as well as third-country training has improved health services in general.

In general, the role of a research institute is to develop the technology for infectious diseases control. A series of JICA cooperation activities has enabled research to be conducted that has improved health services, such as through the distribution system of vaccines and improvements in the accuracy of diagnosis. It is therefore considered that these activities have contributed to improving the health of the population indirectly through the improvement of health services.

However, a dichotomy between the needs of the NMIMR and objective of technical cooperation with JICA that aims at technology transfer has accompanied the enhancement of the independence of the NMIMR through the strengthening of its collaborative research with foreign institutes, although JICA's technical cooperation met the needs of the NMIMR in the initial stage of cooperation. It is concluded that a new cooperation scheme that involves the NMIMR as an equal partner is required to improve future cooperation.

4.4 Expected Roles of the NMIMR

The NMIMR has contributed to improving infectious diseases control in Ghana based on assistance from JICA. The expected roles of the NMIMR in relation to its further contributions to infectious diseases control are summarized from the viewpoint of research, human resources development and contributions to the health services as follows:

(1) Research

Japan has assisted the NMIMR through technology transfer based on project-type technical cooperation and infrastructure development through grant aid since the NMIMR was established. The NMIMR introduced advanced technology to improve infectious diseases control, such as molecular level and genetic analysis through technical cooperation with JICA. Even now, the NMIMR is the only institute that is able to conduct CD4 counts and viral load analysis among all the government institutes.

The research subjects of the NMIMR have covered a broad spectrum from medical issues in Ghana to regional issues such as EPI. These research outputs have been well applied in the implementation of infectious diseases control by the MOH and other research partners. In addition, the research outputs have also been utilized through their publication in international journals, and are utilized widely to improve infectious diseases control.

Research on infectious diseases control is not only the mandate of the NMIMR, but also a means to secure research grants from foreign institutes. In addition, experience in collaborative research with foreign institutes also improves the research capacity of the NMIMR.

The NMIMR has become established as the foremost medical research institute in Ghana. It is expected that the NMIMR will continue to conduct cutting-edge research activities in order to help improve infectious diseases control in Ghana and neighbouring African countries. It is recommended that this research be strengthened with regard to major infectious diseases in West Africa and infectious diseases that are peculiar to Africa as a whole.

In addition, it is also expected that the NMIMR, as the foremost medical research institute in Africa that has continuously contributed to the promotion of medical research in the African region, will continue its development through collaborative research with foreign institutes.

(2) Human Resources Development

The NMIMR has disseminated its research outputs to health personnel through the ICTP and TCTP in the field of EPI vaccines, TB, HIV/AIDS and parasitology.

The NMIMR has continued EPI training for neighbouring countries in cooperation with WHO after the termination of JICA cooperation. The NMIMR also conducted training for TB in cooperation with the NTP. Therefore, it is concluded that the NMIMR is adequately fulfilling its role as a training institute for health care personnel from Ghana and the neighbouring countries. As an affiliated institute of the University of Ghana, the most important role of the NMIMR is to promote and foster the next generation researchers.

In addition to the training activities mentioned above, the NMIMR also implements training activities in medical research for students from Ghana and other countries. In addition, the senior staff members of the institute also serve as lecturers at the University of Ghana. It is expected that the NMIMR will contribute to foster health personnel in Ghana in the future. In addition, as a stronghold of TCTP, the NMINR is expected to conduct training such as on diagnosis methods for EPI diseases and parasite control in cooperation with JICA and other donor agencies.

(3) Contributions to the Health Services

The NMIMR's research findings are utilized by the MOH and relevant institutions through the Annual Research Meetings. In addition, the NMIMR also contributes to improving the health services by implementing surveillance and reference tasks, and by evaluating diagnostic kits.

In particular, in the field of surveillance and reference work, the NMIMR provides technical services that other institutes are not able to provide. Surveillance services, such as the potency testing of EPI vaccines and the drug resistance of malaria should contribute to improving the infectious diseased control programs of the MOH. In addition, the NMIMR has an important role in implementing infectious diseases control as a reference laboratory for polio, HIV/AIDS and TB.

It is expected that the NMIMR will continue to conduct research, surveillance and reference services that are directly linked to infectious diseases control in Ghana.

The expected roles of the NMIMR in infectious diseases control in Ghana are summarized in Table 4.19.

Table 4.19 Expected Role of the NMIMR on Communicable Diseases Control

Areas	Roles
Research	➢ Research targets are viral, bacterial and parasitic infectious diseases. ➢ Epidemiological surveys and studies ➢ Improving diagnostic methods in classical and modern technology, such as isolation and identification with regard to basic techniques, and molecular level and genetic analysis in a P-3 biosafety laboratory using advanced technology ➢ Clinical trials in vitro and in vivo such as on drug resistance and sensitivity ➢ Evaluation of research and study results or outcomes ➢ Collaborative studies with institutes, universities and hospitals within the country or overseas
Human resources development	➢ Laboratory practice for students of medical schools, faculty of sciences and medical vocational schools ➢ Re-training in diagnostic techniques for medical workers ➢ Technical transfer of diagnostic experimental methods and QC to researchers ➢ Collaborative research with institutes and universities within the country or overseas ➢ Third-Country Training for EPI vaccines and parasite control ➢ Giving lectures in the medical schools and courses by researchers.
National / Regional Health Services	【Surveillance Services】 ➢ Conducting potency test for the EPI vaccines based requests from the MOH ➢ Dispatch of staff to organise Rapid Response Teams for national preparedness in the event of a major disease outbreak. 【Reference Services】 ➢ Reporting to the MOH as a national reference laboratory ➢ Reporting to WHO as a collaborating centre ➢ QA for HIV testing and TB microscopy. 【National control and other tests】 ➢ Technical evaluation off HIV test kits and anti-snake venom serum test kits. 【Others】 ➢ Technical advice and consultations for the MOH/GHS

Prepared by the investigation

Annex 4.1 Main Activities of the NMIMR-JICA Programs

	Korle Bu Hospital[*1]	NMIMR Project	NMIMR Project Ⅱ + FU	Infectious Diseases Project	West African Centre for International Parasite Control Project
Malaria	➢ Technical transfer on the classification and identification of Anopheles vectors.	➢ Malaria infection, morbidity and antibody levels in infants in the Gomoa district. ➢ Plasmodium falciparum sensitivity to chloroquine and other ant-malaria drugs in the Central, Volta, Upper East, and Brong Aharo regions.			
Epidemiology	The following activities in the Gomoa district: ➢ Establishment of health facilities ➢ Collection of samples for research. ➢ Study on vaccination.	The following activities in the Gomoa district: ➢ Epidemiological surveillance of communicable diseases and determination of the causative agents of diseases (including diarrhoea) ➢ PHC activities ➢ Clinical trials of heat stable Acellular Pertussis Diphtheria Tetanus (APDT) vaccine.			
Nutrition / Diarrhoea Diseases	➢ Transfer of basic technology through amino acid analysis, quantitative analysis of metals, comparison for quantity of metals among various disease patients ➢ Relation between diarrhoea and malnutrition	➢ Analysis of nutrients in food, blood and body tissues ➢ Improvement of the nutritional status of infants through appropriate weaning foods ➢ Determination of the prevalence of Vitamin A deficiencies and anaemia	➢ Persistent diarrhoea in childhood ➢ Nutrition and persistent diarrhoea ➢ Persistent diarrhoea and immune dysfunction ➢ Immuno-competence in protein-energy malnutritio. ➢ Cereal based-ORS study		
General Subjects	➢ Sample preparation for the electron microscope ➢ Study on morbidity changes, antigens for yellow fever, leptospirosis	➢ Serological diagnosis for human retroviruses, yellow fever virus, measles virus, rubella virus, and polio virus ➢ Establishment of virus isolation techniques and epidemiological analysis of virus infectious diseases			
VPD		➢ Potency tests for polioviruses, measles virus, and yellow fever virus vaccine (in cooperation with MOH & UNICEF) ➢ Monitoring of the effectiveness of imported cold chain vaccines ➢ Assessment of a rise in antibodies after vaccination with polioviruses ➢ Evaluation of WHO recommended the four doses schedule of vaccination for poliovirus at birth ➢ Evaluation of the two doses schedule of the double normal dose of the poliovirus vaccine ➢ Comparison of seroconversion rates of poliovirus vaccination	➢ Evaluation of the effectiveness of DTP vaccines by epidemiologic and immunologic methods ➢ Investigation of the effectiveness of various measles vaccines and the determination of the appropriate timing for vaccination ➢ Evaluation of the acquisition of immunity after the administration of EPI vaccines in malnourished and immunocompromised children, and to determine the appropriate schedule of vaccination among both healthy and immunocompromised hosts ➢ Development of a vaccine quality control system	➢ Viral haemorrhagic fever antibody tests (yellow fever virus IgM, IgM of dengue fever virus, and IgG, Ebola, Marburg, and Lassa fever virus, etc.). ➢ Introduction of RT-PCR techniques to identify virus genomes in mosquitoes ➢ Establishment of a community- based surveillance system in the Dangme East District for measles ➢ Clarification of the cytokine profiles in plasma, changes in the population of lymphocyte surface markers and apoptosis related events, during and after measles infection for the better understanding of immuno-suppression after measles infection	
HIV/AIDS STD			➢ Transfer of the diagnostic techniques for the determination of HIV-1,2 (and HTLV-1) infections ➢ Research on the epidemiology and transmission of HIV infections ➢ Virus isolation in cell culture and characterization of the isolated viruses	➢ Research on the molecular and antigenic characterization of HIV strains ➢ Introduction of protease inhibitor susceptibility tests ➢ Establishment of standardized diagnostic methods for HIV/AIDS and QC/QA for HIV testing in collaboration with the MOH ➢ Characterization of etiological agents for STD ➢ Technical transfer of	

	Korle Bu Hospital[*1]	NMIMR Project	NMIMR Project Ⅱ + FU	Infectious Diseases Project	West African Centre for International Parasite Control Project
				diagnostic methods for C. trachomatis.	
Tuberculosis				➢ Technical transfer of smear preparation, culture, mycobacterium species identification, and drug susceptibility testing ➢ Establishment of a reference laboratory	
Schistosomiasis			➢ Analysis of the present status of schistosomiasis prevalence in Ghana in collaboration with the MOH ➢ Examination of basic epidemiological, socio-cultural, economic and behaviour factors associated with schistosomiasis in defined communities ➢ Examination of the effectiveness of combined control measures for schistosomiasis. ➢ Development of effective molluscicides ➢ Studies on the different strains of S. haematobium ➢ Development of immunodiagnosis	➢ Production and screening of anti-schistosome monoclonal antibodies ➢ Identification of Schistosoma haematobium resistant individuals to analyse their sera for protective antibodies ➢ Molecular cloning of S. haematobium vaccine candidates	➢ Establishment of WACIPAC. ➢ Establishment of a model project for school- based parasitic disease control ➢ In-country and third-country training ➢ Establishment of an information network within the West Africa ➢ Promotion of the advocacy of school-based parasitic diseases control ➢ Implementation of start-up activities on school-based parasitic diseases control in the supporting sites
Laboratory animals				➢ Conformation with SPF status specifications ➢ Conformation with specific genetic profiles of the strains ➢ Establishment and characterization of grasscutter colonies	
Biosafety				➢ Biosafety level 3 facility guidelines ➢ Biosafety manual ➢ Training ➢ Reporting and countermeasures system for biohazard accidents ➢ Organization of biosafety related committees	

Prepared by the investigation team

5 Analytical Findings on the Kenya Medical Research Institute in Kenya

This chapter comprises four sections, and it presents the analysis of the contribution of Kenya Medical Research Institute (KEMRI) to infectious diseases control and the effect of JICA's cooperation, which made possible the contribution of KEMRI. JICA's assistance to KEMRI is summarized in Section 5.1. Section 5.2 gives a summary outline of infectious diseases control in Kenya, including the role and functions of KEMRI in infectious diseases control. Based on these findings, the effects of JICA's assistance that enabled KEMRI to contribute to infectious diseases control are analysed as described in Section 5.3. The results of this analysis are summarized in Section 5.4 in terms of the expected role of KEMRI.

5.1 Summary of JICA Cooperation with the KEMRI

5.1.1 Background History to the Cooperation

The leading causes of morbidity and mortality in Kenya in 1975 were related to infectious diseases such as malaria, measles, varicella and diarrhoea. In 1976, the Government of Kenya (GOK) requested from the Government of Japan technical assistance that aimed to conduct research on public health, especially research on infectious diseases in order to improve the health situation.

JICA started project type technical cooperation on infectious diseases control, namely the Communicable Diseases Research and Control Project in March 1979. The Project was implemented in cooperation with several agencies under the Ministry of Health (MOH), such as the National Public Health Laboratory Services (NPHLS) and the Division of Vector Borne Diseases (DVBD). The Kenya Medical Research Institute (KEMRI) was established in 1979, and joined the JICA project as one of the counterpart agencies. KEMRI has been the main partner in JICA projects since the main facilities at KEMRI were completed with Japanese Grant Aid in 1981.

JICA has continuously implemented project type technical cooperation with KEMRI, and there were seven projects implemented up to 2004 (Research and Control of Infectious Diseases Project and the International Parasite Control Project, which resulted from a division of the Research and Control of Infectious and Parasitic Diseases Project). The Government of Japan further supported the development of facilities and equipment at KEMRI through the implementation of grant aid projects, including the Kenya Medical Research Institute Development Project in the Republic of Kenya in 1981/82 and the Project for Improvement of the Kenya Medical Research Institute in the Republic of Kenya in 1997. Thus, a series of cooperation projects involving KEMRI were implemented strategically by adopting various schemes for ODA.

5.1.2 Outline of KEMRI

(1) Mandate of KEMRI

KEMRI was established in 1979 under the Science and Technology (Amendment) Act. Under this Act, the Kenya Medical Research Institute was charged with the

responsibility of carrying out health research, and their mandate under the Act is as follows:

- To carry out research in the field of biomedical sciences
- To co-operate 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 co-operate with the Ministries responsible for research, such as the Ministry of Health, the National Council for Science and Technology, and the Medical Science Advisory 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

(2) Organization of KEMRI

1) Management System of KEMRI

KEMRI, which consists of 11 research centres focused on certain specific areas, is the largest medical research institute in Kenya.

KEMRI is governed by a Board of Management appointed by the Minister that is for the time being responsible for research. The Board consists of a Chairman, six appointed members, and representatives from various government Ministries, Departments and Agencies. The Board is responsible for all the policy matters of the Institute.

There are a number of standing committees of the Board that perform some specialised functions shown in Table 5.1:

Table 5.1 Roles of Standing Committees

Committees	Roles
Scientific Programmes Committee (SPC):	Responsible for scrutinising, evaluating and approving research performance and the output of research projects.
Staff Establishment and Appraisal Committee (SEAC):	Reviews staff needs and determines staff promotion and employment, as necessary.
Finance Committee (FC):	Responsible for the financial and development needs of KEMRI.

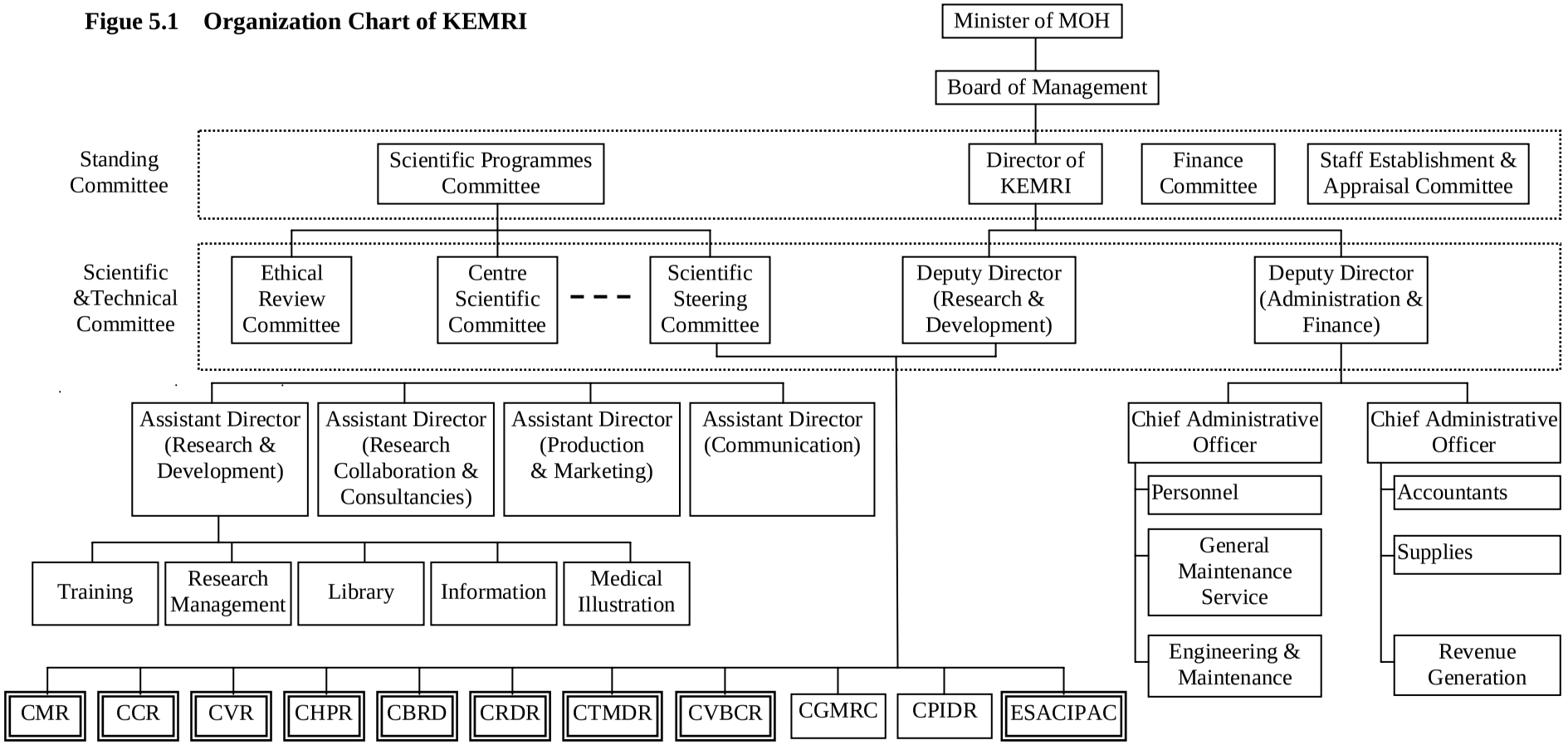
Source: KEMRI (1998), Guideline on the Conduct of Research

Under the Standing Committees, there are 11 scientific and technical committees to assess research projects from various points of view, such as ethics, hazards, equipment management, human resources management and specialized programmes. Among these, the Scientific Steering Committee (SSC) is the main body that comprises all the directors of the research centres. SSC meetings are held at least every 6 months to review and approve all research projects. The Centre Scientific Committee (CSC) reviews all proposals and manuscripts at each centre.

Besides these 11 committees, there are Programme Committees (PCs) dealing with specific research areas taking into consideration national strategies and various diseases. The PCs include 21 committees, such as those covering acute respiratory infections research, diarrhoeal research and health systems research. PCs consider the relevance of research activities at KEMRI from the comprehensive viewpoints of health administration, including policy aspects with the officials of the relevant agencies assigned as members of the committees.

The organization chart of KEMRI is shown in Figure 5.1.

Figue 5.1 Organization Chart of KEMRI



Legend;

CBRD	Centre for Biotechnology Research and Development	CRDR	Centre for Respiratory Diseases Research	CGMRC	Centre for Geographic Medicine Research, Coast (Kilifi, Coast Province)
CCR	Centre for Clinical Research	CTMDR	Centre for Traditional Medicine and Drug Research	CPIDR	Centre for Parasitic and Infectious Disease Research, Busia (Busia, Western Province)
CPHR	Centre for Public Health Research	CVBCR	Centre for Vector Biology and Control Research	ESACIPAC	Eastern and Southern Africa Centre of International Parasite Control
CMR	Centre for Microbiology Research	CVR	Centre for Virus Research		

Prepared by the investigation team

2) Research Management

The scientific and technical committee of KEMRI summarises the criteria for choosing the research, monitors the research process and evaluates the research outputs through its "Guidelines on the Conduct of Research". KEMRI adopts research proposals from the viewpoint of relevance and feasibility in line with the guidelines.

Relevance: the national programme and the mandate of KEMRI.

Feasibility: appreciation of the manpower and technical level, financial resources, terms of the research, theoretical and practical methods.

These criteria are adopted for collaborative research with foreign institutes. All research projects implemented by KEMRI are adopted on the basis of relevance to health policy by the scientific and technical committee to which a representative of the Ministry of Health (MOH) is also assigned.

3) Reflection of Research Outputs in Health Administration

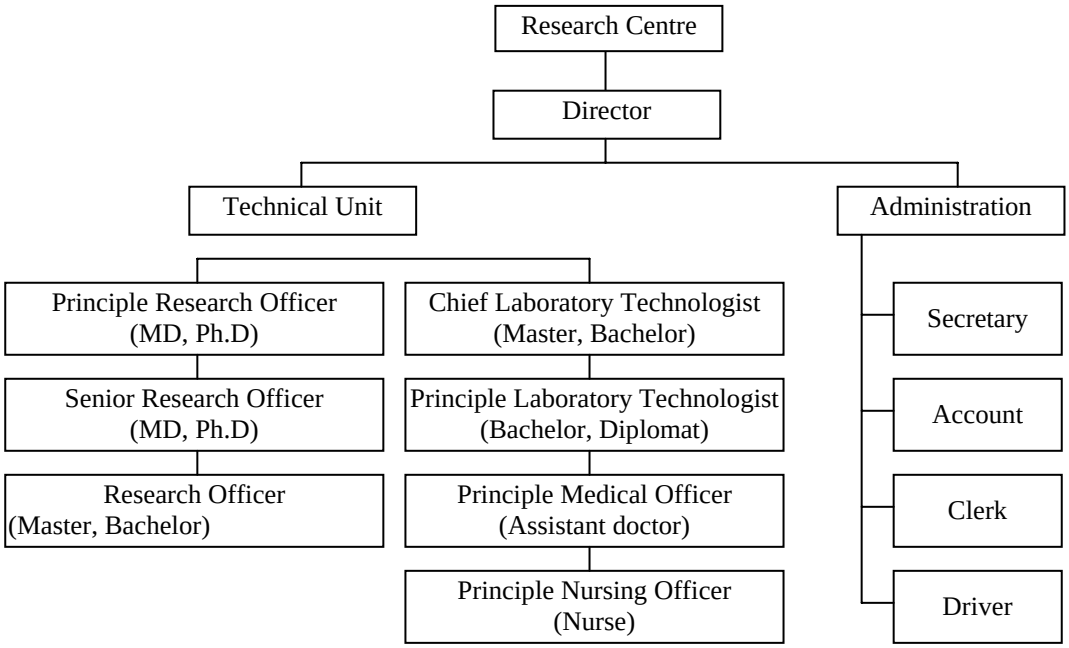
KEMRI maintains communication channels with the MOH in order that its research outputs are reflected in health administration. Research outputs are periodically reported to the MOH through the technical committee. In addition, the director of KEMRI directly reports to the MOH on the research outputs when the research outputs are greatly needed or urgently required. The MOH also requests KEMRI to conduct research on urgent epidemiological subjects.

Thus, KEMRI has established a system for reflecting the research outputs in health administration involving the MOH and KEMRI. This system enables KEMRI to form optimal linkages to act for rapid and global infectious diseases control.

4) Structure of the Research Centres

Each of the 11 centres consists of an administration and a technical unit. The technical unit includes researchers who have a doctors' or masters' degree at least. Many senior researchers have a Ph.D degree in sciences rather than being medical doctors. The technologists are mainly undergraduates of science courses from universities, and personnel who have medical licenses such as assistant doctors and nurses are also assigned to this position. Many of the technologists are employed from the Kenya Medical Training College (KMTC). KEMRI has a close relationship with KMTC in which researchers from KEMRI give lectures at KMTC, and the students of KMTC also take practice courses at KEMRI (see Figure 5.2).

Figure 5.2 General Structure of the Research Centre



Prepared by the investigation team

5.1.3 Outline of JICA Cooperation with KEMRI

(1) Objectives and Components of JICA's Cooperation

Based on the results of studies, it is to be expected that the series of JICA cooperation projects has aimed to strengthen the research capacity of KEMRI. Human resources development in the health sector has been added as an additional objective of JICA's cooperation, and workshops/seminars aimed at disseminating the research outputs to other medical organizations were started in 1990.

As shown in Table 5.2, JICA started technical assistance for infectious diseases control under the Communicable Diseases Research and Control Project in March 1979, before KEMRI was established. As of July 2004, when this evaluation study was being implemented, JICA had implemented a total of seven project-type technical cooperation activities. In addition to technical cooperation, since 1999, JICA has implemented third-country training programmes (TCTP) two times at KEMRI, which acted as a counterpart institution. This evaluation study considers this technical cooperation and the TCTPs to be part of a series of cooperation activities with KEMRI, and hence this evaluation is conducted accordingly.

Table 5.2 Target Projects for Evaluation

Project name	Scheme	Project Period
Communicable Diseases Research and Control Project[*1]	TCP	1979.3～1984.3
Project on the Kenya Medical Research Institute	TCP	1985.4～1990.4
Project on the Research and Control of Infectious Diseases	TCP	1990.5～1996.4
Research and Control of Infectious Diseases Project Phase II	TCP	1996.5～2001.4
Research and Control of Infectious and Parasitic Diseases Project [*2]	TCP	2001.5～2003.4
Research and Control of Infectious Diseases Project	TCP	2003.4～2006.4
International Parasite Control Project	TCP	2003.4～2006.4
Blood Screening for Viral Hepatitis and HIV/AIDS	TCTP	1999～2001 / 2003
Eastern and Southern Africa Centre of International Parasite Control (ESACIPAC)	TCTP	2002～2006

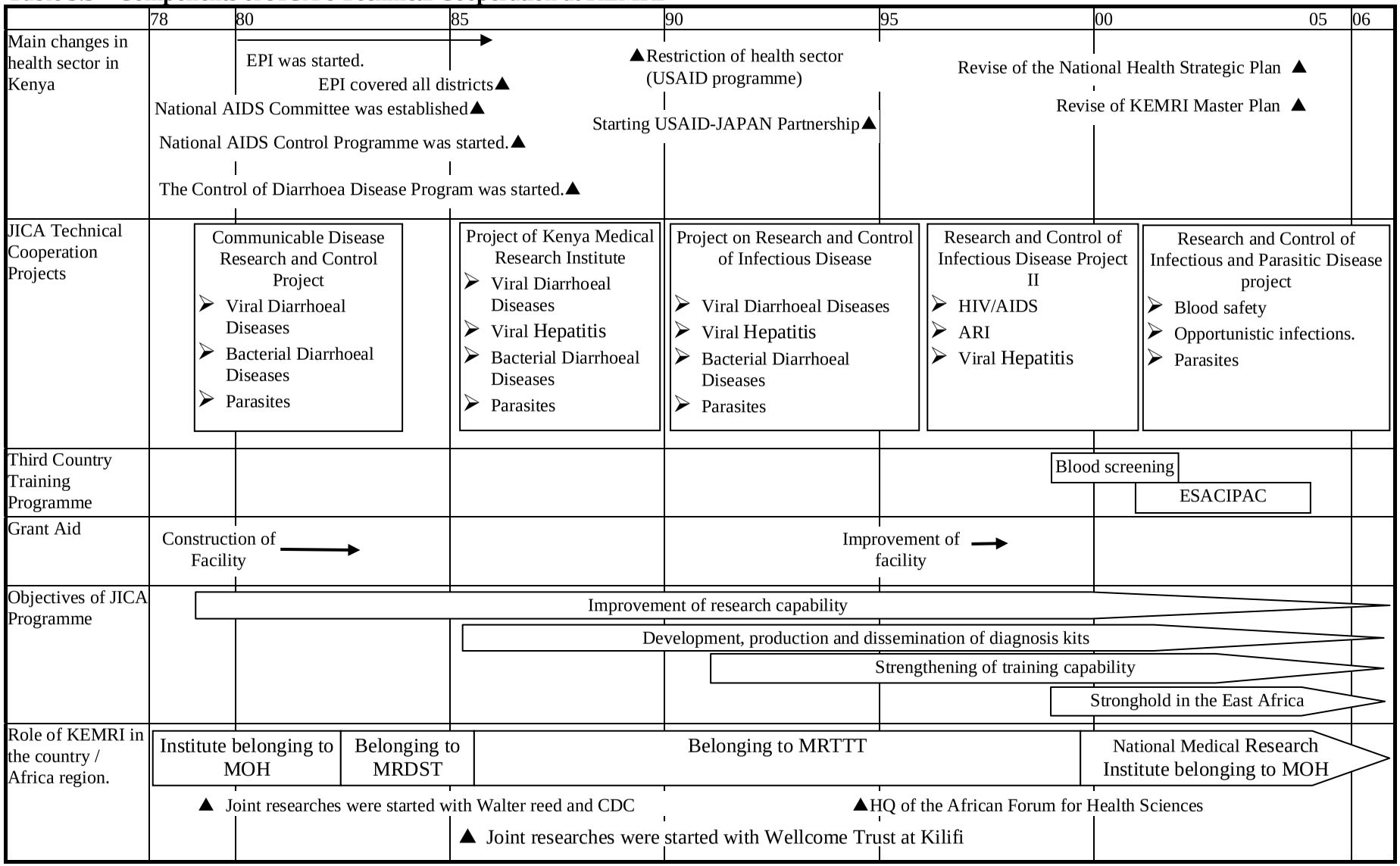
Legend: TCP Technical Cooperation Project
TCTP Third Country Training Programme

Note: *1 The project was implemented under the National Public Health Laboratory Service before the facilities of KEMRI had been built.
*2 "Research and Control of Infectious and Parasitic Diseases Project" has been divided into two technical cooperation projects, namely the "Research and Control of Infectious Diseases Project" and the "International Parasite Control Project," since April 2003.

Prepared by the investigation team

The contents of JICA's technical cooperation at KEMRI are summarised in Table 5.3.

Table 5.3 Components of JICA's Technical Cooperation at KEMRI



Prepared by the investigation team

(2) Components of JICA Cooperation according to the Diseases

As shown in Table 4.3, each project targeted several diseases and research on specific diseases that occurred during a period covering several projects. In consideration of this situation, project activities have been reshuffled on the basis of the incidence or occurrence of the diseases.

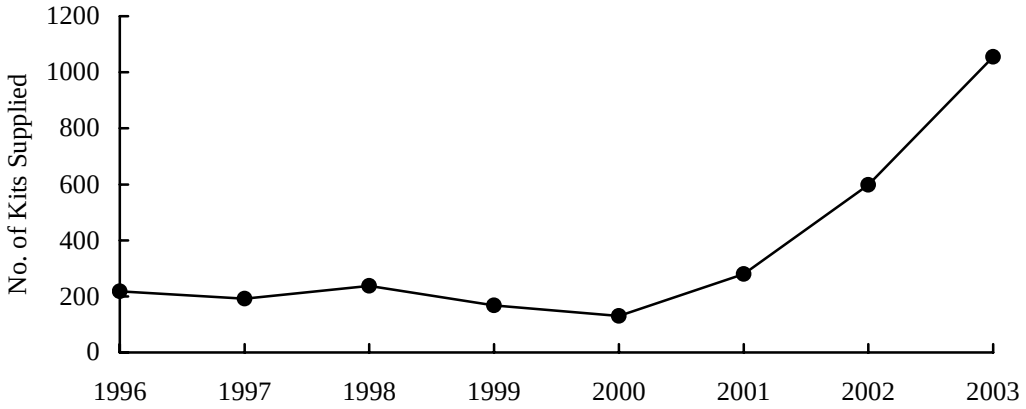
A series of JICA technical cooperation activities targeted diarrhoea, acute respiratory infection (ARI), hepatitis, HIV/AIDS, schistosomiasis, and filariasis. Components of JICA technical cooperation are summarized below: (activities of each project, inputs by JICA such as the dispatch of experts, C/P training and equipment provision are in the attached annex).

1) Hepatitis

Hepatitis B Virus is a major cause of liver disease in Kenya. Infection by the virus may be associated with chronicity, cirrhosis and hepatocellular carcinoma. WHO recommended that blood for transfusions must be screened for HBV, HIV and Treponema palladium, among other pathogens.

All blood diagnostic kits utilized in Kenya, including the kit for Hepatitis B, were imported when JICA started research cooperation on Hepatitis in 1985. Therefore, besides the epidemiological study of hepatitis, KEMRI focused on the prevention and control of viral Hepatitis B through the development and dissemination of a diagnostic kit for Hepatitis B (HEPCELL II). HEPCELL II was approved as the official test kit for Hepatitis B by the GOK in 1992, thus, KEMRI supplied provincial and district hospitals with HEPCELL II, and also conducted TCTP and ICTP on the use of HEPCEL L II. HEPCELL II has been distributed to public hospitals by the National Public Health Services (NPHLS) since 2003.

Figure 5.3 Number of HEPCELL Kits Supplied



Note: A kit consists of reagents for 200 tests.
Prepared by the investigation team

As Figure 5.3 shows, the supply of HEPCELL II fluctuated in the range of 130 - 200 kits over the period 1996 - 2001. After 2002, the supplied volume increases rapidly and reached 1,055 kits in 2003. KEMRI reported that public hospitals in rural areas

screened 69,373 units of blood for transfusions over the period 1996 - 2000. In addition, the Alpha Feto Protein detection test kit for the detection of Hepatitis C Virus (HCV) was developed, and an HCV-antibody detection kit is being developed by KEMRI.

In addition, an exchange of notes was made on 4 August 2004 between the Government of Japan and GOK for establishing mass production facilities for blood test kits at KEMRI.

2) HIV/AIDS

The number of HIV/AIDS infected people has rapidly increased since the first case of AIDS was diagnosed in a patient in 1984. UNICEF reported that by the year 1992 there would be more than 24,000 people infected with HIV/AIDS. To counter the AIDS problem, a National AIDS Committee was established in 1985, and a National AIDS Control Programme was started in 1986. In addition, the Kenya government has positioned HIV/AIDS as a critical issue during the seventh national three-year study (1994 - 97).

In view of this situation, GOK requested the implementation of the Research and Control of Infectious Diseases Project Phase II, including HIV/AIDS as a new target disease. As a result, JICA started activities on HIV/AIDS in 1996.

Regarding cooperation for HIV/AIDS control, a diagnostic kit for HIV, namely Particle Agglutination (PA) for HIV-1 was developed. Because a study by KEMRI showed that there is only the HIV-1 strain in Kenya, the PA kit focused on only HIV-1, but not on HIV-2. However, owing to the fact that it is a WHO requirement that HIV diagnostic kits should be able to detect both HIV-1 and HIV-2, KEMRI has started the development of a new blood test kit called KEMCOM, which is able to detect both HIV-1 and 2 at the same time.

Besides the development of diagnostic kits, KEMRI has also implemented the screening of anti-viral medicinal plants and a cohort study for mother to child transmission in West Kenya (Kisumu, Busia). The cohort study in Western Kenya was modified as a public health education activity and is continuing to be implemented in 2004.

In addition, the TCTP mentioned above also included HIV/AIDS.

3) Parasitology

a. Schistosomiasis

The endemic area for Schistosomiasis expanded to irrigation areas in Kenya. WHO established a specific committee for Schistosomiasis control in Kenya in 1987, and DANIDA/WHO assisted in providing dose curatives for Schistosomiasis to students in primary schools in the Coast Province in the 1990s.

In cooperation with JICA, KEMRI also conducted studies for Schistosomiasis control from 1979 to 1996 in Mwachinga village and Mtsangatamu village in the Kwale district, Coast Province. The control measures employed included mass-chemotherapy, health education, environmental modification for control of the vector snails, and the provision of safe water facilities.

The activities under JICA's cooperation in these villages were terminated in 1995. However, the series of activities mentioned above have been continued by the villagers, except for the environmental modifications and the operation of safe water facilities due to the capacity of the communities. Therefore, an NGO has implemented a safe water supply project using the water sources developed by the JICA project.

b. Filariasis

Filariasis is one of the most important diseases in the Coast Province from the viewpoint of public health. However, research activities have stagnated since 1985, after termination of the research on filariasis control by the Netherlands.

In view of this situation, JICA started to cooperate in a study on filariasis control from 1990 to 1996 based on a request from GOK.

This study aimed to see the infection development of filariasis from its epidemiological aspects and to investigate effective control measures, as well as the improvement of diagnosis, the detection of the prevalent range and the development of mass-chemotherapy that was carried out in the field research on schistosomiasis. However, the need for filariasis control was not realized by the village people, due to the fact that few symptoms of filariasis appear during the incubation period. Thus, the consensus of the community to undergo mass-chemotherapy treatment also could not be developed during the study period.

c. Parasite Control through the School Health Approach

Based on the Hashimoto Initiative, the Eastern and Southern Africa Centre of International Parasite Control (ESACIPAC) was established as a training and research centre for developing human resources and implementing model projects on parasitic diseases control through the school health system.

The ESACIPAC aims to strengthen the parasite control programmes in participating countries through human resources development and to promote preventive measures through the school health approach. In contrast with the former activities, which targeted particular parasites, ESACIPAC targets multiple parasites (Lymphatic Filariasis, Malaria, Schistosomiasis and Soil Transmitted Helminthiasis) through parasite control in schools. ESACIPAC has implemented model projects on parasite control targeting 87 schools in the Mwea district, Central province, and 10 schools in the Kwale district, Coast Province, since 2003. Besides these pilot studies, ESACIPAC conducted two TCTPs in 2003 and 2004. There were 33 participants who attended these TCTPs from 10 countries, including Kenya.

4) Diarrhoeal Diseases

Diarrhoeal diseases are one of main groups of diseases in Kenya, and JICA projects also studied diarrhoea from 1979 to 1996. Diagnostic techniques for viral and bacterial diarrhoea were transferred to KEMRI at the initial stage of JICA's cooperation, and then research activities using these diagnostic techniques were started. Besides these studies, KEMRI conducted actual practical measures such as

the selection of affordable and effective antibiotics and the provision of medicines on the occasion of an outbreak of cholera/dysentery in Mombasa, and also conducted educational activities to prepare brochures and video programmes for diarrhoea control. The research activities on diarrhoeal diseases by KEMRI were terminated in 1996 when the Project on Research and Control of Infectious Diseases was terminated.

5) ARI

ARI was the cause of more than 25% of the infant mortality in Kenya in the middle of the 1990s. Techniques for etiological studies on bacterial, fungal and viral ARI, and sensitivity tests for major bacterial and fungal ARI were transferred through JICA's cooperation activities from 1996 to 2001. In addition, KEMRI prepared education materials such as educational videos and more than 400 brochures, and conducted community-based health education in Kibera, Nairobi, using these materials from 1996 to 2001. However, KEMRI's activities on ARI were also terminated in 2001 when the Research and Control of Infectious Diseases Project Phase II was terminated.

6) Opportunistic Infections

In Kenya, the increase in HIV associated with opportunistic infections has also become a problem. JICA's cooperation started the research on opportunistic infections since 2001, based on the microorganism research technologies and treatment experiences cultivated in ARI. The study targeted Mycrobacterium, Pseudomonas, and Pneumocystis carinii for the respiratory system, and Salmonella, Shigella, enteropathogenic Escherichia coli and E. candidasis for the enteric system, and surveys on HIV/AIDS-infected orphanages.

Outline of Infectious Diseases Control in Kenya

A summary outline of infectious diseases control in Kenya is given as follows to clarify the roles and functions of KEMRI as a research institute for infectious diseases control in Kenya.

5.2 Outline of Communicable Diseases Control in Kenya

An outline of infectious diseases control in Kenya is given below to clarify the roles and functions of the KEMRI as a research institute for infectious diseases control in Kenya.

5.2.1 Structure of Diseases

Infectious diseases are still the main issue for disease control in Kenya since the leading causes of morbidity and mortality are related to infectious diseases, such as malaria, acute respiratory infections (ARI) and diarrhoea in 2003. Significant progress has been made in the eradication of poliomyelitis, the elimination of neonatal tetanus and the control of measles. The targets for the eradication of guinea worm disease and the elimination of lymphatic filariasis and leprosy have been attained. Other parasitic diseases of epidemiological concern, such as schistosomiasis, helminthiasis, leishmaniasis, will need to be addressed. However, new emerging and re-emerging diseases continue to be threats.

Malaria has remained the leading cause of morbidity and mortality. According to the statistics of MOH, it accounts for 30% of outpatient visits and about 19% of all cases requiring inpatient services were infected with malaria. Malaria causes 5% of the total number of deaths in public health facilities. ARI are the second leading cause of morbidity, accounting for up to one quarter of outpatient attendance at public health facilities. Diarrhoeal diseases are the third leading cause of morbidity as well as mortality, especially among children. Regarding HIV/AIDS, it is estimated that since the epidemic commenced in 1984, 1.5 million deaths have occurred, resulting in approximately one million orphans in Kenya. By the year 2000, over 2.2 million people in Kenya had been infected with HIV with a seroprevalence rate of 14%. Recent data indicate a possible stabilization and decline in national seroprevalence. Tuberculosis (TB) shows a high prevalence rate among impoverished groups. The directly observed treatment short-course (DOTS) has been adopted as a national strategy in Kenya. The coverage of resistance to multi-drug therapy was insignificant.

5.2.2 Communicable Diseases Control by the MOH

(1) Development Plans in the Health Sector

Kenya built a health system in the early stages that is comparable to those of neighbouring countries, and provided relatively stable medical services. However, funding sources for health services have seen shortfalls due to the rapid increase in the population and the spread of AIDS in the 1990s. Thus, the poverty gap also expanded with the deterioration in economic conditions. The Interim Poverty Reduction Strategy Paper (IPRSP) 2000 – 2003, which was drawn up by the GOK,

determined that the control of HIV/AIDS is central to an effective poverty reduction strategy. The GOK has declared AIDS a National Disaster. Consistent with this, the MOH proposed the implementation of HIV/AIDS control activities to achieve the objectives of preventing the transmission of HIV among the population with the focus on the most vulnerable groups. On the basis of the IPRSP, the MOH has drawn up the National Health Sector Strategic Plan 1999-2004, which aims to reform the health system through decentralization. In the Health Sector Strategic Plan 1999-2004, the national targets related to infectious diseases control are described as follows;

- Reduce measles morbidity by 95% and mortality by 90%.
- Reduce the incidence of neonatal tetanus to less than 1/1,000 live births with a 100% reporting rate.
- To eradicate poliomyelitis by the year 2000 and certification by 2005.
- Reduce malaria morbidity and mortality rates by 30%.
- Reduce the HIV prevalence rate from the current 13-14% by 10% and STD prevalence by 50%.
- Reduce under-5 morbidity and mortality attributable to measles, pneumonia, diarrhoea, malaria, and malnutrition from 70% to 40%.

To tackle these targets, the service delivery consists of national priority packages that are ranked by data on the burden of the disease, cost-effectiveness of the interventions, the impact of interventions and health outcomes in relation to health expenditures. Six high priority packages are mostly related to infectious diseases control and concern morbidity and mortality among those under 5 years old (see Table 5.4).

Table 5.4 National Priority Packages

High priority packages	Medium priority packages	Low priority packages
➢ Malaria prevention and treatment package ➢ IMCI package ➢ Reproductive health package ➢ HIV/AIDS/TB prevention and management package ➢ EPI ➢ Control and prevention for major environment-related communicable diseases (cholera, dysentery, typhoid and food safety control)	➢ Non-communicable diseases (cardiovascular diseases, diabetes, rheumatic fever) ➢ Reproductive cancers (cervix, breast, scrotal cancers) ➢ Mental health/drug and substance abuse ➢ Injuries and accidents ➢ Control of other vector borne diseases	➢ Eye infections ➢ Skin infections ➢ Ear infections ➢ Worm infections

Source: Ministry of Health (1998), National Health Sector Strategic Plan 1999-2004

The National Health Sector Strategic Plan 2005-2010 is in the process of determination in 2004 and addresses the Millennium Development Goals (MDGs), the National Economic Recovery Strategy, and the Poverty Reduction Strategy. The MOH plans to finalize the National Health Sector Strategic Plan 2005-2010 by

November 2004, and national strategies for infectious diseases control will be continued as they are.

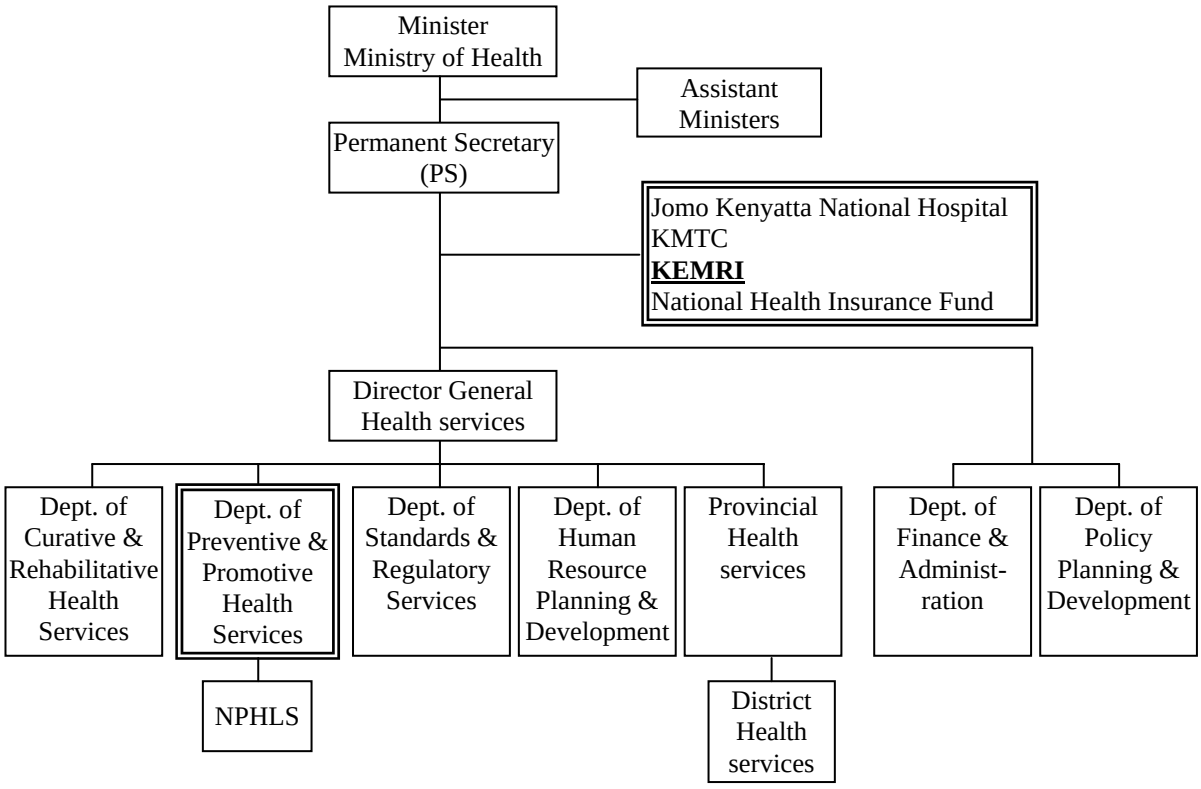
(2) Implementation Structure for Communicable Diseases Control

The MOH has six departments, and the Department of Preventive and Promotive Health Services (PPHS) is the responsible department for infectious diseases control. PPHS has responsibility to implement measures against all diseases, and the divisions of PPHS are divided as follows for conducting measures against diseases that are effectively given high priority under the National Health Sector Strategic Plan (1999-2004).

- Division of communicable and vector borne diseases control:
  To draw up infectious diseases control programmes except for HIV/AIDS-related diseases. In addition, this division manages the National Malaria Control Programme (2005-2010) and Vector Borne Diseases Strategic Plan (2005-2010).
- Division of environmental health services:
  To draw up control programmes against water borne and soil related infectious diseases, and to improve the living standards.
- Division of primary health care:
  To draw up control programmes related to PHC, such as reproductive health, maternal and child health, and immunization.
- Division of STD/AIDS/TB/leprosy:
  To draw up control programmes against HIV/AIDS as a central division for planning the National AIDS and STDs Control Programme.
- Division of health education:
  To draw up and manage the community education and school health activities in cooperation with other divisions for awareness raising and education

In line with the decentralization, programmes prepared by PPHS are implemented by health service departments in each provincial and/or district government. The main organizations related to infectious diseases control are shown in Figure 5.4.

Figure 5.4 Main Structure of the Ministry of Health



Source: Ministry of Health (1998), National Health Sector Strategic Plan 1999-2004

The National Public Health Laboratory Services (NHPLS) is the tertiary referral laboratory among public medical facilities, and belongs to PPHSS. There are seven main laboratories, namely, the 1) blood safety laboratory, 2) vaccine laboratory, 3) microbiology laboratory, 4) quality control/safety check laboratory, 5) medical/ post-mortem laboratory, 6) food/nutrition laboratory, 7) monitoring/outbreak laboratory.

NPHLS is also responsible for the provision of all laboratory needs including various reagents and testing kits such as for HIV/AIDS, STI, malaria, diabetes, urine, etc. NPHLS makes projections of its needs each year and these are passed onto the Kenya Medical Supplies Agency (KEMSA) who tenders for the supplies and then directs them back to the MOH for procurement. However, NPHLS usually receives only about one-third of their requirements through this system and therefore all laboratory supplies have to be rationed to the provinces and districts. Supplies such as equipment are kept in KEMSA, but the reagents come to the NPHLS store in Nairobi. The logistics system for managing and distributing items requiring a cold chain is not well developed.

(3) National Communicable Diseases Control

1) Malaria Control

The MOH has begun to develop the National malaria Plan Action for 1992-1997. The plan was launched and a Malaria Control Unit was set up, under the division of Vector Borne Diseases, to form the operational arm of the National Malaria Control Programmes (NMCP). A movement called "Roll Back Malaria" started by WHO, and the recognition that malaria is the highest priority for prevention and treatment, means that malaria became one of the six essential packages in the Health Sector Strategic Plan (1999-2004). The main objectives of the National Malaria strategy (2001-2010) is to reduce the level of malaria infection and the consequent number of deaths in Kenya by 30% by the year of 2006, and to sustain that improved level of control to 2010. There are four main strategic approaches; 1) clinical management: providing prompt, effective treatment, 2) management of malaria and anaemia in pregnancy, 3) vector controls using insecticide-treated nets (ITN) and other methods and 4) epidemic preparedness and response.

2) HIV/AIDS and STDs Control

HIV/AIDS was declared a national disaster, and the National AIDS Control Council (NACC) was set up in the Office of the President in 1999. The Kenya National HIV/AIDS Strategic Plan 2000-2005 has been approved by the parliament and the HIVAIDS Control Unit was established under the PPHS. Thereafter, a NASCOP that unifies HIV/AIDS, STD, TB, and leprosy diseases was drawn up. Accordingly, the units in charge of each disease were also unified, and the unified unit itself is called NASCOP.

The concrete objectives of NASCOP are a DOTS strategy for the treatment of TB cases, blood safety, Prevent Mother and Child Transmission (PCMT), expansion of Voluntary Counselling and Testing (VCT), anti-retrovirus therapy (ARV) for opportunistic infections and home-based care and abolition of discrimination against HIV/AIDS and leprosy.

3) Vector Borne Diseases Control

To reduce parasitic infectious morbidity and mortality by developing environmental health and health promotion in the community, the division of communicable and vector borne diseases control is implementing the Vector Borne Diseases Strategic Plan 2005-2010. The main activities of the Vector Borne Diseases Strategic Plan are as follows:

- Improved prevention and control of parasitic infections
- Community mobilized and educated for the prevention and control of parasitic infections and their vectors
- Reduction of the disease vectors' breeding sites
- Increased personal protection against parasitic infections

- Conduct of routine parasitological and entomological surveillance for the disease vectors and their dynamics

(4) Implementing Structure for Research on the Communicable Diseases

There are four main laboratories for infectious diseases control besides KEMRI (see Table 5.5).

Table 5.5 Research Institute for Communicable Diseases Control in Kenya

Name of Institute	Outline of the Institute
International Centre of Insect Physiology and Ecology (ICIPE)	ICIPE has three missions: 1) to help ensure food security and better health for humankind and its livestock, 2) to protect the environment, and 3) to conserve and make better use of natural resources. To achieve its mission, ICIPE has specific objectives in research areas on human, animal, plant and environmental health.
Kenya Trypanosome Research Institute (KETRI)	KETRI was established at Kiboko in 1999 to conserve the unique gene pool by collecting and preserving semen for dissemination to willing farmers in tsetse infested and trypanosome endemic areas. KETRI carries out surveys in most parts of the Rift Valley, Central and Eastern Provinces that were initiated by KETRI and brought together officials from the Veterinary Department, the Kenya Wildlife Service, the affected communities and NGOs working in these areas among others. KETRI provides training and technical advice to project implementers, and the targets to be deployed in the Game Reserve to reduce tsetse infestation that was responsible for invasion of the surrounding areas. World Wildlife Fund (WWF) and the local district veterinary office pledged traps and will maintain targets/traps after deployment in the Game Reserve in collaboration with the community.
International Livestock Research Institute (ILRI)	ILRI is a non-profit institution governed by an international Board of Trustees and ILRI belongs to the Consultative Group on International Agricultural Research (CGIAR). The headquarters of ILRI are in Nairobi, and began operations in 1995 with the consolidation of staff and facilities of two former CGIAR livestock centres, the International Laboratory for Research on Animal Diseases (ILRAD) based in Nairobi, and the International Livestock Centre for Africa (ILCA) based in Addis Ababa, Ethiopia. ILRI works at the crossroads of livestock and poverty, bringing high-quality science and capacity-building to bear on poverty reduction and sustainable development for poor livestock keepers and their communities.
Institute of Primate Research (IPR)	IPR was established in 1960 with monkeys as models to understand human evolution and as a facility for the collection and study of East African primates. Since its inception, IPR has expanded tremendously in both physical and research facilities and is now focused on the breeding and use of non-human primates to study, prevent and treat human diseases under the auspices of animal welfare. IPR undertakes research into basic and applied aspects using monkeys. IPR is recognized as a WHO Collaborating Centre on human reproduction and tropical diseases research.

Prepared by the investigation team

KEMRI has been incorporated with other research centres such as the Kenya Tuberculosis Investigation Centre, the Malaria and Other Protozoal Diseases Centre, the Virus Research Centre, the Alupe Leprosy Research Centre, and the Medical Research Centre. As the main laboratories are already incorporated into KEMRI, there are no other laboratories having a duplicate role with KEMRI. KEMRI is recognized by the MOH as the largest medical research institute in Kenya, and it

conducts disease surveillance, produces diagnostic kits, such as HEPCELL II, provides diagnostic services for private companies, and information on outbreaks of infectious diseases as a WHO Collaborating Centre. Research institutes mentioned above, besides KETRI, target animals and plants and have no duplicate role with KEMRI.

5.2.3 Assistance for Communicable Diseases Control by Other Donors

(1) Type of Assistance

Kenya introduced its PRSP in 1999 and it has continued to enact health care reforms as part of its regional decentralization policy, but most donors conduct bilateral cooperation, and it has not established a common fund based on a sector-wide approach (SWAps) as yet. Donor institutions established a Joint Interagency Coordination Committee (JICC) to cover the six areas of gender issues, HIV/AIDS, youth, monitoring and evaluation activities, public relations and emotional support in order to prevent assistance activities from being duplicated in these areas. Donor assistance in Kenya continues to follow this format.

(2) Contents of the Support

Based on the above, the cooperation mainly carried out in Kenya is bilateral, and many donor agencies have provided assistance for infectious diseases control, especially for malaria and HIV/AIDS. Duplication of assistance from donors has been avoided due to a system of information exchanges carried out through JICC. DFID and other Northern European agencies that have initiated SWAps in other African countries have restricted their technical assistance to strengthening regional decentralization and other policy measures.

Kenya is one of the four high priority countries identified by USAID to receive more resources for HIV/AIDS programming. USAID focuses on the prevention of HIV infection, policy and advocacy, community-based care and support, integration of AIDS with family planning and child health programs, blood safety, (operations research,) and multi-sectoral activities. In addition, President Bush's Emergency Plan for AIDS Relief (PEPFER) is committed to funding of US$15 billion over 5 years (2003-2008) for 15 focus countries, including Kenya.

Japan also has been collaborating with the USA for the development of the health sector in Kenya since 1997. As a part of the USAID-Japan Partnership, six projects for HIV/AIDS control, such as strengthening the VCT, and population / health censuses have been implemented, and also exchange staff were dispatched to the JICA Kenya Office.

The main activities of donors are shown in Table 5.6.

Table 5.6 Main activities of Donors in 2003

Donors	Main Activities
World Bank	EPI/NID and Infectious Disease Control Programme
	Maternal and Child Health Programme (MTCT of HIV/AIDS)
WHO	Health Reform
	Prevention and Care Programme
	Environment and Health Programme
UNICEF	EPI/NID and Infectious Diseases Control Programme
	Infant Health Programme
	Iodine Deficiency Disorder Control Programme
	Vitamin A Deficiency Control Programme
	PHC Programme
UNAIDS	National HIV/AIDS Control Programme
USAID	Health Reform
	National HIV/AIDS Control Programme
	Assistance to HIV/AIDS Control through PEPFER
	Supporting for VCT under the USAID-Japan Partnership programme.

Prepared by the investigation team

5.2.4 Position and Roles of KEMRI in Communicable Diseases Control

The position of KEMRI in Infectious Diseases Control was not defined in the National Health Strategic Plan between 1999 and 2004, since KEMRI belonged to the MOH from September 1999 in line with the administrative reform of the GOK. The MOH is preparing the next National Health Strategic Plan, which is expected to be published in November 2004 at the time of the field survey. Thus, the evaluation team could not confirm the role and position of KEMRI in infectious diseases control in the official document. According to the MOH, infectious diseases control is one of the priority subjects of the next National Health Strategic Plan, and the MOH plans that KEMRI will continue to have an important role as a research institute for infectious diseases control as the largest research institute under the jurisdiction of the MOH.

Cooperation with international organizations such as WHO is one of characteristics of KEMRI in infectious diseases control. KEMRI has been appointed as a WHO Collaborating Centre for HIV/AIDS, Polio Immunization, Viral Haemorrhagic Fevers, Leprosy, Leishmaniasis, Anti-Microbial Resistance, and Bacteriology.

KEMRI is also recognized by CDC (USA) as a regional centre for Emerging and Re-emerging Infections. KEMRI is also Africa's regional centre for the International Union against TB and Lung Diseases, the International Union against Cancers, the Global Health Initiative on Climate Change and the Health and Drugs for neglected diseases Initiative (DNDI).

The positions held by KEMRI for control of the main infectious diseases are as follows. In addition, KEMRI also provides technical advice to the MOH and GHS through the dispatch of staff members to organise Rapid Response Teams for national preparedness in the event of major disease outbreaks.

(1) Malaria

As a research institute for Malaria, KEMRI has implemented epidemiological and clinical studies on malaria with the Wellcome Trust in the United Kingdom since

1989. KEMRI also has studied the development of a vaccine for malaria in cooperation with the Walter Reed Army Institute of Research (WRAIR) and USAID.

(2) HIV/AIDS and STDs

KEMRI has been appointed a WHO Collaborating Centre on HIV/AIDS. KEMRI also developed and produced an HIV diagnostic kit with JICA, and conducts AIDS prevention and research in collaboration with the CDC.

(3) Vector Borne Diseases

ESACIPAC, which was established in 2001 in collaboration with the MOH and MOE, was recognized as a training and research centre for parasitic diseases control through the school health system. ESACIPAC trains not only medical personnel in Kenya, but also in neighbouring countries.

As Kenya's foremost medical research centre under the jurisdiction of the MOH, KEMRI conducts comprehensive medical research in various fields, including infectious diseases. KEMRI conducts studies on the epidemiology, immunology, molecular biology, virology, bacteriology and prevention and control of 12 diseases, including HIV and related infections, opportunistic infections, etc. In addition, KEMRI contributes to the management of the African Forum for Health Science as a major research institute in Africa and also contributes to publication of the African Journal of Health Science.

As a training institute, KEMRI also contributes to human resources development in the medical sector through the provision of laboratory training for medical students and vocational medical school students, and lectures to postgraduate students at the Institute of Tropical Medicine and Infectious Diseases. In addition, training in diagnostic technology for medical personnel is carried out as well as the organization of medical conferences and meetings in the African region.

In the area of health services, KEMRI conducts surveillance for various diseases, provides the MOH with technical advice, produces HEPCELL II and other diagnostic kits, provides testing and diagnostic services for private companies, and disseminates the most recent information on each type of disease, both domestically and abroad, as a WHO Collaborating Centre. KEMRI also conducts studies for national preparedness in the event of major disease outbreaks based on a request from the MOH. Table 5.7 shows the studies that KEMRI participated in.

Table 5.7 Rapid Response Teams dispatched by KEMRI

Year	Area	Diseases outbreak
1995	Marakwat District and Elgeyo District	Yellow Fever
1998	North East Province	Rift Valley Fever
2004	Western Kenya	Leptospiral jaundice

Prepared by the investigation team

The roles of KEMRI in infectious diseases control mentioned above are summarized in Table 5.8.

Table 5.8 Main Roles of KEMRI in Communicable Diseases Control

Main Roles	Activities
Research	Studies on the epidemiology, immunology, molecular biology, virology, bacteriology and prevention and control of HIV and related infections, opportunistic infections, TB, STDs, viral hepatitis, ARI, diarrhoeal diseases, malaria, Schistosomiasis, Leishmaniasis, Filariasis, intestinal parasites, drug development and management. Support for the management of the African Forum for Health Science and the publication of the African Journal of Health Science
Human Resources Development	Training and education for medical personnel, undergraduate and postgraduate students. Holding medical congresses
Contribution to Health Services	Dissemination of disease information as a WHO reference laboratory, conducting surveillance, technical advice to the MOH, production of diagnostic kits, and the provision of diagnostic services for private companies.

Prepared by the investigation team

As shown in Table 5.9, 9 research areas out of the 12 mentioned above are covered by JICA cooperation.

Table 5.9 Target Diseases of JICA Projects

Targets Diseases of JICA Projects	Non Target Diseases
Viral Hepatitis	Malaria
HIV/AIDS	TB
Opportunistic Infections	STDs
Diarrhoeal diseases	Leishmaniasis
ARI	Intestinal parasites
Schistosomiasis	
Filariasis	

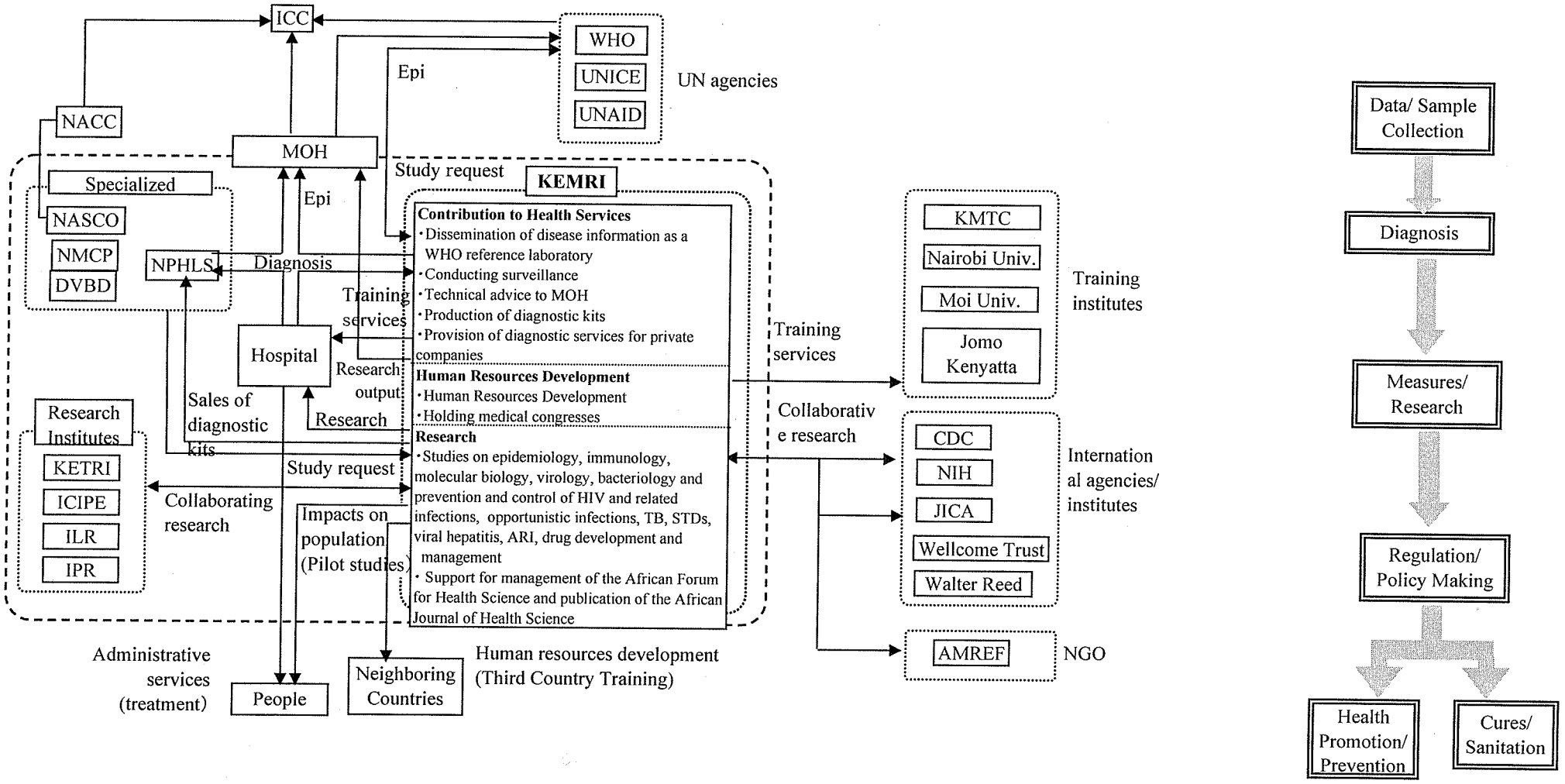
Prepared by the investigation team

5.2.5 Relationship between KEMRI and Other Organizations Involved in Communicable Diseases Control

The MOH is responsible for implementing infectious diseases control in Kenya. PPHS collects the necessary information and data to implement infectious diseases control through the consignment of surveys and research to affiliated research institutes of the MOH, such as KEMRI and NPHLS. Using this data, programmes for infectious diseases control are prepared by each unit and disseminated to hospitals and health facilities. In event of an outbreak of an infectious disease in rural areas, rural hospitals send information to NPHRL, and NPHRL retests specimens from the rural hospitals, if necessary. If it is difficult for NPHRL to obtain a diagnosis, KEMRI will be requested to identify and diagnose the specimens. The epidemiological data that is obtained is disseminated to the MOH and the WHO.

The relationship between KEMRI and other organizations involved in infectious diseases control in Kenya is shown on Figure 5.5.

Figure 5.4 Relationship of the KEMRI to Other Organizations related to Infectious Diseases Control



Prepared by the investigation team

5.3 KEMRI's Contribution to Communicable Diseases Control Based on Cooperation Provided by JICA

KEMRI has largely developed its research infrastructure and research capacity in cooperation with JICA. Collaborative research with foreign institutes was activated simultaneously with the capacity development of KEMRI. KEMRI is now ranked as one of the top research institutes in Africa.

KEMRI has contributed to improving infectious diseases control in Kenya through the dissemination of research outputs among medical personnel or reflecting research outputs the health services of the GOK.

The research outputs that contributed to human resources development or health services are summarized below by the diseases.

5.3.1 Contribution to Each Disease

(1) Hepatitis B

Research and development of hepatitis B diagnostic kits were carried out from the initial stages of JICA's cooperation. During the approximately 20-year period of cooperation, a series of activities were conducted to disseminate the kits throughout the country, including the further development of the diagnostic kits, the establishment of a mass production system, and the introduction of a freeze-dried method for improving storage of the kits. As a result, the screening rate of blood for transfusions was increased from 45% to 95%. The development of HEPCELL II was one of the greatest achievements of JICA's cooperation.

The contributions made by JICA's cooperation in relation to hepatitis B are summarized as follows.

1) Dissemination of HEPCELL II to Medical Personnel

As mentioned above, HEPCELL II was approved as the official test kit for Hepatitis B by the GOK in 1992. Since 1991, in advance of this approval, KEMRI held an In-Country Training Programme (ICTP) for diagnostic methods for Hepatitis B for technicians and technologists at the provincial and district levels. Participants were also trained in the utilization methods of HEPCELL II in this ICTP. There were 194 technicians and technologists trained through this ICTP between 1991 and 2003 (see Table 5.10).

Table 5.10 Number of Trainees in ICTPs for Blood Safety (Hepatitis B)

Year	No. of trainees	Target
1991	16	8 PHs
1992	16	- ditto -
1993	16	- ditto -
1994	8	- ditto -
1995	-	
1996	-	
1997	23	8 PHs
1998	26	DHs in Coast province.
1999	29	DHs in Nyanza province.
2000	43	DHs in Western province. *
2001	40	DHs in Rift Valley province.
2002	20	DHs in Central province.
2003	13	DHs in Eastern / North Eastern province.
Total	194	

Note: PH Provincial hospital, DH District hospital
* Training sessions in 2000 were held 2 times at Kisumu and Kakamega.
Prepared by the investigation team

After the closing of the training courses, KEMRI conducted a follow-up survey of the hospitals in order to monitor and analyse the problems of HEPCELL usage, and conduct an evaluation of the test system, advice and retraining of staff on-site, and data collection. The provincial and district hospitals acquired the utilization techniques of HEPCELL II and the ability to conduct proper blood screening using HEPCELL II through the activities of the ICTPs.

KEMRI also held a Third Country Training Programme (TCTP) for blood screening (hepatitis B and HIV/AIDS). There were 62 participants from 17 countries trained in the blood screening courses (see Table 5.11).

Table 5.11 Number of Participants in the TCTP on Blood Screening for Viral Hepatitis and HIV/AIDS

Unit: Person

Countries	1999	2000	2001	2003	Total
Ethiopia	2	-	-	3	5
Tanzania	2	2	1	2	7
Ghana	2	-	-	2	4
Zambia	3	-	-	2	5
Kenya	2	2	2	2	8
Uganda	3	2	1	3	9
Zimbabwe	-	2	-	-	2
Malawi	-	2	-	-	2
Eritrea	-	2	-	-	2
Botswana	-	2	-	-	2
Swaziland	-	2	-	-	2
Mauritius	-	-	2	-	2
Lesotho	-	-	2	-	2
Namibia	-	-	2	-	2
Seychelles	-	-	2	2	4
Nigeria	-	-	2	-	2
South Africa	-	-	2	-	2
Total	14	16	16	16	62

Source: Reachout Consultancies Ltd.(2002), Evaluation Report on the Third Country Training Programme (TCTP) on Blood Screening for HIV/AIDS and Viral Hepatitis at the Kenya Medical Research Institute (KEMRI) Final Report

KEMRI conducted questionnaire surveys of the participants to improve the training courses. Part of the survey that related to the contents of the courses and the management capacity of KEMRI are summarized in Table 5.12. The answers to the questionnaire surveys in Table 5.12 include answers from the trainees on HIV/AIDS courses mentioned later. In addition, the results of the questionnaire survey in 2003 is not included in this summary due to the use of a different questionnaire in 2003.

The majority of the participants were satisfied with the level and contents of the courses, and also satisfied with the training facilities in KEMRI. All of them were confident of utilizing the techniques learned in the courses.

Table 5.12 Satisfaction Level of the Participants in the Safety Blood Training Course for Viral Hepatitis and HIV/AIDS

Unit: person

Question	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree	Total
The course lived up to my expectations and met the stated objectives	1	1	2	28	11	43
The content is relevant to my job.				27	17	44
The objectives were clear to me			1	24	17	42
The activities stimulated my learning.				24	18	42
The activities in this session gave me sufficient practice and feedback			6	24	14	44
The level of this session is appropriate	1	3	8	16	6	34
The pace is appropriate	2	4	4	17	14	41
The training facility at this site was comfortable for learning.				18	10	28
The training facility provided most of what I needed to learn.			2	16	11	29
I accomplished the objectives of this course.		1	2	24	15	42
I will be able to use what I learned in this course.				27	17	44

Note: Parts of the questionnaire survey from 1999 to 2001 were summarized.

Sources: Reachout Consultancies Ltd.(2002), Evaluation Report on the Third Country Training Programme (TCTP) on Blood Screening for HIV/AIDS and Viral Hepatitis at the Kenya Medical Research Institute (KEMRI) Final Report

Besides the above questionnaire survey by KEMRI, JICA also conducted an ex-post evaluation targeting the participants of courses in 2000 and 2001. This ex-post evaluation collected the information from not only participants, but also their supervisors. The supervisors also recognized changes in the performance of the participants (see Table 5.13). Thus, it is judged that KEMRI contributed to improving diagnostic capacity in neighbouring countries.

Table 5.13 Changes in the Performance of TCTP Participants after Training

Unit: person

Indicator Task Variable	Change in knowledge and skills		
	Yes	No	Uncertain
Knowledge of blood safety	7		2
Setting up blood screening tests	7		2
Interpreting test results	7		2
Reporting test results	7		3
Recording test results	6	1	2
Quality control of tests	6	1	2
Productivity	6	1	2
Morale	6		3

Sources: Reachout Consultancies Ltd.(2002), Evaluation Report on the Third Country Training Programme on Blood Screening for HIV/AIDS and Viral Hepatitis at the Kenya Medical Research Institute

2) Increasing the Screening Rate of Blood for Transfusions

HEPCELL II, a diagnostic kit for Hepatitis B developed by KEMRI, has been distributed to provincial hospitals and blood banks through NPHLS since 2002. There were 400 kits and 1,000 kits distributed in 2002 and 2003, respectively.

As mentioned previously, medicines and reagents distributed by NPHRS are purchased through tender. HEPCELL II has an advantage over competing diagnostic kits from the financial aspects, although the results of the tender for 2004 were not announced during the period of the field survey (see Table 5.14).

Table 5.14 Market Prices for Diagnostic Kits for Hepatitis B

Name of diagnostic kit	Unit price/test (Kshs)
HEPCELL II	50
Celia-Hep B	130
CDI	100
Nerugost	140
Rialab	160
Eurotec	70
ELISA	100

Note: 1 US Dollar = 79.75 Kenyan Shilling (as of July 2004)
Prepared by the investigation team

Besides the financial aspect, HEPCELL has the following advantages:

- Technicians and technologists in the provincial and district hospitals have acquired skills in the use of HEPCELL II through training by KEMRI.
- KEMRI is able to quickly deal with and respond to questions from the users.
- KEMRI is able to establish a sustainable supply system due to its own production within the country.
- Simple operation and does not require electricity; furthermore, no additional apparatus is required.

NPHLS could not provide a sufficient number of diagnostic kits for Hepatitis B before they adopted HEPCELL as the official diagnostic kit. According to NPHLS, the adoption of the most inexpensive kit, HEPCELL II, enabled NPHLS to supply diagnostic kits to most of the district hospitals. As a result, the screening rate of blood for transfusions increased from 45% to 95%.

(2) HIV/AIDS

In addition to hepatitis B, research and development on HIV test kits has also been a major activity of JICA's cooperation. Although test kits that met basic WHO standards had not been developed in July 2004, JICA's cooperation contributed to HIV/AIDS control through the dissemination of diagnostic methods, research on PMTCT and the introduction of new technology as follows:.

1) Dissemination of Diagnostic Methods for HIV

KEMRI held training courses for HIV/AIDS diagnosis as a part of an ICTP for technicians and technologists at the provincial and district levels. Lectures on HIV tests and practical training using PA kits developed by KEMRI were conducted during the course. There have been 122 technicians and technologists trained through the ICTP between 1997 and 2004 (see Table 5.15).

Table 5.15 ICTP for Blood Safety

	No. of trainees	Target
1997	8	8 PHs
1998		
1999		
2000	24	DHs in Western Province
2001	18	DHs in Central Province
2002	22	DHs in Coast Province
2003	20	DHs in Nairobi province
2004	30	DHs in Rift Valley Province
Total	122	

Note: PH Provincial hospital, DH District hospital
* Training sessions for Hepatitis were held two times at Kisumu and Kakamega in 2000.

Sources: Reachout Consultancies Ltd.(2002), Evaluation Report on the Third Country Training Programme (TCTP) on Blood Screening for HIV/AIDS and Viral Hepatitis at the Kenya Medical Research Institute (KEMRI) Final Report

As well as the ICTP for Hepatitis B, KEMRI conducted a follow-up survey at hospitals in order to monitor and analyse the problems of PA usage, and conducted an evaluation of the test system, the advice and retraining of staff on-site, and data collection. The provincial and district hospitals acquired techniques for the utilization of PA and the ability to conduct proper blood screening using PA through the activities under the ICTP. Although PA cannot be utilised in hospitals since it reacts to the HIV-1 strain only, KEMRI contributed to improving the diagnostic capacity of public hospitals through the ICTP.

The TCTP for blood screening, which is described in the section on Hepatitis B included training in HIV/AIDS diagnostic techniques (detailed information is given in 4.3.1 (1) 1) b.).

As mentioned in the section on the TCTP for Hepatitis B, the majority of the participants were satisfied with the level and contents of the courses, and also satisfied with the training facilities at KEMRI. All of them were confident of utilizing the techniques learned in the courses.

In addition, according to the ex-post evaluation conducted by JICA in 2000 and 2001 mentioned above, the supervisors of the participants also recognized positive changes in the performance of the participants. Thus, KEMRI contributed to improving the diagnostic capacity for HIV in neighbouring countries.

2) Contribution to PMTCT

The efficacy of short-course Zidovudine for the prevention of mother to child transmission (PMTCT) of HIV was confirmed by KEMRI in cooperation with JICA. As a result, it was confirmed that the transmission rate has decreased by more than

60% by dosing HIV infected pregnant women with Zidovudine. Based on this result, Zidovudine was adopted by earlier national intervention programmes as an anti-retrovirus drug.

3) Introduction of New Diagnostic Methods

KEMRI was the first institute to introduce CD4/CD8 counting and viral load for monitoring the progress of HIV-infected patients through JICA's cooperation. KEMRI took part in the technical training when the MOH introduced the equipment for these diagnostic methods.

(3) Schistosomiasis

The health condition of people in two villages in the Kuware district was improved as a result of the pilot project for verifying the effectiveness of intensive treatment (consisting of mass-chemotherapy, safe water supply, control of vector snails, and health education) for Schistosomiasis control. Some of the project activities have been handed over to an NGO, and safe water has been supplied to the village. In addition, the urine ELISA method was developed and utilized in the field studies for schistosomiasis research. However, this method was not disseminated to the MOH and other institutes due to cost issues.

The integrated intervention methods for Schistosomiasis control were applied, such as mass-chemotherapy, safe water supply, environmental modification (control of the vector snails through cleaning plans for the rivers) and health education in the period 1982 - 1993. As a result, there was a significant decrease in the haematuria rate (indicator for the symptoms of Schistosomiasis) confirmed during the pilot studies, although a significant change in the prevalence rate was not observed. The prevalence rate fluctuated between 20 and 47% in Mwachinga, and 18 to around 48% in Mtsangatamu, during the period of the pilot study.

Research conducted in cooperation with JICA ended in 1996. However, a Nagasaki University professor who was originally dispatched as a JICA expert under this project has continued his research into parasitic control using both of these two villages as part of a university study after the JICA programme ended. Moreover, a clinic has been voluntarily set up in Mwachinga village by the Nagasaki University professor, which is being effectively utilized by the villagers.

In Musangatam village, Plan International, an NGO, created a new water supply facility using the water resources developed by KEMRI, and it has continued to provide assistance to ensure that the villagers have access to safe water.

Facilities developed under the pilot project are no longer in use, but due to the activities of Nagasaki University and the NGO, the activities for parasite control continue to be carried out in both villages. Table 5.16 shows the facilities or inputs through JICA's cooperation and their current state.

Table 5.16 Current State of Facilities Provided

Facilities	Present situation
Mwachinga village	
Shower rooms	Under the conditions in which children swim in the river, shower rooms were established for children at a primary school. Since the schools have a budget for water fees from the government, this facility has been used and maintained.
Water taps	There were five water taps installed through the pilot study. However, none of the water taps were being used due to a malfunction of the fee collection system. However, recently, one water tap has started operation.
Mtsangatamu village	
Pool and washing place on the outskirts of the village	A pool and washing place were built to avoid swimming in the river. These facilities were well utilized during the period of the pilot study. However, these facilities have not been used since the NGOs established more convenient facilities at the centres of villages in 1996. The appearance of elephants around the facilities was also leading to neglect of the facilities.

Prepared by the investigation team

It was observed that, in these pilot studies a major contribution was made by the villagers in relation to their knowledge about the disease, its prevention and the control measures. The villagers became aware of the dangers of parasitic infections through the pilot project. KEMRI estimated that more than 90% of the village inhabitants improved their knowledge and attitude towards parasite control, and changed their utilization of the river water.

(4) JICA's Cooperation in KEMRI

As mentioned earlier, JICA has supported various kinds of research activities for infectious diseases. The research capacity of KEMRI established through technical cooperation provided by JICA has been utilized or applied for the implementation of surveillance and reference services. Diagnostic techniques transferred by JICA through training have been disseminated to medical personnel within and outside the country.

The diseases targeted by JICA cooperation are listed in Table 5.17.

Table 5.17 JICA's Cooperation in KEMRI

Target diseases	Research	Human Resources Development	Contribution to Health Services			
			Surveillance	Reference	Direct Contribution to the Population	Diagnostic kit Development
Viral Hepatitis	○	○	○	―	○	○
HIV/AIDS	○	○	○	―	―	○
Opportunistic Infections	○	―	―	―	―	―
Diarrhoeal diseases	○	―	―	―	―	―
ARI	○	―	―	―	―	―
Schistosomiasis	○	―	―	―	○	―
Filariasis	○	―	―	―	―	―

Prepared by the investigation team

All 12 diseases mentioned in Table 5.16 are infectious diseases, and JICA has cooperated in research activities for 7 of these diseases. It was confirmed that KEMRI conducted activities in human resources development and the improvement of health services for 3 diseases out of 9. Research on viral hepatitis and HIV/AIDS in particular had achieved significant outputs through the development of diagnostic kits.

5.3.2 Achievements of JICA's Cooperation

As mentioned in Section 5.3.1, KEMRI has contributed to infectious diseases control through cooperation with JICA. JICA contributed not only to disease control, but also to the capacity development of KEMRI. The achievements of JICA's cooperation in the capacity development of KEMRI are as follows.

(1) Capacity Development of KEMRI

As mentioned in Section 5.1.3, it is assumed that technical cooperation provided by JICA since 1979 aimed to strengthen the research capacity of KEMRI, and also strengthened the capacity of medical personnel engaged in infectious diseases control though training.

Besides the JICA projects, KEMRI has conducted collaborative research with the CDC and the Walter Reed Army Institute of Research since its establishment. KEMRI improved its research capacity based on the support provided by JICA and other foreign institutes, and activated collaborative research. A case example of such collaborative research.carried out by KEMRI and foreign research institutes is shown in Table 5.18.

Table 5.18 Case Example of Collaborative Research by KEMRI

Overseas Research Institutes	Research Content
Centres for Disease Control and Prevention (CDC)	CDC conducts AIDS prevention and research at Kisumu in West Kenya in collaboration with KEMRI. The Kisumu centre, which has 200 staff members assigned from KEMRI is the largest CDC group outside the United States.
Walter Reed Army Institute of Research (WRAIR)	WRAIR conducts studies on the development of vaccines for malaria in cooperation with USAID and KEMRI.
Wellcome Trust	The Wellcome Trust has conducted epidemiological and clinical studies on malaria in Kilifi since 1989. Kirifi is the largest site of KEMRI, and has 600 staff members.

Prepared by the investigation team

The Kisumu centre is the largest CDC group outside the United States. Both the CDC and WRAIR have established their research base at the Kimusu centre, and intend to continue research activities with KEMRI in the future. In addition, the Wellcome Trust in Kilifi also intends to conduct research on malaria.

KEMRI has a sophisticated research capacity and infrastructure for conducting collaborative research, and also plans to continue collaborative research.

Researchers from KEMRI have high academic degrees, and most of them have the title of doctor, PhD, or the minimum of a Masters degree with research experience. The research outputs of these researchers have been published in internal/external journals (see Table 5.19).

Table 5.19 Number of Publications

	1991-93	1994-95	1996	1998	1999	2000	2001
No. of articles	200	156	32	49	61	81	48

Source: KEMRI (2002), Annual Report and Statement of Account

Although it fluctuates every year, KEMRI has published more than 50 articles per year, and it seems that KEMRI has conducted research at a high technological level.

The research projects of KEMRI are categorized into four groups, namely 1) Biotechnology and Non-Infectious Diseases, 2) Infectious Diseases, 3) Epidemiology, Health Systems and Public Health, 4) Parasitic Diseases. It seems that KEMRI focuses on research in the field of Infectious Diseases and Parasitic Diseases, since more than 80% of the research projects implemented between 1998 and 2003 were categorized into Infectious Diseases or Parasitic Diseases. In addition, about 60% of the publications during this period were also in the field of Infectious Diseases and Parasitic Diseases (see Table 5.20).

Table 5.20 Number of Projects and Publications (1998-2003)

	No. of projects approved	No. of projects funded	No. of Publications
Biotechnology and Non-Infectious Diseases	19	18	48
Infectious Diseases	98	92	57
Epidemiology, Health Systems and Public Health	19	12	22
Parasitic Diseases	68	65	55
Total	204	187	182

Sources: KEMRI (1999), About KEMRI et al.

KEMRI has been appointed as a WHO Collaborating Centre, and is also recognized by the CDC as a regional centre for Emerging and Re-emerging Infections, and as Africa's regional centre for international organizations. Thus, KEMRI is recognized for its research capacity by international organizations.

As a leading institute in Africa, KEMRI contributed to the establishment of the African Forum for Health Science which undertakes two activities towards the promotion of health research in Africa, the organization of the African Health Congress and the publication of the African Journal of Health Science. The Director of KEMRI is appointed as the editor in chief of the African Journal of Health Science.

As mentioned above, KEMRI has continuously conducted research on infectious diseases control, and its research capacity is highly regarded by foreign research institutes. Thus, it is considered that the objectives of JICA cooperation and the strengthening of the research capacity of KEMRI have been achieved to a large extent.

(2) Infrastructure Development

Japan's contribution towards capacity building at KEMRI is not only concerned with technology transfer, but also infrastructure development. The main buildings of the KEMRI Headquarters and a large quantity of equipment were procured through Japanese assistance. KEMRI has evaluated that this advanced infrastructure and equipment enabled KEMRI to implement collaborative research activities with foreign institutes. These collaborative research activities with other foreign institutes have also improved the research capacity of KEMRI.

The case of JICA's cooperation with KEMRI is one of the successful examples of the synergistic effects that JICA's technical cooperation has achieved through a well utilized research infrastructure that was developed with Japanese grant aid, and this infrastructure and the transferred technology has enabled the institute to carry out collaborative research with other foreign institutes.

(3) Strengthening the Capacity for Research Implementation

As mentioned earlier, KEMRI had acquired the capacity to conduct research that has enabled it to expand collaborative research with foreign institutes through the transfer of technology and infrastructure development provided by Japan. This capacity also enables KEMRI to continuously obtain research grants from foreign institutes as well as to strengthen its financial base.

The budgetary sources of KEMRI consist of the MOH grants (budget from the GOK) for recurrent expenditures (personnel costs, lighting and heating expenses, etc.), research grants from foreign institutes, and earnings from income-generating activities. Some of the recurrent expenditures are allocated to each centre as an operational budget (fuel costs, costs for consumable items). According to the directors of each centre, they earned 5 to 10% of their operational budget through income-generating activities, although this amount is not mentioned in the balance sheet.

The MOH grants have continuously increased since 1999/2000, and reached 545 million Kshs in 2002/03 and 852 million in 2003/04.

Development expenditures that consist of "special accounts and grants" and "JICA operational grants" also increased due to the rapid increase in "special accounts and grants". Thus, the share of JICA operational grants in the development expenditures declined from 11% in 1998/99 to 5% in 2002/03 (see Table 4.21).

Table 5.21 Income and Expenditure Account of KEMRI

Unit: 1,000 Kshs

	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003
Income					
MOH Grants	297,769	282,737	382,934	478,694	544,923
Special Accounts and Grants	99,665	228,555	238,132	330,001	589,533
JICA Operational Grants	12,386	18,471	12,026	15,657	31,952
Total	409,820	529,763	633,092	824,352	1,166,408
Expenditure		406,330	534,443	632,387	817,579

Note: 1 US Dollar = 76.35 Kenyan Shilling (as of December 2003)
Source: KEMRI (2002), Annual Report and Statement of Accounts et al.

As Table 5.22 shows, over 50% of the research grants from overseas come from US institutes, such as the CDC and Walter Reed Army Institute of Research.

Table 5.22 Details of the Special Accounts and Grants

Unit: 1,000 Kshs

	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003
US Embassy-USAMRU Project	25,437	49,891	80,048	132,752	245,468
US, Embassy CDC Project	28,280	56,122	46,953	110,712	226,889
US Government Treasury Others	473	14,087	20,610	6,810	3,068
Wellcome Trust Research Laboratory	n.a.	n.a.	n.a.	3,560	2,812
US, Embassy Others					271
Case Western Reserve University	1,527	3,488	3,490	4,865	6,481
Commonwealth Secretariat	1,591	269	404	415	85
World Health Organization	17,555	32,594	23,393	21,959	32,277
Carnegie Corporation	748	26			
UNICEF	3,908	4,887	549	730	669
Royal Tropical Institute	2,598	9,086	4,631	1,399	86
University of New Mexico	365	3,661	6,352	6,007	3,739
African Medical Services Trust		4,704	2,225	91	
SmithKline Pharm Institute			5,788	5,684	3,222
Glaxo SmithKline		3,294			
University of Otago			2,537	419	34
Oxford University			2,139	23	75
Liverpool School of Tropical Medicine			847	3,059	4,257
INSERM Institute National			381	1,396	1,306
New York State University					8,467
University of Washington					2,511
Miscellaneous sources	17,186	46,446	37,784	30,119	47,814

Note: 1 US Dollar = 76.35 Kenyan Shilling (as of December 2003)
Source: KEMRI (2002), Annual Report and Statement of Accounts et al.

KEMRI relies on grants from foreign donors for its development expenditures, and it seems that the expansion of the collaborative research was enabled through the research infrastructure of KEMRI developed by Japan. Japanese cooperation with KEMRI has contributed to strengthening its research capacity as well as its financial sustainability.

(4) Strengthening the Relationship with the MOH

KEMRI has conducted various types of research contributing to infectious diseases control. However, much of this research did not include consideration of the financial feasibility of reflecting the research outputs in the actual practice of disease control and cooperation with the implementation systems for infectious diseases control. For instance, the pilot project for parasite control in Kwale was not reflected in the activities of the MOH due to a lack of consideration for the relationship with the MOH, even though the health condition of the villagers was improved by the project activities.

As mentioned in Table 5.23, the responsible Ministry for KEMRI changed several times due to the reform of the government structure. KEMRI explained that it had heard that their research outputs on infectious diseases control produced during the period 1983 – 1999 was when KEMRI belonged to ministries that did not have responsibility for the health sector. This was also pointed out by reports of JICA projects.

Table 5.23 Changes in the Ministry Responsible for KEMRI

	Ministry Responsible for KEMRI
1979～1983	MOH
1983～1985	Ministry of Regional Development Science and Technology (MRDST)
1985～1999	Ministry of Research, Technical Training and Technology (MRTTT)
1999～	MOH

Prepared by the investigation team

KEMRI became an affiliated research institute of the MOH in 1999, due to the reorganization of the government structure. A smooth relationship has been established between KEMRI and MOH through the appointment of representatives of the MOH as members of all committees in KEMRI following this shift.

(5) Reform of JICA Schemes

Many of the participants from KEMRI pointed out that JICA did not have any system for counterparts to acquire an academic background. This constraint has been discussed between KEMRI and JICA since the beginning of JICA's cooperation.

In KEMRI, the promotion of staff largely depends on their academic background. For instance, it is necessary to at least have a Masters degree to become a research officer, and a Doctoral degree for a senior research officer. Therefore, support for participants from KEMRI to pursue a higher educational degree is included in collaborative projects with other foreign institutes.

Thus, the lack of support for proceeding to a higher educational degree in JICA's cooperation has influenced the willingness of researchers in KEMRI to participate in JICA projects. However, JICA has tried to resolve this problem through the recent introduction of a support system for pursuing educational degrees by counterparts.

5.3.3 Conclusions

JICA has implemented cooperation with the expectation that health services will be improved through the effect of KEMRI's functioning as a base for research and diagnosis on infectious diseases control as well as a base for the human resources development.

JICA's cooperation with KEMRI is characterized by activities that concentrate on two main functions - blood screening and parasite control. Blood screening activities, in particular, enabled the test kits developed by KEMRI to be disseminated nationwide through coordinated research and training activities. In addition, as a research institute and a WHO Collaborating Centre, KEMRI has greatly contributed to infectious diseases control in other parts of Africa as well serving as a regional educational and training institute.

As in the case of NMIMR in Ghana, KEMRI contributed to improvements in the health condition of the population through the improvement of health services that reflected its research outputs. As expected by JICA, KEMRI contributed to improving infectious diseases control in Kenya, and the foundations for this research were built through JICA's cooperation. As with NMIMR, KEMRI has also acquired sufficient capacity as a research institute. In view of the fact that the cooperation

between JICA and KEMRI is proceeding to next stage, JICA should consider the validity of the cooperation that has the aim of technology transfer. It is, therefore, required to establish a new cooperation scheme for KEMRI with activities consisting mainly of collaborative research with foreign institutes.

5.4 Expected Roles of the KEMRI

KEMRI has contributed to improving infectious diseases control in Kenya and in the surrounding countries. The expected roles of KEMRI for making a further contribution to infectious diseases control are summarized from the viewpoint of research, human resources development and the contribution to health services as follows:

(1) Research

Japan has continuously provided cooperation to KEMRI since its establishment through the implementation of project type technical cooperation and grant aid projects. As a result, KEMRI has become the foremost medical research institute in Africa and it conducts collaborative research with the CDC, WRAIR and Wellcome Trust. KEMRI is, therefore, recognized as one of the global strongholds for infectious diseases control.

As mentioned above, JICA's cooperation is characterised by its focus on the continuous development of blood test kits. The development of inexpensive test kits has contributed to increasing the screening rate of blood for transfusions. KEMRI is developing several test kits, including ones for HIV/AIDS. It is expected that KEMRI will continuously conduct research for the development of these test kits.

The research subjects of KEMRI extend to the entire medical sector covering infectious diseases control. These research outputs are applied to infectious diseases control by the MOH and its research partners. In addition, research outputs are published in medical journals and utilised internationally for improving infectious diseases control. Moreover, KEMRI contributes academically to the development of medical personnel in Africa through the management of AFHES, which is the foremost medical forum in Africa and publishes the African Journal of Health Science.

As a stronghold of infectious diseases control, it is expected that KEMRI will continue to contribute to the diffusion of research outputs in the African region through periodic or continuous research activities, such as the development of original disease control methods based on regional characteristics, the development of blood test kits, and other research related to infectious diseases in Africa, and providing support for the AFHES and the African Journal of Health Science.

(2) Human Resources Development

KEMRI has contributed to human resources development in the medical sector through the implementation of ICTP, TCTP, and the acceptance of postgraduate students from universities in Kenya, and training for postgraduate students from the Institute of Tropical Medicine and Infectious Diseases. In particular, ICTP for blood

screening contributed to an increase in the screening rate of blood for transfusion through the spread of HEPCELL II, a test kit for Hepatits B developed by KEMRI.

Moreover, collaboration research by KEMRI also contributed to human resources development in the medical sector as a training place for foreign researchers. In addition, through the support to the AFHES and the African Journal of Health Science, KEMRI conducts human resources development in the medical sector in the African region. It is expected that KEMRI will take leadership in the medical sector in the African region, and conduct training related to development research and contribute directly to the health services.

(3) KEMRI's Contribution to the Health Services

Since the research institute was placed under the jurisdiction of the MOH in 1999, KEMRI and the MOH have strengthened their relationship. The institute's research findings are submitted to the MOH and have helped improve health services. In particular, the development and production of HEPCELL II and its dissemination through the ICTP have improved the screening rate of blood for transfusions from 45% to 95%.

In addition, KEMRI contributed to the improvement of the health services by providing surveillance services and reference services. As part of the surveillance services, KEMRI dispatches rapid response teams to outbreaks of infectious diseases, and provides diagnostic services to private companies. KEMRI also provides reference service as a regional WHO Collaborating Centre.

Although KEMRI does not have the role of implementing national diseases control and other testing, KEMRI has the additional role of producing test kits, which was not included in the original mandate of the research institute. The Japanese government plans to support the development of a production facility for test kits under KEMRI. Thus, KEMRI will have a new role of producing and selling test kits.

It is expected that the research activities that directly link infectious diseases control and the implementation of disease surveillance will increase to improve the health services in Kenya through the adoption of the research outputs of KEMRI by health services. It is also important to strengthen the reference services such as the establishment and expansion of epidemiological databases for HIV/AIDS and emerging/re-emerging infectious diseases, and enhancing information services.

The expected roles of KEMRI in relation to infectious diseases control in Kenya are summarized in Table 5.24.

Table 5.24 Expected Roles of KEMRI in Communicable Diseases Control

Areas	Roles
Research	➢ Research targets are viral, bacterial and parasitic infectious diseases ➢ Epidemiological surveys and studies ➢ Improving diagnostic methods in classical and modern technology, such as isolation and identification through basic techniques, and molecular level and generic analysis in a P-3 bio-safety laboratory using advanced technology ➢ Clinical trials in vitro and in vivo, such as drug resistance and sensitivity ➢ Evaluation of research and study results or outcomes ➢ Collaborative studies with other institutes, universities and hospitals within the country or overseas.
Human resources development	➢ Laboratory practice for students of medical schools, faculties of science and medical vocational schools ➢ Re-training of diagnostic techniques for medical workers. ➢ Technical transfer of diagnostic experimental methods and QC to researchers ➢ Collaborative research with institutes and universities within the country or overseas ➢ Third Country Training for safe blood and parasite control ➢ Giving lectures in medical schools and conducting courses by researchers ➢ Regional research and training collaboration
National /Regional Health Services	【Surveillance Services】 ➢ Contribution to the rapid response system for emerging and re-emerging infectious diseases ➢ Laboratory diagnostic services for the private sector 【Reference Services】 ➢ Reporting to WHO as a Collaborating Centre 【Other services】 ➢ Technical advice and consultations for the MOH ➢ Production of HEPCELL II and other diagnostic kits

Prepared by the investigation team

Annex 5.1 Main Activities of the KEMRI-JICA Programme

	Communicable Diseases Research and Control Project	Project of the Kenya Medical Research Institute	Project on Research and Control of Infectious Diseases	Research and Control of Infectious Diseases Project II	Research and Control of Infectious and Parasitic Diseases Project
Diarrhoeal Diseases	➢ Basic diagnostic techniques for rotavirus using an electron microscope ➢ Retrieval of etiological agents of viral and bacterial diarrhoea in the selected areas, and the evaluation of pathogens	➢ Analysis and diagnosis of viral diarrhoea ➢ Community-based cohort study of rotavirus infections in children in the Bahati division ➢ Analysis of fluctuations in faecal bacterial flora in Lari ➢ Analysis of short chain fatty acid and bile acid content in the faeces from the onset to the recovery from diarrhoea in diarrhoeal children residing in Lari	➢ Epidemiological study of gastroenteritis symptoms caused by rotavirus in Nairobi, Nanyuki and Kitui ➢ Preparation of a brochure and video programme for measures including ORT ➢ Technical training on normal samples and negative staining at the workshop on electron microscopes ➢ Study on bacterial diarrhoea and water quality in Malindi. ➢ Etiological study for diarrhoeal diseases in Kitui and Nairobi ➢ Study and measures against cholera and dysentery in Mombasa		
ARI/OI				➢ Isolation of bacterial, fungal and viral etiological agents and drug sensitivity tests ➢ Recommendations for changing standard curative drugs based on the results of drug sensitivity tests for major bacterial and fungal ARI ➢ Preparation of educational videos and more than 400 brochures	➢ Establishment of methods for the diagnosis, prevention and treatment of opportunistic infections in both adults and children with HIV/AIDS.
Hepatitis		➢ Community-based longitudinal epidemiological study of viral hepatitis B in the Maragua district ➢ Trial Production of diagnostic reagents for viral hepatitis B	➢ Establishment of a production system for diagnostic reagents for viral hepatitis B (HEPCELL I) in Kenya (45,000 tests/year) ➢ Trial Production of diagnostic reagents for viral hepatitis C ➢ Trial Production of diagnostic reagents for liver cancer ➢ Establishment of a Liver Disease Diagnosis Centre ➢ Training in liver disease diagnosis for doctors and technicians from 8 provinces ➢ Blood screening (65,021 samples were screened from July 1991 to May 1994) ➢ Workshops/Seminars on hepatitis	➢ Introduction of Lyophilization for HBV diagnostic kits (HEPCELL II) ➢ Distribution of HEPCELL II to provincial hospitals (1,886 Kits were distributed from July 1996 to February 2000, and 69,373 units of blood were screened ➢ Share of HEPCELL II for HBV screening in the official sector was 60% ➢ Epidemiological studies on HCV ➢ Third Country Training (Blood Safety)	➢ Production, QC and distribution of HEPCELL II. ➢ Development of a serum bank for hepatitis positive blood ➢ Establishment of a gene diagnostic system for various types of hepatitis ➢ O&M of a facility for the production of HEPCELL II.(After implementation of a grant aid project) ➢ Third Country Training
HIV/AIDS				➢ Development of a diagnostic kit for HIV (PA kit) ➢ Establishment of a production system for a PA kit using locally collected and purified antigens ➢ Comparison of a PA kit with other kits ➢ Isolation and characterization of virus with the application of molecular biological and epidemiological techniques ➢ Screening of antiviral plant extracts ➢ Demonstration of the short course administration of AZT (Zidovudine) to HIV positive mothers in reducing MTCT in West Kenya (Kisumu、Busia)	➢ Development of a PA kit continues at the research level, and development of a new kit（KEMCOM） ➢ Monitoring of epidemic HIV strains ➢ Establishment of a counselling and education system ➢ Workshops/Seminars for PA ➢ Community health education in Western Kenya
Schistosomiasis	➢ Field surveys to clarify the Schistosomiasis situation in Mwachinga and Mtsangatamu villages in the Kwale district ➢ To develop the facilities for safety water supplies	➢ Evaluation of the control measures adopted in the previous project ➢ Mass-chemotherapy in Mwachinga and Mtsangatamu. ➢ Development of new diagnostic techniques (Urine ELISA)	➢ Integrated methods (chemotherapy, water supply, environmental modification and health education in Mwachinga and Mtsangatamu		
Filariasis			➢ Epidemiological studies and mass-chemotherapy in three villages in Kwale		
Parasites					➢ Promotion of preventive measures through the school health approach (Mwea and Kwale) ➢ TCTP for parasite control

Prepared by the investigation team

Annex 5.2 Inputs by JICA

Annex 5.2.1 Dispatch of JICA Experts (1/2)

	Communicable Diseases Research and Control Project				Project of the Kenya Medical Research Institute				Project on Research and the Control of Infectious Diseases				Research and Control of Infectious Diseases Project Phase II			
	Long term		Short term		Long term		Short term		Long term		Short term		Long term		Short term	
	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M
Leader	2	39.3	2	6.1	1	12.5	-	-	1	69.3	-	-	3	74.7	2	0.4
Coordinator	1	38.5	-	-	2	60.0	-	-	3	121.0	1	4.2	2	59.1	-	-
Virology	5	65.4	6	2.9	10	157.8	7	12.6	4	47.3	5	3.8	-	-	-	-
Bacteriology	7	93.8	1	8.1	7	87.5	11	25.3	4	61.1	18	19.1	-	-	-	-
Parasitology	6	84.2	1	6.2	8	138.1	9	14.9	6	107.4	16	35.4	-	-	-	-
Equipment Maintenance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1.6
HIV／AIDS	-	-	-	-	-	-	-	-	-	-	2	0.8	3	59.1	24	32.1
Viral Hepatitis	-	-	-	-	-	-	-	-	2	57.6	10	9.4	3	50.8	8	7.7
Viral Diarrhea	-	-	-		-	-	-	-	2	36.7	4	4.3	-	-	-	-
ARI	-	-	-	-	-	-	-	-	-	-	2	1.2	3	61.2	10	9.9
Bacterial Diarrhea	-	-	-	-	-	-	-	-	-	-	3	9.8	-	-	-	-
Pathology	-	-	-	-	-	-	-	-	-	-	1	2.9	-	-	-	-
Clinical Research	-	-	-	-	-	-	-	-	-	-	1	0.9	-	-	-	-
Epidemiology	-	-	-	-	-	-	-	-	-	-	5	7.1	-	-	-	-
In Country / Third Country Training	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	2.8
Traditional Medicines	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laboratory Animals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Immunology	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	21	321.2	10	23.2	28	455.9	27	52.9	22	500.5	68	98.9	14	304.8	50	54.5

Prepared by the investigation team

Annex 5.2.1 Dispatch of JICA Experts (2/2)

	Research and Control of Infectious and Parasitic Diseases Project				Research and Control of Infectious Diseases Project				International Parasite Control Project				Total			
	Long term		Short term		Long term		Short term		Long term		Short term		Long term		Short term	
	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M
Leader	2	21.2	-	-	-	-	-	-	1	28.4	-	-	8	939.6	2	0.4
Coordinator	3	24.6	-	-	1	37.0	-	-	1	22.4	-	-	12	2,089.1	1	4.2
Virology		-	-	-	-	-	-	-	-	-	-	-	14	4,845.3	12	382.8
Bacteriology	-	-	-	-	-	-	-	-	-	-	-	-	11	2,721.1	29	779.1
Parasitology	1	18.0	3	1.2	-	-	-	-	3	50.8	2	1.0	18	4,374.3	30	484.7
Equipment Maintenance	-	-	-	-	-	-	-	-	-	-	-	-	0	0.0	2	1.6
HIV／AIDS	3	47.3	3	1.8	1	17.8	5	3.3	-	-	-	-	7	124.2	34	38.0
Viral Hepatitis	1	9.9	2	1.3	1	14.2	3	1.6	-	-	-	-	7	132.5	23	20.0
Viral Diarrhea	-	-	-	-	-	-	-	-	-	-	-	-	2	36.7	4	4.3
ARI	-	-	-	-	-	-	-	-	-	-	-	-	3	61.2	12	11.1
Bacterial Diarrhea	-	-	-	-	-	-	-	-	-	-	-	-	0	0.0	3	9.8
Pathology	-	-	-	-	-	-	-	-	-	-	-	-	0	0.0	1	2.9
Clinical Research	-	-	-	-	-	-	-	-	-	-	-	-	0	0.0	1	0.9
Epidemiology	-	-	-	-	-	-	-	-	1	24.0	-	-	1	24.0	5	7.1
In-Country/Third Country Training	2	19.4	2	1.5	-	-	-	-	-	-	-	-	2	19.4	6	4.4
Traditional Medicines	-	-	1	0.7	-	-	2	2.3	-	-	-	-	0	0.0	3	3.0
Laboratory Animals	-	-	1	1.0	-	-	-	-	-	-	-	-	0	0.0	1	1.0
OI	1	4.7	4	3.2	3	48.1	3	1.7	-	-	-	-	4	52.8	7	4.9
Immunology	-	-	-	-	-	-	2	0.4	-	-	-	-	0	0.0	2	0.4
Total	13	145.2	16	10.8	6	117.0	15	9.3	6	125.6	2	1.0	89	15,420.2	178	1,760.6

Prepared by the investigation team

Annex 5.2.2 Counterpart Training in Japan

	Communicable Diseases Research and Control Project		Project of the Kenya Medical Research Institute		Project on Research and Control of Infectious Diseases		Research and Control of Infectious Diseases Project Phase II		Total	
	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M
Virology	1	8.8	5	48.1	1	12.2	1	36.3	8	105.4
Bacteriology	2	23.9	4	31.1	2	14.4	1	4.9	9	74.3
Immunology	1	7.0	-	-	1	9.9	-	-	2	16.9
Inspection	4	2.0	1	0.6	3	3.9	-	-	8	6.5
消化器病	-	-	2	4.4	-	0.0	-	-	2	4.4
Hospital Management	-	-	1	0.5	2	2.9	-	-	3	3.4
Parasitology	-	-	4	38.9	2	23.6	2	11.8	8	74.3
Equipment Management	-	-	1	7.8	2	6.6	1	1.8	4	16.2
Diagnosis	-	-	1	0.5	1	4.5	-	-	2	5.0
Hepatitis	-	-	2	18.1	2	13.9	4	17.7	8	49.7
Respiratory Diseases	-	-	-	-	1	12.1	7	36.5	8	48.6
Entomology	-	-	-	-	1	10.1	-	-	1	10.1
HIV/AIDS	-	-	-	-	-	-	13	49.7	13	49.7
Total	8	41.7	21	150.0	18	114.1	29	158.7	76	464.5

Note: Data for the “Research and Control of Infectious and Parasitic Diseases Project”, “Research and Control of Infectious Diseases Project” and “International Parasite Control Project” is not included.

Prepared by the investigation team

Annex 5.2.3 Budgets for the Programme

	Communicable Diseases Research and Control Project		Project of the Kenya Medical Research Institute		Project on Research and Control of Infectious Diseases	
JICA						
Equipment	JP¥	193,000,000	JP¥	268,300,000	JP¥	409,047,000
Operational costs	JP¥		JP¥	112,800,000	JP¥	
Total	JP¥	193,000,000	JP¥	381,100,000	JP¥	409,047,000
KEMRI						
Operational costs			Khs	18,300,000	Khs	9,421,719

Note: Excluding personnel costs

1 US Dollar = 76.35 Kenyan Shilling (as of December 2003)

6 Analytical Findings on the University Teaching Hospital in Zambia

This chapter comprises four sections, and it presents an analysis of the contribution of the Virology Laboratory and TB Laboratory of the University Teaching Hospital (UTH) to the control of infectious diseases and the effects of JICA's cooperation that made possible the contribution of both laboratories. JICA's cooperation with both these laboratories of the UTH is summarized in Section 6.1. Section 6.2 gives an outline of infectious diseases control in Zambia, including the roles and functions of the Virology Laboratory and TB Laboratory of the UTH in this infectious diseases control. Based on the findings described in Sections 6.1 and 6.2, the effects of JICA's cooperation that enabled both laboratories to contribute to infectious diseases control are analysed in Section 6.3. The results of this analysis are summarized in Section 6.4 in terms of the expected role of both laboratories.

6.1 Summary of JICA Cooperation with the UTH

6.1.1 Background History to the Cooperation

The infant mortality rate of Zambia marked 141 deaths/1,000 live births in the middle of the 1970s, and this was one of the main issues in the health sector. In view of this situation, the Ministry of Health (MOH) of Zambia requested the establishment of a paediatric ward, and the School of Medicine, Zambia University requested the dispatch of experts for medical training when JICA conducted a needs survey in the health sector in Zambia. JICA accepted these requests, and started the University of Zambia Medical School Project with the aim of improving the available technology in the areas of neonatal care and paediatric surgery from 1980. In addition, a paediatric ward was constructed at the site of the University of Zambia through a grant aid project provided by Japan in 1983. When the University of Zambia Medical School Project was terminated in 1989, the importance of prevention, diagnosis, and care related to infectious diseases among infants was emphasized as a recommendation of the final evaluation of the project.

Consequently, the Government of the Republic of Zambia (GRZ) requested cooperation from the Japanese government to help establish infectious diseases control programmes following the end of the project mentioned above. In response to this request, after 1989, JICA designated the UTH as an implementing agency and launched three technical cooperation projects for infectious diseases control. The Virology Laboratory and the Tuberculosis (TB) Laboratory, which are part of the laboratory services department of the UTH, served as counterparts for these projects, and JICA conducted technical cooperation to establish the diagnostic capacity for infectious diseases control in Zambia.

Moreover, in order to develop the infrastructure for associated research activities, JICA constructed a building for the Virology Laboratory in 1991, and a building for TB Laboratory using the budget for project-type technical cooperation.

6.1.2 Outline of the UTH

(1) Mission of the UTH

The UTH is a university hospital that is in charge of implementing the three-year clinical course within the seven-year medical education curriculum that is implemented by the School of Medicine, Zambia University. It is the top referral hospital as well as the only teaching hospital in Zambia. The mission of UTH described in the "Action Plan and Budget of UTH" is "to provide affordable quality, health care, function as a referral centre; train health care providers; conduct research to find solutions to existing health problems and for the development of science".

(2) Organizational Structure of the UTH

The UTH functions as a general hospital and as a teaching hospital and it is managed and operated by both the Ministry of Education (MOE) and Ministry of Health (MOH). As a general hospital, it has 14 wards including ones for internal medicine and surgery. There are four departments under the supervision of the managing director – the department of clinical services, department of laboratory services, department of nursing, and department of finance. The head of clinical services is also the deputy managing director of the hospital, who is responsible for the entire department of clinical services.

The department of laboratory services is in charge of six laboratories, including the virology laboratory, which is the JICA project counterpart, the microbiology laboratory, the clinical pathology laboratory, the haematology laboratory and the histopathology laboratory. The TB laboratory, which is another JICA counterpart, is a unit of the microbiology laboratory. The organizational chart of the UTH is shown in Figure 6.1.

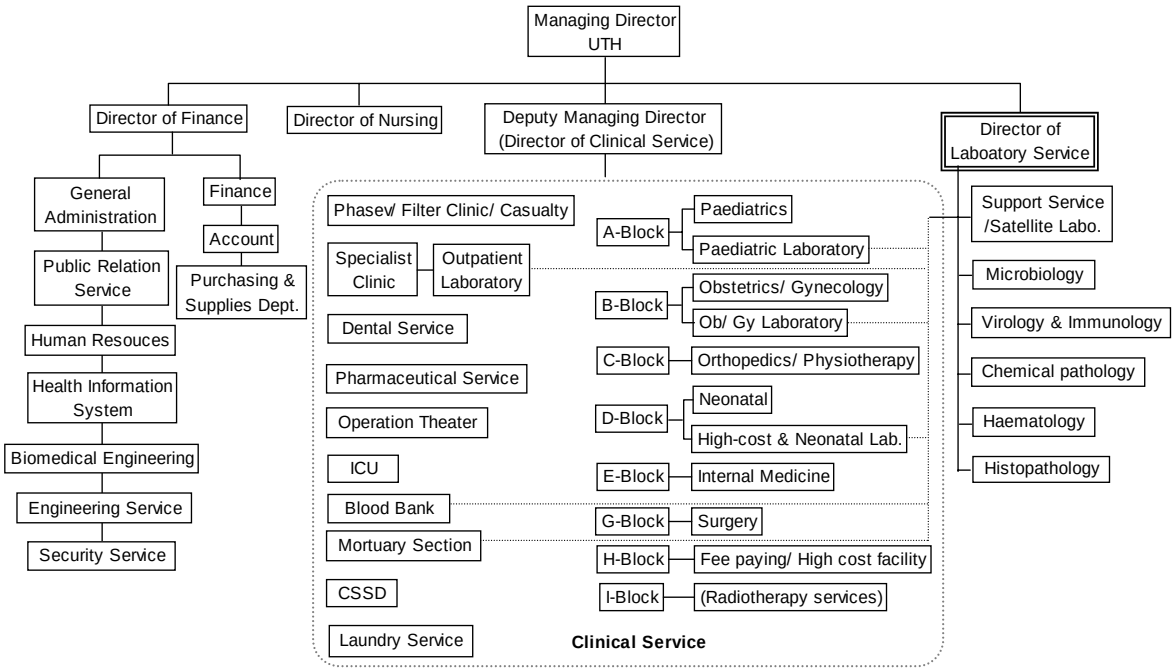
These laboratories serve as public health laboratories for the country and participate in various programmes implemented by the Department of Public Health and Research of the Central Board of Health (CBoH)[1]. Those involved in the research activities of the UTH laboratories are consulted every two weeks through a special committee composed of representatives of the CBoH, School of Medicine, Zambia University, the managing director and deputy managing director of the UTH, and two representatives of the MOH.

On the other hand, the UTH itself is managed by an executive committee chaired by the managing director. The director of each department appoints the other members of the executive committee.

The laboratory management committee, chaired by the Directors of Microbiology and Pathology, is in charge of all of the laboratories. The laboratory management committee consists of representatives from each laboratory and each unit under the microbiology laboratory. Problems related to the laboratories are communicated to the executive committee where final decisions are made via the laboratory management committee. The organizational chart is shown in Figure 6.1

1 In July 2004, it was announced that the CBoH would be dissolved and integrated into the MOH. However, as of March 2005, although its governing body had been dissolved, the CBoH was continuing with the operation of health care services.

Figure 6.1 Organizational Chart of the UTH



Prepared by the investigation team

6.1.3 Outline of JICA's Cooperation with the UTH

(1) Objectives and Components of JICA's Cooperation

JICA's cooperation with the UTH for infectious diseases control began with the Infectious Diseases Project (1989 to 1995). JICA implemented three technical cooperation projects and the UTH was designated as the project implementing counterpart for the Zambian side until July 2004 when this evaluation study was conducted.

A series of cooperation activities was aimed at establishing the diagnostic capacity for infectious diseases control in Zambia. They were focused on the establishment and capacity building of the virology laboratory of the UTH in the initial stage of this cooperation. After the virology laboratory acquired the necessary technology and facilities, the targets of cooperation were extended nationwide through the participation of the EPI Programme, Polio Eradication Programme, and HIV sentinel survey. As a result of an evaluation of the Infectious Diseases Control Project, JICA judged that the Virology Laboratory and TB Laboratory had already acquired the diagnostic technology for the target diseases in the initial stage of the cooperation, namely, for diarrhoea, ARI, Hepatitis, polio, and measles. Thus, since 2001, JICA has focused the targets of cooperation on HIV/AIDS and TB, which have become the foremost public health problem in Zambia.

Unlike the cooperation projects in Ghana and Kenya, the buildings of the virology and TB laboratory were not constructed through the grant aid scheme, but by using the budget for project-type technical cooperation.

In this evaluation study, projects were evaluated as a package of cooperation measures concerning infectious diseases control that were implemented after 1989. (see Table 6.1).

Table 6.1 Target Projects for the Evaluation

Project title	Scheme	Execution period (fiscal years)
Infectious Diseases Project Phase I and F/U	TCP	1989.4～1995.3
Infectious Diseases Control Project	TCP	1995.4～2000.3
Dispatch of individual experts (two person)	Individual experts	2000.4～2001.3
HIV/AIDS and TB Control Project	TCP	2001.3～2006.3

Prepared by the investigation team

The components of JICA's cooperation are summarised in Table 6.2.

Table 6.2 Components of JICA's Technical Cooperation with the UTH

	89	90	95	00	05
Main changes in the health sector in Zambia		▲Health Reform starts National Health Strategic Plan ▲ is started User fee system is introduced ▲ National AIDS/STD, TB and leprosy ▲ control programme is drawn up	CBoH is established ▲ Japan-USAID Cooperation is started ▲ VCT is started ▲	National Measles Immunization Campaign ▲ NAC is established ▲ ART is started ▲	
JICA Technical Cooperation Projects		Infectious Diseases Project Phase Ⅰ・F/U ➢ Establishment of the diagnostic methods for infectious diseases in the laboratory ➢ Nosogenesis analysis from patient samples ➢ Standardization of the treatments for infectious diseases	Infectious Diseases Control Project ➢ Improvement of the diagnostic methods ➢ Epidemiological and clinical research involving inpatients and communities ➢ Strengthening surveillance in infectious diseases control ➢ Improvement of the diagnostic techniques in rural hospitals ➢ Effective use of research outputs through the project	HIV/AIDS and TB Control Project ➢ Improvement of diagnosis quality, data management and laboratory management ➢ Introduction of diagnostic and surveillance techniques for HIV/AIDS and TB to rural hospitals ➢ Promotion of diagnostic methods among laboratory technicians in rural hospitals ➢ Effective use of HIV/AIDS and TB information through projects in a national programme ➢ Establishment of a network with working groups	
Expenditures from JICA Technical Cooperation		Establishment of Virology Lab. →	Establishment of TB Lab. →		
Objectives of the JICA Programme		Establishment of the Diagnostics Capacity of the Virology Laboratory at the UTH	Expand the targets to other health facilities		
Role of the UTH in the country/ Africa region.		Teaching hospital National Reference▲ Laboratory (HIV)	WHO National Reference▲ Laboratory (influenza) Joint research with ▲ international institutes WHO Inter-countries Reference Laboratory (polio)▲	▲WHO National Reference Laboratory (measles)	

Prepared by the investigation team

(2) Components of the JICA Cooperation by Diseases

As shown in Table 6.2, each project targeted several diseases, and research was carried out on specific diseases of which outbreaks occurred during the period covered by several projects. In consideration of this situation, project activities were rearranged on the basis of the incidence or occurrence of the diseases.

A series of JICA technical cooperation activities targeted Viral Diarrhoea, Acute Respiratory Infections (ARI), Hepatitis, Polioviruses and other Enteroviruses, Measles, HIV/AIDS, and TB. The components of this JICA technical cooperation are summarized below (the activities of each project, inputs by JICA, such as the dispatch of experts, and C/P training and equipment provision are given in the Annexes).

1) Polioviruses and other Enteroviruses

The World Health Organization (WHO) set the year 2000 as the target for the global eradication of poliomyelitis. The most important elements for meeting this challenge are increasing the vaccine coverage and improving the surveillance capacity for precisely assessing the epidemiological status of poliomyelitis.

The virology laboratory at the UTH conducted studies on the polio antibody ratio among elementary school children and antibody formation stemming from OPV inoculations and strengthened the surveillance system for polio. As a member of the WHOAFRO polio laboratory network, the laboratory also conducted diagnoses of Acute Flaccid Paralysis (AFP) samples sent from Zambia and Tanzania between 1993 and 2000.

The Virology Laboratory was designated as a polio inter-country reference laboratory by the WHO and polio surveillance activities became an important task of the virology laboratory even after polio activities conducted through JICA's cooperation ended in 2000.

2) Measles

There were cyclical epidemics of measles every two to three years, although the vaccine coverage for measles was about 60% between 1986 and 1983 in the Lusaka Urban area. Therefore, the Virology Laboratory at the UTH clarified and accumulated epidemiological information on measles to solve this problem through a series of studies. It was confirmed through a hospital-based survey between 1992 and 1995 that many children were exposed to measles before the vaccination age (9 months in Zambia). This result suggested that the age of vaccination for infants was inappropriate.

In addition, about one third of measles cases during this period had been vaccinated, which also suggested a low vaccine efficacy in this population.

3) HIV/AIDS

Zambia has one of the highest HIV infection rates in the world. Consequently, HIV/AIDS greatly threatens the nation's development. From 1985, when the first AIDS patient was reported in Zambia, the number of AIDS patients increased to 3,155

and the number of HIV infected people grew to 12,815 by June 1990. In addition, the proportion of HIV patients hospitalized at the UTH rose from 10 percent in 1986 to 1987 to 30 percent in 1990, and measures to cope with the situation became urgent. HIV/AIDS-related activities, especially improved diagnostic technology and services were provided from 1989 through JICA cooperation. Initially, the Virology Laboratory at the UTH implemented training activities for laboratory technicians and later contributed to the organization of the HIV Sentinel survey, its implementation, and quality assurance (QA) of the test results. The Virology Laboratory was designated as a national reference laboratory in 1992.

In 1999, the GRZ started Voluntary Counselling and Testing (VCT), which was implemented in 46 locations throughout the nation in 2001, but this was increased to 101 locations by mid-2003 and to 176 locations as of April 2004. The Virology Laboratory at the UTH also provided guidance to the staff of the VCT programme and for HIV counsellors. The Virology Laboratory is also trying to implement the Dynabean method, an inexpensive CD4 count method, in all provincial hospitals in Zambia.

4) TB

In Zambia, short-programme chemotherapy for tubercular patients was introduced in 1982. As a consequence, treating patients over a short period was made possible and the number of outbreaks has decreased.

However, TB, which is an opportunistic infectious disease, has been increasing with the spread of HIV since 1985. The TB laboratory was therefore established and research on TB was started as a part of JICA's cooperation from 1989. Techniques for the identification of TB, and sputum culture were transferred as a part of infectious diseases surveillance in the initial stage. Research on a drug-resistant bacterium became the main activity after 2001. In addition, human resources development, such as the retraining of laboratory technicians, and quality assurance in the rural microscopy centres were executed.

5) Viral Diarrhoea

There was previously little knowledge available on the distribution and aetiology of viral diarrhoea in Zambia, although diarrhoea is one of leading causes of morbidity and mortality in children. The Virology Laboratory therefore conducted a series of studies on viral diarrhoea from 1989 to 2000 in cooperation with JICA.

The diarrhoea pathogens and seasonal fluctuations in rotaviruses were elucidated through the aetiological and epidemiological studies on rotaviral diarrhoea in the UTH and Urban Health Clinics in Lusaka. Studies on the association between rotaviruses and HIV in children with acute diarrhoea were also conducted, although no significant difference in the positive rate for rotaviruses was confirmed between HIV positive and negative children with acute diarrhoea.

6) ARI

Of the patients hospitalized in the UTH general paediatrics ward in 1988, 30 to 50% suffered from upper respiratory infections. However, no study on viral respiratory infections was conducted due to the lack of virology-related diagnostic facilities in Zambia. When the Virology Laboratory was built through the infectious diseases project in 1992 research on viral respiratory infectious diseases began.

As a result of this research, routine diagnostic techniques for virus isolation using microplates was established, and Influenza Virus A and B infections were identified in Zambia for the first time. Studies on the Respiratory Syncytial Virus (RSV) were also conducted during this period. These research activities were continued until 2000.

7) Hepatitis

According to the blood bank in Zambia, about 10% of blood donors were classified as carriers of Hepatitis B in the early 1990s, although information on hepatitis was very limited during this period. Thus, the Virology Laboratory at the UTH conducted research on hepatitis to assess the current status of hepatitis in Zambia during the 1989 – 2000 period. In particular, the research focused on Hepatitis B, and the importance of horizontal transmission control among hospitalized children was recognized through this research. The Virology Laboratory at the UTH also established the serum diagnostic techniques for the hepatitis virus as part of this research.

6.2 Outline of Communicable Diseases Control in Zambia

An outline of infectious diseases control in Zambia is summarised as follows to clarify the roles and functions of the Virology Laboratory and the TB Laboratory as research institutions for infectious diseases control in Zambia.

6.2.1 Disease Structure

A breakdown of the disease load in terms of the number of health clinic outpatients in 1999 showed that malaria was at the top of the list, followed by ARI and diarrhoea. However, data on HIV/AIDS and TB was not included in these statistics due to the unreliability of the data.

Currently, the foremost public health problem is HIV/AIDS. As explained earlier, the rapid increase in the number of HIV/AIDS patients has contributed to the drop in the average life expectancy from 55 years in 1980 to 33 years in 2004. In addition, in conjunction with the HIV/AIDS epidemic, opportunistic TB infection has also increased. According to the CBoH, the reported ratio of new tuberculosis patients was an average of about 100 (87.7 to 127.6) per 100,000 people from 1964 to 1984, but after 1985, when the first HIV/AIDS patient was reported, the reported ratio of new TB patients rapidly increased and rose to 409 cases in 1996. The number of reported TB patients in 1996 was 38,863. Although data after this period does not exist, the MOH has projected that the number of cases will reach 50,000 by 2005.

According to the 2002 health statistics of the CBoH, the prevalence and morbidity rates for malaria were the highest among those for infectious diseases. Moreover, it is estimated the infant mortality rate for children under five years of age due to malaria in Zambia was nearly 40% and the mortality rate for pregnant women was about 20%. According to a 2001 UNICEF report, nearly 42 percent of all children under five years of age suffered from acute malnutrition and ARI. In recent years, cholera and measles epidemics and a high MMR have also become serious problems. Major causes of death stemmed from complications during the perinatal period (26%), puerperal fever (25%), and septic fever after delivery (26%).

6.2.2 Communicable Diseases Control by the MOH

(1) Development Plans in the Health Sector

The PRSP, which was approved in April 2002, gives priority to seven programmes, including the Basic Health Package, which aims to provide exemption from user fees for public health services to vulnerable groups, improve access to health care, and raise standards of public health. The elements of these public health priorities are in line with the National Health Strategic plan (2001-2005).

Within the Zambian context, health sector reform is being sustained to improve the efficiency, equity and effectiveness of the health sector, so the National Health Strategic Plan 2001-2005 has designed a 5-year plan with 19 strategic objectives. Public Health Priorities, of which concern for infectious diseases control is one of objectives, are described within the framework of an integrated approach to health care, as shown in Table 6.3.

Table 6.3 Public Health Priorities in the National Health Strategic Plan

Diseases/Health conditions	Approach
Malaria	Provision of insecticide-treated mosquito nets according to the "Roll Back Malaria" initiative and the improvement of techniques for malaria diagnosis for medical worker (refer to the following "National Roll Back Malaria Strategy")
HIV/AIDS, TB and STI	Activities of the "National HIV/AIDS/STI/TB Intervention Strategic Plan" such as a prevention strategy, support treatment and care, support for patients (refer to the following "National HIV/AIDS/STI/TB Intervention Strategic Plan")
Integrated reproductive health	Including family planning, safe motherhood, adolescent health, abortion and post-abortion care, infertility and (sexual) violence against women
Child health:	Aims at reducing morbidity and mortality due to childhood diseases
Mental and oral health	Creating the appropriate framework and mechanisms for strengthening mental and oral health activities and programmes
Epidemics	Improved public health surveillance and the control of epidemics.
Hygiene, sanitation and safe water	Promotion of personal hygiene, proper refuse disposal and access to safe water and the implementation of other critical aspects of environmental health as will be elaborated in the National Environmental Health Policy

Source: Ministry of Health (2002), National Health Strategic Plan 2001-2005

(2) Implementation System for Communicable Diseases Control

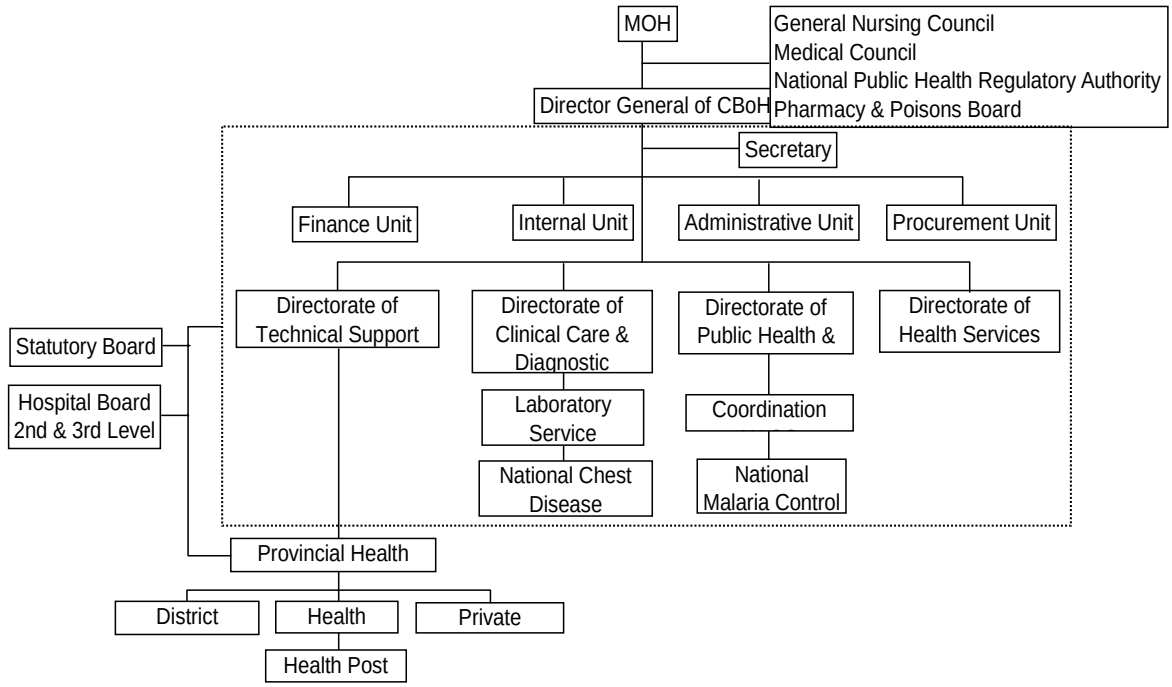
The role and structure of the MOH has changed in line with the National Health Services Act of 1995. The administration of the health system has been divided into four main groups of institutions, the MOH, the CBoH, the District Health Boards (DHB), and the Hospital Management Boards (HMB). The MOH is the policy-making body for the health sector, while the CBoH is the national administrative and health policy implementation unit. The CBoH is responsible for the overall technical management of the services that will implement and operate government health policies. The CBoH is responsible for the provision of health services through autonomous management boards at the district, second and third referral hospital levels.

The headquarters of the CBoH operates as the national coordinator of health services delivery with four technical directorates (see Figure 6.2):

- Directorate of Technical Support Services: responsible for conducting performance audits of the health boards, monitoring and providing technical support for services provision, and capacity building of the health boards
- Directorate of Clinical Care and Diagnostic Services: responsible for planning, monitoring, and evaluating the provision of diagnostic and pharmaceutical services
- Directorate of Public Health and Research: responsible for developing guidelines on epidemiology, environmental health, health promotion, and mental health, for developing and maintaining the HMIS, and for facilitating research on all health activities
- Directorate of Health Services Planning: responsible for the planning and contracting of health services, providing financial management, developing

partnerships in health, and providing national level human resources planning and training

Figure 6.2 Organizational Chart of the CBoH



Source: Ministry of Health (2000), National Health Strategic Plan 2001-2005

The HMB has responsibility for the management of the second and third level hospitals in Zambia. Each DHB organizes District Health Management Teams consisting of medical experts for all 72 provinces in Zambia, and supervises institutions for primary health care services delivery. The DHB also has facilities where the community health workers and traditional birth attendants work.

In line with the promotion of decentralization as a part of health sector reform, the DHBs have their own budgets. Regarding the implementation of infectious diseases control programmes, such as the "National HIV/AIDS/STI/TB Intervention Strategic Plan", the DHB in each province prepares an individual programme or project in line with the national programme through close communication with the CBoH, and implements its own programme or project.

(3) National Communicable Diseases Control

1) Malaria Control

The GRZ has prepared the National Strategic Plan for Roll Back Malaria based on the "Roll Back Malaria" initiative that was adopted by WHO in 1998. The overall goal of the national Roll Back Malaria strategy is to reduce malaria morbidity and mortality in Zambia to 50% of current rates by 2010.

This strategy comprises seven main strategic elements, such as program management and health system development, insecticide treated nets (ITN), and case management. The direction of these strategies is towards a comprehensive approach involving medical workers, the private sector and communities for prevention using ITN, the monitoring and case management of anti-malarial drugs, and IEC (Information, education and communication) activities.

- Program Management and Health System Development: focus on strengthening the delivery systems at the district level
- Insecticide Treated Nets: distribution of insecticide treated nets to the extent possible through existing systems and resources
- Case Management: ensure the availability of effective anti-malarial drugs and improvement of health workers skills in the management and diagnosis of malaria
- Targeted Vector Control and Epidemic Preparedness: effectively implement a framework for the IRS and district rapid response teams in place
- IEC: increase community health seeking behaviour and empower health providers to ensure the effective implementation of health promotion
- Monitoring and Evaluation and Surveillance: improve malaria information systems in the target districts
- Research: apply improvement plans to other regions as a result of research in the target districts

2) HIV/AIDS Control

In 2002, Zambia declared HIV/AIDS as a national disaster, and established the National Aids Council (NAC) as the highest national body with the authority to coordinate a national response to HIV/AIDS/STD/TB. The mandate of the NAC is to coordinate, monitor and evaluate inputs, activities, outputs and impacts of HIV/AIDS programmes.

The National HIV/AIDS/STI/TB Intervention Strategic Plan (NAISP) (2002-2005) has been developed through a participatory and highly consultative process, involving the Secretariat of the NAC, NGO stakeholders, representatives of the CBoH and government ministries as well as cooperating development assistance partners. The main strategic targets under the NAISP are: 1) to reduce HIV/AIDS prevalence in the 15-19 age group through the implementation of communication campaigns for changes in multi-scrotal behaviour , 2) to decrease the MTCT rate of HIV by increasing access to quality presentations on MTCT services, 3) to make all blood, blood products and body parts safe for transfusion and to promote the use of sterile syringes, blades, and needles by strengthening all screening centers and adopting infectious control measures, 4) to improve the quality of life of HIV/AIDS infected persons, 5) to provide appropriate care, support and treatment for HIV/AIDS infected persons, and 6) to provide improved care and support services for orphans and vulnerable children.

The objectives and actions under the NAISP are shown in Table 6.4.

Table 6.4 Objectives and Actions under the NAISP

Objective	Action
Prevention and control	Information, Education and Communication, Life Skills, Voluntary Counselling and Testing, Barrier methods and Condoms, Provision of Safe Blood Transfusion Services, Treatment of STIs, Prevention of Mother to Child Transmission
Treatment, Care and Support	Treatment of Opportunistic Infections and STIs, Access to Anti-Retroviral Drugs, Availability of Traditional/Alternative Remedies, Provision of appropriate Nutrition
Support for the affected and infected	Continuum of care for PWA, Strengthen Home Based Care, Orphan care, Caring for Care Providers
High risk and vulnerable groups	Poverty Reduction, Aid to high risk groups: commercial sex workers, prisoners, refugees, truckers, fish traders, etc.
Human Rights, Stigma, Discrimination and Ethical Issues	HIV Testing, Partner Notification, Stigma and Discrimination, Persons with varying physical or cognitive abilities, Awareness education for Children and Young People, Prevention of the Willful Transmission of HIV
Gender	
Research and Development	Research, Vaccine Development
Monitoring and Evaluation	

Source: National HIV / AIDS / STI / TB council（2003）, National HIV / AIDS / STI / TB Intervention Strategic Plan 2002-2005

Zambia has received $US1.96 billion from the Global Fund against Tuberculosis, Malaria and HIV/AIDS for a period of five years to help infectious diseases control against HIV/AIDS and malaria. It has also received financial assistance from PEPFER and the Zambia National Response to HIV/AIDS Project (ZANARA). NAISP is implemented through the use of these budgetary resources to support the focus on HIV/AIDS.

3) TB Control

TB has been a major public health problem for Zambia since it became independent in 1964. It has spread throughout the country, especially among the young and economically productive adults. The National Tuberculosis Control Program (NTP) was initially established in 1964 and was based on the provision of anti-tuberculosis drugs.

The problem of TB has been worsened by the HIV/AIDS pandemic in Zambia since 1985. Thus, the MOH has strengthened the NTP through the unification of the TB Working Group and Leprosy Working Group in 1999 to serve as an advisory body to the MOH on matters pertaining to TB and leprosy control activities. In conformity with the NTP, the following are the key interventions;

Technical Support: It is vital that technical assistance at all levels ensures that TB control activities are adequately carried out. A TB/Leprosy Control Officer at the CBoH will coordinate activities at the central level, providing technical assistance to the provincial level. A similar structure is required at the provincial level. The integration of functions can occur at the district level up to the health centre level as long as the provincial level can provide the needed technical support and supervision and training with assistance from the CBoH.

- Capacity Building: A clear system for training all cadres of health staff in the principles of tuberculosis control with the development of curricula and training modules to meet the need or demand
- Diagnosis: The provision of a network of smear microscopy services in all areas should be improved through the quality of diagnosis. The provision of quality control through the Central Reference Laboratory (CRL) and a programme of training will ensure high quality diagnostic services
- Case Detection: Education of health staff on the signs and symptoms of TB to improve the ability to correctly recognize suspected TB patients and leading to the initiation of correct diagnostic procedures and improved diagnosis of TB.
- Drugs and Supplies: Ensure an uninterrupted supply of drugs and laboratory supplies with adequate buffer stocks at the Central and District level by assuring the availability of funds allocated for the purchase of these drugs and supplies. The cycle for the ordering of drugs should be cognizant of the long lead times required within the context of the International Tender System.
- Information System: In order to ensure the capacity to conduct a proper analysis of the status of TB treatment and its outcomes, the Health Management Information System (HMIS) should be updated to include additional parameters for TB management indices.
- Reduction of Stigmas: The production and dissemination of appropriate messages regarding TB, its treatment and its relationship to HIV in order to reduce the social stigma attached to contracting TB. Any reduction in such stigmas will improve the health seeking behaviour or attitude of suspected TB patients, thereby increasing the identification of passive cases
- Collaboration with Community-Based Organizations: Ensure effective collaboration with community-based organizations (CBO) in order to ensure the achievement of widespread DOTS coverage within the context of an uninterrupted supply of TB drugs.
- Private Sector: Provide an environment through which effective collaboration can be established between the public and private sector for the provision of quality TB care.

4) Implementing Structure for Research on Infectious Diseases

Table 6.5 lists three other research institutes for infectious diseases control under the jurisdiction of the MOH.

Table 6.5 Implementing Structure for Research on Communicable Diseases

Organization	Outline
Tropical Diseases Research Center (TDRC)	TDRC was initiated by WHO in collaboration with the GRZ. In 1981, TDRC became a National Institution for research, training, and services in diseases of public health importance in Zambia. To this effect, TDRC became the first and foremost national resource dedicated to priority health problems in Zambia and a facility for the training of national and regional health service personnel. It is a statutory body under the MOH with the mandate to conduct epidemiological and clinical research. Activities of the TDRC include epidemiological and clinical research on malaria, schistosomiasis, African trypanosomiasis, HIV/AIDS, micronutrient deficiencies, health systems research, health impacts, health project implementation and policy evaluation, training and services.
Chest Diseases Laboratory (CDL)	The CDL has been established as the national reference laboratory for TB. The CDL conducts routine activities and research on mycobacteriology services such as smears, cultivation, drug sensitivity testing and national quality control services for smear tests. In 2003, the CDC upgraded its facilities and equipment for the CDL and provincial/ district microscopy centers using a grant (US$1 million) to improve TB treatment and monitoring.
National Malaria Control Center (NMCC)	NMCC is a research centre that is managed by the Malaria Secretariat of the Directorate of Public Health and Research of the CBoH. NMCC conducts collaborative research with foreign institutes such as WHO, UNICEF, USAID NGOs, and universities (CDC, Boston University, etc) to realise the Roll Back Initiative for Malaria.

Prepared by the investigation team

The Virology Laboratory of the UTH has been designated as an inter-country reference centre for polio and a national reference laboratory for HIV/AIDS, influenza, and measles. The TB Laboratory of the UHT is an executing agency for external quality assurance (EQA) for the TB microscopy centres in Lusaka Province. The TDRC (HIV reference laboratory) and the CDL (a national reference laboratory for tuberculosis) have the same role as the Virology and TB Laboratories of the UTH. However, in the case of HIV, the Virology Laboratory is in charge of the northern region and the TDRC is in charge of the southern region. The TB Laboratory of the UHT has also been designated as a support institution for the CDL, and both laboratories have complemented their respective roles in TB control.

6.2.3 Assistance provided for Communicable Diseases Control by Other Donors

(1) Type of Assistance

SWAp was introduced into the health sector in Zambia with the formulation of the National Health Policies and Strategies: Health Reform by the MOH in 1992. The health sector basket funds consist of the District Basket Fund (DHB), which was started in 1994, and the Hospital Basket Fund, which was started in 2003. The DHB was used as an operating fund for health services (primary health services) and the Hospital Basket Fund was used as an operating fund for the second and third level hospitals.

In 1999, the Memorandum of Understanding (MOU), which stipulated a shared sector programme, was signed between Zambia and other donor countries, except for Japan. The bilateral donor signatories were the Netherlands, DANIDA, DFID, GTZ, Irish

Aid, SIDA, USAID, and the EU and the international institutions were UNICEF, UNFPA, UNDP, WFP, WHO, UNAIDS, and the World Bank. The MOU is not legally binding and there is no mandatory funding. As of 2004 to the present, the only donors who have officially participated in the SWAp, while contributing funds, are DANIDA, SIDA, DFID, the Netherlands, and the EU. Participating donors hold an annual consultative meeting (once a year), a health sector committee meeting (biannually), and a MOH/CP policy consultative meeting (monthly). The MOH/CP policy consultative meetings are held between the MOH and donor agencies to hold policy level discussions. The health sector committee meetings are held to review each basket fund accounting report and to approve expenditures. The annual consultative meeting is the highest level donor meeting where an activity report on the entire health sector and the fiscal year activity report are approved. In addition, the Monitoring and Evaluation Sub-committee, consisting of the Netherlands, Sweden, Ireland, Japan, UNICEF, and the Statistics Bureau of MOH, hold weekly meetings.

Japan, Canada and Norway are allowed to participate in the donor meeting, are given the floor, and are also provided information related to donor coordination. The JICA Zambia Office explained that bilateral cooperation implemented by Japan has not been influenced by the promotion of the SWAp. However, official development assistance is expanding based on the SWAp, and as a non-participating donor, the activities of Japan are not described in the annual action plan prepared by the MOH. Thus, the visibility of Japan is also limited in the aforementioned donor meetings.

(2) Contents of Development Assistance

By pooling their development funds in a common basket fund, each donor has supported the national health strategy plan, while implementing a project approach in specific areas. In March 2004, general core donor groups centred on the DfID were created for each major health sector issue and a framework based on coordinated and effective assistance between donors was established. In the area of infectious diseases: the World Bank, the Netherlands, WHO, UNAID, and JICA were designated as members of the donor group for HIV/AIDS; USAID, WHO, and JICA as members of the donor group for TB; and USAID and WHO as members of the donor group for malaria. The major types of assistance and the major issues addressed by each donor are shown below (see Table 6.6).

Table 6.6 Main Programmes of Donor Agencies (2003)

Organization	SWAp	Chaired subject	Programme
DFID	○	SWAp	Health reform Health and education programmes Strengthening the quality of life project HIV/AIDS programmes
Embassy of Netherlands	○	HIV/AIDS Monitoring and Evaluation Resource provision	National drug policy Strengthening district health programmes Strengthening district hospital programmes
DANIDA	○	Procurement	Strengthening district health programmes Strengthening district hospital programmes
EU	○	Procurement Monitoring and Evaluation Resource provision	Strengthening district health programmes Strengthening district hospital programmes
SIDA	○	Human resources development Resources provision	Health reform Strengthening district health programmes Strengthening district hospital programmes
World Bank	○	HIV/AIDS	HIV/AIDS support programme (ZANARA)
WHO		HIV/AIDS Monitoring and Evaluation Child Health Tuberculosis Malaria	Child health programmes Strengthening district health programmes EPI/NID, vaccination programmes
UNICEF		Child Health	EPI/NID, vaccination programmes IMCI（PMTCT） PHC programmes
UNFPA		Reproductive Health	PMTCT for HIV/AIDS
UNAIDS		HIV/AIDS	Coordination of National HIV/AIDS programmes
USAID		Reproductive Health Child Health Tuberculosis Malaria	National HIV/AIDS programmes HIV/AIDS support through PEPFER

Prepared by the investigation team

6.2.4 Position and Roles of the Virology Laboratory and the TB Laboratory of the UTH in Communicable Diseases Control

All laboratories at the UTH serve as public health laboratories for the country, and the research activities of the UTH laboratories are consulted every two weeks through the special committee composed of the representative of the CBoH, School of Medicine, Zambia University, the managing director and deputy managing director of the UTH, and two representatives of the MOH. The activities of the Virology and TB Laboratories are also judged by the special committee, thus they are in line with the policies of the GRZ.

The Virology Laboratory of the UTH has been designated as an inter-country reference site for polio and a national reference laboratory for HIV/AIDS, influenza, and measles. The Virology Laboratory also participates in the disease surveillance programmes implemented by the CBoH. The TB Laboratory of the UHT is an executing agency for external quality assurance (EQA) of the TB microscopy centres in Lusaka Province.

The positions of both laboratories regarding control of the main diseases are as follows.

(1) HIV/AIDS

As aforementioned, the Virology Laboratory of the UTH has been designated as a national reference laboratory for HIV/AIDS, and it conducts training for technologists of the sentinel survey implemented by the CBoH and EQA for HIV testing. As mentioned above, there are two national reference laboratories for HIV/AIDS in Zambia, namely the Virology Laboratory of the UTH and TDRC. Both these national reference laboratories have demarcated their area of operations; the Virology Laboratory is in charge of the northern region while the TDRC is in charge of the southern region. The Virology Laboratory also trains personnel in HIV testing and disseminates inexpensive the CD4 counting method for technologists in provincial hospitals and VCT programmes.

All of these activities by the Virology Laboratory are implemented based on JICA's cooperation.

(2) TB

The TB Laboratory of the UHT has been designated as a support institution for the national reference laboratory for TB (CDL), and is also designated as an executing agency of the EQA for 22 TB microscopy centres in Lusaka Province. All of these activities of the TB Laboratory are implemented based on JICA's cooperation.

The major tasks of the Virology and TB Laboratories at the UHT are testing and diagnostics training for medical personnel and university students, surveillance, and research. According to the head of the Virology Laboratory, testing and diagnostics are given the highest priority, then training, surveillance and research. Although research is given the lowest priority among the major tasks, the Virology Laboratory has conducted continuous collaborative research on EPI-related diseases, HIV/AIDS, TB, etc., with foreign institutes.

The UTH provides educational services such as 3-year clinical training for undergraduate and post-graduate students as a teaching hospital affiliated with the university. Both laboratories of the UTH also provide educational services for these students. As for retraining for medical personnel, the Virology Laboratory holds training courses on HIV diagnosis for VCT and PMTCT centres. In addition, the laboratory holds short-term training courses based on requests from the organization concerned. For instance, HIV diagnosis training courses were held for health workers in the Defence Force three times, in September and October 2003, and August 2004.

The Virology Laboratory provides diagnostic services and also epidemiological information on infectious diseases nationally and internationally as the WHO inter-country reference laboratory for poliomyelitis, and the national reference laboratory for HIV/AIDS, influenza and measles. The TB Laboratory also conducts external quality control for microscopy centers in Lusaka Province.

The roles of the Virology and TB Laboratories in infectious diseases control are shown in Table 6.7.

Table 6.7 Roles of the Virology and TB Laboratories in Communicable Diseases Control

Main Role	Activities
Research	Research and diagnosis on Viral Diarrhoea, Polio, Measles, ARI, Hepatitis, HIV/AIDS, and TB
Human Resources Development	Training and education for medical personnel, undergraduate and post-graduate students
Health Services	Information services such as a reference laboratory, external quality assurance for TB microscopy, dispatching staff to national response systems in relation to emerging and re-emerging infectious diseases, technical advice for health programmes and committees

Prepared by the investigation team

JICA's cooperation covers all diseases targeted by both the Virology and TB Laboratories.

6.2.5 Relationship between the Virology and TB Laboratories and Other Organizations Involved in Communicable Diseases Control

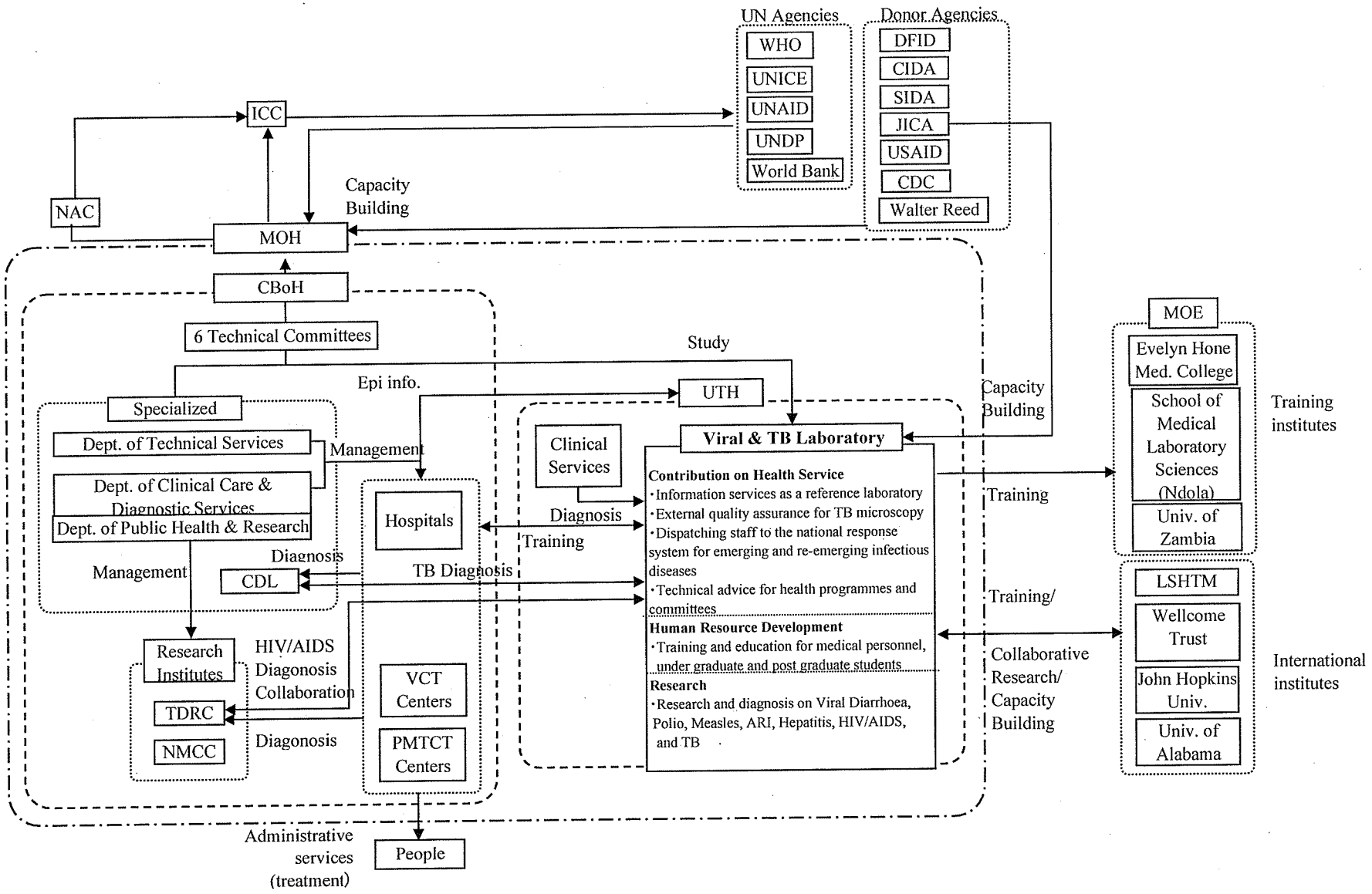
Zambia's infectious diseases control programmes are mainly implemented by the CBoH. The Department of Public Health and Research of the CBoH consigns research and studies required for infectious diseases control to the infectious diseases research institutes, such as the TDRC, the virology and the TB laboratories of the UTH, in order to obtain the required data. Using this data, the relevant departments of the CBoH prepare the action plans for infectious diseases control and inform the hospitals and health facilities regarding this.

If an infectious disease epidemic occurs in a rural area, the TDRC or UTH will diagnose the specimens sent by the rural hospitals. If the TDRC is incapable of diagnosing some of the specimens, the UTH will be asked to diagnose or identify them. The epidemiological data that is obtained through this process is disseminated to the MOH and the WHO.

The HIV Sentinel survey is conducted by the TDRCs in the northern region and by the Virology Laboratory at the UTH in the southern region. In addition, quality assurance for TB microscopy centers is conducted by the TB Laboratory at the UTH in Lusaka Province and by the CDL for all other provinces.

The relationship between the Virology and TB Laboratories and Other Organizations Involved in Infectious Disease control in Zambia is shown in Figure 6.3.

Figure 6.3 Relationship between the Virology and TB Laboratories and Other Organizations for Communicable Diseases Control



Prepared by the investigation team

6.3 Contribution of the Virology Laboratory and the TB Laboratory of the UTH to Communicable Diseases Control Based Cooperation Provided by JICA

The Virology Laboratory and TB Laboratory of UTH have largely developed their research infrastructure and research capacity based on cooperation with JICA. Collaborative research with foreign institutes is also implemented by the Virology Laboratory.

The Virology Laboratory and the TB Laboratory of UTH have contributed to improving infectious diseases control through the dissemination of research outputs and diagnostic techniques among medical personnel, and by having research outputs reflected in the health services of the GRZ.

The research outputs that contributed to human resources development or health services are summarized below according to the disease.

6.3.1 Contribution to the Control of Each Disease

(1) Establishment of National Surveillance Network on Viral Communicable Diseases

JICA had assisted activities for the establishment of surveillance systems for EPI diseases and HIV/AIDS since the beginning of its cooperation. The Virology Laboratory of the UTH has largely contributed to the establishment of a surveillance network in Zambia through this cooperation and to various surveillance systems implemented by the CBoH as a reference laboratory for polio, measles and HIV/AIDS. As a result of these activities, the wild poliovirus has not occurred in Zambia since 1997. WHO plans to dispatch a team for the authorization of Zambia as a polio free country in 2005.

1) Contribution to Polio Eradication

For poliomyelitis, surveillance relies heavily on laboratory services. Since AFP has multiple causes, laboratory isolation of the wild poliovirus from the stools of patients is necessary for the confirmation of poliomyelitis.

The Virology Laboratory of the UTH was the only the laboratory that had adequate cell culture facilities for isolating the poliovirus in Zambia. In cooperation with the EPI Programme and Polio Eradication Programme, the Virology Laboratory of the UTH conducted workshops to improve the surveillance capacity of laboratories in provincial and district hospitals. In order to establish the surveillance structure for polio, the Virology Laboratory held ICTPs between 1994 and 2003 for doctors and technologists in provincial and district hospitals (see Table 6.8).

Table 6.8 List of ICTPs

Title	Period	No. of participants
Epidemiology and Control of Vaccine Preventable Viral Diseases	27 Jan. 1994	N.A.
Reverse Cold Chain Workshop	19-24 Oct 1994	N.A.
HIV and Tissue Culture Workshop	8-11 Sep 1994	N.A.
Department of Pathology and Microbiology, Departmental seminar	11 Nov. 1994	N.A.
Infectious Diseases of Viral Organs	26 Sep 1995	226 (Doctors and technicians)
Workshop on HIV Testing / Polio Eradication (Kitwe)	Jan. 1996	
Workshop on HIV Testing / Polio Eradication (Lusaka)	May 1996	
Workshop on HIV Testing / Polio Eradication (Lusaka)	March 1997	
Training Workshop for HIV testing and Polio Surveillance (Lusaka)	March 1998	
Training Workshop for HIV/STDs & TB testing and Polio Surveillance (Lusaka)	March 1999	

Prepared by the investigation team

The doctors and technologists who were trained in the workshop worked for national surveillance on polio. In the national surveillance on polio, all samples collected by those working in rural laboratories were sent to and were diagnosed by the Virology Laboratory of the UTH.

The workshops held after 1996 covered not only polio, but also HIV testing.

The Virology Laboratory has also played the role of a national and inter-country reference laboratory. The Virology Laboratory investigated stool samples collected from children with AFP in Zambia (131) and Tanzania (197) in the period 1993 to 2000. As a result, thirteen cased of wild poliovirus 1 – associated AFP were identified in Zambia (7) and Tanzania (6) between the period 1994 to 1997 (see Table 6.9 and 5.10).

Table 6.9 Results of Virus Isolation from Stool Samples of AFP Cases in Zambia

Unit: Sample

Strain	1993/4	1995/6	1997/8	1999/2000
Polio 1 (Wild)	0	7	0	0
Polio (vaccine type)	0	0	1	0
Non-polio enteroviruses	4	6	1	2
No virus isolation	7	48	31	24
Total	11	61	33	26

Source: JICA Infectious Diseases Control Project (2000), Viral Infections and Tuberculosis in Zambia 1989-2000

Table 6.10 Results of Virus Isolation from Stool Samples of AFP Cases in Tanzania

Unit : sample

Strain	1994/5	1996/7	1998/9	1999/2000
Polio 1 (Wild)	3	3	0	0
Polio (vaccine type)	5	0	1	3
Non-polio enteroviruses	1	0	6	0
No virus isolation	12	24	88	51
Total	21	27	95	54

Source: JICA Infectious Diseases Control Project (2000), Viral Infections and Tuberculosis in Zambia 1989-2000

Based on these surveillance results, CBoH strengthened vaccine immunization activities, such as national immunization days. As a result of activities carried out by related organization such as the MOH and the Virology Laboratory of the UTH, the wild poliovirus has not been seen in Zambia since 1997. WHO plans to dispatch teams for the authorisation of Zambia as a polio free country in 2005.

In addition, as the inter-country reference laboratory for polio, the Virology Laboratory has contributed to polio eradication activities in neighbouring countries through the diagnosis of about 700 samples of suspected cases annually from Tanzania and Zambia. The Virology Laboratory identified one imported case from Angola in 2001.

2) Contribution to Measles Control

National surveillance on measles utilises the same system and laboratories as the polio surveillance system. As the national reference laboratory for measles, the Virology Laboratory tests all suspected samples in Zambia. In addition, the Laboratory dispatches staff members to the target area for sample collection.

The Virology Laboratory provided technical advice to the CBoH for the planning of the national measles campaign and also conducted monitoring activities such as a study on the change in the prevalence rate of measles before and after the campaign. Thus, the Virology Laboratory has also contributed to the establishment of a surveillance system, and the implementation and monitoring of actual surveillance.

Based on the research outputs, the Virology Laboratory recommended that WHO lower the vaccination age from 9 months of age. However, the Immunization Plan is made for the African region as a whole with the support of WHO. The South African Region to which Zambia belongs selected other measles control measures, not the lowering of the vaccination age.

3) National HIV Surveillance

The HIV status of antenatal care recipients at 24 sentinel sites has been examined through the Sentinel Surveillance of HIV/AIDS and Syphilis. The Virology Laboratory at the UTH has performed the confirmatory results and quality assurance of sentinel surveillance since the laboratory was recognized as a national reference laboratory on HIV/AIDS.

The Virology Laboratory was responsible for the Southern Region (sites in Southern, Western, Lusaka, Central and Eastern provinces) and TDRC, and another national reference laboratory was responsible for the remaining areas. All of the specimens

collected at the sites were diagnosed by laboratory technicians at the site of the laboratories. These technicians acquired the necessary techniques from the ICTP for HIV/AIDS held by the Virology Laboratory at the UTH, as mentioned above. The Virology Laboratory of the UTH contributed to providing reliable epidemic information on HIV/AIDS through its activities to improve the accuracy of the sentinel survey for HIV/AIDS.

4) Publication of Guidelines/Manuals

The Virology Laboratory at the UTH has published the following guidelines and manuals. These guidelines and manuals were distributed to and utilised by laboratory technicians throughout the country.

- National Guidelines for Infectious Diseases
- Laboratory Manual for Technicians in Zambia
- Surveillance guidelines and laboratory testing guidelines for notifiable viral diseases
- Laboratory Manual on HIV and Related Diseases

Besides these guidelines and manuals, the Virology Laboratory at the UTH also provided the CBoH with technical support when the CBoH published the EPI manual.

These manuals were distributed to technicians and medical personnel in Zambia, and were utilized for improving diagnostic techniques and implementing surveillance. The virology laboratory at UTH contributed to strengthening the diagnostic capacity of the rural laboratories and national surveillance system through the preparation of guidelines and manuals. The Virology Laboratory was revising the Laboratory Manual for Technicians in Zambia in August 2004 when the field survey for this evaluation was conducted.

(2) Promotion of ART

Zambia has recently embraced the WHO/UNAIDS global 3 by 5 ART programme whose aim is to have 3 million people in the developing countries on antiretroviral treatment by the end of the year 2005. Through this programme, the GRZ intends scaling up access to ART from the 4,000 in 2004 to 100,000 people living with HIV/AIDS (PLWHA) by the end of 2005. The GRZ has already allocated K12 billion (US$3 million) for the purchase of ARV drugs. The government ART programme began with two pilot sites at the UTH and Ndola Central Hospital (NCH) at first, then expanded nationwide.

The Virology Laboratory at the UTH has contributed to promoting ART through the following.

1) Dissemination of inexpensive technologies for CD4 count testing

The GRZ has established an ART centre in each provincial hospital in Zambia to promote ART. The Virology Laboratory at the UTH has supported this exercise by introducing CD4 count techniques for ARV monitoring to each of these centres.

During this technology dissemination, the Virology Laboratory of the UTH introduced the Dynabead method in consideration of its cost effectiveness and the simplicity of the technique as shown in Table 6.11.

Table 6.11 Comparison of CD4 Count Methods

CD4 Count Methods	Equipment (US$)	Test Cost (US$/test)	Work time (Min/test)	Max. Test Number (Test/6hr-day)
Total lymphocyte count	30,000	1.5	2	80-120
Flow cytometry (FACSCalibur)	82,000	14	5	40-60
FACSCount	42,000	13	5	40-60
Dynabead	4,500	3	10-15	12-18

Source: UTH (2004), UTH-JICA Newsletter 1 Jan. 2004

The Virology Laboratory of the UTH also conducts follow-up surveys at these nine ART centres every three months. In addition, the laboratory also donates equipment such as Dynal magnets, microscopes, rotators, and micropipettes to all these ART centres. The ART centres conduct CD4 counts using the Dynabead method with the support of the Virology Laboratory of the UTH.

As mentioned above, the Virology Laboratory also contributed to improving the diagnostic accuracy of VCT and PMTCT centres through training in rapid HIV testing for counsellors, nurses and midwives who are involved in VCT and PMTCT services and quality assurance and quality control for these tests.

Thus, the Virology Laboratory of the UTH assists ART centers and VCT and PMTCT centers in the accurate diagnosis of patients by providing technical support and consumable items.

2) Monitoring Drug Resistance

The Virology Laboratory at UTH, being the only centre with facilities for the genetic typing of HIV strains, has taken the lead in monitoring emergent resistance to ARV drugs. The laboratory contributed to strengthening the monitoring of drug resistance through the implementation of a baseline survey in Lusaka, the development of a protocol for resistance monitoring, the selection of sentinel sites throughout the country, and the training of staff at these sentinel sites.

3) Training for Laboratory Technicians

The Virology Laboratory at the UTH held ICTPs for HIV testing together with ICTPs for polio eradication between 1994 and 1999, and also held ICTPs for rapid test kits for HIV targeting 460 laboratory technicians and counsellors in hospitals, health centres and for VCT/MTCT from 2001 to 2003.

The Virology Laboratory at the UTH also prepared and disseminated a "Laboratory Manual on HIV and Related Diseases", and provided technical assistance to the CBoH for preparing the "HIV/ART and Syphilis Infections Training Manual". These manuals are disseminated to laboratories and medical personnel in Zambia for the training of laboratory technicians.

As mentioned above, the establishment of a diagnostic system for HIV/AIDS is urgently required in Zambia due to the adoption of the 3 by 5 ART programme. The Virology Laboratory at the UTH contributed to capacity building for laboratory technicians who participate in ART through the training of laboratory technicians and counsellors in hospitals, health centres and the VCT/MTCT programmes besides the dissemination of the laboratory manuals.

(3) External Quality Assessment for Microscopy Centres

The TB laboratory of the UTH has undertaken to improve the reliability of TB diagnostic services by introducing EQA.

As a part of the ICTP, the TB laboratory trained 46 technicians and technologists from 22 TB microscopy centres in Lusaka Province. One week training sessions were conducted for groups of 15 technicians per session. In addition, the participants were also introduced to the EQA guidelines.

The results of diagnostic examinations when comparing the diagnostic capacity of technicians before and after training shows that the diagnostic capacity of all 46 technicians was significantly improved. In addition, these technicians were continually monitored for their diagnostic capacity, and are provided training again if necessary. The diagnosis capacity of the 22 microscopy centers in Lusaka Province was significantly improved through the training and monitoring by the TB Laboratory of the UTH.

All microscopy slides diagnosed by the microscopy centers are required to be stored for sampling surveys by the TB Laboratory of the UTH as a part of EQC. This EQA enhances the Directly Observed Treatment Short-course (DOTS) by accurately determining TB patients, thus resulting in the early diagnosis and treatment of patients.

(4) Diagnosis of Samples from Hospitals

Besides the research activities on infectious diseases control, the Virology Laboratories diagnose samples from patients of the UTH and private hospitals. These services directly bring benefits to patients of the UTH. More than 9,000 samples from patients have been diagnosed annually (see Table 6.12).

Table 6.12 Number of Virology Laboratory Services Provided to the UTH and Private Hospitals

Unit: tests

	2001	2002	2003	2004
No. of HIV tests*	746	875	1,869	2,710
UTH	741	581	1,787	2,708
Private	5	294	82	2
No. of CD4 count tests	-	1,711	700	2,979
UTH	-	1,242	282	1,486
Private	-	469	418	1,493
No. of Viral Load tests	-	420	483	400
UTH	-	206	145	59
Private	-	214	338	341
No. of Hepatitis tests	33	733	710	753
UTH	32	732	704	753
Private	1	1	6	0
No. of RPR tests (STD)	1,112	2,912	2,911	2,232
UTH	1,054	2,577	2,722	2,052
Private	58	335	189	180
No. of RF tests*	79	283	189	166
UTH	78	257	178	166
Private	1	26	11	0
Total	1,970	6,934	6,862	9,240

Prepared by the investigation team

The Virology Laboratory of the UTH contributed to sustaining the health status of the population through the production of sophisticated diagnostic techniques transferred in the process of JICA's cooperation.

(5) JICA's Cooperation with the Virology Laboratory and TB Laboratory

As mentioned above, JICA has supported various types of research activities for infectious diseases since the establishment of the Virology Laboratory and TB Laboratory of the UTH. The research capacity of both laboratories established through the technical cooperation provided by JICA has been utilized or applied in the implementation of surveillance and reference services. Diagnostic techniques transferred through JICA training have been disseminated to medical personnel such as technicians in public hospitals and VCT, etc.

As mentioned in 6.2.4, all target diseases of the Virology Laboratory and TB Laboratory of the UTH were covered in JICA's cooperation activities. It was confirmed that both laboratories have conducted activities for human resources development for four diseases and the improvement of health services for five diseases (see Table 6.13)

Table 6.13 JICA Cooperation in Diseases Control

Target diseases	Research	Human Resources Development	Contribution to Health Services		
			Surveillance	Reference	Direct Contribution to the Population
Polio	○	○	○	○	―
Measles	○	○	○	○	―
ARI	○	―	○	○	―
HIV/AIDS	○	○	○	○	―
TB	○	○	○	○	―
Viral Diarrhoeal	○	―	○	―	―
Diagnosis of Samples from Hospitals	―				○

Prepared by the investigation team

6.3.2 Achievements of JICA Cooperation

As mentioned in Section 6.3.1, both laboratories have contributed to infectious diseases control through cooperation with JICA. JICA's cooperation contributed not only to disease control, but also to capacity development in both laboratories. The achievements of JICA's cooperation for capacity development in both the laboratories are described as follows.

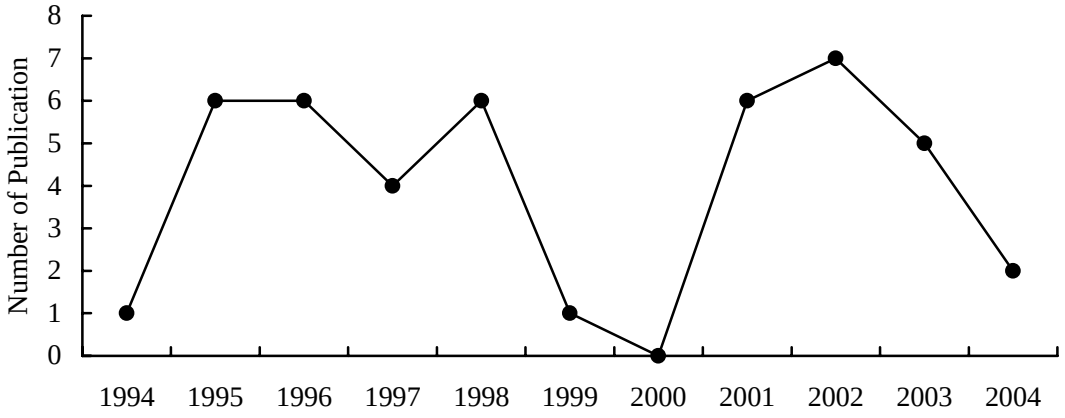
(1) Capacity Development of the Virology Laboratory and TB Laboratory

As mentioned in Section 6.1.3, JICA's cooperation aimed to establish diagnostic capacity for infectious diseases in Zambia

The Virology Laboratory has functioned as a WHO national reference laboratory for influenza and measles, and also as a WHO inter-country reference laboratory for polio without any assistance from JICA, since JICA's cooperation for influenza, measles and polio was terminated on 2000.

In addition, the research outputs of both laboratories have appeared in internal/external journals (see Figure 6.4)

Figure 6.4 Number of Publications Contributed by the Virology and Tuberculosis Laboratories



Prepared by the investigation team

Both laboratories have consistently published papers almost every year, although the number of publication has fluctuated since the scale and capacity of the institute is smaller than NMIMR and KEMRI.

The Virology Laboratory has operated as a WHO inter-country reference laboratory for more than three years, and both laboratories have published papers almost every year. This research capacity has been developed based on JICA's continued cooperation.

(2) Infrastructure Developments

In contrast to NMIMR and KEMRI, whose facilities were developed by Japanese grant aid, the facilities and equipment of the Virology Laboratory and TB Laboratory of the UTH were developed through technical cooperation provided by JICA.

The infrastructure and equipment developed by JICA enabled the Virology Laboratory to implement collaborative research with foreign institutes. This collaborative research with other foreign institutes also improved the research capacity of the Virology Laboratory of the UTH through equipment and technology transfers.

(3) Strengthening the Capacity for Research Implementation

It would not be an exaggeration to state that most of the research infrastructure and research capacity of both these laboratories of the UTH are the outputs of assistance from Japan.

Both laboratories have been assigned infectious diseases control functions by the MOH as reference laboratories, and the Virology Laboratory has the capacity to conduct collaborative research with foreign institutes. This capacity also enables both laboratories to continuously obtain or procure research grants from foreign institutes, and to strengthen their financial base.

The budget of the UTH consists of the budget from the GRZ, income from fees collected, referral income and other income. The budget from the GRZ consists of two parts, one is an operational grant for medical services, and the other is for personnel costs. In the "Action Plan and Budget for 2003", the UTH projected about K69.4billion (US$147.7 thousand) as income in 2003 (see Table 6.14).

Table 6.14 Projected Income of the UTH in 2003

Unit: Kwacha

Source of Income	Amount
Projected allocation	28,895,000,000
- Operational grants	4,895,000,000
- Personnel costs	24,000,000,000
Projected Income from fees collected	2,394,000,000
Referral income	654,000,000
Other income	8,529,000,000
Total Projected funds	69,367,000,000

Source: University Teaching Hospital (2003), Action Plan and Budget for 2003

The Department of Laboratory Services was allotted 969 million Kwacha (about 2 million US dollars) in 2003 from the above budget. A part of this budget allocated to the Virology and TB Laboratories consists of fixed expenditures.

The Virology and TB Laboratories rely for their development expenditures on grants from their foreign partners. Although JICA is one of the main partners of the Virology and TB Laboratories, the laboratories have many other partners for research collaboration (see Table 6.15).

Table 6.15 Collaborating Institutions of the Virology and TB Laboratories in 2004

Cooperating Institution	Funding Organization	Budget	
		(US$)	Note
Johns Hopkins University	NIH	N.A.	
London School of Hygiene and Tropical Medicine	Burroughs Wellcome Trust	900,000	annually
London School of Hygiene and Tropical Medicine	Thrasher Foundation	100,000	
University College London	European Union	N.A.	
London School of Hygiene and Tropical Medicine	Wellcome Trust	80,000	pounds
WHO/Ministry of Health	WHO	12,000	annually
Yamanashi Medical University, Japan/Obiken Pharmaceutical Co.	Obiken Pharma Co	100,000	
Yamanashi Medical University, Japan/Lymphotec Inc. Japan	Lymphotec Inc	N.A.	
Institute of Child Health, London	Wellcome Trust	500,000	
Institute of Child Health, London		N.A.	
Ministry of Health	JICA/NORAD	400,000	for 2 years
TDRC/Ministry of Health	CDC/JICA/SIDA	316,000	for 2 years
NAC	UNESCO/NAC	N.A.	

Prepared by the investigation team

JICA disbursed 94.52 million yen for the operational costs of the HIV/AIDS and Tuberculosis Control Project from March 2001 to November 2003 (about 34.37

million yen per year). Although the evaluation team could not confirm part of the budget with the collaborating partners, it is estimated that JICA's operational costs provided about 13% of the funds from the collaborating partners shown on Table 6.14.

The research activities described above consist mainly of joint research activities conducted with overseas research institutions. A case example of joint research implemented between the UTH and an overseas research institute in 2004 is shown in Table 6.8.

Since the equipment is commonly used not only for JICA projects, but also by other collaborating partners, the Virology and TB Laboratories introduced a sharing system for the maintenance costs among the collaborating partners, include JICA. Although some equipment has not been repaired for budgetary reasons, the laboratories are appropriately managed within the limited budget.

According to the head of the Virology Laboratory, the number of collaborative research projects has increased every year. In addition, as shown in the table above, WHO pays the Virology Laboratory operational costs for its role as an inter-country reference laboratory every year.

The Virology Laboratory's role as a WHO inter-country reference laboratory and its large income source from collaborative research are possible due to the research capacity and infrastructure developed through the cooperation provided by JICA. Technical cooperation with JICA has, therefore, contributed to strengthening the financial sustainability of the Virology Laboratory.

(4) Technical Advice to the MOH

In addition to the activities of JICA projects, the Virology and TB Laboratories are designated as members of following committees, and six staff members of the laboratories (researchers and technologists) are also appointed as members of technical working groups of the NAC to provide technical advice.

- National Polio Expert Committee
- National Taskforce for Polio Containment
- Inter-agency Contingency Committee
- National ARV Committee
- Epidemic Preparedness Committee

The capacity developed through JICA cooperation is well utilized for policy making by the MOH through these health committees.

(5) Targeted Support from the MOH

The MOH has prioritized Infectious Diseases Control since the beginning of JICA's cooperation. Under the strong leadership of the MOH, JICA has continued to cooperate with the UTH since 1989. In addition, the Zambian Project Manager for the Infectious Diseases Project became the Minister of Health from 1996 to 2000.

Due to the Minister's clear understanding of the project contents, the UTH was appropriately supported by the MOH. The support of the MOH is one of the factors contributing to the success of the JICA projects.

6.3.3 Conclusions

JICA has implemented technical cooperation with the Virology Laboratory and TB Laboratory of the UTH to establish the diagnostic capacity for infectious diseases control in Zambia. As a result, both laboratories have contributed to strengthening the diagnostic capacity of Zambia through the establishment of a national surveillance system for polio and measles, and the introduction of EQA for HIV and TB testing, etc. In addition, the Virology Laboratory has played an important role in infectious diseases control as a WHO inter-country reference laboratory for polio and as a national reference laboratory for measles and influenza. The Virology Laboratory already has the capacity to fulfil its role without any assistance from JICA's cooperation.

Both laboratories provide the function of diagnosis, which differs from NMIMR and KEMRI. Thus the contribution of both laboratories to infectious diseases control is also to provide reference and surveillance services, such as for polio eradication.

As bases for research and diagnosis as well as for the human resources development, the Virology and TB laboratories have conducted a series of activities that include the training of laboratory technicians in rural areas and the diagnosis of specimens, and have produced outputs that came up to the expectations of JICA.

In addition, the Virology and TB Laboratories contribute to human resources development by conducting clinical training for students as laboratories of the university teaching hospital and also conduct training for medical personnel.

Thus, it is judged that the Virology Laboratory and the TB Laboratory have greatly contributed to the establishment of diagnostic capacity in Zambia using the research capacity developed through JICA's cooperation.

6.4 Expected Roles of the Virology Laboratory and TB Laboratory of the UTH

The Virology Laboratory and TB Laboratory of the UTH have contributed to improving infectious diseases control in Zambia in cooperation with JICA. The expected roles of both laboratories for further contributions to infectious diseases control are summarized from the viewpoint of research and laboratory services, human resources development and their contribution to health services.

(1) Research and Laboratory Services

The virology laboratory and TB laboratory of the UTH have contributed to infectious disease control of the MOH using the research capacity developed through JICA's cooperation. The Virology Laboratory and TB Laboratory are diagnostic units of the UTH and have contributed to infectious diseases control in the areas of testing, diagnosis and surveillance. Although polio eradication has almost been achieved in Zambia, polio eradication activities are still ongoing in neighbouring countries. In addition, there have been intermittent outbreaks of measles. In view of this situation,

it is expected that the Virology Laboratory will continue to contribute to the control of EPI-related diseases as a reference laboratory.

HIV/AIDS is recognized as a national disaster in Zambia. Therefore, the Virology Laboratory is required to fulfill an important role as the national HIV/AIDS reference laboratory. In particular, the strengthening of the diagnostic capacity for HIV and opportunistic infections such as TB will be one of the main issues for the health sector due to the adoption of the global 3 by 5 ART programme.

RVT is a new development, and involves many research topics for the future. It is also estimated that CVT, a participatory regional health activity will also be one of the important issues for operational research. Thus, it is expected that the Virology and TB Laboratories will continue to conduct activities to strengthen their diagnostic capacity.

(2) Human Resources Development

The Virology Laboratory and TB Laboratory held a series of training courses including workshops for technicians in provincial and district hospitals aimed at HIV and polio surveillance, introducing inexpensive the CD4 counting method to provincial hospitals, and introducing quality assurance systems to microscopy centers in Lusaka province. In particular, a series of workshops on HIV testing and polio eradication largely contributed to the establishment of the national surveillance system for HIV/AIDS and polio.

A national surveillance system for polio and measles has already been established in Zambia based on the series of cooperation activities supported by JICA. It is expected that the Virology Laboratory will strive to maintain the national surveillance system through the implementation of training for technicians in regional and district laboratories as required. In addition, the training of the next generation of medical personnel is also an important role of both laboratories as institutes of a university teaching hospital.

On the other hand, it is necessary to strengthen the HIV diagnostic capacity of provincial/district hospitals and VCT and to establish the EQA for TB diagnosis nationwide. Therefore, training needs will increase in the fields of HIV/AIDS and TB in the near future. It is expected that the Virology and TB Laboratories will contribute to strengthening the capacity of human resources in the health sector by conducting training in these fields.

(3) Contribution to the Health Services

Both the Virology and TB Laboratories have contributed to health services from the aspects of providing surveillance and reference services. In particular, the Virology Laboratory has made a major contribution in the field of polio, measles and HIV/AIDS control, such as through the establishment of a surveillance system and its implementation, QA for diagnosis, etc. These functions as a reference laboratory should be continued in the future.

Regarding HIV/AIDS, it is necessary to strengthen the diagnostic functions urgently due to the promotion of ART. It is also necessary to strengthen the diagnostic functions for TB, one of the typical opportunistic infections related to HIV/AIDS. As

a reference laboratory as well as being in charge of the EQA, both the Virology and TB Laboratories should contribute to strengthening the diagnostic system for HIV/AIDS and TB in Zambia.

Measles also occurs as an intermittent epidemic in Zambia. The Virology Laboratory should conduct surveillance and provide information for related organizations as the national reference laboratory for measles.

The expected roles of the Virology Laboratory and TB Laboratory in relation to infectious diseases control are summarized in Table 6.16.

Table 6.16 Expected Roles of the Virology and TB Laboratories in Relation to Communicable Diseases Control

Areas	Roles
Research	➢ Research targets are viral and bacterial infectious diseases ➢ Epidemiological surveys and studies ➢ Improving diagnostic methods using classical and modern technology, such as isolation and identification as basic techniques, and molecular analysis ➢ Drug resistance and sensitivity ➢ Evaluation of research and study results or outcomes ➢ Collaborative research with institutes, universities and hospitals within the country or overseas.
Human resources development	➢ Pre-service training for students of universities and colleges. ➢ Retraining in diagnostic techniques for medical workers. ➢ Technical transfer of diagnostic methods and QC/QA to provincial / district hospitals.
Health Services	【Surveillance Services】 ➢ Contribution to the national response system for emerging and re-emerging infectious diseases 【Reference Services】 ➢ Reporting to CBoH/MOH as a national reference laboratory ➢ Reporting to WHO as a national and inter-countries reference centre ➢ Dissemination of testing and diagnosis technology 【Others】 ➢ Technical advice and consultation to the MOH and related programmes
Laboratory services	➢ Laboratory diagnostic service for the UTH

Prepared by the investigation team

Annex 6.1 Activities of the UTH-JICA Programme

	Infectious Diseases Project Phase I and F/U	Infectious Diseases Control Project	HIV/AIDS and TB Control Project (at the point of Dec. 2000)
Diarrhoea	➢ Study on seasonal fluctuations in rotaviruses ➢ Study of the relationship between rotaviruses and HIV ➢ Study of diarrhoea pathogens at Urban Health Centres	➢ Identification of two diarrhoea pathogens through electron microscopic studies	
ARI	➢ Isolation of the influenza virus	➢ Appointment as a national reference laboratory by WHO ➢ Continuous field studies and diagnosis of pathogens at Urban Health Centres	
Hepatitis	➢ Survey of Hepatitis B in pregnant women and blood donors ➢ Horizontal transmission control in childhood	➢ Technical support for immunological diagnosis of hepatitis ➢ Survey on Hepatitis B in pregnant women and blood donors ➢ Horizontal transmission control in childhood ➢ Study of pathogens in hepatic failure ➢ Epidemiology of Hepatitis A and C	
Polio	➢ Isolation of Echo3 virus from patients who are suspected of contracting polio ➢ Isolation of the polio virus and vaccine assays	➢ Appointment as a national reference laboratory by WHO ➢ Increasing the sample numbers through the surveillance system	
Measles	➢ Proposal of inoculation period (under 9 months year) and review of vaccine quality control method to MOH and WHO	➢ Strengthening of the surveillance system and the detection of five outbreaks	
HIV/AIDS	➢ Diagnostic activities through a hospital network in the national reference laboratory ➢ Technical training for laboratory technicians in hospitals nationwide	➢ Technical support for immunological diagnosis of HIV ➢ Appointment as the national reference laboratory on HIV diagnosis ➢ In charge of quality control for the national survey in 1998 ➢ Establishment of the PCR method for HIV diagnosis ➢ Establishment of analytical methods using serological tests and CD4/CD8 counts using flow cytemeters	➢ Technical support for the evaluation of anti-HIV drugs, assay of drug resistance, surveillance and analysis of HIV immuno reactions at the UTH laboratory ➢ Evaluation of HIV test kits, data management of diagnosis and quality control of test kits ➢ Training for laboratory technicians and counsellors in rural hospitals, health centers and VCT/MTCTs (17 times for a total of 460 persons) ➢ Expansion of the number of VTC/MTCT centres from 30 to 106 (by Dec. 2000), and the number of examinations (approximately 380,000 tests)
Tuberculosis		➢ Identification of TB through the examination of sputum and tissue cultures	➢ Training for surveillance on the examination of drug resistance, the introduction of MIGT methods, finger print methods and the DDH method ➢ Surveillance of drug resistant bacteria in Lusaka Province and the establishment of quality control systems in rural TB centres (demarcation with CDC) ➢ Retraining in basic diagnostic techniques for TB testing (6 times in total 81laboratory technicians) ➢ Guidelines on external quality control of diagnosis

Prepared by the investigation team

Annex 6.2 Inputs by JICA

Annex 6.2.1 Dispatch of JICA Experts

	Infectious Diseases Project Phase I and F/U				Infectious Diseases Control Project *1				HIV/AIDS and TB Control Project*2				Total			
	Long term		Short term		Long term		Short term		Long term		Short term		Long term		Short term	
	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M	Person	M/M
Leader	2	43.3	-	-	1	56.6	-	-	1	24.0	-	-	4	123.9	0	0.0
Coordinator	1	24.4	1	10.2	2	58.1	-	-	3	72.0	-	-	6	154.5	1	10.2
Virology	2	63.6	4	3.7	2	36.0	4	2.8	-	-	-	-	4	99.6	8	6.5
Pediatrics	2	57.5	4	3.0	1	12.0	-	-	-	-	-	-	3	69.5	4	3.0
Medical Equipment	2	53.6	1	0.7	-	-	-	-	-	-	-	-	2	53.6	1	0.7
Bacteriology	-	-	1	0.4	2	33.9	1	0.7	-	-	-	-	2	33.9	2	1.2
Immunology	-	-	-	-	1	24.0	6	6.6	-	-	-	-	1	24.0	6	6.6
HIV/AIDS	-	-	-	-	1	10.1	-	-	3	66.5	7	5.9	4	76.6	7	5.9
TB	-	-	-	-	-	-	-	-	1	2.1	1	0.4	1	2.1	1	0.4
Public Health	-	-	-	-	-	-	-	-	1	36.0	-	-	1	36.0	0	0.0
Cooperation Planning	-	-	2	0.7	-	-	-	-	-	-	-	-	0	0.0	2	0.7
Clinical Research	-	-	1	0.4	-	-	-	-	-	-	-	-	0	0.0	1	0.4
Epidemiology	-	-	-	-	-	-	3	3.9	-	-	-	-	0	0.0	3	3.9
Construction	-	-	3	11.0	-	-	-	-	-	-	-	-	0	0.0	3	11.0
Total	9	242.3	17	30.1	10	230.7	14	14.0	9	200.6	8	6.3	28	673.6	39	50.4

Note *1 Two individual experts (HIV/AIDS and Bacteriology) dispatched from April 2000 to March 2001 are included in the Infectious Diseases Control Project
*2 Data until November 2003.

Prepared by the investigation team

Annex 6.2.2 Counterpart Training in Japan

	Infectious Diseases Project Phase I and F/U		Infectious Diseases Control Project		HIV/AIDS and TB Control Project*1		Total	
	Persons	M/M	Persons	M/M	Persons	M/M	Persons	M/M
Virology	9	102.1	5	48.5	1	12.1	15	162.7
Bacteriology	2	24.0	2	17.4	1	6.1	5	47.5
Pediatrics	4	20.6	-	-	-	-	4	20.6
Hospital Management	1	0.7	-	-	1	0.5	2	1.2
Immunology	-	-	3	25.2	-	-	3	25.2
Epidemiology	-	-	-	-	1	0.7	1	0.7
HIV/AIDS	-	-	-	-	2	4.8	0	0.0
TB	-	-	-	-	2	6.6	0	0.0
Medical Equipment	2	8.6	-	-	-	-	2	8.6
Total	18	156.0	10	91.1	8	30.8	36	277.8

Note ∗1 Data until November 2003.
Prepared by the investigation team

Annex 6.2.3 Budgets for the Programme

	Infectious Diseases Project Phase I and F/U		Infectious Diseases Control Project		HIV/AIDS and TB Control Project*1	
JICA						
Equipment	JP¥	345,000,000	JP¥	211,270,000	JP¥	91,703
Operational Costs			JP¥	117,716,000		
Construction	JP¥	30,000,000				
Others					JP¥	2,814
Total	JP¥	375,000,000	JP¥	328,986,000	JP¥	94,517
UTH						
Operational Cost			US$	8,740		

Note: Excluding personnel costs
∗1 Data up to November 2003.
1 US Dollar = 110 Japanese Yen (as of November 2003)
Prepared by the investigation team

Section 3

Cross-Sectional Analysis

Section 3 Cross-Sectional Analysis

7 Conclusions

In this chapter, the effects of JICA's cooperation involving the three research institutes are examined and the similarities are analysed. At the end of the evaluation analysis, the direction for cooperation with the research institutes will be presented in the form of recommendations.

7.1 Effects of Cooperation with the Research Institutes

JICA cooperation with the NMIMR and KEMRI has focused on the enhancement of their research capabilities, while cooperation with the UTH Virology Laboratory and Tuberculosis Laboratory has been implemented for the purpose of the establishment of diagnostic capabilities for dealing with infectious diseases. In reviewing the relationship between each research institute and the respective supervising agency, NMIMR is a semi-autonomous institution under the University of Ghana, KEMRI is directly under the jurisdiction of the Kenyan Ministry of Health, and the UTH is the parent organization of the UTH Virology and Tuberculosis Laboratories, and is itself under the jurisdiction of the Ministry of Health (hospital facilities) and the Ministry of Education (school of medicine facilities).

As a result of the evaluation study, it has been found that the three institutes contribute to infectious diseases control through similar functions of research/diagnosis, human resources development, and surveillance/reference services under the framework of the functions of infectious diseases control, although their positioning as research institutes differs. The three research institutes, which have accepted long term technical transfers and facilities establishment, have now become centres of excellence for their respective countries and regions. Moreover, each research institute conducts research in line with the national health policies and contributes to enhancing public health.

According to the past project evaluation reports, the objects of JICA cooperation have been the three research institutes and the expected effects of cooperation have not been beyond research and human resources development. However, as can be seen from the fact that each research institute dispatches researchers to health programmes and committees organized by the health ministries and provides technical advice, and representatives of the health ministries are engaged in the management of the research institutes, JICA cooperation has affected administrative decision-making through the research institutes, and the institutes themselves conduct personnel training in relation to public health.

As shown in the case of the research institutes for infectious diseases control described in Chapter 2, the functions of each research institute include not only research, but also public health services such as human resources development, surveillance and reference services. As for the target research institutes for the evaluation study, JICA has strengthened the framework for the functions of these research institutes, which has led to enhanced infectious diseases control for their nations as a whole.

The following are the common effects of JICA cooperation at the three research institutes elucidated through the evaluation study.

(1) Relationship with the Ministries of Health and Communicable Diseases Control

The NMIMR is a semi-autonomous research institute affiliated with the University of Ghana, while KEMRI was attached to the Ministry of Research, Technical Training and Technology (MRTTT) until 1999. Project evaluation reports have pointed out that the collaborative relationship between the two institutes and their Ministries of Health has become weakened and administrative changes that reflect the results of research have not been sufficiently established. However, as of 2004, when the evaluation study was implemented, the evaluation team confirmed that the three target research institutes, including the UTH, can now access administrative routes that make it possible to have the results of research reflected in infectious diseases control by the relevant Ministries of Health. For instance, NMIMR has held annual meetings and exchanges of ideas with the Ministry of Health since 2000, on the other hand, KEMRI has established its position as a core research institute for infectious diseases control in Kenya after its transition into a supervising agency of the Ministry of Health. Moreover, the UTH Virology Laboratory and TB Laboratory are regarded as national laboratories of Zambia, and miscommunication with the Ministry of Health no longer exists.

At present, the three research institutes conduct research through collaboration with their respective Ministries of Health, and they are regarded as research institutes for the purpose of infectious diseases control in each of the countries.

(2) Contributions as Reference Laboratories and Collaborating Centres

The NMIMR, the KEMRI, and the UTH Virology and Tuberculosis Laboratories conduct testing and quality assurance in the process of infectious diseases control as reference laboratories, which cannot be replaced by any other laboratory in these countries or the surrounding countries. In particular, the UTH Virology Laboratory has contributed to eradicating polio in Zambia in cooperation with the Polio Eradication Programme.

As can be seen, in the case of Japan, the USA, and the UK, reference services are one of the main functions of research institutes concerned with infectious diseases. Through the provision of reference services by the research institutes, epidemic information can be kept updated and measures to contain the situation can be taken. For example, the test results for measles specimens obtained by the NMIMR in Ghana were used by the Ministry of Health in their decision to implement NIDs. In addition, the UTH Virology Laboratory has contributed to eradicating polio in its role as a reference laboratory.

The activities of reference laboratories do not directly benefit the populace, but indirectly help citizens to maintain their health. They also contribute to health policies and health administrative services.

(3) Synergistic Effects on Technical Cooperation and Improved Foundations for Research

The facilities of the three target institutes of the evaluation study have been developed through Japanese assistance. Through this Japanese assistance, the research capacity

of the institutes has been developed as a result of the conduct of high level research using the established research facilities.

The research facilities provided through Japanese cooperation were essential for the acquisition of the advanced technology transferred from the Japanese counterparts. In addition, the establishment of a foundation for advanced research makes it possible to carry out joint research activities with overseas research institutions. Moreover, conducting joint research activities with overseas institutions has further enhanced the research capacity of each institute. Furthermore, the institutes, which are dependent on external research subsidies, are able to strengthen their financial basis through these joint research activities with overseas research institutions.

(4) Human Resources Development

All three research institutes, the NMIMR, KEMRI, and UTH, are top-level institutes in their respective countries, and function not only as research institutes, but also as training facilities in the field of health and medicine. Each institute conducts technical training activities for health and medical personnel, as well as for graduate and undergraduate students. Moreover, the researchers at the NMIMR and KEMRI lecture at national universities in their respective countries.

Of the three institutions, the NMIMR and KEMRI are involved in JICA's third country training programmes. In contrast to KEMRI, which jointly implements third country training programmes with JICA, the NMIMR's third country training programmes for EPI diseases are jointly conducted by both JICA and the WHO. Even after JICA terminated cooperation, the NMIMR's third country training programme for EPI diseases has been jointly conducted with the WHO. In recent years, the NMIMR and KEMRI have been implementing third country training as a basis for WASIPAC and ESACIPAC, respectively, for international parasite control and have established their position as centres for human resources development for the surrounding countries.

As mentioned above, the three research institutes have strengthened their functions as research institutes in terms of facilities and research capabilities, and they are engaged in human capacity development in the field of health and medicine. In particular, the three research institutes promote the development of medical personnel who are expected to directly contribute to infectious diseases control by providing training in diagnostic techniques and the techniques required for national surveillance.

(5) Contribution to Communicable Diseases Control through Health Programmes and Commissions of the Ministries of Health

Besides the above-mentioned services, each research institute dispatches researchers to health programmes and committees organized by their respective Ministries of Health, and provide advice to these ministries. The achievements of JICA cooperation have contributed to infectious diseases control by these governments in the form of technical assistance to health programmes and committees outside the scope of the research institutes, although this was not originally anticipated as an effect of cooperation.

7.2 Roles of the Research Institutes

JICA has implemented cooperation with the target research institutes for the purpose of enhancing health services by ensuring that the institutes function as bases for research and diagnosis for infectious diseases control and human resources development. The three research institutes became representative research institutes for infectious diseases both in their respective countries and in their regions through Japanese assistance in terms of techniques and their establishment as bases for research since each of them started. Despite the different relationship with respective to the ministry of health and the division of work with other related organizations, the research institutes have common functions comprising research/diagnosis, human resources development and contributions to health services.

As a result of the evaluation study, the evaluation team has confirmed that the institutes fulfil the functions expected of research institutes for infectious diseases control. The functions of such research institutes are analysed and their role in terms of acting as bases for research/diagnosis and human resources development are described in the following.

(1) Research

A certain period of time is required to enable the results of basic research to be reflected in practical infectious disease control, although basic research is important in itself and essential to progress in medical sciences. Each research institute has accumulated epidemic information on infectious diseases in Africa by conducting joint research with overseas research institutions. On the other hand, JICA cooperation has focused on applied research, including polio vaccine potency testing, the development of blood test kits, and so on, which has directly led to the enhancement of infectious diseases control. Moreover, each institute conducts research based on needs derived from health policies, and the results of research are applied by administrative services through annual meetings with their respective Ministries of Health and through regular reporting to these ministries.

The three research institutes are expected to continue to conduct basic and applied research based on the needs derived from health policies. The research should be strengthened in the following areas.

- Practical applied research in priority areas
- Research on emerging / re-emerging infectious diseases and parasitic diseases
- Research on infectious diseases control based on regional characteristics through operational research in order to develop preventive methods and medical cures in Africa
- Operational research through participatory approaches in order to increase the effects of infectious diseases control

In addition to infectious diseases research, practical research that is reflected in infectious disease control and which supports national health plans has been implemented. For example, epidemiological surveys, the development of diagnostic

methods and test kits, treatment methods, including vaccines, are just some examples of the work that has been carried out.

(2) Reference Laboratory/ Surveillance Tasks

Each institute utilises advanced diagnostic techniques and assists the Ministry of Health in collecting epidemiological information. As for infectious diseases surveillance by the health ministries, the three research institutes play an important role in quality control for subordinate testing institutions. In future, they are expected to provide technical advice for the health ministries based on the diagnostic findings and diagnoses of specimens sent regularly from subordinate testing institutions in their respective countries, or in surrounding countries that are unable to diagnose the specimens themselves.

Moreover, each research institute provided health services not only within the country, but also for the surrounding countries. In addition, it is important for them to promote assistance to neighbouring countries in terms of strengthening the functions of reference and surveillance. It is necessary to strengthen diagnostic functions in terms of following objectives.

- To strengthen the establishment and expansion of the epidemiological database and information transmission capacity on HIV/AIDS and emerging / re-emerging infectious diseases
- To participate in epidemiological surveys conducted by the government as representative surveillance institutions in the countries and to strengthen quality control for subordinate testing institutions
- To introduce advanced infectious disease testing and diagnosis techniques and to strengthen dissemination of these technique to related domestic medical institutions
- To strengthen infectious diseases control within the region by providing reference services to surrounding countries that do not have sufficient diagnostic techniques

(3) Human Resources Development

The three research institutes are engaged in educational activities through their affiliations as research institutes to the University of Ghana and Zambia University (NMIMR, and the UTH Virology Laboratory and Tuberculosis Laboratory) and as joint operator of the Institute of Tropical Medicine and Infectious Diseases with Jomo Kenyatta University of Agriculture and Technology (KEMRI). In addition, they conduct technical training for medical personnel and play an important role as institutes for human resources development. In particular, the NMIMR and KEMRI conduct third country training for medical personnel from the surrounding countries. In this training, they provide technical advice to subordinate testing institutions in order to ensure the smooth conduct of surveillance services by the Ministries of Health, which forms a contribution to the execution of infectious diseases control. Human resources development activities should be continued in relation to the following aspects in future.

- Development of medical researchers in the region by conducting research on infectious diseases control
- Contribution to human resources development in the field of medicine for the next generation by providing medical education and opportunities for research on infectious diseases for graduate and undergraduate students from home and abroad
- Strengthening infectious diseases control through technical transfers in third country training for medical personnel from the surrounding countries as a basis for JICA cooperation in the region

7.3 Recommendations on the Effective Use of Each Research Institute

Japan has provided continuous technical cooperation to the NMIMR, the KEMRI, and the UTH Virology and Tuberculosis Laboratories since their establishment over a period of 10 to 30 years. All three institutes have generated a synergistic effect stemming from technology transfers and the establishment of a research base, and they have grown to become research institutes representative of Africa. Presently, all are involved in joint research activities with research institutes in advanced countries and they have become focal points for medical research in Africa. On the other hand, in view of the fact that cooperation between the three research institutes is proceeding to the next stage, JICA should consider the validity of cooperation with the aim of technology transfer.

In the following, the orientation of cooperation with the research institutes is discussed in the form of recommendations based on the evaluation analysis.

(1) Joint Research

It was recognized that the three research institutes that were targeted in this evaluation study had already become leading research institutes in Africa. All three institutes are involved in joint research activities with overseas research institutions and function as WHO collaboration centres and reference laboratories. In addition, all three institutes have become self-sufficient in their activities.

JICA has implemented technical cooperation for the purpose of enhancing the research capacity of the institutes, which has been sufficiently fulfilled. For the future, there should be an examination of how to utilize the research capacity of these research institutes as development partners in the field of medicine and health in Africa. In African countries, health projects for the purpose of the examination of the effectiveness of surveillance and medical cures can be executed efficiently and effectively by entrusting it to research institutes that are familiar with local conditions.

Moreover, each research institute provides technical advice to the health ministries as a member of health committees and programmes organized by the governments. Through the strengthening of this relationship, there should be an examination of ways to more directly reflect the results of technical cooperation by JICA in infectious diseases control.

In addition, a great number of experts have been dispatched to each of the research institutes from universities and research institutions in Japan for periods of long term

JICA cooperation. At the same time, the above-mentioned institutions in Japan have hosted researchers from the target research institutes, which has deepened interaction between research institutes in Japan and Africa. In future, when JICA designates these institutes as counterparts, it is desirable that assistance measures adopt a policy aimed at fostering ownership by the other party in order to strengthen the self-reliance of each institution. It is also desirable that Japanese universities and government research institutions develop partnerships with these institutes in view of the ties that each institute has cultivated with Japan through JICA projects and to implement joint research activities on an equal basis.

On the other hand, each research institute is expected to utilize its capacity from the standpoint of the broad perspective of enhancing public heath by proactively participating in research projects implemented not only JICA, but also other foreign aid agencies.

(2) Cooperation to Maintain their Functions as Reference Laboratories

The functions of the research institutes as reference laboratories have contributed greatly to promoting EPI diseases control and ART. In particular, the role of the UTH Virology and Tuberculosis Laboratories as HIV reference laboratories is anticipated to become even more important since Zambia adopted the WHO/USAID 3X5 Initiative.

Meanwhile, it is important that each research institute participate in survey activities implemented by their respective health ministries and WHO aimed at improving the health sector and for their testing and diagnostic capabilities to be effectively utilized.

It is desirable for JICA to review the requirements of these institutes and to provide assistance in terms of maintaining the research facilities and human capacity development for renewing the facilities and equipment as needed.

(3) Utilization as Research Institutes

Each research institute is involved in implementing third country training activities in their respective countries, in addition to training activities required by the health ministries and other related institutions. Their capabilities should be adequately utilized as training facilities.

An issue that must be reviewed in future is how JICA will utilize the training functions of the NMIMR, the KEMRI, and the UTH Virology and Tuberculosis Laboratories. Possibilities include utilizing these institutes as training facilities for health projects implemented in other African countries, as support for training activities carried out independently by each institute, or consigning third country training activities to each institute as part of South-South Cooperation.

In the area of third country training activities, assistance can be provided to promote jointly implemented research activities between each institute and overseas research institutions as in the case of NMIMR, where third country training activities in EPI diseases were jointly implemented with the WHO.

On the other hand, Japanese research institutes and universities can also utilize the research institutes as a training facility for Japanese health personnel. As Japan is located in a temperate zone, it has environmental limitations with regard to its study of

tropical diseases. With JICA assistance, Japanese students and young researchers can utilize these three research institutes, which have established deep ties with Japan. An effective approach is also to develop further exchanges between Japan and African countries in the medical research field in order to promote infectious diseases research in Japan.

(4) Strengthen Regional Networks

JICA regards these institutes as bases for infectious diseases control in their respective regions; NMIMR for the West African region, KEMRI for the East African region, and the UTH for the Southern African region. JICA has implemented cooperation for infectious diseases control based on this regional division and all of the research institutes targeted in this study have been designated as WHO reference laboratories and collaborating centres and support infectious diseases control for each of their governments and regions.

In the future, after the regional networks based on the three research institutes have become established, it is desirable to promote the dispatch of third country experts and south-south cooperation. From now on, the mainstream form of cooperation in the field of health is expected to be support to ART and participatory approaches to regional public health. There should be an examination of how to promote cooperation effectively by utilising the personnel who have research experience in the three research institutes.

JICA has been implementing long term cooperation in terms of technical transfer and facility development since the establishment of the research institutes. It has been verified through the evaluation survey that as a result of JICA cooperation, each institute is acknowledged internationally as a centre for research in the health and medical fields and has sufficient research capabilities. From now on, JICA is expected to examine the orientation of its cooperation with these research institutes in order to more effectively contribute to infectious diseases control in the Africa region through proactive engagement with the research institutes.

External Review by Intellectuals

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Proposals for Future Aid Modalities in Infectious Disease Control Based on the Findings of the Evaluation on Infectious Disease Research Institutes in Kenya, Zambia and Ghana

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The Japan International Cooperation Agency (JICA) has sent two evaluation missions to three research institutions in Kenya, Zambia and Ghana as part of its integrated evaluation program. As a member of both missions, I had the impression that JICA had contributed greatly in such aspects as technology transfer that involved facilities, equipment and materials, and human resources development. When JICA started to provide aid to these three institutions 15 to 25 years ago, they were all but nothing in the field of virology. The missions learned that the institutions were given high marks by WHO and other UN organizations, health ministries and other government offices concerned in their respective countries, and health-related organizations of the donor countries. Such a high evaluation was shared by the missions themselves.

The globalization of infectious diseases and the rise of emerging infectious diseases which are zoonotic in origin are increasingly associated with the tropical regions including Africa. Attention is now paid to the need for surveillance and control of infectious diseases in these regions. Other recent developments include the modernization of research methods and the diversification of measures to control infection disease. Given these developments, it is about time that JICA reviewed the modalities and directions of its research assistance to Africa, although it must continue to address the health sector and have the perspective of public health.

Research assistance in infectious disease control should be centered on infectious disease epidemiology, which provides a basis for infectious disease control. When even an emerging infectious disease, not to mention existing infectious diseases, breaks out, infectious disease epidemiology makes it possible for the government to develop an optimal program to conquer or control the disease and for research institutions to provide data based on laboratory diagnosis for crisis management purposes. In that sense, the importance of the laboratory-based aid scheme is expected to increase more than ever.

JICA has continued to support the three institutions as key entities for infectious disease research in their respective countries. As a result, they now have highly skilled staff and state-of-the-art equipment. Specifically, JICA's technical cooperation has a track record of focusing on laboratory diagnosis--a key to combating polio and HIV/AIDS. Such a track record is highly evaluated as a unique one different from those of the western donors. As these institutions performed well over the years, they received an increasing number of requests for joint research from counterparts in western countries and UN organizations. This was reflected in the increasing percentages of joint research revenues in their total budgets. In contrast, the percentages of JICA's financial assistance fell in relative terms. Japan was

increasingly perceived as a participant in joint research. The image of Japan as a provider of aid in research was diminished.

Other entities in the Japanese donor community have recently set out their policy of supporting in infectious disease research in developing countries in Africa and other tropical regions. Among such entities are the Ministry of Health, Labour and Welfare and not least the Ministry of Education, Culture, Sports, Science and Technology. These recent developments provide more opportunities than ever for ministries to support research activities abroad. Yet such opportunities are limited in terms of research support funds. This is where JICA can come into play. The agency is in a position to provide advanced and large equipment and facilities that fit modern research methods. In fact, what these ministries are doing is largely the extension of JICA's past activities in infectious disease control. For them, venturing into countries where JICA has not laid the groundwork may be a formidable task.

In light of the findings of the evaluation, how should JICA deliver aid from now? For one thing, JICA may be able to continue with the rather unique approach it took for Zambia--an approach designed to support from the very beginning, that is, the construction of a small laboratory, and continue to provide small-scale and focused aid for research activity--if a small developing country requests aid in infectious disease control from Japan. In that case, a technical cooperation project should be designed to have a direct impact on infectious disease control and it should see the construction of a laboratory as a means, not an end itself. Such a project should also respect the perspective of public health as discussed above and take the evaluation process into account. In addition, partnership with local communities as discussed below is a viable option. Other options worth considering include the upgrading of the third country training program using the three institutions and the invitation of more junior researchers to Japan for training as part of technology transfer and human resources development.

There is an alternative approach to infectious disease control other than the laboratory-oriented approach that has been discussed above. That is the community-based approach. This participatory approach, which stresses coordination with community activities, is attracting attention because of two major background factors. First, it is becoming clear that efforts by the government sector alone are insufficient in controlling infectious diseases. The second factor is a brain drain. The lack of health care providers is a serious problem in developing countries.

Although it is based on public health, the community-based approach can address many other aspects, including: agriculture in the context of malnutrition, the economy in the context of poverty, civil engineering in the context of environmental sanitation and patient transportation, and school education in the context of hygiene education and other information campaigns. This multifaceted approach is designed to accommodate community needs. In that sense, it is parallel to primary health care, which stress the sustainable participation and autonomy of the local community.

The community-based approach can also support operational research based on scientific evidence, which has been already practiced in Japan. Operational research offers, and is actually offering, new areas of activity for JICA. In fact, JICA is phasing in operational research in Zambia, where the geographic information system (GIS) is providing valuable data for project planning and evaluation.

Infectious disease testing and research institutions built in Africa with Japan's ODA

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As part of Japan's official development assistance (ODA), the Japan International Cooperation Agency (JICA) has to date built medical-related facilities in many developing countries, including hospitals, testing and research institutions and vaccine production facilities. Of these medical-related facilities, three testing and research institutions of infectious diseases in Africa have recently been inspected as part of JICA's evaluation program. They are: the Noguchi Memorial Institute for Medical Research, University of Ghana (NMIMR), which was established in 1986; the Kenyan Medical Research Institute (KEMRI), with which Japan has maintained long-term relationship since 1979; and the virology and TB laboratories, Zambia University Teaching Hospital (UTH).

It should be noted that these institutions are completely different from universities and research institutions Japan established in Taiwan, Korea and Manchuria for colonial purposes before WWII. The former have been constructed with Japan's ODA, which supports self-help efforts by developing countries as part of the country's initiative to support peace and development of the international community. The latter were designed to provide protection for Japanese settlers and impose Japanese systems on these areas. Western countries also once built such institutions as part of their colonial management.

Research activity--intellectual activity to study things and phenomena scientifically--requires social overhead capital, which encompasses education and economic surplus. Developing countries that wish to have research institutions may fulfill their wishes with development aid, but may have difficulty in operating and maintaining them on their own. These three institutions inspected are now pursing their own way as institutions affiliated to universities or governments after completing the primary phase of a series of JICA's development projects. It is safe to say that the fact-finding inspection was about self-help on the part of these recipient institutions.

JICA is judged to have delivered proper aid, if these institutions are working properly, although that is the result of their self-help efforts. If they are having problems and failing to work properly, it may be inappropriate for JICA to blame the recipients. Rather, JICA might be held accountable for such a failure and a waste of long-term efforts by those involved. In addition, JICA might have to apologize to the Japanese people for the waste of taxpayers' money.

Infectious disease testing and research institutions

Infectious disease is caused by pathogens, including microorganisms and parasites. Pathogens are diverse, and so are infection routes. Although some infectious diseases such as tetanus may not be spread to other people, other infectious diseases such as influenza may

become rampant. Fears of the outbreak of an infectious disease and the occurrence of an infectious disease of unknown etiology cause social unrest. Infectious diseases may also bring about huge economic losses.

Efforts to control infectious diseases should be made at national and international levels. Controlling infectious diseases and dispelling fears for them require establishing the methods of diagnosing, treating and preventing them. Government control of social and daily activities may be necessary to prevent them from spreading. In addition, governments need to develop hospital and other medical facilities, testing and research institutions, the administrative structure and legal framework to vaccinate people.

In general, the duties of infectious disease testing and research institutions include: analytical research on pathogens, pathogeneses and protection mechanisms; development research on diagnosis methods, vaccines and therapeutic drug; diagnostic work, including the separation and identification of pathogens and serologic testing; field surveys on diseases and pathogens; quality control of vaccines, antisera, antibacterial drugs, antiviral drugs and in-vitro diagnostic agents; clinical diagnosis; and therapeutic research. The three institutions are testing and research institutions that play a pivotal role in their respective countries. Yet central institutions for infectious disease research are also required to undertake tests on behalf of domestic testing institutions and provide policy advice, as well as recommendations when asked, to governments based on scientific evidence.

Such central institutions vary in scale and type from country to country. The United States has big three central institutions: the National Institutes of Health (NIH), the Centers for Disease Control and Prevention (CDC), and the Food and Drug Administration (FDA). NIH is tasked with basic and development research, CDC with special diagnosis and field survey, and FDA with quality control. Clinical and therapeutic research is conducted by NIH and teaching hospital. In Japan, the central institution for infectious disease research is the National Institute of Infectious Diseases (NIID). NIID takes charge of basic and development research, quality control and surveillance. The needs for special diagnosis and surveys are addressed by the NIID network involving local institutes of public health. NIID is dwarfed by the U.S. big three institutions, as university research institutions have traditionally dominated the field of basic and development research and still play the central role in this field in Japan.

Japan's testing and research institutions for infectious diseases may date back to the Institute for Infectious Disease (IID), which was established in 1892 and headed by Dr. Shibasaburo Kitasato under the jurisdiction of the Ministry of Home Affairs. As Dr. Kitasato was not on good terms with the ministry, IID was later placed under the control of the Ministry of Education and became affiliated with Tokyo Imperial University (now the University of Tokyo). Dr. Kitasato himself left IID and established his own research institute. IID then developed as the central research institution of infectious disease. In its pre-war prime, the institute was a large organization whose operations ranged from basic and development research to clinical diagnosis and therapeutic research and to the production and quality control of vaccines and serum products. It even had a teaching hospital for clinical diagnosis and therapeutic research. After WWII, under the direction of the occupied forces, IID was dissolved and reorganized into the National Institute of Preventive Medicine (NIPM) under the control of the Ministry of Health and Welfare, with its original function of quality control of biologics relinquished. NIPM and the National Institute for Leprosy Research were combined to form the National Institute of Infectious Diseases.

Although the testing and research institutions inspected by the evaluators play central roles in testing and research of infectious diseases in their respective countries, they remained university affiliated institutions except for KEMRI; NMIMR is a research institution affiliated with the University of Ghana and the virology and TB laboratories are testing facilities affiliated with the University Teaching Hospital (UTH). As the case of Japan mentioned above suggests, however, central institutions in charge of testing and research of infectious diseases may well take a form that fits to the development stage of each developing country. What matters is that they fulfill their duties as central institutions discussed above and such performance is recognized at the national and international levels.

Importance of central testing and research institutions of infectious diseases

Rapid progress in science and technology in the 20th century benefited human beings, especially in the field of infectious disease control. Incidences of infectious diseases were sharply reduced in the world by both direct and indirect factors. The main direct factor was the development of antibiotics, prophylactic vaccines and other strong anti-disease agents. The indirect factors included: improvements in public health mainly thanks to sanitary water supply and sewer services; improvements in storage stability of foods and drugs with the development of cold storage equipment; advances in medical technology; the spread of the knowledge about sanitation through education and mass media; better communication with the development of telecommunications; dietary improvements; and legal framework development. A case in point was the global eradication of smallpox by the international initiative led by the World Health Organization (WHO). This epoch-making event caused many to believe that war on infectious disease all but over.

Yet infectious disease is a hard fight between two different forms of life--human beings versus pathogens. In fact, it is an endless fight. The end of the 20th century has seen the rise of a number of infectious diseases, including emerging infectious diseases such as AIDS and SARS, reemerging infectious diseases such as malaria and tuberculosis, infections with antibiotic-resistant microorganisms such as MRSA, and zoonoses such as infections with enterohemorrhagic E. Coli. It is predicted that global warming increases incidences of malaria, dengue fever and other diseases transmitted by mosquitoes living in warm-temperature regions. The problem of infectious diseases at natural disaster areas and refugee camps is likely to become even more serious, as climate changes associated with global warming will trigger more floods and other natural disasters, and unabated civil wars and struggles in many parts of the world will continue to bring about large numbers of refugees.

Industrialized countries have solved many problems in rather short periods of time in their fight against infectious disease, largely thanks to research networks they developed with central research institutions of infectious diseases at their cores. These countries have achieved a measure of success in controlling infectious diseases that are not fully controllable. In contrast, the situation in developing countries is becoming even more serious. The infectious disease problem, like other problems, is difficult to solve unless causes, triggers and contributing factors are identified and addressed on the ground.

This is why central institutions for testing and research of infectious diseases are necessary in developing countries than anywhere else. Tasked with providing advice, recommendations and answers to inquiries based on scientific evidence, such a central institution provides a useful tool to help people suffering from infectious diseases within the nation. It can do more than that. A central institution can join global networks for testing and research of infectious

diseases centering on WHO and other international institutions, and contribute to promoting the health of people in the world.

It should be remembered, however, that establishing research institutions in developing countries is a formidable challenge. For one thing, many of the developing countries lack human resources that support research institutions. Be it higher education in medicine and biology or not, it is often the case that the better researchers have performed in school, the poorer they are at laboratory work, although they are good at learning from textbooks. In the worst case, a researcher who has taken a high position without receiving laboratory training from a competent instructor may not be able to conduct laboratory work for fear of making mistakes. Japanese researchers are generally willing to perform laboratory work. Such an attitude at research institutions that they are assigned to may or may not serve as a role model for local researchers, who may be impressed but not motivated to work on their own.

Japanese researchers in infectious disease control must have taken great pains to support the testing and research institutions from their inception until they got off the ground. Their efforts led to the development of competent human resources there. Together with advanced equipment provided by Japan, these institutions seem to be highly appreciated at home and abroad. They have WHO recognition as infectious disease laboratories and are even designated as its partner laboratories. It is my hope that many Japanese researchers go to these institutions for joint research with local researchers, as the institutions have been built with Japan's aid in regions prone to infectious diseases.

Comments on the Thematic Evaluation on Communicable Disease Control in Africa

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This thematic evaluation report focuses on the Noguchi Memorial Institute for Medical Research of the University of Ghana (NMIMR), the Kenyan Medical Research Institute (KEMRI) and the Zambia University Teaching Hospital (UTH), as case studies of research institutions for which Japan has provided technical assistance in infectious disease control in Africa. Assistance to these institutions constitutes a key component of JICA's health programs in the region.

The thematic evaluation covers typical technology transfer projects to recipient institutions for the Japan International Cooperation Agency (JICA). Interestingly, however, it is not limited to the evaluation of individual institutions or projects: it also has wider implications for and recommendations on technical cooperation to research institutions in general. Moreover, the report provides useful suggestions as to the evaluation processes, including highlighting chronological developments in research institutions and JICA's assistance to them, developing a model for roles and functions of these institutions, and establishing an analysis framework for evaluation.

Comments are made on the following three aspects.

1. The importance of highlighting chronological developments in the project in evaluation

This evaluation has paid close attention to the chronological developments in the research institutions, which have undergone progressive changes over the years. Such changes largely dictate the roles and development of the JICA's technical cooperation projects themselves. It is important to evaluate JICA's projects in the context of such developments in the research institutions concerned. In this evaluation, efforts have been made to appropriately keep track of such institutional changes and place the JICA's projects in the context of these changes.

The evaluation has made it clear that JICA has had a great influence on the research institutions from their establishment. Of them, NMIMR and KEMRI have been established with JICA assistance, with grant aid as well as technical cooperation from Japan used for their facility development. UTH has also expanded its facilities and equipment using facility development funds for JICA's technical cooperation. The evaluation has also noted that the scale and role of JICA assistance have gradually declined over the years.

The evaluation has followed changes in JICA's assistance in line with the development process of the research institutions and appropriately kept track of the roles played by JICA's assistance, highlighting JICA approach that has focused on individual projects for each institution. In general, an organization sets out its policy and strategy more clearly as it develops. Under such clearly defined policy and strategy, an organization tends to launch

individual programs and projects for its development. The evaluation provides a clear picture that in the context of such a development process of an organization, JICA has shifted its focus from policies and strategies to individual programs and projects.

2. The establishment of a functional model and the applicability of program evaluation

Based on the findings of their review of the functional aspect of research institutions for infectious disease control in Japan, the U.S. and the U.K., the evaluators have established a functional model for such institutions in general and used this model as an analysis framework in the evaluation processes. Establishing such a framework has enabled the evaluators to characterize each of the three institutions in the context of infectious disease control, identify its functions and roles, and place the evaluated projects into perspective.

Although this was not the first time the relevant JICA projects have been evaluated, it was not until the evaluation this time around that these projects, as well as the institutions involved, were properly evaluated. Past evaluations on these projects failed to clearly define the functions and roles of these institutions and focused solely on the projects themselves. The lack of understanding of these functions and roles led to inappropriate analysis of the roles of these projects themselves, resulting in these projects being under-evaluated in many cases.

Such a clear definition of the functions and roles of the research institutions concerned may give rise to the possibility of regarding these JICA projects as part of a wider program for infectious disease control. Ghana, Kenya and Zambia have come to have more feasible health strategy planning than ever before. With more clearly defined policies and measures, these countries increasingly emphasize the program approach. In other words, they consider it important to place each aid project in a proper context. This evaluation accommodates such recent developments in these three countries. In fact, the clear definition of the functions and functions of the research institutions involved did provide an opportunity to cast JICA projects as part of a program.

3. The need for stressing outcomes and reviewing the aid approach

The evaluation report is short on the need for reviewing the approach of supporting the research institutions involved in terms of its outcomes and outputs. Such review is largely in parallel with the need for a transition from the project approach to the program approach.

JICA's projects to provide assistance to research institutions like the ones covered in this evaluation are often aimed at helping them gain substantial ability to conduct research on their own. The conventional wisdom within JICA seems to be that once a research institution gains such ability, the need for technical cooperation is fulfilled and the relevant project(s) should be terminated. (Such an approach is in contrast to approaches of other donor agencies and relevant institutions where they increase aid as the recipient research institutions improve their research ability.)

Such an approach in technical cooperation, however, is open to question in terms of its appropriateness. According to the program theory, the capacity to conduct research only represents the capacity to produce outputs, not the capacity to produce outcomes--changes in the target group or by extension, a society as a whole. JICA usually terminates its aid projects for research institutions once they create an environment conducive to producing outcomes.

Today, there are strong calls for development assistance to produce outcomes. In response, the donor community in the world is largely shifting its focus from outputs to outcomes. The community may not consider that an aid project for a research institution has achieved its objectives until the findings of research by the institution are put to good use for government policies, programs and projects to produce changes in the target group and possibly the society to which the group belongs.

If JICA is to seek to produce such outcomes, it should not be satisfied with a recipient research institution gaining research capacity. It is important for JICA to see to it that the institution takes advantage of its increased capacity and resources to conduct research and influence government policies and programs with its findings, bringing about changes in the target group and the society to which the group belongs. JICA is advised to pursue assistance that produces positive changes in a society by making the most of the resources of recipient research institutions, as well as those of itself and other aid agencies of Japan.

To that end, it is necessary to make a shift in aid approach--from the output-oriented approach designed to improve the research capacity of the recipient institution to the outcome-oriented approach designed to improve the capacity of the institution to take advantage of its research findings to provide policy advice to the government and influence its policy-making process. The outcome-oriented approach, or the program-based aid approach, provides a basis for the recipient institution to have a wider social impact.

External Review by Intellectuals from the Target Countries

Ghana

Dr. Anthony T. Seddoh

Head, Policy and Health Systems Development Unit, Ghana Health Service, which is an implementation body for public health services under the Ministry of Health in Ghana. He has been engaged in policy planning and monitoring evaluation in the Ghana Health Service and has worked on the WHO African Region Country Cooperation Strategy, the Ghana Poverty Reduction Strategy – the Health Sector Component (commissioned by the UNDP), and so on. The contribution of the Noguchi Memorial Institute for Medical Research under the Ministry of Education has been analyzed from its position as an implementation entity for public health services.

Zambia

Mr. Stephen L. Muyakwa

He is a member of the Zambia Evaluation Association. With expertise in Institution Building/Organisation Development and Socio- economic aspects of HIV/ AIDS, he has been engaged in policy reports on the baseline assessment for HIV/AIDS and the Zambia Integrated Health Programme (ZIHP).

Report of the thematic evaluation on Communicable Disease Control in Africa

Prepared by:
Anthony Theophilus Seddoh

This report is prepared by Dr. A. T. Seddoh, as a result of a thematic evaluation of Noguchi Memorial Institute for Medical Research (NMIMR) from 9th – 25th September 2004. Dr. Seddoh participated as an independent third party evaluator to JICA. The purpose is to present the key findings, challenges and lessons learnt to assist the JICA office to evaluate:

- The impact of NMIMR's activities on the population with respect to communicable disease control including administration, training and dissemination of information
- The current roles and functions of NMIMR's since its establishment vis-à-vis the vision for the future with regard to communicable disease control

Key Findings

1. The administrative mandate, roles and functions of NMIMR

Noguchi Memorial Institute for Medical Research (NMIMR) is a semi-autonomous research based academic institution under the University of Ghana, Ministry of Education. The establishment of the NMIMR in 1979 is seen as the physical manifestation of the collaboration between Ghana and Japan in promoting evidence-based health care development, that begun with Hideyo Noguchi since 1928. The institute had the mandate to (i) conduct research into infections and communicable diseases and nutritional problems (ii) provide training opportunities for post-graduate training in medical research and (iii) to provide specialised laboratory and diagnostic monitoring services to improve public health. Over the years, a number of projects have been executed by NMIMR with support through JICA:

1986	-	NMIMR phase I project
1991-1997	-	NMIMR phase II project
1999-2003	-	Infectious Diseases Project
2004-	-	West African Centre for International Parasite Control

Key researches conducted among others within and in addition to the project areas are tuberculosis, HIV/AIDS/STIs, viral haemorrhagic fevers, measles, malaria, schistosomiasis, maternal mortality analysis, intestinal helminths, leishmaniasis and filariasis.

The capacity of NMIMR

The laboratories are highly equipped with facilities for molecular, biological, immunological (including flow cytometry), biochemical and haematological research. It also has an electron microscopy. The institute is also staffed with high calibre scientific personnel with most of them holding post-graduate qualifications in their various fields of expertise. The capabilities acquired and the extended expertise has enabled NMIMR to undertake the following activities to international standard:

- Delineate the epidemiology and pathogenesis of HIV/AIDS, STDs, and vaccine preventable diseases and thus contribute to vaccine development

- Laboratory research for tuberculosis and drug efficacy testing
- The training of laboratory and research fellows in medical and public health up to the highest post-graduate level in their areas of activities

In recent times, the institute has added to its portfolio, research into non-communicable diseases in response to the increasing incidence and significance of hypertension, diabetes and anaemia on public health in Ghana.

2. Training

NMIMR has been able to train as part of its project activities, personnel mostly laboratory technicians in basic parasitology, TB microscopy, quality assurance and basic bacteriology in general and as related to STIs. It has also creditably performed the required 25% of duty hours to teaching required of its senior staff to the University of Ghana resulting in the direct and indirect production of graduate, masters and doctoral level professionals.

3. The impact of NMIMR on policy development, diagnosis and treatment practices

The relationship between the NMIMR, the Ghana Health Service and its National Public Health Reference Laboratory (NPHRL) is very positive. There is however no formal or administrative relationship between NMIMR and the GHS/NPHRL. The NPHRL and its sub-units, the Zonal PHRL is the government's lead laboratory in diagnostics and not research. Its capabilities are limited to bacteriological investigations and an almost rudimentary capacity for viral case detection. NMIMR functionally fills the gap as a leading medical research institute of great repute with capacity for virology investigations and cutting-edge research. This positioning by NMIMR has lead to it becoming a centre of last resort in medical and pharmaceutical investigations, diagnosis, treatment, policy development and research in Ghana and the sub-region. The institute takes lead in medical investigations with regard to HIV/AIDS, yellow fever, measles, general vaccine preventable diseases and microbial quality monitoring for nutrition and food security. The studies into yellow fever for instance lead to the change of the international regime to accept that yellow fever vaccine can effectively be given in concert with other EPI vaccines. NMIMR was also actively involved in the development of population dynamics statistics under the Demographic and Health Surveys in Ghana. The institute also assume the following responsibilities among several others:

- Serves as the main virology centre and the national reference laboratory for TB control, HIV/AIDS and STIs and vaccine preventable diseases
- Undertook the research into chloroquine resistance that lead to the change in the country's anti-malaria drug policy in 2003 and are managing the change over to an artemisinin-based combination therapy
- Effectively supports studies into the effective use of ITNs in Ghana and its monitoring
- Is currently the WHO Collaborating Centre for Polio in the sub-region and does all the vaccine potency tests for Ghana and Togo
- Undertakes the mandatory testing of anti-snake serums imported into the country

4. WACIPAC

The test of versatility of NMIMR to combine a purely laboratory based scientific research orientation with an operations community focused program of research came with the advent of the West African Centre for International Parasite Control (WACIPAC). The project has proven to be the much needed bridge between the institute and the population at a local

government level. Through WACIPAC, NMIMR has shared expertise with the population and some African Countries in operations research for parasitic disease control and trained their personnel for parasitic disease control programs. This 'third country training' program appears to have a high regard in the GHS and Ministry of Education, Youth and Sports (MOEYS) as a program worth sustaining. The impact on revitalising a slumbering school health program using the WACIPAC has been tremendous. The MOEYS and the GHS have indicated their intention to scale-up the project implementation across the whole country. All donor partners consider this program a worthwhile project even though they do not necessarily agree with the coordinating mechanisms.

5. Dissemination

Most of the findings of NMIMR activities have been published or are in the process to be published in both local and international journals. Annual three day dissemination seminars have also been instituted by NMIMR with the theme 'Bridging the research-policy divide'. Different presentations are made at these meetings with the aim of sharing research findings with policy makers and peers in academia. The outcome of these meetings has led to policy reviews that have no doubt contributed to addressing the health needs of the population.

6. The future role of Noguchi in disease control

There is a functional rather than an administrative role for Noguchi in disease control in Ghana. Indeed, the evaluation shows that the NMIMR functional priority areas – communicable and non-communicable diseases - are closely related to the core of programs implemented in the Ghana Health Sector and the African region and is likely to increase the demand of their services for a long time to come. The demand from the health sector is likely to continue to be diagnostic support and research to promote prevention, case containment and eradication activities.

The functions in supporting non-communicable disease research also provides a good orientation for NMIMR to help Ghana and countries in the region to address key issues regarding health and the environment, health and poverty and sustainable development within the framework of poverty alleviation strategies and activities of partners. The emphasis on policy advice and advocacy is appropriate as it focuses more on how best to support countries to deliver services. In effect, there is a unique opportunity for NMIMR to continue to use its comparative advantage in virology and technical competency to assist Ghana and countries in the sub-region in infectious disease control.

The WACIPAC project is a very positive development. However it cannot be considered that this is an area that NMIMR has the needed competency. This area is a social science related field. It may therefore be more appropriate for NMIMR to relinquish their role in WACIPAC to the field research centres in Navrongo, Dodowa or Kintampo or indeed the Health Research Unit who have the competency and capacity for this.

7. Challenges

NMIMR is an important institution with a unique competency that will be required for the advancement of health care in the region. The main challenge however to the institute is funding and staffing. The Ministry of Education, Youth and Sports, who confirms this difficulty that the institute has, put it down to competing needs. To this end, donor and

partner collaboration is inevitable to its survival and continuing viability. Currently, aside of JICA and a limited bilateral cooperation with the US Navy in anti-malaria drug research, no other donor agency appears to have any significant direct funding support to the institute. This situation is unlikely to change soon as most of the additional funding is through competitive tendering via proposal submission by the institute.

REPORT OF FINDINGS ON THE THEMATIC EVALUATION ON COMMUNICABLE DISEASE CONTROL IN ZAMBIA

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Date: 24th September 2004.

Contents

1.0 Purpose of the Study

The purpose of this thematic evaluation is to verify the achievements of the technical cooperation interventions by JICA in Zambia to medical research institutes, and its impacts on communicable disease control on the population generally and in the medical and health sectors.

2.0 Scope of the Evaluation

The scope of the evaluation of the external evaluators is as follows.

a) To evaluate achievements of Japanese representative projects on communicable disease control in Zambia in terms of the roles and functions curried out by research institutes ever since their establishment in comparison with the expected roles and functions of the research institutes in communicable disease control

b) To verify the impact of the cooperation on the population and administrative systems in Zambia and surrounding countries through the cooperation including personnel training, and dissemination of information on communicable disease control.

3.0 Methodology

The evaluation utilised the following evaluation tools:

a) Literature review. Literature in the custody of JICA, UTH and other institutions was closely reviewed to determine the achievements and impacts of the HIV/ AIDS and TB project.
b) Key informant interviews. The senior staff at the UTH, CBoH, NAC and international organisations such as UNDP and WHO were interviewed. The list of interviewees is attached to this report.
c) Groups discussions. A group of senior staff at the virology laboratory held discussions with the research team.

4.0 Background

4.1 Socio-economic Context

Zambia is a sub- Saharan country in southern Africa with a population of 9.9 million. The population growth rate is quite high and exceeds 2%. The latest population census was conducted in 2000. Educational attainment is relatively high by African standards with an adult literacy rate at 75.% and gross primary school enrolment at 72.4%. There is a growing issue of malnutrition, however, and more than 40% of children under five are stunted.

Zambia's per capita GNP is now below the average for Sub-Saharan Africa and was at $490 in 19990-96. Data from the Zambia Central Statistics Office indicates that nearly 70 per cent of Zambians fell below the poverty line in 1996. Further more, Zambia's debt burden remains astronomically high at $6.5 billion.

The debt service consumes a significant portion of government expenditures, equalling to 69% of the entire budget for all sectors combined. A recent analysis concluded that Zambia's external public debt would remain high at unsustainable

levels for many years to come. Therefore, budget reform and restructuring, including the decisions to seek exceptional debt relief under the Heavily Indebted Poor Countries (HIPC) initiative and to explore alternative debt swap mechanisms, are considered essential for the Government overall ability to mount an effective and sustainable response to the current HIV/AIDS and TB pandemic.

Instability of the major macroeconomic indicators such as inflation, unemployment rate, dollar-Kwacha exchange rate would seriously affect the amount of resources available for health sector development, which is already severely constrained. The national health expenditure per capita in Zambia is estimated to be at US $10.5 in 2000. It is not sufficient even to provide the most essential health care package at district level which requires US $ 11.5 per capita.

The socio-economic context suggests the preponderance of conditions inimical to the effective prevention and control of HIV/AIDS and TB in Zambia. If new resources are not found, the decline in available public resources for HIV/AIDS and TB control may severely undermine the government's ability to amount a timely and effective response.

4.4 The Health Sector in Zambia

The health sector in Zambia is currently facing a crisis. Mortality rate is quite high with IMR at 109/1,000 and U5MR at 197/1,000 in 1992-96, and they are increasing since the mid 1980s. The burden of diseases is also increasing, while the national resources to combat the problems is shrinking. It is considered that the promotion of the health reforms is the only way for the Zambian health sector to revive.

The HIV/AIDS pandemic and coincidental TB resurgence are two of the most serious risks which are threatening the health of the Zambian population. The decentralization of the health service delivery system is being promoted at the moment. It is, however, essential that disease control strategy and operation which are integrated with the decentralised system are also developed. For that purpose, the roles and functions of central level organisations and local organisations need to be clearly defined, and effective coordination mechanisms among those organisations need to be established.

The capacity of the frontline organisations, i.e., District Health Management Teams, District Hospitals (First Referral Hospitals) and Health Centres, have to be strengthened in order for any disease control activities to produce any health impact on community. At the same time, regulatory and supervisory functions of the central organisations need to be strengthened so that the system performance of the entire health sector could be assured and sustainable.

4.5 Institutional Framework of the Health Sector

The reforms of the health care system in Zambia is comprised of several structural layers. There are currently plans to merge some of the activities of the CBoH with those of the MoH so as to prevent overlaps in responsibilities. Under the health reforms, the main focus was first referral facilities in order to reduce congestion at the top referral hospitals.

It is in this line that the Zambian Government requested the Japanese Government to assist in implementing and financing the HIV/ TB project. It is considered that District Hospitals (First Referral Hospitals) and Health Centres with laboratory service will be the focal point in the implementation of the HIV/AIDS and TB control project activities.

5.0 The JICA UTH Cooperation

The JICA/ UTH cooperation ran for three phases. The phases are itemised below:

5.1 Infectious Disease Project – 1989 - 1995

The Infectious Disease Project (IDP), a technical cooperation between the Japanese and the Zambian governments, commenced in April 1989 and ended in March 1995. The project was implemented by the Japan International Cooperation Agency (JICA). Japanese experts were dispatched for the purpose of technological transfer in the field of clinical virology. A total of 22 Japanese (7 as long term and 15 as short-term experts) were dispatched for this project. These experts helped to lay the foundation for the various activities of the virology laboratory.

According to earlier evaluation mission reports, a total of 19 Zambians were sent to Japan for training in various fields including virology, and medical equipment maintenance at the virus research centre, Sendai National Hospital, Japan.

The main objectives of the IDP were:

To establish the laboratory diagnostic procedures for infectious diseases, particularly for viral infections at the University Teaching Hospital.

To analyse the aetiology among Zambian patients with infectious diseases by means of laboratory diagnosis.

To standardise the treatment measures for infectious diseases in Zambia by analysing the aetiology of the disease.

During the six years of the project a number of activities were done in the field of virology, paediatrics and medical equipment maintenance. The virology laboratory was opened in February 1992 as the first specialised laboratory for viral infections in Zambia. Projects in scientific research in clinical virology, public health in Zambia were commenced.

In September 1993, an evaluation team consisting of Japanese and Zambians evaluated the activities and achievements of the IDP and agreed that further collaboration between Zambian and Japanese Governments was necessary to achieve better control of infectious diseases in Zambia.

It was further decided that technical cooperation of IDP be extended to March 1995. During this one year follow up period, two Zambians were sent to the virus Research Centre at Sendai National Hospital, Japan for training.

5.2 Infectious Diseases Control Project – 1995 - 2000

The new project "Infectious Diseases Control Project (IDCP)' started after the final evaluation of the previous project under the agreement between the Zambian and Japanese Governments in April, 1995. The IDCP started in April 1995 and ended in March 2000.

Three Japanese experts were sent from Japan to work on the IDCP. The main purposes of IDCP are described as follows:-

1. To improve the quality of laboratory diagnosis of infectious diseases at UTH

2. To conduct etiological and epidemiological studies on infectious diseases for prevention and control at the hospitals and in the community.

3. To strengthen the diseases surveillance systems for infectious diseases, in particular, poliomyelitis, measles, acute respiratory infection (ARI) and HIV

4. To transfer essential laboratory techniques on infectious diseases to district hospital staff

5. The transfer laboratory techniques in immunology was to be an important function of the IDCP

5.3 The HIV/ TB Project – 2001 - 2006

The third and currently running phase of the JICA/ UTH cooperation is the HIV/ TB project. The Zambian Government requested this project after noticing that HIV/ AIDS and TB are very serious diseases in Zambia that needed immediate attention. It has the following expected outputs:

(1) Performance of laboratory techniques, data management and overall laboratory management are improved.
(2) Performance and quality of peripheral labs for HIV/AIDS and TB testing and surveillance are improved.
(3) Utilization of laboratory services by health workers (private, public and NGOs) is improved
(4) Information on HV/AIDS and TB generated by the project is utilized widely by majority of stakeholders in planning and implementing programmes (i.e. GRZ, other donors, health workers, NGOs, schools, youth and communities).
(5) Collaboration with HIV/AIDS and TB Working Groups is institutionalised.

6.0 National Medical Laboratory Policy

The Japanese funded project, being a laboratory-based intervention, operates within the framework of the national laboratory policy. This policy, according to Muyakwa who carried out an assessment of health policies in 2001, deals with all medical and

laboratory issues in the country including capacity building, standardisation of procedures and equipment, legal issues and organisational structures needed to implement the policy.

The vision of the policy is to provide Zambians with quality, cost-effective, appropriate laboratory services as close to the family as possible.

The policy goals are:

- To improve and maintain laboratory services at an optimum standard
- To provide national technical guidelines for the improvement and provision of laboratory services at each level of health care delivery
- To fully integrate laboratory standards and systems in the various components of health sector reforms

The implementation Strategy is:

- Full and active participation of all stakeholders
- Significant infusion of resources to raise standards to a basic minimum acceptable level and therefore the need for a co-ordinated response from government and co-operating partners to achieve the set goals
- Short-term priorities to focus on the improvement in basic inputs (equipment, supplies, human resources, infrastructure and utilities) and the full integration of the sector in improvements to delivery quality care in the health reforms process
- In the long term, quality to be achieved through the development of a sustainable system to support the laboratory services at all levels.
- The implementation is guided by a five-year implementation plan. Monitor various stages of the implementation process
- The situation analysis provides baseline indicators against which the progress can be measured.

7.0 UTH Mission

The JICA/ UTH cooperation is under the overall management of the UTH. In an interview during the course of this thematic evaluation, the UTH Executive Director Dr. T. Lambart stated that the UTH Mission Statement is:

> *"To provide affordable quality health care, function as a referral centre, train health providers, conduct research to find solutions to existing health problems and for the development of science."*

8.0 Findings

8.1 Relationship between the Japanese and Zambian Government

The study revealed that the relationship between the Japanese and Zambian Governments and people is very cordial. The support and cooperation efforts by the Japanese government are very highly regarded in Zambia. In one report evaluating the relationship between the European Union and the Zambian Government under the

ACP-EU Cotonou Agreement, the Private Sector in Zambia urged the EU to emulate the Japanese in terms of effective project implementation. The Japanese Infections Diseases Project (IDP) is one of those projects the Zambians treat as being highly successful and beneficial to the country.

8.2 Factors that contributed to success of JICA/ UTH Cooperation

A number of factors can be isolated to determining the high rating that the JICA/ UTH cooperation is receiving. These can be summarised as follows:

- High political commitment by both the Japanese and Zambian Governments.
- Clear, achievable and measurable objectives and indicators in the project document.
- High motivation by both Zambian and Japanese staff associated with the JICA/ UTH project
- Skilled and trained manpower on both the Zambian and Japanese sides of the laboratory staff
- Integration of the laboratory into the regular work of both the UTH and the UNZA School of medicine.
- Regular monitoring and evaluation by joint teams of Zambian and Japanese experts
- The training of Zambian staff in Japan has helped to introduce the staff to Japanese culture, which has made it easy for both Zambian and Japanese staff to work together.

8.3 Challenge Facing the JICA/ UTH Cooperation

The JICA/ UTH cooperation faced and continues to face some challenges. These can be summarised as follows:

1. The virology laboratory is the only one of its type in Zambia and in neighbouring countries. This has meant that it has a lot of work. The staff is, however, limited.
2. UTH has been suffering from an image problem in the eyes of the public and the media for a long time. The perception in the general public, which may be different from the reality, is that UTH is inefficient, poorly equipped with technical staff and equipment. This has meant that the virology laboratory, which is part of UTH, has not been able to escape this negative image despite its excellent work and outputs.
3. The ART has been introduced in Zambia without an all-encompassing policy framework. Private and Government health providers have been distributing ARV drugs without proper supervision. This has resulted in many types of drugs reaching the patients/ consumers. It is reported that some drugs do run out thus forcing patients/ consumers to use different drugs at short notice. This is likely to cause serious HIV resistance problems in the near future. The virology laboratory will be flooded with requests to deal with the HIV drug resistance problem.

8.4 Impact of the JICA/ UTH Cooperation

The impacts of the JICA/ UTH cooperation can be summarised as follows:

1. The JICA/ UTH cooperation has resulted in the construction of the virology laboratory and the supply of laboratory equipment. The cooperation, being part of UTH, has continued rendering laboratory services to the patients in the hospital and for training purposes at the UNZA School of Medicine. This has saved lives of patients and the trained human resources will contribute to infectious diseases control in Zambia.

2. The Zambian Staff at the JICA/ UTH cooperation has been exposed to a lot of intensive training both locally and in Japan in various medical fields such as tissue culture, serology/ immunology, electron microscopy, molecular virology and the repair and maintenance of medical equipment. These trained professionals sit on various working groups both within UTH and at the NAC, CBoH and MoH providing much needed expertise to the working groups.

3. The WHO has designated the virology laboratory to an inter country reference laboratory. Thus the virology laboratory has possibilities to offer its services to the surrounding countries. This development can act as a catalyst for other cooperating partners to work with UTH on the control of infectious diseases in the country.

4. The JICA/ UTH cooperation is involved in various research projects in the fields of polio, measles, HIV and TB. These research projects have been disseminated to various relevant stakeholders and also published in important local and international medical journals. Some of the institutions found the research work very useful in their daily work.

5. The JICA/ UTH cooperation has continued to offer training to staff in various institutions such as ZIHP, district hospitals and provincial hospitals as well as the armed forces. This has greatly increased these institutions ability to carry out laboratory diagnosis of infectious diseases.

6. The JICA/ UTH cooperation has been testing medicines from traditional healers to assess the potency of these medicines. These medicines are forwarded to the JICA/ UTH project by the NAC. These tests, though negative so far, are helping in the search for a cure for HIV.

7. The JICA/ UTH cooperation has continued to serve the country by responding to emergency disease outbreaks. This service is critical to saving lives.

9.0 Recommendations

In view of the above findings, concrete and actionable recommendations are hereby made. These are as follows:

1. Infectious diseases, including HIV/AIDS, are still a serious public health problem in Zambia. JICA has demonstrated great capacity to assist in developing interventions to control these diseases. It is therefore

recommended that the JICA/ UTH cooperation should be continued and the Japanese government should support it.

2. The Zambian Governement has introduced ART in Zambia. There are plans to scale up the number of HIV patients with access to the ART. There is, therefore, need to focus more on the possibility of resistance of the HIV to ART drugs. The diagnostic services are crucial in this exercise. The Zambia Government should strive to increase funding to both UTH and the virology laboratory to cope with this task.

3. The current narrowing of the project to HIV/ TB has left other infectious diseases such as polio and measles without support. It is recommended that the project supports the entire virology laboratory activities and not be restricted to HIV and TB alone

4. The Japanese support to the JICA/ UTH cooperation has helped strengthen the manpower base at the UTH generally and the virology laboratory in particular. During interviews in the course of this thematic evaluation, the Zambian management team at the virology laboratory stated that they feel sufficiently empowered to run the laboratory without long-term Japanese experts. In view of this, it is recommended that the Japanese support be reduced to supply of laboratory equipment, research partnerships and short-term consultancies. The number of long-term experts should be gradually reduced.

List of Acronyms

ACP	African Caribbean and Pacific
ANC	Antenatal Care
AZT	Azidothymidine/Zidovudine
BTS	Blood Transfusion Service
CboH	Central Board of Health
CDC	Centers for Disease Control and Prevention (United Stated)
CDL	Chest Disease Laboratory
DOTS	Directly Observed Treatment Short-course
EU	European Union
ELISA	Enzyme Linked Immunosobent Assay
DHS	Demographic and Health Survey
HAART	Highly Active Anti-retroviral Theraphy
LDHMB	Lusaka District Health Management Board
IMR	Infant Mortality Rate
MTCT	Mother to Child Transmission (of HIV)
NVP	Nevirapine
HIPC	Highly Indebted Poor Country
SOP	Standard Operating Procedures
STI	Sexual Transmitted Infection
TB	Tuberculosis
TDRC	Tropical Disease Research Centre
UNZA	University of Zambia
UTH	University Teaching Hospital
VCT	Voluntary Counselling and Testing
WHO	World Health Organisation
ZIHP	Zambia Integrated Health Project

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List of people interviewed

NAME	INSTITUTION
1. Dr. T. Lambart	UTH
2. Dr. B. Chirwa	CBoH
3. Dr. M. Monze	UTH
4. Dr. Handema	UTH
5. Mrs. Mulundu	UTH
6. Dr. M. Sinkala	LDHMB
7. Prof. N. Luo	Private Consultant
8. Dr. C. Musumali	ZIHP
9. Dr. R. Kumwenda	UNDP
10. Dr. M Maboshe	WHO
11. Dr. Sinyinza	CBoH
12. Dr. Kafwebulula	CBoH

Appendices

1. Evaluation Grid
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Noguchi Memorial Institute of Medical Research

Evaluation Questions	Survey Items	Information / Indicators	Data Sources	Survey Methods
1. Program components and effects of the program	How was the infectious disease control in Ghana improved by the activities of NMIMR?			
1.1 Impact on research activities	How were the outputs of research activities reflected on administrative services?			
	1) How many technical articles does NMIMR contribute to internal/ external journal?	No. of contribution and publishing	NMIMR	Document review
	2) Are there any researches of which results were utilized for or were reflected on the actual infectious disease control activities?		NMIMR MOH	Document review interview
	VPD 1) Did the MOH introduce the quality control technology for measles, polio and yellow fever vaccines which was developed by the "Noguchi Memorial Institute Project Phase II (1991-1996)"?		NMIMR MOH	Interview
	2) Did MOH introduce AIK-C vaccine for measles at 6 months in Ghanaian children?		MOH	
	TB 1) Please explain the role of NMIMR and PHRL as the reference laboratory of TB respectively.		NMIMR MOH	
	Diarrhoeal Diseases 1) How was the cereal-based ORS developed by the "Noguchi Memorial Institute Project Phase II" contributed to infectious disease control?		NMIMR MOH	
	Parasites 1) How was the urine-based dipstick assay for Schistosomiasis diagnosis developed by the Noguchi Memorial Institute Project Phase II contributed to the Ghana medical sector?		NMIMR MOH	
1.2 Impacts on administrative services	How was the administrative service for infectious disease control improved?			
	1) How did the middle-level manpower training improve level of medical service?		MOH	
	2) How does NMIMR have communication with MOH for infectious disease control?	Existence of council/ committee and their activities	MOH/ GHS/ NMIMR	Document review/ Interview

	3) Does NMIMR set the priority research according to the national programme?	Annual action plan, mandate/ aim of the institute	NMIMR	Document review/ Interview
1.3 Impacts on human resources development	How does NMIMR contribute to improve human resources development in infectious disease control?			
	1) Did NMIMR conduct middle-level manpower training in STD after termination of the Infections Disease Project?	Annual report/ Record of training course	NMIMR	Interview
	2) Did NMIMR conduct additional middle-level manpower training in Parasite and TB after termination of the Infections Disease Project?	Annual report/ Record of training course	NMIMR	Interview
	3) Did the NMIMR hold any training courses in cooperation with MOH and/or NTP after termination of the Infections Disease Project?	Annual report/ Record of training course	NMIMR MOH	Interview
	4) How did the training courses contribute to improve the infectious disease control in Ghana?		MOH Related organizations	Interview
	5) How does NMIMR train researcher/ technical staff?	Resume/ career of staff	NMIMR	Document review
	6) Does NMIMR keep the technical skill level for experiment/ routine work? If yes, how does it prove as status ‘good practice laboratory/ bio-safety/ guideline’?	Method of Quality control	MOH/ NMIMR/ WHO	Document review/ Interview
	7) Does NMIMR have constant cooperation with external research organization?	No. of programmes and joint research	NMIMR/ donors (USAID, CIDA,DANIDA,WB, etc.)	Document review/ Interview
	8) Does MOH/ MOE stipulate the status and the salary for human resources in NMIMR?	Grading of publish researcher on MOH/ MOE	MOH/ MOE	Document review/ Interview
1.4 Impacts on information services	What kinds of information does NMIMR send to? And how was it utilised?			
	1) Have you received any information (results of research activities) from the NMIMR? If yes, how do you utilize that information?	Report system to MOH	MOH/GHS	
	2) Does NMIMR have a channel for free access to epidemiologic information?	Report system to MOH Free access to epidemiologic information system in	MOH/ GHS	Document review

		NMIMR		
	3) Does NMIMR have a survey network and skill?	Structure of HMIS and the research method	MOH/ HMIS	Interview
1.5 Impacts on nations	How did NMIMR contribute to improve the health condition of nations?			
	1) A series of pilot project aimed to improve PHC at 4 villages, namely Gomoa Fetteh, Gomoa Onyadze/Otsew, Jukwa, Mprumen in Central Region until 1997. Did the NMIMR have any activities at these villages after termination of the JICA Project?	Report of the activities	NMIMR	Document review/ Interview
	2) Does NMIMR have any activities target on communities or rural population?	Annual report	NMIMR	Document review/ Interview
	3) Did the 4 villages establish sustainable PHC system in the villages?	Operation condition of Health station at Onyadze village. Health condition of village people.	Village people	Interview
	4) Did people in Mwachinga and Mtsangatamu have any kinds of positive / negative impacts from the project activities?		Village people	Interview
1.6 Historical changes of program approach and its adequacy.	1) Were there any incidents in Ghana health sector that affected JICA Projects and/or NMIMR's activities? If yes, what were those incidents? And what kind of actions you take for counter measures?		NMIMR	Interview
2. Roles of research organization in infectious disease control	What kinds of roles does NMIMR have as a research institute for infectious disease control in Ghana and/or Africa region?			
2.1 Confirmation of the infectious diseases control in the health policy	How does the Government of Ghana tackle on the infectious diseases control?			
	1) Is the infectious diseases control prioritized in the National Health Plan and programmes in the health sector?	National health plan, sector programme	MOH/ GHS	Document review/ Interview
	2) How much budget is allocated for infectious diseases control in the health budget?	Health budget of MOH	MOH	Document review/ Interview
	3) Is the infectious diseases control prioritized technical assistance of each donor's policy?	Donor report	NMIMR/ donors (USAID, CIDA,DANIDA,WB, etc.)	Document review/ Interview

	4) Who participates and what are the priority subjects in SWAp of health sector?	SWAp concept paper	SWAp participants (WB)	Document review/ Interview
	5) How many infectious diseases control programme is in SWAp?	SWAp concept paper	SWAp participants (WB)	Document review/ Interview
	6) How many programmes in SWAp for supporting NMIMR itself or using the NMIMR's function?	SWAp concept paper	SWAp participants (WB)	Document review/ Interview
2.2 Position of NMIMR on the infectious diseases control	What is the role of NMIMR on the infectious diseases control system?			
	1) Please explain the infectious disease control system in Ghana, that is to say key players (organizations) and their roles/functions.		MOH	Document review/ Interview
	2) Who is the responsible research organization for infectious disease prevention / control?		MOH	
	3) What is the role of NMIMR on the infectious diseases control system?		NMIMR/ MOH (NACP, NTBP/NTP, etc.)	Interview
	4) What is the position of NMIMR among other institutes? (What is the difference between NMIMR and other institute/ research center?)		MOH/ MOE/ NMIMR	Interview
	5) Does NMIMR execute its expected role completely?		MOH/ MOE/ NMIMR	Document review/ Interview
	6) Is there a resemblance technical assistance by other donor agency?	Donor TA programme	NMIMR/ donors (USAID, CIDA,DANIDA,WB, etc.)	Document review/ Interview
	7) Is there a duplication of role with resemblance institutes in MOH	Structure and flow of HIMS	MOH/ NPHLS, Univ. Ghana etc.	Document review/ Interview
2.3 Function of NMIMR	What kinds of functions does KEMRI have?			
	1) What is the mandate and aim of NMIMR?	Brochure, publishing document	NMIMR	Document review/ Interview
	2) What is the activity of NMIMR?	Annual Plan/ Report	NMIMR	Document review/ Interview
	3) How is the structure of NMIMR and how many staff?	Brochure, publishing document	NMIMR	Document review/ Interview
	4) How much is the budget and how does NMIMR provide budget?	Budget sheet	NMIMR	Document review/ Interview
	5) What kind and how many experimental equipment for research NMIMR has?	Equipment list	NMIMR	Document review/ Interview
	6) Are there any malfunctioned equipment?	Maintenance record	NMIMR	Document review/ Interview
	7) What is the out put of NMIMR and how does NMIMR / MOH/ MOE evaluate it?		MOH/ MOE/ NMIMR	Document review/ Interview

	8) What is the role of NMIMR in MOH/ MOE?		MOH/ MOE/ NMIMR	Interview
	9) How important infectious diseases researches are for NMIMR?		MOH/ MOE/ NMIMR	Interview
	10) What kinds of researches are studied in NMIMR?		NMIMR	Document review/ Interview
	11) NMIMR is appointed as WHO Reference Laboratory/ National Reference Laboratory. How this status helps/burden with activity of NMIMR? (ex: raising up the whole status of NMIMR, reputation, budget provision, quality of staff, burden of hard research requirement, etc.)	WHO report	MOH/ NMIMR/ WHO	Document review/ Interview
3. Necessary condition for playing expected roles	What is the expected role of NMIMR as a research institute for infectious disease control in the future?			
	1) Do you have any plan to expand NMIMR's roles/functions in the infectious disease control system? If yes, please explain your plan.	MOH/ MOE report	MOH/ MOE/ NMIMR	Document review/ Interview
	2) Besides research activities, what kind of development does NMIMR want in the field of empowerment of human resources and/ or announcement of epidemiologic information?	MOH/ MOE report	MOH/ MOE/ NMIMR	Document review/ Interview
	3) What is necessary implementation to satisfy above mentioned development plan?	MOH/ MOE report	NMIMR	Document review/ Interview

KEMRI

Evaluation Questions	Survey Items	Information / Indicators	Data Sources	Survey Methods
1. Program components and effects of the program	How was the infectious disease control in Kenya improved by the activities of KEMRI?			
1.1 Impact on research activities	How were the outputs of research activities reflected on administrative services?			
	1) How many technical articles does KEMRI contribute to internal/ external journal?	No. of contribution and publishing	KEMRI JICA Expert	Document review
	2) Are there any researches of which results were utilized for or were reflected on the actual infectious disease control activities?		KEMRI MOH	Document review interview
	Diarrhoeal Diseases 1) Does the vaccine for Rota virus vaccinated at 6 months in Kenyan children?		MOH KEMRI	Document review interview
	Hepatitis 1) Please explain the future plan for producing and disseminating HEPCELL II.		KEMRI JICA Expert	Document review interview
	2) How did the HEPCELL II contribute to the infectious disease control in Kenya?		MOH KEMRI	Interview
	3) How many kits of HEPCELL II does the MOH purchase annually?	Sales record	KEMRI MOH	Document review interview
	4) Are there any competitive diagnostic kits for Hepatitis B? If yes, what is the share of HEPCELL II and others?		KEMRI MOH Hospital	Document review interview
	5) How do you estimate the marketability of HEPCELL II?		MOH KEMRI JICA Expert	
	6) Does KEMRI have any plan to export HEPCELL II to neighboring countries?		KEMRI	
	7) What is the role of the Liver Disease Diagnostic Center? And what kinds of activities does it have?		KEMRI JICA Expert	Document review interview
	ARI 1) According to the evaluation report, KEMRI recommended to change the standard curative drugs based on the result of drug sensitivity test of		KEMRI JICA Expert	Document review interview

	major bacterial and fungal ARI。 Was this recommendation realized?			
	2) Does the KEMRI continuously conduct community based health education in Kibera, Nairobi after termination of the Project on research and control of infectious diseases Phase II (1996-2001)?		KEMRI JICA Expert	Document review interview
	3) How does KEMRI contribute to improve the ARI control?		MOH KEMRI	Interview
	HIV/AIDS 1) Please explain the current situation of PA and developing plan of HIV diagnostic kit.		KEMRI JICA Expert	Document review interview
	2) It was reported that 10 extracts with reverse transcriptase inhibitory activity and 8with HSV inhibitory activity was identified as the result of antiviral plant screening during the project on research and control of infectious diseases Phase II. Does KEMRI continuously conduct additional study about theses extracts?		KEMRI JICA Expert	Document review interview
	3) KEMRI confirmed the efficacy of short-course AZT for the prevention of mother to child transmission of HIV during the project on research and control of infectious diseases Phase II. Does KEMRI continuously conduct additional study about AZT? Or was this result utilized to improve the national intervention programs?		KEMRI JICA Expert	Document review interview
	4) How did KEMRI contribute to improve the HIV/AIDS control?		MOH KEMRI	Interview
1.2 Impacts on administrative services	How was the administrative service for infectious disease control improved?			
	1) How does the MOH plan to utilise the diagnosis kits developed by KEMRI?		MOH	Document review interview
	2) How does KEMRI have communication with MOH for infectious disease control?	Existence of council/ committee and their activities	MOH/ KEMRI	Document review/ Interview
	3) Does KEMRI set the priority research according to the national programme?	Annual action plan, mandate/ aim of the institute	KEMRI	Document review/ Interview
	4) How was the result of Schistomiasis research reflected on the government program?		MOH KEMRI	Interview
	5) How does KEMRI utilise the research facilities at Malindi and Kwale?		KEMRI	Interview
1.3 Impacts on	How does KEMRI contribute to improve human resources development in			

human resource development	infectious disease control?			
	1) Did KEMRI have continuously conducted seminars / workshops on hepatitis and liver disease after termination of the Project on research and control of infectious diseases (1990-1996)?	Records of seminar / workshop	KEMRI JICA Expert	Document review interview
	2) How did the seminars / workshops contribute to improve the infectious disease control in Kenya?		MOH/ KEMRI	Interview
	3) Does KEMRI employ high qualified researcher/ technical staff?	Resume/ career of staff	KEMRI	Document review
	4) Does KEMRI keep the technical skill level for experiment/ routine work? If yes, how does it prove as status 'good practice laboratory/ bio-safety/ guideline'?	Method of Quality control	MOH/ KEMRI/ WHO	Document review/ Interview
	5) Does KEMRI have constant cooperation with external research organization?	No. of programmes and joint research	KEMRI/ donors (USAID, CIDA, EU, WB, AMREF etc.)	Document review/ Interview
	6) Does MOH/ MOE stipulate the status and the salary for human resources in KEMRI?	grading of publish researcher on MOH/ MOE	MOH/ MOE	Document review/ Interview
1.4 Impacts on information services	What kinds of information does KEMRI send to? And how was it utilised?			
	1) Does KEMRI have a channel for free access to epidemiologic information?	Report system to MOH Free access to epidemiologic information system in NMIMR	MOH	Document review
	2) Does KEMRI have a survey network and skill?	Structure of HMIS and the research method	MOH/ HMIS	Interview
	3) Have you received any information (results of research activities) from the KEMRI? If yes, how do you utilize the information?		MOH WHO Internal organizations	Interview
1.5 Impacts on nations	How did KEMRI contribute to improve the health condition of nations?			
	1) A series of research activities on Parasitology were conducted at Mwachinga and Mtsangatamu in Kwale district from 1979-1996. The Plan International (NGO) and the Institute of Tropical Medicine, Nagasaki University took over the project activities after termination of JICA project at the sites. Were Schistosomiasis and Filariasis exterminated at the villages?	Research report	Plan International KEMRI	Document review/ Interview
	2) Did people in Mwachinga and Mtsangatamu have any kinds of positive		Village people	Interview

	/ negative impacts from the project activities?			
	3) Do people in Kibera improve their knowledge about ARI prevention through the health education program implemented by the Project on research and control of infectious diseases Phase II?		Mothers in Kibera	Interview Additional information; A part of Kibera was demolished due to the Government decision on February 2004. Existing situation in Kebera is not clear.
1.6 Historical changes of program approach and its adequacy.	1) Were there any incidents in Kenya health sector that affected JICA Projects and/or KEMRI's activities? If yes, what were those incidents? And what kind of actions you take for counter measures?		KEMRI	Document review/ Interview
2. Roles of research organization in infectious disease control	What kinds of roles does KEMRI have as a research institute for infectious disease control in Kenya and/or Africa region?			
2.1 Confirmation of the infectious diseases control in the health policy	How does the Kenyan Government tackle on the infectious diseases control?			
	1) Is the infectious diseases control prioritized in the National Health Plan and programmes in the health sector?	National health plan, sector programme	MOH	Document review/ Interview
	2) How much budget is allocated for infectious diseases control in the health budget?	Health budget of MOH	MOH	Document review/ Interview
	3) Is the infectious diseases control prioritized technical assistance of each donor's policy?	Donor report	KEMRI/ donors (USAID, CIDA, EU, WB, AMREF etc.)	Document review/ Interview
	4) What is the priority subject in USAID-JAPAN Partnership of health sector?	USAID-JAPAN Partnership concept paper	USAID	Document review/ Interview
	5) How many infectious diseases control programme is in USAID-JAPAN Partnership?	USAID-JAPAN Partnership concept paper	USAID	Document review/ Interview

	6) How many programmes in USAID-JAPAN Partnership for supporting KEMRI itself or using the institute function?	USAID-JAPAN Partnership concept paper	USAID	Document review/ Interview
2.2 Position of the KEMRI in the infectious diseases control	What is the role of KEMRI on the infectious diseases control system?			
	1) Please explain the infectious disease control system in Kenya, that is to say key players (organizations) and their roles/functions.		MOH	Document review/ Interview
	2) Who is the responsible research organization for infectious disease prevention / control?		MOH	Document review/ Interview
	3) What is the role of KEMRI on the infectious diseases control system?		KEMRI/ MOH (NPHLS, IEPI, NASCOP, NMCP, NLTCP, etc.)	Interview
	4) What is the position of KEMRI among other institutes? (What is the difference between the institute and other institute/ research center?)		MOH/ MOE/ KEMRI	Interview
	5) Does KEMRI execute its expected role completely?		MOH/ MOE/ KEMRI	Document review/ Interview
	6) Is there a resemblance technical assistance by other donor agency?	Donor TA programme	KEMRI/ donors (USAID, CIDA, EU, WB, AMREF etc.)	Document review/ Interview
	7) Is there a duplication of role with resemblance institutes in MOH?	Structure and flow of HIMS	MOH/ Univ. Nairobi/ Univ. Moi etc.	Document review/ Interview
2.3 Function of the KEMRI	What kinds of functions does KEMRI have?			
	1) Is there a clear mandate and aim of KEMRI?	Brochure, publishing document	KEMRI	Document review/ Interview
	2) What is the activity of KEMRI?	Annual Plan/ Report	KEMRI	Document review/ Interview
	3) How is the structure of KEMRI and how many staff?	Brochure, publishing document	KEMRI	Document review/ Interview
	4) How much is the budget and how does KEMRI provide budget?	Budget sheet	MOH/ MOE/ KEMRI	Document review/ Interview
	5) What kind and how much experimental equipment for research KEMRI has?	Equipment list	KEMRI	Document review/ Interview
	6) What is the out put of KEMRI and how does KEMRI/ MOH/ MOE evaluate it?		MOH/ MOE/ KEMRI	Interview
	7) What is the role of KEMRI in MOH/ MOE?		MOH/ MOE/ KEMRI	Interview
	8) How important infectious diseases researches are for KEMRI?		MOH/ MOE/ KEMRI	Intervie

	9) What kinds of researches are studied in KEMRI?		KEMRI	Document review/ Interview
	10) KEMRI is appointed as WHO Reference Laboratory/ National Reference Laboratory. How this status helps/burden with activity of KEMRI? (ex: raising up the whole status of KEMRI, reputation, budget provision, quality of staff, burden of hard research requirement, etc.)	WHO report	MOH/ KEMRI/ WHO	Document review/ Interview
3. Necessary condition for playing expected roles	What is the expected role of KEMRI as a research institute for infectious disease control in the future?			
	1) Do you have any plan to expand KEMRI's roles/functions in the infectious disease control system? If yes, please explain your plan.	MOH/ MOE report	MOH/ MOE/ KEMRI	Document review/ Interview
	2) Besides research activities, what kind of development does KEMRI want in the field of empowerment of human resources and/ or announcement of epidemiologic information?		KEMRI	Document review/ Interview
	3) What is necessary implementation to satisfy above mentioned development plan?		KEMRI	Interview

UTH

Evaluation Questions	Survey Items	Information / Indicators	Data Sources	Survey Methods
1. Program components and effects of the program	How was the infectious disease control in Zambia improved by the activities of UTH?			
1.1 Impact on research activities	How were the outputs of research activities reflected on administrative services?			
	1) How many technical articles does UTH contribute to internal/ external journal?	No. of contribution and publishing	UTH	Document review
	2) Are there any researches of which results were utilized for or were reflected on the actual infectious disease control activities?		MOH/ CBoH UTH JICA Expert	Document review interview
	Polio 1) Does UTH continuously conduct vaccine potency testing program for poliovirus vaccine? And how is the result of test utilized?		National EPI manager UTH	Document review interview
	HIV/AIDS 1) How are new technologies introduced by UTH such as CD4/CD8count utilized?		MOH/ CBoH UTH JICA Expert	
1.2 Impacts on administrative services	How was the administrative service for infectious disease control improved?			
	1) How are the following manuals and guidelines prepared by UHT utilized? a. National Guidelines for Infectious Diseases b. Laboratory Manual for Technicians in Zambia c. Surveillance guidelines and laboratory testing guidelines for notifiable viral diseases		MOH/ CBoH UTH JICA Expert	Document review interview
	2) How does UTH contribute to national EPI programme?		MOH/ CBoH UTH JICA Expert	Document review interview
	3) How the UTH support surveillance for ARI, influenza, measles virus		MOH/	Document review

	and polioimyelitis?		CBoH UTH	interview
	4) How does UTH have communication with MOH for infectious disease control?	Existence of council/ committee and their activities	MOH/ CBoH/ UTH	Document review/ Interview
	5) Does UTH set the priority research according to the national programme?	Annual action plan, mandate/ aim of the institute	MOH/ CBoH UTH	Document review/ Interview
1.3 Impacts on human resource development	How does UTH contribute to improve human resources development in infectious disease control?			
	1) Does the UTH have any training programmes for staff members of hospitals in rural areas except the training programmes under JICA projects?	Annual report	UTH	Document review/ Interview
	2) How the training programmes held by JICA projects contribute to infectious disease control in Zambia?		MOH/ CBoH/ UTH JICA Expert	Interview
	3) Does UTH employ high qualified researcher/ technical staff?	Resume/ career of staff	UTH	Document review
	4) Does UTH contribute technical articles to internal/ external journal?	No. of contribution and publishing	UTH	Document review
	5) Does UTH keep the technical skill level for experiment/ routine work? If yes, how does it prove as status ‘good practice laboratory/ bio-safety/ guideline’?	Method of Quality control	MOH/ UTH/ WHO	Document review/ Interview
	6) Does UTH have constant cooperation with external research organization?	No. of programmes and joint research	UTH/ donors (USAID, CIDA, DANIDA, WB, etc.)	Document review/ Interview
	7) Does MOH/ MOE stipulate the status and the salary for human resources in UTH?	grading of publish researcher on MOH/ MOE	MOH/ MOE	Document review/ Interview
1.4 Impacts on information services	What kinds of information does UHT send to? And how was it utilised?			
	1) Have you received any information (results of research activities) from the UTH? If yes, how do you utilize that information?		WHO, UNICEF, UNAIDS	Interview
	2) Does UTH have a channel for free access to epidemiologic information?	Report system to MOH Free access to epidemiologic information system in UTH	MOH/ CBoH	Document review

	3) Does UTH have a survey network and skill?	Structure of HMIS and the research method	MOH/ HMIS	Interview
1.5 Impacts on nations.	How did UTH contribute to improve the health condition of nations?			
	1) Was the disposable type syringe introduced for avoiding hospital-acquired infection into the hospital?		Hospital/ MOH/ CBoH	
	2) Was the recommendation about the advancing vaccination for measles and polio realized?		MOH/ CBoH	
1.6 Historical changes of program approach and its adequacy.	1) Were there any incidents in Zambia health sector that affected JICA Projects and/or UTH's activities? If yes, what were those incidents? And what kind of actions you take for counter measures?		UTH JICA Expert	Interview
2. Roles of research organization in infectious disease control	What kinds of roles does UTH have as a research institute for infectious disease control in Zambia and/or Africa region?			
2.1 Confirmation of the infectious diseases control in the health policy	How does the Zambia Government tackle on the infectious diseases control?			
	1) Is the infectious diseases control prioritized in the National Health Plan and programmes in the health sector?	National health plan, sector programme	MOH/ CBoH	Document review/ Interview
	2) How much budget is allocated for infectious diseases control in the health budget?	Health budget of MOH	MOH	Document review/ Interview
	3) Is the infectious diseases control prioritized technical assistance of each donor's policy?	Donor report	UTH/ donors (USAID, CIDA, DFID, WB, etc.)	Document review/ Interview
	4) Who participates and what are the priority subjects in SWAp of health sector and USAID-JAPAN Partnership?	SWAp/ USAID-JAPAN Partnership concept paper	SWAp participants (WB), USAID	Document review/ Interview
	5) How many infectious diseases control programme is in SWAp and USAID-JAPAN Partnership?	SWAp/ USAID-JAPAN Partnership concept paper	SWAp participants (WB), USAID	Document review/ Interview
	6) How many programmes in SWAp and USAID-JAPAN Partnership for supporting UTH itself or using the institute function?	SWAp/ USAID-JAPAN Partnership concept paper	SWAp participants (WB), USAID	Document review/ Interview
	7) Is there a resemblance technical assistance by other donor agency?	Donor TA programme	UTH/ donors (USAID,	Document review/

			CIDA, DFID, WB, etc.)	Interview
	8) Is there a duplication of role with resemblance institutes in MOH?	Structure and flow of HIMS	MOH/ CBoH laboratory/ ASTL/ Chest Diseases Laboratory/ NASTLP/ NTLP/ NTP	Document review/ Interview
2.2 Position of UTH on the infectious diseases control	What is the role of UTH on the infectious diseases control system?			
	1) Please explain the infectious disease control system in Zambia, that is to say key players (organizations) and their roles/functions.		MOH/ CBoH	Document review/ Interview
	2) Who is the responsible research organization for infectious disease prevention / control?		MOH/ CBoH	
	3) What is the role of UTH on the infectious diseases control system?		UTH/ MOH	Interview
	4) What is the role of UTH in MOH/ MOE?		MOH/ MOE/ UTH	Interview
	5) What is the position of UTH among other institutes? (What is the difference between UTH and other institute/ research center?)		MOH/ MOE/ UTH	Interview
	6) How important infectious diseases researches are for UTH?		MOH/ MOE/ UTH	Interview
	7) What kinds of researches are studied in UTH?		UTH	Document review/ Interview
	8) Does UTH execute its expected role completely?		MOH/ MOE/ UTH	Document review/ Interview
2.3 Function of UTH	What kinds of functions does UTH have?			
	1) Is there a clear mandate and aim of UTH?	Brochure, publishing document	UTH	Document review/ Interview
	2) What is the activity of UTH?	Annual Plan/ Report	UTH	Document review/ Interview
	3) How is the structure of UTH and how many staff?	Brochure, publishing document	UTH	Document review/ Interview
	4) How much is the budget and how does UTH provide budget?	Budget sheet	MOH/ MOE/ UTH	Document review/ Interview
	5) What kind and how much experimental equipment for research UTH has?	Equipment list	UTH	Document review/ Interview
	6) What is the out put of UTH and how do UTH / MOH/ MOE evaluate it?		MOH/ MOE/ UTH	Interview
	7) UTH is appointed as WHO Reference Laboratory/ National Reference Laboratory. How this status helps/burden with activity of UTH? (ex: raising up the whole status of UTH, reputation, budget provision, quality of staff, burden of hard research requirement, etc.)	WHO report	MOH/ UTH/ WHO	Document review/ Interview
3. Necessary	What is the expected role of UTH as a research institute for infectious			

condition for playing expected roles	disease control in the future?			
	1) Do you have any plan to expand UTH's roles/functions in the infectious disease control system? If yes, please explain your plan.	MOH/ MOE report	MOH/ MOE/ UTH	Document review/ Interview
	2) Besides research activities, what kind of development does UTH want in the field of empowerment of human resources and/ or announcement of epidemiologic information?		UTH	Document review/ Interview
	3) What is necessary implementation to satisfy above mentioned development plan?		UTH	Interview

Schedule of the First Field Survey (Kenya, Zambia)

Days	Date	Schedule
1	7/17 Sat	Leaving Japan (Evaluation Analysis, Analysis of Research Institutes, Evaluation Planning) Via London
2	18 Sun	Arriving Nairobi/Internal Meeting.
3	19 Mon	Courtesy call and interview with the KEMRI. Courtesy call on the MOH.
4	20 Tue	Courtesy call on the Embassy of Japan, Interview with the JICA Kenya Office, Discussions with the KEMRI.
5	21 Wed	Interview with CMR, CRDR, PHR of the KEMRI and the Research and Control of Infectious Disease Project.
6	22 Thu	Interview with CDRD of the KEMRI and the Research and Control of Infectious Disease Project.
7	23 Fri	Interview with DCDC, MOH Interview with CVR of the KEMRI and related personnel of JICA projects
8	24 Sat	Internal Meeting
9	25 San	Data Analysis
10	26 Mon	Interview with the KEMRI HQ, CMR and ESACIPAC Interview with NMCP
11	27 Tue	Interview with the MOH Interview with ESACIPAC
12	28 Wed	Interview with NPHLS and National Blood Transfusion Center Interview with CCR of KEMRI
13	29 Thu	Interview with USAID, CDC, Walter Reed, AMREF, Walter Reed (U.S. Army Medical Research Unit)
14	30 Fri	Field survey in West Kenya (Evaluation Analysis and Evaluation Planning) Interview with WHO and UNICEF (Analysis of Research Institutes)
15	31 Sat	Field survey in West Kenya (Evaluation Analysis and Evaluation Planning) Internal Meeting
16	8/1 San	Leaving Japan (Team Leader) Data analysis (Evaluation Analysis, Analysis of Research Institutes, Evaluation Planning)
17	8/2 Mon	Arriving Nairobi (Team Leader) Interview with the JICA Kenya Office and the MOH (Evaluation Analysis, Analysis of Research Institutes, Evaluation Planning) Internal Meeting
18	8/3 Tue	Interview with the KEMRI, NASCP and MOH
19	8/4 Wed	Courtesy call on the Director of the KEMRI
20	8/5 Thu	Report to the KEMRI
21	8/6 Fri	Report to the Embassy of Japan and JICA Kenya Office
22	8/7 Sat	Leave Nairobi for Lusaka
23	8 San	Internal Meeting
24	9 Mon	Courtesy call on the UTH HQ, CBoH and Embassy of Japan, Interview with the JICA Zambia Office
25	10 Tue	Interview with JICA experts and counterparts
26	11 Wed	Courtesy call on the MOH Interview with the Virology Lab. and TB Lab.
27	12 Thu	Interview with NAC and the UTH

Days	Date	Schedule
28	13 Fri	Interview with the Virology Lab, TB Lab, Lusaka District Chelstone Health Center Leaving Zambia (Evaluation Planning)
29	14 Sat	Interview with CBoH Arriving Japan (Evaluation Planning)
30	15 San	Leave Lusaka for Livingstone
31	16 Mon	Visit to Livingstone Central Hospital Leave Livingstone for Lusaka
32	17 Tue	Interview with the Virology Lab, CBoH, UNDP and CDC Leaving Zambia (Team Leader)
33	18 Wed	Interview with WHO and WB Arriving Japan (Team Leader)
34	19 Thu	Data collection from the UTH and MOH Interview with UNAIDS and UNICEF
35	20 Fri	Data collection from the UTH and MOH Interview with DFID
36	21 Sat	Interview with JICA staff
37	22 San	Data analysis
38	23 Mon	Report to the UTH, Embassy of Japan and JICA Zambia Office
39	24 Tue	Leaving Zambia
40	25 Wed	Arriving Japan

Schedule of the Second Field Survey (Ghana)

Days	Date	Schedule
0	9/10 Fri	Leaving Zambia (Communicable Disease Control) (Communicable Disease Control joined from Zambia)
1	11 Sat	Leaving Japan (Team Leader, Evaluation Analysis, Analysis of Research Institutes)
2	12 Sun	Arriving Accra (Team Leader, Evaluation Analysis, Analysis of Research Institutes)
3	13 Mon	Courtesy call on the MOH, Embassy of Japan, Interview with the JICA Ghana Office
4	14 Tue	Courtesy call on the NMIMR, Interview with WACIPAC Interview with GHS, MFEP and EU
5	15 Wed	Interview with DFID and UNFPA
6	16 Thu	Interview with UNICEF, WB and WHO Interview with Counterparts in the NMIMR
7	17 Fri	Interview with USAID, the Royal Netherlands Embassy and DANIDA Courtesy call on the MOE Leaving Accra (Team Leader)
8	18 Sat	Internal Meeting
9	19 Sun	Data Analysis Arriving Japan (Team Leader) Leaving Accra (Communicable Diseases Control)
10	20 Mon	Arriving Japan (Communicable Diseases Control) Interview with Counterparts in the NMIMR
11	21 Tue	Interview with UNAIDS and NPHRL Interview with Counterparts in the NMIMR

Days	Date	Schedule
12	22 Wed	Interview with Counterparts in the NMIMR
13	23 Thu	Additional data collection
14	24 Fri	Additional data collection
15	25 Sat	Internal Meeting
16	26 Sun	Data Analysis
17	27 Mon	Report to the NMIMR
18	28 Tue	Report to the Embassy of Japan and JICA Ghana Office Leaving Accra
19	29 Wed	Via London
20	30 Thu	Arriving Japan

List of Interviewees

Interviewees in Kenya

Name	Position
Ministry of Health	
Dr. A. O. Misore	Head, Dept. of Preventive and Promotive Health Services
Dr. S. Nzioka	Head of Communicable Diseases, Division of Communicable Diseases Control
Dr. Muhamed	Director of National AIDS and STDs Control Programme
Dr. Sam Ochola	Director of the National Malaria Control Programme
Mr. Kitenge	Chief of the laboratory, National Blood Transfusion Centre
KEMRI	
Dr. Davy K. Koech	KEMRI Director
Mr. Dunstan M. Ngumo	KEMRI Deputy Director
Dr. F. A. Okoth	CVR Director
Dr. P. M. Nyakundi	CCR Acting Director
Dr. Charles. S. Mwandawiro	ESACIPAC Director
Mr. G.A.O. Seko	Engineering Division
Dr. Phoebe Josiah	Collaboration and Partnership Division
Dr. Solomon S.R. Mpoke	CBRD, JICA Project Coordinator
Dr. Evans Amukoye	CRDR Director
Dr. Njeri Wamae	CMR Director
Dr. Willie Abela Githui	Principal Research Officer, CRDR / WHO recognized laboratory
Dr. Hellen Meme-Murerwa	Research Officer, CDRD / WHO recognized laboratory
Dr. Peter M. Tukei	Assistant Director/Laboratory Director of CDC/KEMRI Nairobi
Mr. Peter Kaiguri	Blood Safety Project
International Centre of Insect Physiology and Ecology (ICIPE)	
Dr. John I. Githure	Head, Human Health Division
USAID	
Dr. Bedan Gichanga	Programme officer
CDC	
Mr. Bill Galo	Deputy Director for Operations
Ms. Heather Burke	Deputy Director
African Medical Research Foundation	
Dr. Mette Kjaer	Director
Walter Reed (USA Medical Research Unit)	
Mr. Norman Peterson	Administrator
WHO Country Office	
Dr. Eliki	Country Representative
UNICEF	
Dr. Iyabode Olusanmi	Health programme officer
Embassy of Japan	
Masanori YUZAWA	First Secretary
Research and Control of Infectious Disease Project	
Isao OISHI	JICA Expert (Chief Advisor)
Tomoo UKON	JICA Expert (Opportunistic Infection)
Yoshito EIZURU	JICA Expert (Traditional Medicine)
Kozo ONO	JICA Project Coordinator
International Parasite Control Project	
Teruaki AMANO	JICA Expert (Chief Advisor)
Toshiki AWASAWA	JICA Expert (Parasite Control)
Yoshinori MITSUI	JICA Expert (Public Health)

Name	Position
Tsutomu KOBAYASHI	JICA Project Coordinator
JICA Kenya Office	
Yoshiaki KANO	Resident Representative
Tom NITTA	Deputy Resident Representative
Takayuki NAKAGAWA	Assistant Resident Representative (Regional Support Programme HIV/AIDS
Shinichi TAKENAKA	Project Formulation Advisor
Dr. Willie Nyambati	JICA Senior Programme officer

Interviewees in Zambia

Name	Position
Ministry of Health	
Mr. Chimfwenbe	Director of Planning and Development
Mr. Alex Simwanza	Programme Director, National AIDS Committee
Central Board of Health	
Dr. Ben Chirwa	Director General
Dr. Kahenya	Laboratory Specialist
Dr. Syninza	Director, Department of Public Health and Research
University Teaching Hospital	
Dr. T. K. Lambart	Managing Director
Dr. Francis Kasolo	Head of the Virology Laboratory
Dr. Mwaka Monze	Deputy head of the Virology Laboratory, Virus culture and Outbreak Investigation Unit
Dr. Ray Handema	Molecular Biology Unit, Senior scientist, Virology Laboratory
Mr. David Lubasi	Biomedical scientist, TB Laboratory
Ms. Charity Habeenzu	Biomedical scientist, TB Laboratory
Ms. Mazyanga Liwewe	Laboratory scientist, acting head of the Virus Culture and Outbreak Investigation Unit, Virology Laboratory,
Dr. Zulu Wamemba	Medical officer, head of TB laboratory
Ms. Idah Mweene Ndumba	Biomedical scientist, Chief medical laboratory technologist, Chief of the Microbiology Laboratory
Ms. Gina Mulundu	Virology Laboratory, Lecturer of the School of Medicine, Univ. of Zambia (UNZA)
Lusaka District Health Management Board	
Dr. Moses Sinkala	Director of Health
Livingstone Central Hospital	
Dr. Makani	Director
Former Minister of Health	
Prof. N.Luo	
UNDP	
Dr. Rosemary Kumwenda	HIV/AIDS Advisor
CDC	
Dr. Marc Bulterys	Director
Dr. Lin Parsons	Public Health Consultant
Dr. Alwyn Mwinga	Medical Epidemiologist
Dr. Bereneice M. Madison	Health Scientist
WHO	
Dr. Maboshe	Country team adviser for TB
Dr. Sunkutu	Country team adviser for HIV/AIDS
World Bank	
Dr. Musonda Rosemary Sunkutu	Senior Health Specialist

Name	Position
UNAIDS	
Dr. Cathryn Sizi	Country Coordinator
UNICEF	
Dr. Birthe Locatelli-Rossi	Head of the Health Section
Dr. Flint Zulu	Assistant Project Officer for Child Health
DFID	
Mr. Anthony Daly	Adviser Health and HIV/AIDS
HIV/AIDS & Tuberculosis Control Project	
Tetsuo MIZUTANI	JICA Expert (Chief Advisor)
Toru KUBO	JICA Expert (HIV Virology and Immunology)
Tomoko KUDO	JICA Expert (Tuberculosis)
Mami Hirota Shields	JICA Expert (Public Health/Epidemiology)
Kuniko YOSHIDA	JICA Expert (ARV Treatment)
Yoshikazu SEKINO	JICA Project Coordinator
Embassy of Japan	
Ken-ichi YUMOTO	Second Secretary
JICA Zambia Office	
Eiji INUI	Resident Representative
Katsuichiro SAKAI	Deputy Resident Representative
Shiro KITAZAWA	Assistant Resident Representative
Tomoko ZAMA	HIV/AIDS and Tuberculosis Control Programme Coordinator
Festus Lubinga	Programme Officer

List of Interviewees in Ghana

Name	Position
Ministry of Health	
Dr. Edward Addai	Head of Monitoring and Evaluation, Division of Policy, Planning, Monitoring and Evaluation
Dr. Robert Azumah	Deputy Director, Division of Traditional and Alternate Medicine
Mr. Jones Ofosu	Deputy Director, Division of Human Resources Management and Development
Ms. Salah Math	Deputy Director, Division of Administration
Ghana Health Service	
Dr. Sam Adjei	Deputy Director General
Dr. George Amofa	Director, Public Health Division
Mr. A. Manu Sarpong	Administrator, Public Health Division
Dr. Alex Asamoah Adu	Director, National Public Health Reference Laboratory
Dr. John Gyapong	Director, Health Research Unit
Miss Evelyn Quaye	Care & Support Coordinator, National AIDS/STI Control Programme
Dr. K. O. Antwi-Aqyei	Programme Manager, Expand Programme on Immunization
Dr. Frank Bonsu	Programme Manager, National TB Control Programme
Dr. L. Ahadzio	Head, Surveillance Unit
Ministry of Finance and Economic Planning	
Dr. Sam Archer	Head of Japan Desk
Mr. N. B. Bowah	Economic Officer, Budget Unit
Ms. Yvonne O. Quansah	Prime Economic Officer, Aid/Debt Management Unit
Ministry of Education	
Mr. Ato Essuman	Chief Director
Ms. Mary D. Ouaya	National Coordinator, GSE-SHEP
Ms. Tokuko Matsuda	JICA Expert
Noguchi Memorial Institute of Medical Research	

Name	Position
Prof. David Ofori-Adjei	Director General
Dr. Margaret Amar-Klemesu	Deputy Director
Mr. Okyere Boateng	Administrative Secretary
Mr. E.O. Lamptey	Head, Maintenance Unit
Prof. Michael D. Wilson	Head, Parasitology Unit/ WACIPAC
Dr. Daniel Boakye	Deputy Project Manager, Parasitology Unit/ WACIPAC
Dr. Nana K. Ayisi	Head, Virology Unit
Dr. William Ampofo	Research Fellow, Virology Unit
Mr. Jacob Arthur-Quarn	Deputy Head, Principle Technician, Virology Unit
Dr. Osei-Kwasi	Technical Adviser, Virology Unit
Dr. Kwasi Addo	Head, Bacteriology Unit
Dr. Kwadwo Koram	Head, Epidemiology Unit
Dr. Batholomew Akanmori	Head, Immunology Unit
Dr. E.E.K.Takyi	Head, Nutrition Unit
Prof. Alexander Nyarko	Head, Clinical Pathology Unit
Dr. Phyllis Addo	Head, Laboratory Animal Unit
Dr. Daniel Kojo Arhinful	Research Coordinator, IMMPACT Project
EU	
Ms. Janet Appiah	Programme Officer, Social Sector
DFID	
Mr. Will Gust	Programme Manager, Human Development
UNFPA	
Dr. Emmanuel Tofoatsi	National Programme Officer
Dr. Gilfy Addico	Officer, National Professional Project Personnel (NPPP) Reproductive Health
UNICEF	
Dr. Aliu Bello	Project Officer
World Bank	
Ms. Georgia Dawson Amoah	Project Officer
WHO Country Office	
Dr. Melvin George	Representative
Ms. Messeret Eshetu	Epidemiologist
Dr. Moricir Newman	Medical Programme Officer for HIV/AIDS/ STI
Dr. Fericia Ownsu-Amiwi	Medical Programme Officer for Malaria
USAID	
Ms. Ursula Nadolny	Chief, Health Population and Nutrition Office
Dr. Peter Wondergem	HIV/AIDS Adviser, Health Population and Nutrition Office
Dr. Goel K. Draqeed,	Child Health Adviser, Health Population and Nutrition Office
Royal Netherlands Embassy	
Dr. Janvan der Horst	Health and Gender Development Advisor, First Secretary
DANIDA	
Dr. Kobina	Health Officer, Health Sector Support Office
UNAIDS	
Dr. Warren Naamara	Country Coordinator
Embassy of Japan	
Ms. Kazuko ASAI	Ambassador of Japan
Mr. Takafumi NAKASE	Researcher at the Japanese Embassy to Ghana
WACIPAC	
Mr. Hisayoshi OGIWARA	JICA Expert (Chief Advisor)
Ms. Yukari KOGA	JICA Project Coordinator
Ghana JICA Office	
Mr. Kenichi SHISHIDO	Resident Representative
Mr. Shinji OBUCHI	Deputy Resident Representative
Ms. Megumi HIROSE	Assistant Resident Representative (Health)
Ms. Haruyo SHIMIZU	Project Formulation Advisor (Health Sector)

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