付　属　資　料

１．合同評価レポート

２．PDMバージョン１、PDMバージョン２（DRAFT）

３．日本人専門家一覧

４．評価グリッド

５．活動計画（部門別）

MINUTES OF MEETING
BETWEEN
THE JAPANESE MID-TERM EVALUATION TEAM AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF INDIA
ON THE JAPANESE TECHNICAL COOPERATION FOR THE PROJECT
FOR "PREVENTION OF DIARRHEAL DISEASES (PHASE II)"

The Japanese Mid-Term Evaluation Team organized by the Japan International Cooperation Agency and headed by Mr.Toshifumi SAKAI (hereinafter referred to as "the Team") visited India from 1 February 2006 to 16 February 2006 for the purpose of jointly evaluating the achievement of the Project for Prevention of Diarrheal Diseases (Phase II) in India (hereinafter referred to as "the Project").

During their visit, the Team was briefed on the achievements of the project by the project staff and the relevant authorities of the Government of India and through the Evaluation Workshop. Based on the information and data collected through the evaluation, the Joint Evaluation Team compiled the results of their findings in the evaluation report and presented it to the Joint Coordinating Committee on 16 February 2006 at New Delhi.

The Joint Coordinating Committee discussed the contents of the report and shared mutual understanding. Furthermore the Committee members agreed to adopt the PDM version 2 draft as recommended in the evaluation report, as the official plan of the Project for the remaining implementation period.

Mr.Toshifumi SAKAI
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Prof. N. K. Ganguly
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Ministry of Health and Family-welfare

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Director
National Institute of Cholera and
Enteric Diseases

16-2-2006

New Delhi, 16 February 2006

PROJECT NAME: **PREVENTION OF DIARRHEAL DISEASES (PHASE2)**

PROJECT PERIOD: FROM JUL. 2003 TO JUN.2008

PROJECT AREA:KOLKATA, INDIA; Target Group: 1. Scientists at NICED, 2. Trainees from other institutions

Version: 2 (draft)

DESIGNED DATE: 16 FEBRUARY 2006

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
SUPER GOAL Mortality rate of diarrheal diseases will be reduced in India.	Mortality rate of diarrheal diseases	1. National Health Statistics	
OVERALL GOAL Capacities of medical institutions in India to prevent diarreal diseases will be improved.	The results of the reproducibility tests of the networked centres are higher than that of 2003.	1. Reproducibility tests implemented by NICED	
PROJECT PURPOSE Strengthen capacities and augment capabilities at NICED and to the same throughout the country for prevention and control of diarrheal diseases.	1 .No. of kinds of species and subspecies of diarrheal pathogens that could be identified at NICED is higher than that of 2003. 2. No. of research institutions that are capable of identifying diarrheal pathogens at the molecular level. 3. No. of publication produced by NICED scientists. 4. Average impact factor of the publication produced by NICED scientists is higher than that of 2003.	1. NICED annual reports 2. NICED annual reports 3. NICED annual reports 4. NICED annual reports	1. Government adapts policy on prevention, treatment and diagnosis of diarrheal diseases based on acquired result. 2. Epidemic investigation is conducted at national level.
OUTPUTS 1. Capacity to identify diarrheal diseases at the molecular level is established. 2. Strains and diagnostic sera are appropriately managed and archived. 3. Constant surveillance of pathogens of diarrheal diseases is established. 4. Technical expertise to identify diarrheal pathogens is transferred to other parts of India and neighbouring countries. 5. Surveillance network of diarrheal diseases is established in India. 6. Capacity to investigate the efficacy of drugs for diarrheal diseases is improved.	1.1 No. of diarrheal diseases diagnosed at the molecular level increases 1.2 Results of the reproducability test of NICED 2. Antisera is produced for 100 serogroups of *v. cholera* nonO1/nonO139 3. At least 2 more hospital based surveillance system will be established. 4.More than 200 scientists (medical/non-medical) will be trained in molecular level identification and characterization 5. At least 20 institutions will be networked by mid 2008. 6.1. No. of drug resistance test will increase than that of 2003. 6.2 At least 2 clinical trials for the treatment of diarheal diseases will be	1. NICED annual reports 2. Reproducability tests 3. NICED annual reports 4. NICED annual reports 5. NICED annual reports 6. NICED annual reports	1. Adequate network between state and national government 2. Good collaboration is kept with other institutes. 3. More staff are assigned at NICED.
ACTIVITIES 1.1 To examine phenotype of enteric pathogens 1.2 To analyze enteric pathogens at molecular level by DNA typing 1.3 To develop molecular methods of identification of diarrheal pathogens 2.1 To collect, analyze and archive sera from patients with diarrheal 2.2 To establish an institution for producing diagnostic antisera 2.3 To maintain proper animal facility and to facilitate production of	**INPUT Donors' side** 1. Experts : short-term, in the following fields; (Virology, Parasitology, Microbiology, Environmental Microbiology, Molecular Biology, Epidemiology, Clinical medicine etc.) 2. Counterparts training in Japan 3. Equipment: analytical instrument, information gathering instrument, etc. 4. Counterparts training at home and in the third country		1. Trained counterparts stay at work during the project period. 2. Budget allocation for NICED is enough to cover all activities.

2.4 To introduce specimen banking system for strains and antisera 3.1 To setup continuous surveillance system for pathogens 3.2 To select fields for epidemiological research and conduct investigation on diarrheal disease 3.3 To conduct environmental surveillance for human pathogens to identify reservoirs 4.1 To provide training for doctors and scientists of relevant hospitals and neighbouring countries 4.2 To conduct follow up of the trained doctors and scientists to assess the effects of the training 5.1 To collect clinical data of patients from hospitals participating in the network 5.2 To establish network system for early warning of outbreaks and epidemics 6.1 To test drug resistance of enteric pathogens 6.2 To report the results of the drug susceptibility test back to the hospitals on a timely basis 6.3 To improve formulation of ORS for acute secretory diarrhea.	**INPUT: Recipient's side** 1. Administrator 2. Counterparts-Scientist and technician in the fields of Microbiology, Epidemiology, Clinical medicine, Virology, Parasitology, and other related field as necessary 3. Cost for administration, consumable supply etc. 4. Office Building (NICED)	**PRECONDITIONS** 1. Government does not oppose planned work in the project 2. State government and relevant hospitals are cooperative

JOINT MID-TERM EVALUATION REPORT

ON JAPANESE TECHNICAL COOPERATION

FOR

THE PROJECT FOR PREVENTION OF DIARRHEAL

DISEASES (PHASE II)

Japan International Cooperation Agency

And

National Institute of Cholera and Enteric Diseases

(Indian Council of Medical Research)

FEBRUARY 2006

LIST OF TABLES

ANNEX LIST

ABBREVIATIONS

BCRCH	Dr. B.C. Roy Memorial Children's Hospital
FY	Fiscal Year
ICMR	Indian Council of Medical Research
IDH	Infectious Disease Hospital of the State of West Bengal
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
NICED	National Institute of Cholera and Enteric Diseases
PDM.	Project Design Matrix
Rs.	Indian Rupees

1. INTRODUCTION

1.1 Background and Objective of the Evaluation Mission

Japan International Cooperation Agency (JICA) has collaborated with the National Institute of Cholera and Enteric Diseases (NICED) under the Indian Council of Medical Research (ICMR) in implementing the Project for the Prevention of Diarrheal Diseases (hereinafter referred to as "the Project") with the aim to establish and improve technology for diarrheal disease control at NICED and other institutions in the country. This Project succeeds another JICA technical cooperation project in support of NICED, implemented between February 1998 and January 2003. The Project was launched on 1 July 2003, and will be completed on 30 June 2008.

JICA dispatched an evaluation team (hereinafter referred to as "the Team") to India from 1 to 17 February 2006 to conduct a mid-term evaluation, as the Project has come to the mid-point of its implementation period. The evaluation was a joint undertaking by the Indian and the Japanese sides, with full cooperation from NICED and other relevant authorities.

The objectives of the evaluation mission were as follows:

1. To review the past inputs, activities, and outputs of the Project;
2. To evaluate the overall achievement of the Project since its commencement in 2003, using JICA's standard project evaluation criteria of relevance, effectiveness, efficiency, impact and sustainability;
3. To discuss about the Project implementation and highlight constraints if any;
4. To summarize recommendations for the remaining period of the Project, and to draw lessons learned for the benefit of both Indian and Japanese Governments.

1.2 Evaluators

The following are the members of the evaluation team.

	Name	Designation	Position, Organisation
1	Mr. Toshifumi SAKAI	Leader	Resident Representative JICA India Office
2	Dr. Hideo HAYASHI	Basic Medical Sciences	Professor, Chugoku Gakuen University
3	Ms. Tomoko SHIMADA	Evaluation Planning	Staff, Infectious Disease Control Team Human Development Department, JICA
4	Ms. Minako NAKATANI	Evaluation Analysis	Researcher, Social Development Department, Global Link Management, Inc.

1.3 Mission Schedule

DAY	DATE	ACTIVITIES
1	FEB 1 (WED)	Ms. Nakatani arrives in Kolkata
2	FEB 2 (THU)	Briefing session to NICED counterparts, Interviews of NICED counterparts
3	FEB 3 (FRI)	Meeting with the Director, NICED Interviews with NICED counterparts, Data collection
4	FEB 4 (SAT)	Interviews with NICED counterparts Collection of data
5	FEB 5 (SUN)	Document reviews
6	FEB 6 (MON)	Interviews with NICED counterparts Collection of data
7	FEB 7 (TUE)	Visit to the Infectious Disease Hospital and Dr. B.C. Roy Memorial Children's Hospital Drafting of the Joint Evaluation Report (DRAFT)
8	FEB 8 (WED)	Meeting with Ministry of Health, West Bengal Dr. Hayashi and Ms. Shimada arrives in Kolkata
9	FEB 9 (THU)	Visit to the Infectious Disease Hospital and Dr. B.C. Roy Memorial Children's Hospital (Dr. Hayashi and Ms. Shimada)
10	FEB 10 (FRI)	Evaluation Workshop
11	FEB 11 (SAT)	Consolidation of workshop results, Meeting with main NICED counterparts Field Visits to Surveillance System Outposts (Dr. Hayashi and Ms. Shimada)
12	FEB 12 (SUN)	Team members leave Kolkata for Delhi
13	FEB 13 (MON)	Discussion session on the Minutes (Joint Evaluation Report) with ICMR Curtesy call to Ministry of Health, DEA
14	FEB 14 (TUE)	Discussion session on the Minutes (Joint Evaluation Report) Revise the Minutes if necessary
15	FEB 15 (WED)	Finalization of the Minutes (Joint Evaluation Report)
16	FEB 16 (THU)	Joint Coordination Committee (Minutes Signing) Curtesy call to the Embassy of Japan Team members leave for Japan
17	FEB 17 (FRI)	Team members arrive in Japan

1.4 Stakeholders Consulted/Interviewed

The stakeholders who were consulted or interviewed by the Evaluation Mission consisted mainly of the following:

- Counterparts of the Project
- Japanese experts assigned to the Project
- Officials from the Ministry of Health and Family Welfare
- Officials from the State Office of Public Health, West Bengal
- Doctors and staff from Infectious Disease Hospital and Dr. B.C. Roy Memorial Children's Hospital
- Other partner institutions

Detailed list of the parties consulted by the Team is included in **ANNEX 1.**

1.5 Methodology of Evaluation

In accordance with the JICA Project Evaluation Guideline of January 2004, the mid-term evaluation of the Project was conducted in the following process.

Step 1: Project Design Matrix[1] for the evaluation (PDM_E) was adopted as the framework of the mid-term evaluation exercise, and the Project achievements were assessed vis-à-vis respective Objectively Verifiable Indicators. The level of inputs and activities were evaluated in comparison with the output levels.

Step 2: Analysis was conducted on the factors that promoted or inhibited the achievement levels including matters relating to both the project design and project implementation process.

Step 3: An assessment of the Project results was conducted based on the five evaluation criteria: "relevance", "effectiveness", "efficiency", "impact", and, "sustainability".

Step 4: Recommendations for the Project stakeholders for the remaining implementation period and lessons learned were formulated for future projects to be implemented by both Indian and Japanese Governments.

Definition[2] of the five evaluation criteria that were applied in the analysis for the mid-term evaluation is given in Table 1-1 below.

Table 1-1 : Definition of the Five Evaluation Criteria for the Final Evaluation

Five Evaluation Criteria	Definitions as per the JICA Evaluation Guideline
1. Relevance	Relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in connection with the Government development policy and the needs of the target group and/or ultimate beneficiaries in India.
2. Effectiveness	Effectiveness is assessed to what extent the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.
3. Efficiency	Efficiency of the Project implementation is analyzed with emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.
4. Impact	Impact of the Project is assessed in terms of positive/negative, and intended/unintended influence caused by the Project.
5. Sustainability	Sustainability of the Project is assessed in terms of institutional, financial and technical aspects by examining the extent to which the achievements of the Project will be sustained after the Project is completed.

Both quantitative and qualitative data were gathered and utilized for analysis. Data collection methods used by the Team were as follows:

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1 Within the latest JICA Evaluation Guideline of 2004, the term Logical Framework, or LogFrame has been introduced in place of Project Design Matrix (PDM). However since the Project continued referring to this tool as PDM throughout the Project Period, this Report will use the term PDM.

2 "JICA Project Evaluation Guideline (revised: January 2004)," Office for Evaluation and Post-Project Monitoring, JICA.

- Literature/Documentation Review;
- Questionnaires (Counterparts, Experts);
- Key Informant (Counterparts, Japanese Long-term Experts, Doctors from IDH and BCRCH);
- Evaluation Workshop
- Direct Observations

1.6 Adoption of the PDM_E as the framework for Evaluation

Prior to the Team's dispatchment, the Domestic Project Coordination Committee reviewed the PDM version 1, and several revisions were made based on their recommendations. This was initially conceived as a draft of the PDM version 2, and thus was adopted as the PDM in which the mid-term evaluation was conducted.

However during the evaluation exercise, the Team recognized that further changes were needed in the PDM, especially in some of the indicators in which data was difficult to obtain. Furthermore, NICED Counterparts requested additional revisions during the evaluation workshop on 10 February. In this context, the Team decided to retrospectively adopt the PDM in which they conducted the mid-term evaluation as the PDM for evaluation, or PDM_E. The latest PDM reflecting the evaluation workshop results is now the final draft of the PDM version 2. Both the original PDM version 1 and the final draft of the PDM version 2 are attached as **ANNEX 2.**

Description of the Project under the PDM_E is as follows:.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	IMPORTANT ASSUMPTIONS
Super Goal Mortality rate of diarrheal diseases will be reduced in India.	Mortality rate of diarrheal diseases	
Overall Goal Capacities of medical institutions in India to prevent diarrheal diseases will be improved.	The ratio of referrals to NICED made by the medical institutions vis-à-vis their total number of diagnosis on diarrheal disease will decrease.	
Project Purpose Strengthen capacities and augment capabilities at NICED and to disseminate the same throughout the country for prevention and control of diarrheal diseases	1. Number of diarrheal diseases identified in NICED. 2. Number of persons who acquired technology 3. Number of indeterminable samples in diarrheal diseases 4. Number of presentations and thesis published by researchers at NICED	1. Government adapts policy on prevention, treatment and diagnosis of diarrheal diseases based on the required result. 2. Epidemic investigation is conducted at national level.

In order to achieve the Project Purpose, the following six Outputs were included in the design.

Narrative Summary	Objectively Verifiable Indicators	Important Assumptions
1. Capacity to identify diarrheal diseases is established at the molecular level.	Number of cases identified at the molecular level	1. Adequate network between state and national governments 2. Good collaboration is kept with other institutes. 3. More staff are assigned at NICED.
2. Strains and diagnostic sera are appropriately managed and archived.	Record of specimens and maintenance of facility	
3. Constant surveillance of pathogens is established.	Record of surveillance (no. of epidemic caused)	
4. Technical expertise to identify diarrheal pathogens is transferred to other parts of India and neighbouring countries.	No. of trainees and the level of the proficiency	
5. Surveillance network of diarrheal diseases is established in India	No. of networked centres	
6. The capacity to investigate the efficacy of drugs for diarrheal diseases is improved.	Results of drug resistance test and data of therapeutic effect	

2. RECORD OF PROJECT IMPLEMENTATION

2.1 Inputs

2.1.1 Japanese Side

a) Experts Dispatched

All technical inputs on the Japanese side have been implemented as dispatch of short-term experts. To date, **26** short-term experts have been dispatched for a total of **8.17** man/months (245 days) with an average stay of 9.4 days per expert. Their fields of expertise included the following areas: Molecular Biology, Environmental Microbiology, Epidemiology, Clinical Microbiology, Electron Microscopy, Parasitology, and Virology.

In addition, Project Coordinators, as long-term experts, were assigned for a total of 32 man/months to administrate the Project in Kolkata.

The detailed list of Japanese experts is shown in **ANNEX 3.**

b) Trainees Accepted

A total of **10** counterparts were trained under the Counterpart Training Scheme in Japan. The following are the areas for training courses and the number of Counterparts accepted in the respective courses.

Training Course	Number of CPs
Virology (and Molecular Virology)	3
Microbiology (and Molecular and Cellular Biology)	2
Epidemiology (including Biostatistics in epidemiological study)	2
Pathophysiology	2*
Clinical Medicine	1
Facilities Maintenance and Management	1

Source: JICA Project Office
**NOTE: Includes 1 counterpart who will start his training in March 2006.*

To date, all trainees continue to work in NICED in their pre-training positions except for one scientist who was promoted to Deputy Director.

The detailed list of Trainees is shown in **ANNEX 4**.

c) Equipment Provided

Machinery and equipment worth **Rs 21,249,583** or **JPY 53,017,922**[3] in total were provided at the time of the mid-term evaluation. In addition, for the FY2005, the Project is in the process of procuring additional **Rs 1,447,760** or **JPY 3,612,176** worth of equipment.

Furthermore, for the equipment procured in Japan brought in by the short-term experts, a total of **Rs 1,192,767** or **JPY 2,975,966** was spent.

All the equipment that were handed over to NICED are being well utilized[4] and none have been reported to be in need of any repair.

The detailed list of equipment is shown in **ANNEX 5**.

d) Operational Expenses

As of end December 2005, a total of **Rs 2,823,264** or **JPY 7,041,072** equivalent was disbursed as direct operational expenses, mainly used for the administrative costs of the Project.

In addition, for the In-country Trainings and the Third-country Trainings, a total of **Rs 9,635,520 or JPY 24,040,719** were spent.

The details of the operational expenses are shown in **ANNEX 6.**

2.1.2 Indian Side

a) Appointment of Counterpart Personnel

A total of **10** NICED scientists have been assigned as the counterpart personnel by the Indian side.

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[3]. Calculation was made with the at 100 JPY=40.08Rps, which is the average exchange rate between the period of 1 July 2003 and 31 January 2006.

[4] This does not include some of the equipment which are in stock waiting for the new NICED building to be opened.

The list of counterpart personnel as of 31 January 2006 is shown in **ANNEX 7**.

b) Cost-sharing of Operational Expenses

In comparison with the Phase I of this Project, NICED has increasingly taken on a greater share of the operational expenses. For the current phase from July 2003 to date, a total of **Rs 139,600,000** [5] **or JPY 348,303, 390** was allocated as direct operational costs for project activities.

Details on cost sharing in direct operational expenses by NICED from FY2000 to FY2005 (planned) is shown as **ANNEX 6.**

2.2 Activities Implemented

Most of the Project's activities, as specified under the PDM_E and the Project's Five-year Plan, have been implemented on schedule. The achievements for each of the activities are summarised in **ANNEX 8**

2.3 Issues relating to the Implementation Process

The Project was designed so that most of the technical inputs by the Japanese side were provided through the dispatchment of short-term experts; only the Project Coordinators were assigned full time as the long-term experts. This set up has been effective in this Project's context partly because it is in its second phase and the Counterparts are already well aware of what a JICA technical cooperation project entails. More importantly, NICED Counterparts and the Japanese technical experts have gradually developed a strong partnership based on mutual respect and trust. Such foundation allowed the main stakeholders of the Project to maintain a good channel of communication, and in many cases, the collaboration has evolved into joint studies and other mutually beneficial initiatives.

It has been noted however that such project design presents some challenges in project management, especially in regards continuous and holistic monitoring based on the Project's implementation plan and technical achievements.

Furthermore, it has been observed that application of JICA's standard approach for project management (Project Cycle Management Methodology), especially its key tools and framework for monitoring and evaluation, is difficult due to the following characteristics of the Project:

- Since majority of the activities involves research work in basic sciences, setting attainable targets, especially within the 5 year time frame of the Project, has been cited as very difficult. The same has been noted for the selection of the objectively verifiable indicators that would measure the achievements themselves.
- Majority of the research work by NICED counterparts is supported by its own resources and with the combination of JICA and non-JICA external resources. Since the achievements from such research work is a fruition of integrated inputs by various parties, attribution to respective contributors is not feasible. Similarly, many activities within the current PDM and 5 year plan include activities which

5 This includes the budgeted allocation for FY2005.

are directly or indirectly supported by resources outside of the Project.

- NICED counterparts and other scientists are usually responsible for specific research projects, and are bound to those plans. On the other hand, the activities identified under the PDM and the Project's 5 year Plan are not research project specific, may encompass separate activities of different divisions, and are time bound to the overall timeline of the Project. Although the actual contents of both plans may be the same, the plans do not necessarily correlate, leaving room for confusion for the Counterparts as to which part of the PDM they are responsible for.
- Project counterparts and many of the Japanese experts have not had exposure to the JICA standard project management framework of utilizing the PDM and Project's 5 year Plan.

2.4 Achievement of Outputs

2.4.1 Achievement of Output 1

Output 1:	**Objectively Verifiable Indicators**
Capacity to identify diarrheal diseases is established at the molecular level.	Number of cases identified at the molecular level

In all departments it was confirmed that all research activities are progressing as planned in the Project's 5 year Plan, and it may be concluded that at the time of the mid-term evaluation, NICED's capacity to identify diarrheal diseases at the molecular level has been well established. Various techniques for analyzing pathogens at the molecular level introduced during the first phase of the Project (e.g. PCR, RT-PCR, Ribotyping, Genotyping/DNA Fingerprinting, PFGE, DNA Cloning and sequencing) continue to be applied more frequently and in a wider scope. Detailed achievements obtained through full utilization of these techniques are recorded in Annex 8 under records of activities implemented.

The enhanced diagnostic capabilities at the molecular level has resulted in following developments since mid-2003:

- Division of Microbiology are now able to identify more kinds of species and subspecies of diarrheal pathogens, such as O2 through O26 of *V. cholerae* non O1/non O139 serotypes, *V. parahaemolyticus*, *V.fluverius*, and *Aeromonas*.
- Division of Virology, developed a methodology for molecular probes which are applied to reconfirm the PCR results with regards to identification of Rotavirus type A and B.
- Division of Parasitology are now conducting molecular level diagnosis of all samples from the IDH and BCRCH surveillance systems that had microscopic confirmation of parasites

The following table 2-1 shows the total number of diarrheal diseases identified at the molecular level and its results for the FY 2001 through FY 2005.

Table 2-1 Number of diarrheal diseases identified at the molecular level and its results by NICED

Identified Diseases	FY2001	FY2002	FY2003	FY2004	FY2005*
Division of Microbiology					
No. of cases examined	**2131**	**2285**	**1789**	**2430**	**1297**
No. of cases identified	**252**	**266**	**258**	**637**	**298**
V. cholerae	243	245	243	613	270
V. parahaemolyticus	9	21	15	24	28
No. of cases examined	**1653**	**1782**	**1515**	**1937**	**1370**
No. of cases identified	**72**	**102**	**63**	**19**	**73**
Salmonella spp	33	17	9	8	4
Shigella spp	39	85	53	11	69
Division of Virology					
No. of cases examined	**548**	**375**	**351**	**559**	**429**
No. of cases identified	**107**	**104**	**89**	**121**	**74**
Rotavirus	6	19	7	12	5
Astrovirus	6	5	5	1	2
Picobirnavirus	-	-	-	16	47
Norovirus	-	-	-	3	0
Sapovirus					
Division of Parasitology					
No. of cases examined	**975**	**400**	**65**	**134**	**62**
No. of cases identified	**207**	**92**	**62**	**124**	**57**
E. histolytica	24	12	9	18	8
G. lamblia	30	12	8	16	8
C. parvum	51	22	18	24	13
Ascaris	62	26	18	33	18
H. nana	10	5	2	8	3
T. trichuria	16	7	3	11	3
T. hominis	12	5	3	7	3
Hookworm	2	3	1	7	1

Source: Division of Microbiology, Virology, Parasitology, NICED
**Note: FY2005 data is up to end January 2006*

2.4.2 Achievement of Output 2

Output 2:	Objectively Verifiable Indicators
Strains and diagnostic sera are appropriately managed and archived.	Record of specimens and maintenance of facility

With regard to Output 2, substantial number of strains has already been categorized and archived by the Microbiology Division, of which the total for the period between FY2001 through FY2005 was 2,621 specimens. 78% of the archived strain is *V. cholerae*. The Division is now compiling a catalogue of these specimens including detailed information per specimen. The number of archived strains at the maintenance facility is shown in table 2-4.

Table 2-4 Record of archived strains at the maintenance facility

Archived strains	FY2001	FY2002	FY2003	FY2004	FY2005	TOTAL
V. cholerae	243	245	243	613	270	2,042
V. parahaemolyticus	9	21	15	24	28	97
Salmonella spp	33	17	9	8	4	71
Shigella spp	39	85	53	11	69	357
Escherichia coli	-	4	-	-	50	54

Source: Division of Microbiology, NICED
**Note: FY2005 data is up to end January 2006*

On the other hand, with the collection of sera, some difficulties were reported due to the fact that there are very few patients who would volunteer their blood samples. In order to serve its purpose, the blood samples need to be collected twice, with a 7 to 10 day intermission. NICED began the collection of sera in the year 2005, and to date, there are only 5 pairs of sera from 5 patients.

For the production of O1 and O139 *V. cholerae* anti-sera, the production levels are currently limited due to the current capacity of the animal facilities at NICED. Nevertheless, NICED has been providing, as part of its extension activities, doses of this anti-sera upon demand to various research and medical institutions in the country free of charge. The provision of anti-sera aims to enhance other institutions' capabilities to accurately diagnose *V. cholerae* pathogens. In FY2005 to date, 11 institutions benefited from this service provided by NICED. With the expected expansion of the animal facility in the new NICED building, it is envisaged that the production levels of the anti-sera would also increase. Production of other non O1/ non O139 anti-sera is in progress, and to date anti-sera for 25 serotypes have been completed from O2 through O26. NICED aims to produce and archive diagnostic anti-sera of more than 100 serotypes for *V. cholerae* by the end of the Project, however some reservations were expressed by the Director regarding the time frame due to the fact that production of each anti-sera would be a very laborious process.

2.4.3 Achievement of Output 3

Output 3:	Objectively Verifiable Indicators
Continuous surveillance of pathogens is established.	Record of surveillance (no. of epidemic caused)

NICED currently administers two hospital based surveillance systems, one with the Infectious Disease Hostpital (IDH) and another one with Dr. B.C. Roy Memorial Children's Hospital (BCRCH).

The surveillance system for IDH, which begun in 1995, is one of active surveillance, where there is systematic sampling (i.e. every 5th patient on two randomly selected days per week). The main objectives for the surveillance is to monitor changes in disease patterns including drug sensitivity, to provide a data base on diarrheal illness for researchers, to provide regular reports to the State Government of West Bengal and other relevant agencies on diarrheal pathogens, to develop an early warning system for forecasting an epidemic, and to improve care and introduce better preventive measures[6]. For each year approximately 1,000 samples from patients enrolled in the surveillance program are taken for diagnosis in the Divisions of Microbiology, Virology, Parasitology, and Electron Microscopy for the identification of pathogens. The

[6] Indian Council of Medical Research, *National Institute of Cholera and Enteric Diseases Research Projects 2003-2004*, p.2.

results are usually compiled in biweekly institutional report submitted to the Public Health Directorate of the State Government of West Bengal, IDH; individual patient's reports are also prepared and are made available upon request. Similarly for the BCRCH, samples are collected, diagnosed and reported back to the hospital, but sampling is conducted according to the clinical diagnosis by the doctors from the Clinical Division of NICED, on the basis of various symptoms shown by the patient.

Furthermore, NICED initiated two additional hospital based surveillance systems in the district hospitals of Howrah and Midnapur. Currently, surveillance activities have been discontinued.

With the current diagnostic capacity within NICED and its various research priorities, it was reported that it would be unrealistic to consider establishing additional surveillance systems with the similar design. Instead, the current vision for expanding the surveillance system appears to be to form an information based network in which other medical institutions, first within the State of West Bengal and from other major metropolitan areas at a later stage, may send diagnostic results with clinical information on a regular basis for further analysis by NICED. Immediate constraints for proceeding with such activities were raised as the limited number of computers, staff, office space for the additional surveillance data management. The situation is expected to improve with the expansion of the surveillance system room in new office building to be inaugurated in April 2006, but NICED's internal budget has yet to be earmarked for the necessary computers and staff. Equally important, cooperative arrangements with the medical institutions need to be established for them to participate in the surveillance system.

With regards to NICED's ongoing epidemiological research on the vaccine trials for *V. cholerae* and typhoid in collaboration with the International Vaccine Institute, all preparatory work was completed on schedule, and over 110,000 people from 3 wards within Kolkata metropolitan area were registered. The vaccine trials of NICED are scheduled to be implemented in April 2006, and 7 field outposts will conduct surveillance for results in the period of 3 years. The Project provided complementary support to this Study through the provision of key equipment, BACTEC, which greatly speeds up the diagnosis procedures.

Finally, environmental surveillance system has been set up for 5 water sources within Kolkata metropolitan area. On a monthly basis, water quality is monitored for any existence of *V. cholerae*, faecal pollution and chlorine levels. Similar diagnostic activities play a critical role during outbreak investigations to determine the pathogenic causes for the outbreak of diarrheal disease.

2.4.4 Achievement of Output 4

Output 4:	**Objectively Verifiable Indicators**
Technical expertise to identify diarrheal pathogens is transferred to other parts of India and neighbouring countries.	Number of trainees and the level of the proficiency

In continuity with Phase I activities, the Project implemented 3 In-country Training Programs targeting scientists and technical staff from inside India and 3 Third-country Training Programs targeting trainees from neighbouring countries (i.e. China, Bhutan, Myanmar, Nepal, Sri Lanka, Philippines, Indonesia, Bangladesh, Zambia, Kenya, Ghana, Tanzania). Both training programs focus on molecular epidemiology of diarrheal diseases, with special reference to *V. cholerae*. The summary of training programs is shown below

Table 2-5 Summary of training programs of the Project

Training Scheme	Participants	Duration
In-country Training	Total of 46 participants in three training programs	1. 3~12 November 2003 2. 27 September ~ 6 October 2004 3. 17~28 October 2005
Third-country Training	1. 13 trainees from 9 countries 2. 11 trainees from 8 countries 3. 10 trainees from 9 countries	1. 13~26 January 2004 2. 22 November ~ 5 December 2004 3. 21 November~4 December 2005

Source: JICA Project Office, 2006

The core faculty of NICED with additional Japanese experts act as the lecturers. In addition, NICED is responsible for the selection of participants and administration of the In-country Training. About 15 participants are selected each year on the basis of 1) their background in clinical biology and whether they have some experience in isolating pathogens, 2) their affiliations in that usually scientists from Government hospitals or Medical Colleges, laboratories are invited, and 3) their current job responsibilities since preference is given to frontline scientists who would be in a position to immediately apply the acquired technology.

As result of the training programs, 46 domestic participants and 34 international participants acquired basic knowledge on diarrheal diseases and have the basis to conduct basic research, if not on molecular biology. Their level of proficiency is assessed during the respective training programs where each participant is requested to present their research activities conducted during their stay at NICED.

Follow-up activities of the training programs have yet to be systematically introduced, however, it was reported that NICED scientists are providing technical consultations or at times diagnostic sera for *V. cholerae* on demand basis. This pool of ex-trainees now acts as the foundation of the emerging network of scientists in collaboration with NICED as will be further discussed in Output 5.

In addition to theses training programs on molecular epidemiology, it was suggested during the evaluation workshop that a training program on molecular virology would be highly beneficial to expand the field of technical transfer from NICED to other institutions, and to further enhance the achievement level of Output 4.

Finally, it should be noted that NICED provides various other training opportunities, in the form of summer programs, research fellows, and conventional trainings aside from those implemented under the JICA/NICED project framework, and the number of participants have increased significantly in the last five years.

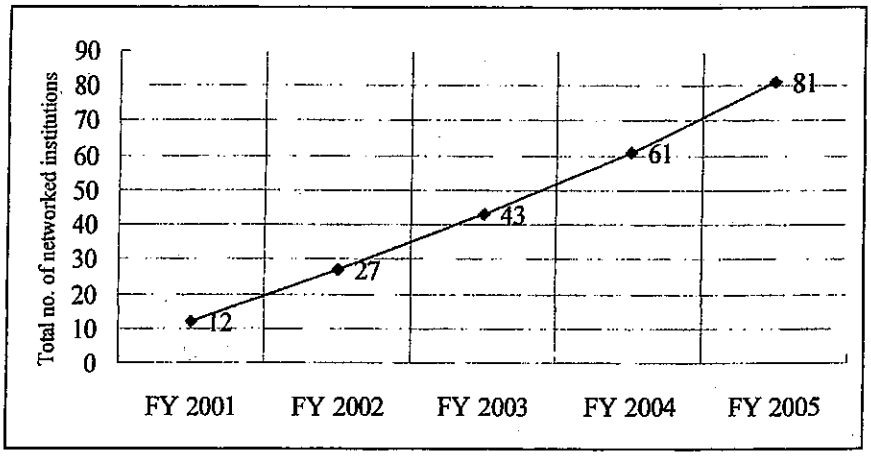
2.4.5 Achievement of Output 5

Output 5:	Objectively Verifiable Indicators
Surveillance network of diarrheal diseases is established in India.	Number of networked centres.

At the institutional level, NICED has established officially, a surveillance network only with IDH and BC Roy Hospital, as described under section 2.4.3. However, there are institutional affiliations with over 40

organizations where NICED receives various request for phage typing[7] of pathogens, diagnostic anti-sera, and training opportunities. On the other hand, extensive networks have been established at the individual scientists level through various means such as joint studies, mutual fields of interest and other collaborative opportunities. Nevertheless, no mechanism exists to date to institutionally consolidate such individual networks into a common platform.

Figure 2-1 Number of networked centres for the Division of Microbiology



Source: Division of Microbiology, NICED
**Note: FY2005 data is up to end January 2006*

One promising development has been the growing network of former trainees from the Project's training programs, mainly with the Division of Microbiology. Substantial partnerships have emerged, and from the surveillance point of view, during the year 2000 and 2004, 8 cholera outbreaks in the Kottayam in Kerala, Murshidabad and Kihirpur in West Bengal, Ahmedabad in Gujarat, Orissa were investigated through this network of trainees[8].

2.4.6 Achievement of Output 6

Output 6:	Objectively Verifiable Indicators
The capacity to investigate the efficacy of drugs for diarrheal diseases is improved.	Results of the drug resistance test and data of therapeutic effect

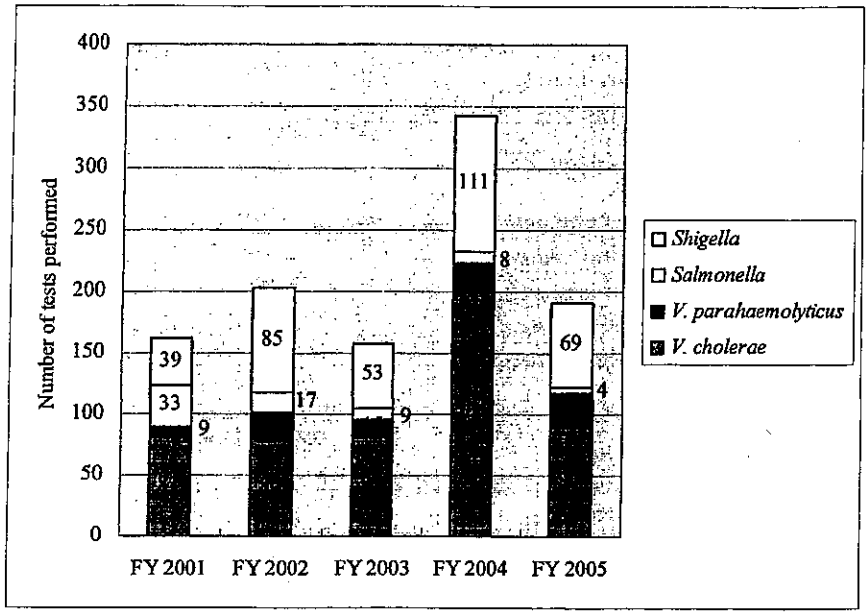
NICED's capacity to investigate the efficacy of drugs and other treatments for diarrheal diseases has much been enhanced. Starting with this phase of the Project, NICED developed the mechanism to conduct 11 kinds of drug resistance tests and are performing them for every sample provided from the surveillance

[7] NICED is the only institution in India that conducts phage typing. Just for FY 2003 alone, 36 institutions across 10 states of India referred 411 strains to NICED for phagetyping.

[8] It is important to note that the institutions within the network would not have the authority to request for outbreak investigations by NICED. Only when the State Public Health Office officially sends the request to NICED, a team of scientists may be dispatched.

system. The figure 2-2 shows the numbers of tests for *V. cholerae, V. parahaemolyticus, Salmonella and Shigella.* All of the individual test reports are systematically reported back to the respective hospitals.

Figure 2-2 Number of drug resistance tests performed by NICED FY 2001-FY2005



Source: Division of Microbiology, NICED
**Note: FY2005 data is up to end January 2006*

If there are any emerging trends of drug resistance shown by a specific pathogen, the reports are immediately produced and submitted to the public health offices concerned. This information is also circulated to other medical and research institutions through the network of scientists or publications. Some of the major findings with regards to NICED's investigation in drug efficacy and treatment of diarreal diseases are as follows:

- Antibiotic resistance in enteroaggregative *E. coli*
- Discovery of multi-drug resistance *Shigella dysentariae typi 1*
- Antibiotic susceptibility patterns of V. *cholerae O1* and *O139*
- Clinical studies on new ORS compositions

3. Evaluation by Five Criteria

3.1 Relevance

The Project Purpose and Overall Goal are relevant in terms of the needs of the health sector of India and especially the Government of West Bengal, Indian national policy and Japanese Official Development Assistance (ODA) policy.

As shown in Table 3-1, diarrheal diseases continues to be the number one cause for hospitalized cases over

any disease in the State of West Bengal including communicable diseases such as acute respiratory infections (ARI), tuberculosis, or meningitis.

Table 3-1 Percentage of distribution of hospitalised cases by major causes in district level hospitals* in West Bengal State, 2001

	Disease	Percentage
1	Diarrhoeal diseases	19.31
2	Cerebro Vascular/ Cardio Vascular diseases	11.13
3	Respiratory Infections	7.10
4	Poisoning	5.21
5	Chronic Obstructive Pulmonary Disease	5.05
6	Obstructive Labour	4.75
7	Road Traffic Accident	4.14
8	Malignant Neoplasm	3.80
9	Haemorrhage (Maternal)	3.56
10	Abortions	3.38

Source: Health on the March West Bengal 2003-2004, State Bureau of Health Intelligence, Directorate of Health Services, Government of Wet Bengal
NOTE: This statistics is a compilation of all 18 district hospitals in the state of West Bengal and does not include the data for Kolkata metropolitan area.*

Furthermore, the latest data for West Bengal shows that the incidence rate of diarrheal diseases , including acute gastro enteritis, dysentery and cholera, tops any water-borne and respiratory diseases. It has been estimated that the incidence rate for diarrheal diseases was 22.24 per 1,000 population in 2005; this is much higher than acute respiratory tract infections at 14.97, and of hepatitis at 0.09[9]. Thus, it may be deduced that the local health needs to prevent the infection of diarrheal diseases continues to be very high.

In India's National Health Policy of 2002, it was indicated that diarrheal disease such as gastro enteritis and cholera continues to contribute to a high level of morbidity in the population. Furthermore it highlights the national need to strengthen its surveillance system which in turn would enable timely intervention to contain the spread of infection for these diseases. The Project's approach to expand its constant surveillance system and to establish surveillance networks is very much in line with such national policy directions.

According to the JICA Country Assistance Strategy of 2001 for India, the prevention of infectious diseases was identified as one of the main pillars for poverty reduction, which in turn is one of the three main priority areas for JICA assistance together with environmental protection, and support to economic reforms. This is also in line with Japanese Government's 2005 Country Assistance Plan for India, which also highlights the need to support the prevention of infectious diseases not just through support to the development of physical infrastructure, but also with an emphasis on human resource development and institutional strengthening such as referral systems and networks. Thus from both policy documents, it may be concluded that the Project's objectives are also consistent with the Japanese ODA policy to India.

[9] Data for January to September 2005 from the State Bureau of Health Intelligence, Directorate of Health Services, Government of Wet Bengal.

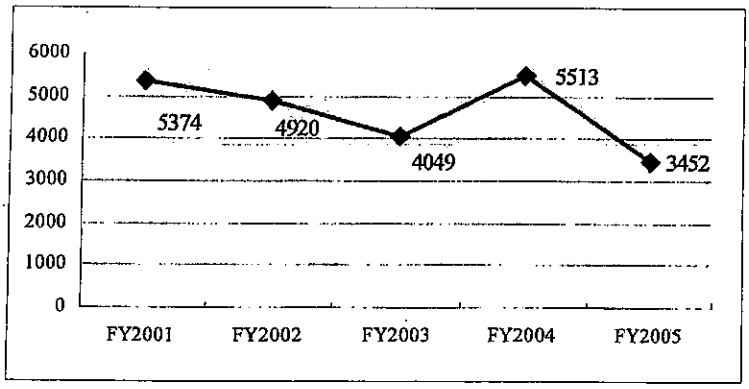
3.2 Effectiveness

Project Purpose:	Objectively Verifiable Indicators
Strengthen capacities and augment capabilities at NICED and to disseminate the same throughout the country for prevention and control of diarrheal diseases	1. Number of diarrheal diseases identified in NICED. 2. Number o f persons who acquired technology 3. Number of indeterminable samples in diarrheal diseases 4. Number of presentations and thesis published by researchers at NICED

From the perspective of effectiveness, the Project has shown good progress so far, and is on track to achieve the Project Purpose by the end of the implementation period.

First, the Project has already succeeded in establishing and improving technical capacities for diarrheal control as it may be observed in the various research achievements to date. NICED Counterparts are applying as well as developing new techniques for molecular level analysis that enabled them to increase the number of diarrheal pathogens that they could identify. Furthermore, the annual number of cases examined[10] for diarrheal diseases remain constantly high as observed in Table 3-2.

Table 3-2 Number of cases diagnosed for diarrheal diseases from the NICED surveillance system



Source: NICED, 2006
**Note: FY2005 data is up to end January 2006*

In addition, substantial number of research work has been published to disseminate the achievements as shown in Table 3-3.

Table 3-3 Number of publications by NICED staff

Division	FY 2003	FY 2004	FY 2005
Microbiology	8	9	10
Virology	6	2	5
Parasitology	4	3	1
Pathophysiology	2	4	0
TOTAL	20	18	16

Source: Annual Report of the Project and NICED
Note: FY2005 data is up to end January 2006

[10] Data includes all tests conducted for different pathogens which may have come from same patient sample.

Moreover, it is important to note that the average impact factor of NICED's publication increased from its level of 4.02 in the year 2000 to 4.25 in the year 2004 signifying the improvement of the quality of its publications. The work of NICED's scientists have been published in renowned academic journals such as *Journal of Clinical Microbiology, Journal of Antimicrobial Chemother,* and *Journal of Infectious Diseases.*

With regards to its objective to strengthen the capabilities of other institutions throughout the country for prevention and control of diarrheal diseases, more effort would be required to achieve further results in the latter half of the Project. Although the Project has been successfully implementing annual training programs to date, the follow-up activities of the trainings that would ensure the technology transfer, are yet to be designed and implemented. Furthermore, since the training programs carry additional significance in that they are considered as entry points in developing a surveillance network to control diarrheal pathogens, NICED requires an institutional strategy and an action plan that would integrate the training and surveillance network related activities to optimize results. The Project should assist NICED to devise such strategy and plans so that the Project Purpose is met.

In terms of NICED augmenting other institutions' capacities and mobilizing their participation in a surveillance network, some institutional issues need to be addressed. Since NICED is a national institution under ICMR, equal support from both the central ministry as well as concerned state authorities is necessary to formalize such a network throughout the country. NICED should initiate discussions with both the Ministry of Health and Family Welfare and ICMR, as well as State Public Health Directorates to rally support before lack of policy level support becomes an inhibiting factor to the Project's achievements.

During the mid-term evaluation, the Counterparts expressed that the indicator 1 for the Project Purpose, "Number of diarrheal diseases identified in NICED" may not be appropriate to measure the level of capacity development defined under the Project Purpose since the number of diarrheal cases identified in a given year depends solely on the number of patients admitted in the surveillance system. Rather, "the number of kinds of species and subspecies of diarrheal pathogens that could be identified at NICED" is suggested as the alternative indicator. Similarly, instead for the current indicator 2, "Number of persons who acquired technology", an alternative indicator "Number of research institutions that are capable of identifying diarrheal pathogens at the molecular level has increased" is recommended for the PDM version 2 DRAFT.

3.3 Efficiency

The Project's efficiency is high with regards to its inputs and the current achievement levels of most of the Outputs. All equipment, except for the ones left to be installed within the new office building, have been procured and utilized fully by the Counterparts. The training opportunities in Japan have been cited in interviews and questionnaires as extremely useful for the Counterparts not just to obtain new technical capabilities but also for the development of professional networks in view of future collaborative work.

Dispatch of the short-term experts has also been viewed favourably by the NICED staff. Most of the Counterparts consider these visits as sessions for exchange of information, rather than an opportunity for technical transfer from the Japanese side. This is mainly attributable to the short length of stay by the experts in NICED that would make it difficult for any substantial training to be implemented.

Some of the Outputs with lower achievement levels (i.e. Output 3 and 5) have had limited inputs especially from both Indian and Japanese side. Re-concentration of inputs into the activities to achieve these outputs

may further enhance the efficiency levels of the Project. With regard to production of anti-sera, and establishment of surveillance system and networks, progress is expected once there is strengthening of physical capacity with the new NICED building to be launched in April 2006. In par with such expansion, procurement of additional staff and equipment needs to be ensured to guarantee that the activities for these Outputs would be carried out to the end of the Project Period.

3.4 Impact

Overall Goal	Objectively Verifiable Indicators
Capacities of medical institutions in India to control diarrheal diseases will be improved.	The ratio of referrals to NICED made by the medical institutions vis-à-vis their total number of diagnosis on diarrheal disease will decrease.

During the mid-term evaluation study, the Team discovered that the necessary data for the predetermined indicator to assess the attainability of the Overall Goal, "the ratio of referrals to NICED made by the medical institutions vis-à-vis their total number of diagnosis on diarrheal disease will decrease," could not, and most likely would not be available in the near future. Nevertheless, through the interviews and observations, the Team confirmed that to date, NICED's dissemination of information and knowledge in the form of publications, reports and training programs have proven to be very effective, and contributed greatly to enhancing the diagnostic and treatment capacities of other medical and research institutions. The increasing breadth of information exchange and interaction among such institutions regarding diarrheal disease control may be attributed to a fair degree to NICED's leadership in pioneering various research initiatives. This is supported by the fact that there is a growing demand for NICED's extension services such as increasing number of requests for diagnostic anti-sera or outbreak investigations[11], in addition to its role as reference laboratory. Moreover, NICED has been accepted at the international network of medical research institutions, *Pulse Net Asia-Pacific*, which would now enable them to take on the additional role to link the domestic to international institutions.

The Team recommends that the following indicator would be selected for monitoring and evaluating the impact of the Project for the remaining Project period: "The results of the reproducibility tests of the networked centres are higher than that of 2003."

No negative impacts of the Project have been reported so far.

3.5 Sustainability

In view of the current national policies, organizational aspects, financial aspects, and technical aspects, it could be deduced that the sustainability of the effects of the Project's after its completion would be very high. Institutionally and financially, ICMR continues to support NICED as the centre of excellence, and this is reflected in the increasing amount of budget allocated for the institution as shown below in Table 3-4.

[11] Where there was only 1 case of outbreak investigation in FY1998, the number has steadily increased to 9 in FY2004. In FY2005 to date, NICED has already conducted 9 outbreak investigations.

Table 3-4 Budget Allocation for NICED for FY 1999 to FY 2005

(in 1000 Rps)

Budget Items	1999	2000	2001	2002	2003	2004	2005
Human Resources	39,770	39,227	40,820	40,864	48,153	55,081	60,136
Travel Expenses	760	913	1,210	1,308	1,020	1,413	1,006
Operational & Maintenance	9,546	11,500	14,650	17,725	16,470	30,500	16,226
Equipment	8,143	22,476	20,916	24,677	11,103	17,227	-
Capital Budget	26,429	45,649	17,706	5,558	16,102	326,636	613,000
Total for FY	**84,648**	**119,765**	**95,302**	**90,132**	**92,848**	**430,857**	**690,408**

Source: NICED, 2006

Note: FY2005 data is up to end January 2006

In addition, NICED has successfully built mutually beneficial partnerships with the State Government of West Bengal and other local health authorities. Most notable acknowledgement of NICED's services perceived by these local authorities concentrates on the dispatch of scientists for the outbreak investigations. Thus, it is very predictable that such policy and institutional support would remain with the organization and its work to sustain the effects of the Project. Furthermore, it should be noted that the financial sustainability of NICED appears solid, since NICED already has much experience in mobilizing external resources, both domestic and international, to support its activities. One matter of concern expressed by the Counterparts focused on the availability of reagents, critical for conducting various laboratory works. Although NICED procures majority of its reagents on its own, scientists also have to mobilize additional external funding to ensure that a steady supply is available for them. It was reported that the lack of reagents sometimes inhibit the design of experiments and may compromise research results. If ICMR agrees to increase NICED's regular budget to procure reagents, this in turn would most likely enhance the sustainability of the Project effects.

Technical sustainability of the Project is also very high, as NICED continues to retain most of its core research faculty within its organization. The level of their technical sustainability has been proven already with its capacity to host a series of In-country and Third-country training programs as well as other human resource development initiatives within the organization.

4. Conclusions

This mid-term evaluation confirmed that the Project has shown good progress so far, and is on track to achieve the Project Purpose by the end of the implementation period. In spite of some constraints in the project management, the implementation process has been smooth due to the firm partnership maintained between the Japanese experts and NICED Counterparts, backed by mutual trust nurtured since the first phase of the Project. Most of all, NICED has shown remarkable progress, both in its physical and human resource capacities, to conduct the crucial research for diarrheal disease control; and now it is reinforcing its leadership role to expand the technologies it has attained to other parts of India.

Areas where additional efforts are necessary to further enhance the results of the Project were identified and discussed between the Team and the Counterparts. Specific recommendations are summarized in section 5.

5. Recommendations

To the Project:

- Some of the Outputs with lower achievement levels (i.e. output 3 and 5) coincided with areas in which limited inputs were planned from both the Indian and Japanese sides. It is recommended that the Project reviews its plan and re-concentrate its inputs into the activities necessary to raise the achievement levels of these outputs.
- The Project's design as well as its technical nature has made its monitoring a challenge. The Project should devise a more structured but feasible monitoring procedure that would enable to facilitate the flow of Project information both inside and outside the Project. Initiatives such as the Annual Report and its website are recommended to continue so that parties outside of the Project may have easy access.

To NICED:

- Annual In-country Training on molecular epidemiology has been a successful activity for both human resource development purposes, and for expanding the network of affiliated institutions for NICED. It is recommended that NICED organize a formal training program for Molecular Virology by the end of Project period.
- NICED requires an institutional strategy and an action plan that would integrate the training and surveillance network related activities to optimize results. Under such strategy, the follow up activities for both In-country and Third-country training programs is envisaged to play a critical role. These follow-up activities need to be carefully planned and implemented in a more systematic manner.

To ICMR and NICED:

- ICMR and NICED should begin discussions on the policy measures necessary in order to establish the surveillance network for the Country. This includes ways of mobilizing support from different state authorities and medical institutions under their responsibilities.

6. Lessons Learned

- Due to various factors within a given Project, conventional monitoring methods and tools may not be applicable or feasible. Especially in Projects where the key stakeholders are dispersed in different regions and have different specializations, innovative ways to guarantee sharing and processing of up to date project information would be beneficial to the Project's successful implementation.
- One of the best practices of the Project was that it has effectively coordinated much of its activities not only with the Counterparts, but also with its policy level advisory body. This has had a remarkable implication on the amount of budget allocated for the Counterpart organization; the budget allocation increased steadily throughout the project implementation period.

7. Revision between PDM version 1and PDM version 2 DRAFT

Based on the results of the evaluation exercise and other discussions with NICED counterparts, PDM version 2 DRAFT was finalized. Major changes from the PDM version 1 are highlighted below.

PDM version 1[12]	PDM version 2 (DRAFT)
Overall Goal: Mortality rate of diarrheal diseases will be reduced in India. **Indicator:** Mortality rate of diarrheal diseases	**Overall Goal:** Capacities of medical institutions in India to control diarrheal diseases will be improved. **Indicator:** The results of the reproducibility tests of the networked centres are higher than that of 2003.
Indicators for Project Purpose: 1. Number of diarrheal diseases identified in NICED. 2. Number of persons who acquired technology susceptibility test.	**Indicators for Project Purpose:** 1. Number of kinds of species and subspecies of diarrheal pathogens that could be identified at NICED is higher than that of 2003. 2. Number of research institutions that are capable of identifying diarrheal pathogens at the molecular level. 3. Number of publications by researchers at NICED 4. Average impact factor of the publication produced by NICED scientists is higher than that of 2003.
Output 1: Capacity to identify at the molecular level viral and parasitic diarrheal diseases is established. **Output 6:** Efficacy of drugs for diarrheal diseases is investigated, improved and applied.	**Output 1:** Capacity to identify diarrheal diseases at the molecular level is established. **Output 6:** The capacity to investigate the efficacy of drugs for diarrheal diseases is improved.
Indicators for Outputs: 1. No. of cases identified at the molecular level 2. Record of specimens and maintenance of facility 3. Record of surveillance 4. No. of networked centres 5. No. of trainees and the level of proficiency 6. Results of drug resistance test and data of therapeutic effect	**Indicators for Outputs:** 1.1 No. of diarrheal diseases diagnosed at the molecular level increases 1.2 Results of the reproducibility test of NICED 2. Anisera will be produced for 100 serogroups of *V. cholerae* non O1/non O139 3. At least 2 more hospital based surveillance system is established. 4. More than 200 scientists (medical/non-medical) will be trained in molecular level identification and characterization. 5. At least 20 institutions will be networked by mid 2008.

[12] This PDM is based on the Master Plan of the Record of Discussion.

	6.1 No. of drug resistance tests will increase than that of 2003. 6.2 2 clinical trials for the treatment of diarrheal diseases will be conducted.
Activities: 1.1 Phenotype and genotype enteric pathogens 3.2 To select fields for epidemiological research 4.2 To follow up trained doctors/scientists/technologists for post-training evaluation 5.1 To collect clinico-epidemiological data of patients from hospitals participating in the surveillance system 6.2 To prescribe and recommend appropriate antibiotic to patients based on results of drug susceptibility test	**Activities:** 1.1 To examine phenotype of enteric pathogens 3.2 To select fields for epidemiological research and conduct investigation on diarrheal disease 4.2 To conduct follow up of the trained doctors to assess the effects of the training. 5.1 To collect clinical data of patients from hospitals participating in the network. 6.2 To report the results of the drug susceptibility test back to the hospitals on a timely basis

ANNEX 1 List of Stakeholders Consulted by the Evaluation Mission

1. The Indian side

JOINT COORDINATION COMMITTEE MEMBERS:

- Mr. R. Mohan Kumar, Undersecretary, (International Health) MoH, New Delhi
- Ms. Sreyasi Chaudhuri, Undersecretary, (Japan), DEA, Ministry of Finance, New Delhi
- Prof. N.K. Ganguly, DG, ICMR
- Dr. Lalit Kant, Sr. Dy. DG, ICMR
- Dr. Rashmi Arora, Dy. DG, ICMR
- Dr. Deepali Mukherjee, Dy. DG, ICMR
- Mr. P.D. Seth, FA, ICMR
- Dr.S.K.Bhattacharya, Director, NICED, Kolkata

NICED STAFF

- Dr. S.K.Bhattacharya, Director, NICED, Kolkata
- Dr. S.Chakrabarti, Deputy Director Sr. Gr., NICED, Kolkata
- Dr. T.N.Naik, Deputy Director Sr. Gr., NICED, Kolkata
- Dr. P. Dutta, Deputy Director Sr.. Gr., NICED, Kolkata
- Dr. M.K. Chakrabarti, Deputy Director, NICED, Kolkata
- Dr. T. Ramamurthy, Deputy Director, NICED, Kolkata
- Dr. D. Sur, Deputy Director, NICED, Kolkata
- DR. A. N. Ghosh, Deputy Director, NICED, K
- Mr. A.Palit, Asst. Director, NICED, Kolkata
- Dr. B.Manna, Asst.Director, NICED, Kolkata
- Dr. M.K. Battacharya, Asst. Director, NICED, Kolkata
- Dr. T.Biswas, Asst.Director, NICED, Kolkata
- Dr. Sandipan Ganguly, SRO, NICED, Kolkata
- Dr. N.S. Chatterjee, SRO, NICED, Kolkata
- Dr. R.Nandy, SRO, NICED, Kolkata
- Dr. A.Pal, SRO, NICED, Kolkata
- Dr. T.Krishnan, SRO, NICED, Kolkata
- Dr. A. Mukhopadhyay, SRO, NICED, Kolkata

OTHER PARTNERS

- Dr. S. N. Dutta, Joint Director of Health Services, Directorate of Public Health Services, the Government of West Bengal

- Dr. R. C. Sahou, Deputy Direct of Health Services Directorate of Public Health Services, the Government of West Bengal
- Dr. Meena Basak, Professor and Principle, B.C. Roy Memorial Children's Hospital
- Dr. M. Ghosh, Infectious Disease Hospital
- Dr. P. Das, Director, Rajendra Memorial Research Institute of Medical Sciences

2. The Japanese side

JAPANESE EXPERTS

- Dr. Yoshifumi Takeda, Chief Advisor of the Project
- Dr. Shinji Yamazaki, Professor Osaka Prefectural University
- Mr. Fumiaki Yoshizaki, Former Project Coordinator
- Mr. Yutaka Noshiro, Project Coordinator

ANNEX 2 PDM Version 1 and PDM Version 2 DRAFT

PROJECT NAME: **PREVENTION OF DIARRHEAL DISEASES (PHASE2)**

Version: 1 (R/D version)

PROJECT PERIOD: FROM JUL. 2003 TO JUN.2008

PROJECT AREA:KOLKATA, INDIA; PROJECT BENEFICIARIES: CITIZENS OF INDIA

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
OVERALL GOAL Mortality rate of diarrheal diseases will be reduced in India.	Mortality rate of diarrheal diseases	1. National Health Statistics 2. State Health Statistics	
PROJECT PURPOSE Strengthen capacities and augment capabilities at NICED and to the same throughout the country for prevention and control of diarrheal diseases.	1 .No. of diarrheal diseases identified in NICED 2. No. of persons who acquired technology	1. NICED annual reports 2. ICMR annual reports	1. Government adapts policy on prevention, treatment and diagnosis of diarrheal diseases based on acquired result. 2. Epidemic investigation is conducted at national level.
OUTPUTS 1. Capacity to identify at the molecular level viral and parasitic diarrheal diseases established. 2. Strains and diagnostic sera are appropriately managed and archived. 3. Continuous surveillance of pathogens of diarrheal diseases is 4. Technology to identify diarrheal pathogens transferred to other doctors/scientists/technologists in India and other countries. 5. Surveillance system for diarrheal diseases established in India. 6. Efficacy of drugs for diarrheal disease investigated, improved and applied	1. No. of cases identified at the molecular level 2. Record of specimens and maintenance of facility 3. Record of surveillance (no. of epidemic caused) 4. No. of networked centres 5. No. of trainees and the level of proficiency 6. Result of drug resistance test and data of therapeutic effect	1. NICED annual reports 2. Journals 3. Questionnaire after training	1. Adequate network between state and national government 2. Good collaboration is kept with other institutes. 3. More staff are assigned at NICED.
ACTIVITIES 1.1 Phenotype and genotpye enteric pathogens 1.2 To develop molecular methods for identification level by DNA typing 1.3 To develop molecular methods for identification of diarrheal pathogens 2.1 To collect, analyze and archive sera from patients with diarrheal 2.2 To establish facilities for producing diagnostic antisera 2.3 To maintain proper animal facility and to facilitate production of	**INPUT Donors' side** 1. Experts : short-term, in the following fields; (Virology, Parasitology, Microbiology, Environmental Microbiology, Molecular Biology, Epidemiology, Clinical medicine etc.) 2. Counterparts training in Japan 3. Equipment: analytical instrument, information gathering instrument, etc. 4. Counterparts training at home and in the third country		1. Trained counterparts stay at work during the project period. 2. Budget allocation for NICED is enough to cover all activities. 3. Several kinds of pathogens variants will be found

2.4 To introduce specimen-banking system for strains and sera 3.1 To conduct continuous surveillance system for pathogens 3.2 To select fields for epidemiological research 3.3 To conduct environmental surveillance for human pathogens to identify reservoirs 4.1 To provide training for doctors of relevant hospitals and neighbouring 4.2 To conduct follow up trained doctors/scientists/technologists for post-training evaluation 5.1 To collect clinico-epidemiological data of patients from hospitals participating in the surveillance system 5.2 To establish an early warning system of outbreaks and epidemics for diarrheal diseases 6.1 To test drug sensitivity of enteric pathogens 6.2 To prescribe and recommend appropriate antibiotic to patients based on reesults of drug susceptibility test 6.3 To improve formulation of ORS for acute secretory diarrhea.	**INPUT: Recipient's side** 1. Administrator 2. Counterparts-Scientist and technician in the fields of Microbiology, Epidemiology, Clinical medicine, Virology, Parasitology, and other related field as necessary 3. Cost for administration, consumable supply etc. 4. Office Building (NICED)	**PRECONDITIONS** 1. Government does not oppose planned work in the project 2. State government and relevant hospitals are cooperative

ANNEX 2 PDM Version 1 and PDM Version 2 DRAFT

PROJECT NAME: **PREVENTION OF DIARRHEAL DISEASES (PHASE2)**
PROJECT PERIOD: FROM JUL. 2003 TO JUN.2008
PROJECT AREA:KOLKATA, INDIA; Target Group: 1. Scientists at NICED, 2. Trainees from other institutions

Version: 2 (draft)
DESIGNED DATE: 16 FEBRUARY 2006

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
SUPER GOAL Mortality rate of diarrheal diseases will be reduced in India.	Mortality rate of diarrheal diseases	1. National Health Statistics	
OVERALL GOAL Capacities of medical institutions in India to prevent diarreal diseases will be improved.	The results of the reproducibility tests of the networked centres are higher than that of 2003.	1. Reproducibility tests implemented by NICED	
PROJECT PURPOSE Strengthen capacities and augment capabilities at NICED and to the same throughout the country for prevention and control of diarrheal diseases.	1 .No. of kinds of species and subspecies of diarrheal pathogens that could be identified at NICED is higher than that of 2003. 2. No. of research institutions that are capable of identifying diarrheal pathogens at the molecular level. 3. No. of publication produced by NICED scientists. 4. Average impact factor of the publication produced by NICED scientists is higher than that of 2003.	1. NICED annual reports 2. NICED annual reports 3. NICED annual reports 4. NICED annual reports	1. Government adapts policy on prevention, treatment and diagnosis of diarrheal diseases based on acquired result. 2. Epidemic investigation is conducted at national level.
OUTPUTS 1. Capacity to identify diarrheal diseases at the molecular level is established. 2. Strains and diagnostic sera are appropriately managed and archived. 3. Constant surveillance of pathogens of diarrheal diseases is established. 4. Technical expertise to identify diarrheal pathogens is transferred to other 5. Surveillance network of diarrheal diseases is established in India. 6. Capacity to investigate the efficacy of drugs for diarrheal diseases is improved.	1.1 No. of diarrheal diseases diagnosed at the molecular level increases 1.2 Results of the reproducability test of NICED 2. Antisera is produced for 100 serogroups of *v. cholera* nonO1/nonO139 3. At least 2 more hospital based surveillance system will be established. 4.More than 200 scientists (medical/non-medical) will be trained in 5. At least 20 institutions will be networked by mid 2008. 6.1. No. of drug resistance test will increase than that of 2003. 6.2 At least 2 clinical trials for the treatment of diarheal diseases will be	1. NICED annual reports 2. Reproducability tests 3. NICED annual reports 4. NICED annual reports 5. NICED annual reports 6. NICED annual reports	1. Adequate network between state and national government 2. Good collaboration is kept with other institutes. 3. More staff are assigned at NICED.
ACTIVITIES 1.1 To examine phenotype of enteric pathogens 1.2 To analyze enteric pathogens at molecular level by DNA typing 1.3 To develop molecular methods of identification of diarrheal pathogens 2.1 To collect, analyze and archive sera from patients with diarrheal 2.2 To establish an institution for producing diagnostic antisera 2.3 To maintain proper animal facility and to facilitate production of	**INPUT Donors' side** 1. Experts : short-term, in the following fields; (Virology, Parasitology, Microbiology, Environmental Microbiology, Molecular Biology, Epidemiology, Clinical medicine etc.) 2. Counterparts training in Japan 3. Equipment: analytical instrument, information gathering instrument, etc. 4. Counterparts training at home and in the third country		1. Trained counterparts stay at work during the project period. 2. Budget allocation for NICED is enough to cover all activities.

2.4 To introduce specimen banking system for strains and antisera 3.1 To setup continuous surveillance system for pathogens 3.2 To select fields for epidemiological research and conduct investigation 3.3 To conduct environmental surveillance for human pathogens to identify 4.1 To provide training for doctors and scientists of relevant hospitals and 4.2 To conduct follow up of the trained doctors and scientists to assess the 5.1 To collect clinical data of patients from hospitals participating in the 5.2 To establish network system for early warning of outbreaks and 6.1 To test drug resistance of enteric pathogens 6.2 To report the results of the drug susceptibility test back to the hospitals 6.3 To improve formulation of ORS for acute secretory diarrhea.	**INPUT: Recipient's side** 1. Administrator 2. Counterparts-Scientist and technician in the fields of Microbiology, Epidemiology, Clinical medicine, 3. Cost for administration, consumable supply etc. 4. Office Building (NICED)	**PRECONDITIONS** 1. Government does not oppose planned work in the project 2. State government and relevant hospitals

ANNEX 3 List of Japanese Experts

JICA Short term Experts who visited NICED in FY2003 to FY2005 (up to January 2006)

No	Name of	Organization	Area of Expertise	Duration	No. Days
1.	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology	3~9 November 2003	7
2.	Dr. S. Shinoda	Okayama University	Environmental Microbiology	10~15 November 2003	6
3.	Dr. K. Hirose	National Institute of Infectious Diseases	Epidemiology	3~11 December 2003	9
4.	Dr. E. Arakawa	National Institute of Infectious Diseases	Epidemiology	3~11 December 2003	9
5.	Dr. K. Okamoto	Okayama University	Clinical Microbiology	13~20 December 2003	8
6.	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology	11~18 January 2004	8
7.	Dr. Y. Takeda	Jissen Women's University	Microbiology	20~31 January 2004	12
8.	Dr. J. Terajima	National Institute of Infectious Diseases	Epidemiology	28 January~7 February 2004	11
9	Dr. Y. Takeda	Jissen Women's University	Microbiology	11 ~ 24 August 2004	14
10	Dr. S. Shinoda	Okayama University	Environmental Microbiology	30 September~8 October 2004	9
11	Dr. K. Okamoto	Okayama University	Clinical Microbiology	30 September~8 October, 2004	9
12	Ms. M. Arita	Okayama Prefectural University	Electron Microscopy	30 September~8 October 2004	9
13	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology	26 September~4 October 2004	9
14	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology	22 November ~5 December 2004	15
15	Dr. K.Furuya	National Institute of Infectious Diseases	Parasitology	28 November~4 December, 2004	8
16	Dr. Y. Takeda	Jissen University	Microbiology	January, 2005	
17	Dr. M. Ishino	Sapporo Medical University	Virology	January, 2005	
18	Dr. S. Shinoda	Okayama University	Environmental Microbiology	3~11 June 2005	9
19	Dr. T.Hamabata	International Medical Center of Japan	Microbiology	3~11 June 2005	9
20	Dr. Y. Takeda	Jissen Women's University	Microbiology	29 June~6 July 2005	8
21	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology (Third Country Training Program)	16~23 October 2005	8
22	Dr. S.	Okayama University	Environmental	18~27 November	10

	Shinoda		Microbiology	2005	
23	Dr. K. Okamoto	Okayama University	Clinical Microbiology	18~27 November 2005	10
24	Dr. S. Yamasaki	Osaka Prefectural University	Molecular Biology (In Country Training Program)	19~26 November 2005	7
25	Dr. Y. Takeda	Jissen University	Microbiology	28 November~8 December 2005	12
26	Dr. A. Sumi	Sapporo Medical University	Virology	21~31 January 2006	11

JICA Long term Expert

	Name	**Position**	
1	Mr. Fumiaki Yoshizaki	Coordinator	14 June 2003~12 June, 2005
2	Mr. Yutaka Noshiro	Coordinaor	12 June 2005~ to date

ANNEX 4 LIST OF COUNTERPART TRAINEES

No.	Name	Training Areas	Training Institutes	Duration
1	Dr. S. K. Bhattacharya, Director	Clinical Medicine of Diarrheal Diseases	International Medical Center of Japan, National Institute of Infectious Diseases and others	16~22 November 2003
2	Dr. M.K.Chakrabarti, Deputy Director	Pathophysiology of Diarrheal Diseases	International Medical Center of Japan, National Institute of Infectious Diseases and others	16~22 November 2003
3	Dr. D. Sur, Deputy Director	Molecular Epidemiology of Diarrheal Diseases	Okayama University, Osaka University and Kyoto University	18 November~ 20 December 2003
4	Dr. S. Chakrabarty, Deputy Director	Molecular Virology	Sapporo University	19 September~ 19 October 2004
5	Dr. B. Manna, Assistant Director	Biostatistics in epidemiological research	National Institute of Infectious Diseases	7 February~9 April 2005
6	Mr. S. Bhunia, Technical Assistant	Molecular Virology	Sapporo University	28 November 2004 ~21 May 2005
7	Dr. M. K. Chakrabarti, Deputy Director	Molecular and Cellular Biology	Institute of Tropical Medicine, Nagasaki University	28 March~31 July 2005
8	Dr. R. Nandy, Senior Research Officer	Microbiology	Research Institute, International Medical Center of Japan	23 August 2005~ 4 February 2006
9	Mr. P.K. Ghoshal, Maintenance Engineer	Facilities Maintenance and Management	Nippon Sekkei and others	28 August~ 8 October 2005
10	Dr. S. Sadhukhan	Virology	Sapporo Medical University	17 January~ 20 May 2006

ANNEX 5 List of Procured Equipment

List of Procured Equipment for Financial Year 2003-2004

No	Name of Equipment	Manufacturer	Quantities	Amount(RS)	Division (Place of installation)
PL0301	Inverted-Phase Contrast Microscope	Olympus	1	399,660.05	Parasitology Dept. No.209
PL0302	Ice making machine	NTDF(Italy)	1	124,252.80	Microbiology Dept. No.107
PL0303	Research Microscope	Zeiss	1	828,452.52	Parasitology Dept.No.209
PL0304	Color Xerox machine	XEROX - DC1632	1	512,754.86	Training & Extension (Director's room)
PL0305	Autoclave	Sanyo	1	232,571.52	Parasitology Dept. No.211, corridor
PL0306	Electronic balances	Mettler	2	189,200.00	Virology Dept.No.403,Immunoology Dept.No.205
PL0307-1 PL0307-2	Refrigerated microcentrifuge	Eppendorf -5415R	2	466,838.19	Immunology Dept. No.204 Virology Dept.No.208
PL0308	PCR-Thermal Cycler	Applied Biosystems	1	439,236.88	Immunology Dept. No.205
PL0309	Water Bath	Precision	2	745,459.08	Parasitology Dept. No.207, Immunology Dept. No.
PL0310	Gel Electrophoresis system	BioRad	2	115,728.87	Parasitology Dept. No.209, Pathophysiology Dept. No. 414
PL0311	Non-Refrigerated microcentrifuge	SIGMA	2	127,910.24	Virology Dept.No 203,Immuno Dept. No.409
PL0312	Electrophoresis with power supply	BioRad	2	402,821.64	Parasitology Dept. No.207,Pathophysiology Dept. No.414
PL0313	Pipetteman	Gilson	25	1,184,056.80	Microbiology,Virology,Pathophysiology,Immunogy,Parasitology,Biochemistry,EM
PL0314	CO2 Incubator	Hereaus	1	347,136.09	Parasitology Dept. No.209
PL0315	Ratio Imaging System	Intracellular Imaging	1	1,878,705.00	Pathophysiology Dept. No.420
PL0316	Distilled water plant (R1 & R3 facility)	Millipore-Elix 3 Century	1	311,282.00	Parasitology Dept. No.107
PL0317	Liquid Nitrogen Generator with Chiller	Iwatani International	1	2,696,942.15	Microbiology Dept. No.
		Total		**11,003,008.69**	

ANNEX 5 List of Procured Equipment

List of Procured Equipment for Financial Year 2004-2005

No	Name of Equipment	Manufacturer	Quantities	Amount(RS)	Division (Place of installation)
PL0415	Bactec 9120(Blood Culture System Bactec)	Becton Dickinson	1	1,378,000.00	Microbiology Div. ICMR Virus Unit
PL0416	ECM-2001(Electroporation)	Harvard Apparatus	1	982,182.23	Parasitology Div. No.209
PL0414	Turner TD-20/20(Luminometer)	Turner Biosystems	1	378,419.84	Parasitology Div. No.209
PL0410	HeraCell 150(CO2 Incubator)	Hereaus	1	359,924.80	Immunology Div. No.410
PL0411	KS12(Biosafety Cabinet)	Hereaus	1	490,432.60	Immunology Div. No.410
PL0404	Microplate(Spectrophotometer for ELISA reader)	Bio Rad	1	571,626.30	Pathophysiology Div. No.414
PL0405	Smart Spec Plus(Spectrophotome	Bio Rad	1	323,026.30	Pathophysiology Div. No.420
PL0406(1)PL0406(2)PL0406(3)PL0406(4)PL0406(5)	Mini SubCell GT(Mini submarine gel electrophoresis with power supply)	Bio Rad	5	276,826.30	Immunology Div. No.408,Biochemistry Div. No.401,Microbiology Div. No.201,Parasitology Div. No.209,Virology Div. No.202
PL0407(1)PL0407(2)PL0407(3)PL0407(4)PL0407(5)PL0407(6)	Mini Protein 3(Protein electrophoresis with power supply)	Bio Rad	6	340,626.30	Pathophysiology Div. No.414, Immunology Div. No.205,Microbiology Div. No.201,Parasitology Div. No.209,EM Div. No108,Virology Div. No.202
PL0412(1)PL0412(2)	Vacuum pressure pump(Vacuum pump+Accessories)	Millipore	2	43,669.00	Immunology Div. No.408,Parasitology Div. No.207
PL0413(1)PL0413(2)	Stirred Cell+UltrafiltersPM-10K(Ultrafiltration system for Protein purification)	Millipore	2	393,805.00	Biochemistry Div. No401,Pathophysiology Div. No.413
PL0408(1)PL0408(2)PL0408(3)PL0408(4)	37°CJouan Innovens EN 1-118(Incubator (37°C))	Thermo Electron Ltd	4	414,474.93	Microbiology Div. No.201,Pathophysiology Div. No.414,Parasitology Div. No.207,Immunology Div. No.314
PL0402(1) PL0402(2) PL0402(3) PL0402(4) PL0402(5) PL0402(6)	4330(pH Meter, Conductivity meter combined)	Jenway	6	463,227.75	Pathophysiology Div .No.420,Parsitology Div .No.208,Virology Div .No.202,Immunology Div .No.204,Microbiology Div .No.201,EM-No.108
PL0409	Heto Advance HLLF-205(Chest freezer -46°C)	Thermo Electron Ltd	1	182,599.05	Immunology Div. No. 408
PL0417	RC-100 with Rotors(Ultracentrifuge with different rotors)	Sorvall	1	2,634,221.11	General-Instruments Room
PL0401(1) PL0401(2) PL0401(3) PL0401(4)	AB-104-S(Electronic balance)	Mettler	4	401,664.00	Immunology Div. No.408,Pathophysiology Div. No.413,Parasitology Div. No.207,Virology Div. No.202
PL0403(1) PL0403(2)	Universal 32R(Table top refrigerated centrifuge)	Hettich	2	611,849.24	Immunology Div. No.410 Microbiology Div. Hybridoma
		Total		**10,246,574.73**	

ANNEX 5 List of Procured Equipment

List of Procured Equipment for Financial Year 2005-2006 (in process)

No	Name of Equipment	Manufacturer	Quantities	Amount(RS)	Division (Place of installation)
	Photo Electric Colorimeter-Mode	Bel-Art	1	190,268.00	Microbiology
	AC Micro Bus	Swaraj Mazda	1	1,162,209.00	Epidemiology
	Centrilutor	Millipore	1	95,283.00	Pathophysiology
		Total		**1,447,760.00**	

ANNEX 6 Operational Expenses

<Japanese Side>

	Indian RS	JPY Equivalent[1]
FY 2003	947,104	2,363,034
FY 2004	1,194,495	2,980,277
FY 2005[2]	681,665	1,700,761
Total	**2,823,264**	**7,044,072**

<Indian Side>

	Indian RS	JPY Equivalent
FY 2003	39,525,000	98,615,269
FY 2004	47,300,000	118,013,972
FY 2005[3]	52,700,000	131,487,026
Total	**139,525,000**	**348,116,267**

[1] Calculation was made with the at 100 JPY=40.08Rps, which is the average exchange rate between the period of 1 July 2003 and 31 January 2006

[2] Actual up to December 2005

[3] Budgeted for FY 2005

ANNEX 7 List of Counterpart Personnel (as of 31 January 2006)

JOINT COORDINATION COMMITTEE MEMBERS	
• Ms. Sreyasi Chaudhuri, UNDERSECRETARY, DEPT of ECONOMIC AFFAIRS, MINISTRY OF FINANCE	DEPARTMENT OF ECONOMIC AFFAIRS
• MR. R. MOHAN KUMAR, UNDER SECRETARY (I. H. Section), MINISTRY OF HEALTH AND FAMILY WELFARE	MINISTRY OF HEALTH FAMILY AND WELFARE
• DR. N. K. GANGULY, DIRECTOR GENRAL, INDIAN COUNCIL OF MEDICAL RESEARCH (ICMR)	ICMR
• DR. RASHMI ARORA, DEPUTY DIRECTOR GENERAL (S. G.) INDIAN COUNCIL OF MEDICAL RESEARCH	ICMR
FROM NICED	
• DR. S. K. BHATTACHARYA	DIRECTOR
• DR. S. CHAKRABARTI, DEPUTY DIRECTOR (Senior Grade)	IMMUNOLOGY
• DR. P. DUTTA, DEPUTY DIRECTOR (Senior Grade)	TRAINING
• DR. T.N. NAIK , DEPUTY DIRECTOR (Senior Grade)	VIROLOGY
• DR.(Mrs). D. SUR , DEPUTY DIRECTOR	EPIDEMIOLOGY
• DR. M. K .CHAKRABARTI , DEPUTY DIRECTOR	PATHOPHYSIOLOGY
• DR. T. RAMAMURTHY , DEPUTY DIRECTOR	MICROBIOLOGY
• DR. A. N. GHOSH , DEPUTY DIRECTOR	ELECTRON MICROSCOPE
• DR. N. S. CHATTERJEE, SENIOR RESEARCH OFFICER	BIOCHEMISTRY
• DR. SANDIPAN GANGULY, SENIOR RESEARCH OFFICER	PARASITOLOGY

ANNEX 8 List of Activities Implemented

Activities as per PDM_4	Achievements
Output 1: Capacity to identify diarrheal diseases is established at the molecular level.	
1.1 To examine phenotype of enteric pathogens	■ (M) The number of strains isolated and identified from diarrheal patients are as follows: 881 *V. cholerae* O1, 8 *V. cholerae* O139, 283 *V. cholerae*, non-O1, non-O139, 79 *V.parahaemolyticus*, 34 *Shigella* spp and 5 *Salmonella* spp. ■ (V) The number of RNA electrophoresis for detection of rotaviruses and human picobirnaviruses are as follows: 284[Kolkata]; 28/120 [Berhampur, GM]Rotaviruses 8[Kolkata] Human picobirnavirus ■ (Pr) A total of 1323 diarrheic stool samples have been screened for *Giardia lamblia, Entamoeba histolytica* and coccidian parasite by newly developed molecular biological based tools. Cases of pathogenic and non-pathogenic *Entamoeba have* been differentiated applying PCR based molecular techniques. Genotyping of Indian *Cryptosporidium* strains are going on. ■ (Pt) Mechanism of action of heat stable enteroyoxin secreted by non-O1 *V.Cholerae* (NAG-ST) was evaluated. This study established the biochemical pathway of action mechanism of NAG-ST with the evidence of involvement of different signal transduction molecule such as calcium, inositol triphosphate, nitric oxide, protein kinase C and guanylate cyclase. ■ (Pt) The enterotoxigenic factor from a cholera toxin gene negative *V.cholerae* non-O1, non-O139 strain was purified as hemagglutinin protease. Functional studies were done with the purified protease on different animal model and tissue culture models.
1.2. To analyze enteric pathogens at molecular level by DNA typing	<u>Microbiology</u> ■ In order to understand the periodic genetic changes occurring in pathogens, DNA typing was introduced for monitor such trends. DNA typing methods such as PFGE, RAPD-PCR, ribotyping were developed and utilized for this purpose - Molecular typing of *V. cholerae* was done using strains collected from 7 cholera outbreaks from different parts of India. During this period, spread of a new clone belongs to O1 serotype Inaba was identified. - Strains of diarrheagenic *E. coli* collected from sporadic and outbreaks of diarrhea were characterized - Dysentery outbreaks caused by *Shigella dysenteriae* type 1

Activities as per PDM$_4$	Achievements
	were characterized by PFGE Virology ■ The molecular studies conducted during the study period revealed; - the emergence of human Group A rotaviruses with G12 genotype as an important pathogen in Eastern India. - the low prevalence of human picobirnaviruses as etiological agents of acute watery diarrhea. - the prevalence of astroviruses of similar genotype as etiological agents of acute watery diarrhea. - the increasing prevalence of Noroviruses as etiological agents of acute watery diarrhea - the low prevalence of Sapoviruses as etiological agent of acute watery diarrhea. Parasitology ■ Biochemical characterization of EDG had been done and partial purification of EDG had also been achieved. ■ The hybridization of collagen activated and normal *E. histolytica* with *E. histolytica* genomic DNA microarray showed 14 reproducible arrayed genes with highest red/green fluorescence indicating upregulation of some genes in collagen activated *E. histolytica* ■ The hybridization of pathogenic and nonpathogenic species of *E. histolytica* with *E. histolytica* genomic DNA microarray showed 5 reproducible arrayed genes with highest red/green fluorescence indicating upregulation of some genes in *E. dispar*. ■ Role of excretory secretory products of *E. histolytica* and *G. lamblia* in apoptosis was studied and found that ESP induces cell death in mammalian cells by apoptosis.
1.3 To develop molecular methods of identification of diarrheal diseases	■ (M) The pandemic strains of *V. parahaemolyticus* are still persisting in Kolkata. Integrons carrying multidrug resistance gene cassettes were detected among enteric pathogens. Novel PCR based assays were established for the identification of *Vibrio fluvialis*, *V. cholerae* O1 bitotypes and V. mimicus ■ (Pr) Studies on snRNA - fibrillarin protein was found to interact by gel electrophoresis mobility shift assay and FRET ■ (B) Chitinase database formed. Database generation in progress.

Activities as per PDM_4	Achievements
	■ (B) Expression of chitinase under different growth conditions were measured in this context ■ (B) Target proteins cloned and characterized ■ (B) A PCR based diagnostic method has been established to characterize enterotoxigenic E.coli based on colonization factors present.
Output 2: Strains and diagnostic sera are appropriately managed and archived.	
2.1 To collect, analyze and archive sera from patients with diarrheal diseases	■ (M) Sera samples from acute and convalescent cholera patients were collected for detailed study on protective immunity
2.2 To establish an institution for producing diagnostic anti-sera	■ (M) Antisera against the serogroups O2 to O17, O19 to O26 were prepared. Monoclonal antibodies for *V. cholerae* O1 Ogawa, Inaba and O139 were prepared and supplied to different research Institutes in India
2.3 To maintain proper animal facility and to facilitate production of anti-sera	■ (M) Antisera against the serogroups O2 to O17, O19 to O26 were prepared. Monoclonal antibodies for *V. cholerae* O1 Ogawa, Inaba and O139 were prepared and supplied to different research Institutes in India ■ (Pt) Oral immunization of rabbits with four doses of heat-killed *Shigella flexneri* 2a showed 100% protection against challenge with virulent *S. flexneri* 2a. In ELISA and immunoblot experiments both whole cell lysate envelope fraction and outer membrane proteins were recognized by the antisera. ■ (I) The target proteins, porin and hemolysin were identified by standard biochemical methods. Porin was identified by its pore-forming ability, while hemolysin was identified by its ability to lyse rabbit RBC. The target proteins were purified and characterized. - Porin was purified by Sephacryl S-200 HR column and 10% SDS-PAGE showed band characteristic of mol. wt. 78,000 (oligomer) and 38,000 (monomer) confirming the protein to be porin. - Hemolysin was purified to homogeneity by a combination of hydrophobic interaction chromatography and anion exchange chromatography. The protein was identified as the 65kDa hemolysin by SDS-PAGE and immunoblotting. - Both porin and hemolysin were recognized by Toll-like receptor (TLR) 2. In association, TLR6 was also expressed by porin but not by hemolysin.

Activities as per PDM4	Achievements
	- The involvement of specific TLRs helps to understand how the target proteins are distinguished by the mucosal immune system that provides defense against enteric pathogens ■ (I) Antisera against both the target proteins were raised.
2.4 To introduce specimen banking system for strains and sera	■ (M) Enteric pathogens isolated in Kolkata and other parts of India were archived. Phenotypic and genetic characteristics were also included in the strain information. A separate manual was prepared for this purpose.
Output 3: Constant surveillance of pathogens of diarrheal diseases is established.	
3.1 To conduct constant surveillance system for pathogens	■ (Pr)The following enteric parasites have been found during this period: *Giardia lamblia* 5.14% *Entamoeba histolytica*5.36% *Cryptosporidium* 6.24% *Trichuris trichura* 1.54% Tricomonas 2.67% Taenia 1.23%Enterbius vermiculis 1.19% Entamoeba coli 1.54% Iodamoeba butschlii 0.93%
3.2 To select fields for epidemiological research and conduct investigation on diarrheal disease	■ (E) Over 110,000 people from 3 wards within Kolkata metropolitan area were registered.
3.3 To conduct environmental surveillance for human pathogens to identify reservoirs	■ (M) Environmental surveillance system has been set up for 5 water sources within Kolkata metropolitan area. On a monthly basis, water quality is monitored for any existence of *Vibrio cholera*, faecal pollution and chlorine levels.
Output 4: Technical expertise to identify diarrheal pathogens is transferred to other parts of India and neighbouring countries.	
4-1 To provide training for doctors of relevant hospitals and neighbouring countries.	■ (M) 3 In-country training programme were conducted during 2003 to 2005 and 46 scientist/doctors were trained ■ (M) Three 3rd country training programmes were conducted during 2003 to 2005 and 33 scientist/doctors were trained
4-2 To conduct follow up of the trained doctors to assess the effects of the training.	■ (M) Many of the Indian scientists already established molecular research after obtaining the JICA-NICED training. Some of the scientist are having collaborative research with NICED and published many scientific articles
Output 5: Surveillance network of diarreal diseases is established in India.	
5-1 To collect clinical data of patients from hospitals participating in the network	■ Clinical data for the Infectious Disease Hospital and Dr. B.C. Roy Memorial Children's Hospital is already being collected in a systematic manner. This activity is expected to increase after the

Activities as per PDM_4	Achievements
	expansion of the networked centers/ hospitals.
5-2 To establish network system for early warning of outbreaks and epidemics.	■ Early warning system of outbreaks and epidemics for Infectious Disease Hospital was established
Output 6: The capacity to investigate the efficacy of drugs for diarrheal diseases is improved.	
6-1 To test drug resistance of enteric pathogens	■ (M) Susceptibility testing was routinely made for many enteric bacteria with commonly used antibiotics for the treatment of diarrhea. In multidrug resistant strains of *V. cholerae*, *Salmonella*, *Shigella*, *Aeromonas*, and enterotoxigenic *E. coli*, class 1 and 2 integrons with resistance gene cassettes were detected and characterized by DNA sequencing
6-2 To report the results of the drug susceptibility test back to the hospitals on a timely basis.	■ (M) Susceptibility tests are conducted on all samples derived from the surveillance system. The results are systematically reported back to the respective hospitals with the results of the pathogen identification.
6-3 To improve formulation of ORS for acute secretary diarrhea	■ (Pt) Evaluation of the relative absorption efficiencies of reducing sodium or glucose concentration to make an ORS hypo-osmolar in a perfusion model. It was noted that the hypo-osmolar ORS with reduced sodium was substantially more absorption efficient compared to the one with reduced glucose.

(M) : Microbiology (V): Virology (Pr): Parasitology (B): Biochemistry (I): Immunology
(Pt): Pathophisiology (E): Epidemiology

プロジェクト名；インド新興下痢症対策フェーズ2　　バージョン1
協力予定期間；2003年7月～2008年6月（5年間）
対象地域；インド・コルタカ　　対象グループ；対象地域の住民　　作成日；平成15(2003)年6月5日

プロジェクトの要約	指標	指標データ入手手段	外部条件
上位目標 インドにおける下痢症疾患による死亡率が減少する	下痢症疾患による死亡率	1．政府機関の統計 2．州政府の統計	
プロジェクト目標 国立コレラ・腸管感染症研究所において下痢症疾患の対策技術が確立・改善され、全国に普及する。	1．NICEDにおける下痢症の鑑別診断数 2．診断技術の習得者数	1．NICEDの年間業務報告書 2．ICMRの年間業務報告書	1．政府はプロジェクトで確立した技術を採用する 2．国レベルで疫学的調査を実施する
成果 1．ウィルス性および寄生虫性下痢症の分子生物学的診断技術が確立される 2．診断用血清および菌株が、適切に管理・保存される 3．下痢症の病原体の常時監視体制が確立する 4．国内の下痢症に関する情報ネットワークが確立する 5．NICEDで確立した診断技術が国内外の医師および技師に普及する 6．下痢症の治療薬の効果が改善し、患者に適用される	1．分子生物学的診断数 2．診断血清及び菌株の維持管理記録 3．常時監視体制の記録（疫学調査数） 4．国内外研修受講者数技術習得状況 5．ネットワーク化したセンター数 6．薬剤耐性研究の成果品および治療効果のデータ	1．NICED年次業務報告書 2．専門誌 3．研修後アンケート	1．インド国政府と州政府（西ベンガル）の関係が安定している 2．他の関連研究機関との良好な協力関係が継続する 3．NICEDの職員が増員される
活動 1.1 新興下痢症患者の情報を収集する 1.1 腸管病原体の型別を行う 1.2 腸管病原体の遺伝子解析（DNA分析）を実施する 1.3 腸管病原体の分子生物学的診断方法の開発を行う 2.1 急性水様下痢症患者の結成の収集・分析・分類・保存を行う 2.2 診断血清製造施設を整備する 2.3 適切な動物実験室の維持管理を行い、診断血清製造を促進する経口補水液の組成改良を行う 2.4 菌株や血清の保存ファイルを作成する 3.1 病原体の疫学的常時監視体制を整備する 3.2 疫学調査フィールドを選定する 3.3 水環境の微生物生態のフィールド調査を行い、腸管病原体の分布を調べる 4.1 関連病院および周辺国の医師に対する研修を実施する 4.2 技術を習得した医師の活動状況のフォローを実施する 5.1 連携する病院施設における患者情報を蒐集する 5.2 流行情報を迅速に捕捉するネットワークシステムを構築する 6.1 腸管病原体の薬剤耐性の試験を実施する 6.2 試験の結果をもとに適切な抗生剤を患者に処方する 6.3 経口補水液の組成改良を行う	**〈日本側投入〉** 1．専門家：短期必要数（微生物学、分子生物学、疫学、寄生虫学、臨床医学等） 2．研修員受け入れ：年間2～3名 3．機材供与：分析機器、情報収集関連機器等 4．第三国研修、現地国内研修 **〈インド側投入〉** 1．プロジェクト運営管理者 2．カウンターパートの配置（研究所長、微生物・疫学・臨床医学、ウイルス学、寄生虫学等の各部長・研究者・技官） 3．運営管理費、研究に係る試薬等の消耗品費の確保 4．NICEDオフィス他		1．技術指導を受けた研修員の異動が技術員の異動がないない 2．活動に十分な予算が継続してNICEDに支給される 3．数種類の病原体変異株が存在する **前提条件** 1．政府が本プロジェクトの研究に反対しない 2．州政府関連病院施設、および国内の下痢関連施設等はプロジェクトに協力的である

バージョン2

対象地域；インド・コルタカ　対象グループ；NICEDの研究員、その他インド全国医療機関からの国内研修受講生　　作成日；平成18(2006)年2月16日

プロジェクトの要約	指標	指標データ入手手段	外部条件
上位目標 インドにおける医療機関の下痢症対策が改善される。	ネットワーク化された医療機関における診断精度が改善する	1．NICEDが実施する再現性試験の結果	
プロジェクト目標 国立コレラ・腸管感染症研究所において下痢症疾患の対策技術が確立・改善され、全国に普及する。	1．NICEDにおいて同定される下痢症病原体の種類、数が2003年当時よりも増加 2．分子生物学的診断のできる医療機関の数が増加する 3．NICEDの研究員の学術論文数 4．NICEDの研究員による学術論文の「インパクト・ファクター」の平均値が2003年当時よりも高くなる	1．NICEDの年次業務報告書 2．NICEDの年次業務報告書 3．NICEDの年次業務報告書 4．NICEDの年次業務報告書	1．政府はプロジェクトで確立した技術を採用する 2．国レベルで疫学的調査を実施する
成果 1．下痢症の分子生物学的診断技術が確立される 2．診断用血清および菌株が、適切に管理・保存される 3．下痢症の病原体の常時監視体制が確立する 4．国内の下痢症に関する情報ネットワークが確立する 5．NICEDで確立した診断技術が国内外の医師および技師に普及する 6．下痢症の治療薬の効果判定能力が向上する	1.1 下痢症の分子生物学的診断数が増加する 1.2 NICEDにおける再現性テストの結果 2．V. コレラの非O1・非O139型の抗血清を100種類以上製造する 3．(B. C. ロイ小児科病院、西ベンガル州立感染症病院に加えて)少なくとも2個以上の病院において常時監視体制が確立する 4．200人以上の医師及び技師が分子的診断技術について研修を受ける 5．少なくとも20の医療機関が2008年半ばまでにネットワーク化される 6.1 薬剤耐性試験数がプロジェクト開始時よりも増加する 6.2 下痢症の治療薬に関して、2回の試験が実施される	1.1 NICED年次業務報告書 1.2 再現性試験の結果 2．NICED年次業務報告書 3．NICED年次業務報告書 4．NICED年次業務報告書 5．NICED年次業務報告書 6．NICED年次業務報告書	1．インド国政府と州政府（西ベンガル）の関係が安定している 2．他の関連研究機関との良好な協力関係が継続する 3．NICEDの職員が増員される
活動 1.1 腸管病原体の型別を行う 1.2 腸管病原体の遺伝子解析（DNA分析）を実施する 1.3 腸管病原体の分子生物学的診断方法の開発を行う 2.1 急性水様下痢症患者の血清の収集・分析・分類・保存を行う 2.2 診断血清製造施設を整備する 2.3 適切な動物実験室の維持管理を行い、診断血清製造を促進する経口補水液の組成改良を行う 2.4 菌株や血清の保存ファイルを作成する 3.1 病原体の疫学的常時監視体制を整備する 3.2 疫学調査フィールドを選定し、下痢症に関する調査を実施する 3.3 水環境の微生物生態のフィールド調査を行い、腸管病原体の分布を調べる 4.1 関連病院および周辺国の医師に対する研修を実施する 4.2 技術を習得した医師、研究者、技師に対する研修の効果を評価するフォローアップを実施する 5.1 ネットワーク化した病院施設における患者情報を収集する 5.2 流行情報を迅速に捕捉するネットワークシステムを構築する 6.1 腸管病原体の薬剤耐性の試験を実施する 6.2 薬剤耐性試験の結果を医療機関に迅速に報告する 6.3 経口補水液の組成改良を行う	**〈日本側投入〉** 1．専門家：短期必要数（微生物学、分子生物学、疫学、 寄生虫学、臨床医学等） 2．研修員受け入れ：年間2～3名 3．機材供与：分析機器、情報収集関連機器等 4．第三国研修、現地国内研修 **〈インド側投入〉** 1．プロジェクト運営管理者 2．カウンターパートの配置（研究所長、微生物・疫学・臨床医学、ウイルス学、寄生虫学等の各部長・研究者・技官） 3．運営管理費、研究に係る試薬等の消耗品費の確保 4．NICEDオフィス他		1．技術指導を受けた研修員の異動が 技術員の異動がない 2．活動に十分な予算が継続してNICEDに支給される **前提条件** 1．政府が本プロジェクトの研究に反対しない 2．州政府関連病院施設、および国内の下痢関連施設等はプロジェクトに協力的である

3．日本人専門家一覧

■　短期専門家 2003年度～2005年度（2006年１月まで）

No	名前	所属	派遣分野	派遣期間
1	山崎　伸二	大阪府立大学大学院農学生命科学研究科教授	分子微生物学（国内研修講師）	2003年11月２日～10日
2	篠田　純男	岡山大学大学院自然科学研究科教授（薬学系）	環境微生物学	2003年11月８日～18日
3	廣瀬　健二	国立感染症研究所細菌第一部	チフス菌の診断検査、薬剤耐性	2003年12月２日～13日
4	荒川　英二	国立感染症研究所細菌第一部	ビブリオの血清診断、遺伝子診断	2003年12月２日～13日
5	岡本　敬の介	岡山大学薬学部分子細胞薬品科学講座	臨床微生物学	2003年12月13日～20日
6	山崎　伸二	大阪府立大学大学院農学生命科学研究科教授	分子微生物学（第三国研修講師）	2004年１月11日～18日
7	竹田　美文	実践女子大学生活科学部教授	微生物学	2004年１月20日～31日
8	寺嶋　淳	国立感染症研究所細菌第一部	病原性大腸菌、赤痢菌の診断、検査	2004年１月27日～２月10日
9	竹田　美文	実践女子大学生活科学部教授	微生物学	2004年８月11日～24日
10	篠田　純男	岡山大学大学院自然科学研究科教授（薬学系）	環境微生物学	2004年９月30日～10月８日
11	岡本　敬の介	岡山大学薬学部分子細胞薬品科学講座	臨床微生物学	2004年９月30日～10月８日
12	有田　美和子	岡山県立大学保健福祉学部栄養学科	電子顕微鏡検査学	2004年９月30日～10月８日
13	山崎　伸二	大阪府立大学大学院農学生命科学研究科教授	分子微生物学（国内研修講師）	2004年９月26日～10月４日
14	山崎　伸二	大阪府立大学大学院農学生命科学研究科教授	分子微生物学（第三国研修講師）	2004年11月22日～12月５日
15	古屋　広二	国立感染症研究所寄生動物部第一室長	寄生虫学	2004年11月21日～28日
16	竹田　美文	実践女子大学生活科学部教授	微生物学	2005年１月15日～28日
17	石埜　正穂	札幌医科大学医学部衛生学講座講師	ウィルス学	2005年２月２日～９日
18	篠田　純男	岡山大学大学院自然科学研究科教授（薬学系）	環境微生物学	2005年６月３日～11日

19	濱端　崇	国立国際医療センター研究所感染症制御研究部細菌感染研究室	微生物学	2005年６月３日～11日
20	竹田　美文	実践女子大学生活科学部教授	微生物学	2005年６月29日～７月６日
21	山崎　伸二	大阪府立大学大学院農学生命科学研究科教授	分子微生物学（第三国研修講師）	2005年10月16日～23日
22	篠田　純男	岡山大学大学院自然科学研究科教授（薬学系）	環境微生物学	2005年11月18日～27日
23	岡本　敬の介	岡山大学薬学部分子細胞薬品科学講座	臨床微生物学	2005年11月18日～27日
24	山崎　伸二	大阪府立大学大学院農学生命科学研究科教授	分子微生物学（国内研修講師）	2005年11月19日～26日
25	竹田　美文	実践女子大学生活科学部教授	微生物学	2005年11月28日～12月8日
26	鷲見　紋子	札幌医科大学医学部衛生学講座講師	ウィルス学	2005年１月21日～31日

■　**長期専門家**

	名前	派遣分野	滞在期間
1	吉崎　史明	業務調整	2005年６月14日～2005年６月12日
2	能代　裕	業務調整	2005年６月12日～派遣中

評価項目	評価設問		必要なデータ	調査結果
	大項目	小項目		
1．プロジェクトの実績	アウトプットの産出達成度	アウトプット１の達成度は。	下痢症の分子生物学診断数	NICEDの分子生物学診断数は以下のとおり。（微生物学部門、ウィルス学部門、寄生虫学部門の総計。2001年度：5,307件、2002年度：4,842件、2003年度：3,720件、2004年度：5,060件、2005年度：3,158件）他の部門でも研究のための、分子レベルの解析を行っている。
			その他指標に表れない達成度	フェーズ１で導入された分子レベルの診断技術（遺伝子増幅法<PCR>、RT-PCR、リボ・タイプ、ジェノタイピング/遺伝子フィンガープリンティング、パルスフィールドゲル電気泳動、遺伝子クローニング・シークエンシング）をより高度な方法で活用。解析の頻度、精度が上がった。また、分離・同定できる病原体の種類が増えたり、新しい同定手法の開発など、目覚しい進歩があった。
		アウトプット２の達成度は。	診断血清及び菌株の維持管理記録	評価時において、保存された菌株は2621株、600種類以上の菌株がカタログ化している。患者からの診断血清は５対のみ。
			その他指標に表れない達成度	コレラO1/O139型の抗血清は製造して、全国32箇所の研究所に提供。なお、非O1/非O139型の抗血清の製造はO2 からO26型までのみ。
		アウトプット３の達成度は。	常時監視体制の記録（疫学調査数）	現在西ベンガル州立感染症病院とBCロイ記念小児病院の二つの病院ベースの常時監視体制をしいている。双方ともプロジェクト開始前から、運営されている。その他、水環境モニタリングを、コルカタ市内５か所で継続している。
			その他指標に表れない達成度	国際ワクチン研究所との共同プロジェクトで、コルカタ市内での腸チフスとコレラワクチン・トライアルの結果を観測する常時監視体制を構築（110,000人対象）。プロジェクトは診断面での側面支援を行った。
		アウトプット４の達成度は。	国内外研修受講者数、技術取得状況	国内研修、第三国研修を３回づつ実施。国内研修受講者数は合計46人、第三国研修受講者は12カ国から34人。技術取得状況は記録されていないが、研修最終週に受講者に研究内容の発表をして、NICED研究員がコメントを寄せる。
			その他指標に表れない達成度	体系だてたフォローアップ活動は実施されていないが、もと受講生を中心に情報交換が活発化し、研修後受講者からの問い合わせや、集団感染調査（outbreak investigation）の要請に応じたりしている。
		アウトプット５の達成度は。	ネットワーク化したセンター数	NICEDが正式なネットワークを構築しているのは、病院ベース常時監視体制を運営している、病院２件（西ベンガル州感染症病院、BCロイ記念小児病院）。その他、微生物学部門によるネットワーク化された研究機関数は81件。主に、研修受講者の間での緩やかなネットワーク（まだ制度化されていない。）
			その他指標に表れない達成度	NICEDは下痢症疾患研究の中枢的役割を担う機関として、国内40以上の研究機関と協力関係を築いてきた。（菌株の同定依頼、コレラ菌血清の供給、研修期間の提供、集団感染症調査（outbreak investigation）等。
		アウトプット６の達成度は。	薬剤耐性研究の成果品および治療効果のデータ	NICEDで実施した薬剤体制検査数（2001年度：162件、2002年度：203件、2003年度：158件、2004年度：343件、2005年度：191件）
			その他指標に表れない達成度	薬剤耐性研究や、下痢症治療薬に関する研究成果は学術論文等で発表され、高い評価を受けている。（腸管凝集性大腸菌、細菌性赤痢、コレラ菌O1/O139型の薬剤耐性傾向、経口補水液の成分改善、下痢症治療においての亜鉛の役割等）
	活動の実績	活動の進捗状況は。	プロジェクト進捗状況	アウトプット１、２、４、６に関しては進展しているが、アウトプット３、５、及び４の研修のフォローアップ活動に関しては、あまり進展がみられなかった。
		活動にあたっての問題点は。	進捗に影響を与えた問題	アウトプット３、４、５に関しては、そのアウトプット達成のために関連性の高い活動が計画されているが、その３つアウトプット同士や活動間の位置づけが明確でないうえ、整理がついていない。また常時監視体制と国内研修と情報ネットワーク構築、しいては全国レベルの下痢症のサーベイランス・ネットワーク戦略的に連携させるような具体的計画がないため、関係者の間には混乱が生じている。
		問題発現時にとられた対策は。	問題解決の仕組みとその有効性	特に問題があった例は、具体的には日本側からもインド国側からも報告がなかった。但し有る場合は、イ国側はNICED所長、日本側はチーフアドバイザーから指示を仰ぐという形で解決される。
	投入の実績	投入の実績は。	インド側	
			＊プロジェクトに必要な人員	NICED所長をはじめ10人の研究者がカウンターパートとして配置。
			＊プロジェクト実施に必要な経費と資材	フェーズ２実施期間中におけるインド側の費用負担は2005年度予算も含め、139,600,000ルピー（348,303,390円相当）
			＊訓練施設、日本人専門家執務室	NICED建物の４階に、JICA専門家用の執務室が設けられている。
			日本側	
			＊専門家派遣	長期専門家：２人（合計18.8月/人分、分野：業務調整）、短期専門家：延べ12人による26回の派遣（合計8.17月/人分、分野：分生物学、環境微生物学、疫学、臨床微生物学、その他）

評価項目	評価設問		必要なデータ	調査結果
	大項目	小項目		
			＊研修員受入	合計10人が本邦研修を受講。もう１人、2006年３月派遣予定。
			＊供与機材	合計21, 249, 583ルピー（53, 017, 922円相当）の機材が供与済み。携行機材は1, 192, 767ルピー（3, 612, 176円相当）。
			＊現地コスト負担	現地業務費の実績は2, 823, 264ルピー（7, 041, 072円相当）。国内及び第三国研修実施予算は9, 635, 520ルピー（24, 040, 719円相当）。
2. プロジェクトの実施プロセス	プロジェクトのマネジメント体制に問題はなかったか	モニタリングの実施状況は。	モニタリングの仕組み	通常のモニタリングは現地に派遣されている業務調整員より行われており、チーフアドバイザー及び、国内支援委員会委員が派遣されたときに、活動の進捗を確認する。
			PDM、詳細活動の軌道修正内容	PDMはR/D以降正式に変更はされていないが、途中でプロジェクト関係者により表現振りの変更があった。
			PDMの活用方法	PDMやPOよりは、プロジェクトが作成したPOを部門ごとに細分化した計画に基づき、各カウンターパートに進捗報告書等の提出を求めている。
	技術移転の方法に問題はなかったか	専門家とカウンターパートとの関係性はどうだったか。	短期専門家の技術移転の方法（コミュニケーションの仕組み、状況）	各専門家の滞在期間が比較的短かったため（平均滞在期間9.4日）、事前に決定したテーマについて意見交換を行ったり、NICEDの実習に対して、日本側専門家がアドバイスをしたりする形で、実施された。ただ、継続的に派遣されている専門家に関しては、派遣時期以外にもコミュニケーションがとれていることから、必要に応じて、技術指導が行われている様子。
	適切なカウンターパートが配置されたか	適切なカウンターパートが配置されたか。	カウンターパートの適正度	カウンターパートは、ほぼ全員、NICED各部門の部門長が務めており、また第一線の研究者であるため、非常に適正。プロジェクト活動に関して、自己責任の範囲と認識しているところについては、オーナーシップも高い。
	カウンターパートのプロジェクトに対する認識は高いか	相手国実施機関のオーナーシップは醸成されているか。	意思決定プロセスにおけるカウンターパートの関わり方・度合い	当プロジェクトの基本計画策定のときは、カウンターパートがそれぞれの部門において、達成したい目標を取り纏めたので、カウンターパートの意見がよく反映された形で立案された。その他プロジェクト運営の意思決定プロセスは主に、チーフアドバイザーとNICED所長の間で行われることが多い。
			カウンターパートの関わり方・度合いの変化	全般的にプロジェクト開始時以降、特にNICEDの新研究棟への無償資金協力が決定した後、カウンターパート全般のモチベーションが上がっていることが報告された。
	その他ステークホールダーのプロジェクトへの参加度合いやプロジェクトに対する認識は高いか	ステークホールダーの事業への関わり方はどうだったか。	ターゲットグループの事業への関わり方	NICED以外のターゲットグループのインド国内の他の研究機関の研修受講者は、プロジェクトへの直接的関わりは今のところないが、講師を務めたNICED研究員との交流が活発になったり、その他協力関係に発展したりしている。
			その他関連機関の事業への関わり方	西ベンガル州の住民がプロジェクトと直接的関わりを持つケースは、西ベンガル州立感染症病院やBCロイ記念小児病院に設置された常時監視体制を通じてサンプルを提供し、診断してもらう以外は、その機会は限られている。その他、集団感染症調査等で、NICED研究員の迅速な対応により、感染症を予防できたというメリットは受けている。
3. 妥当性	プロジェクトを実施する必要性はあったか	対象地域・社会のニーズに合致しているか。	西ベンガル州における保健統計（感染症の罹患数・死亡数）	西ベンガル州における主な感染症の中で下痢症の罹患率が一番高い：下痢症（22.24人/1, 000人）、急性呼吸感染症（肺炎は含まず14.97人/1, 000人）、肝炎（0.09人/1, 000人）、肺炎（0.62/1, 000人）。下痢症の致死率（case fatality rate）は0.038人/100人と他の感染症よりは低い。
		ターゲットグループのニーズに合致しているか。	地域住民の下痢症対策サービスに関するニーズ	西ベンガル州の全県立病院において（コルカタ市は含まない）の入院理由は下痢症が、他の感染症・慢性疾患をおさえて、第一位だった（2001年数字）。
	優先度	インド国の開発政策との整合性はあるか。	インドの開発計画における保健医療分野に関する政策	2002年に発表されたインド国の保健政策では、下痢症が依然として全国の死亡率に大きく寄与していることが明示され、下痢症をはじめとする感染症の大量発生に備えたサーベイランス・ネットワークの強化をその優先課題とすることを謳っている。
		日本の開発援助政策との整合性はあるか。	イ国国別援助計画、JICA事業実施方針	2001年のJICA国別事業実施計画において、感染症予防は重点分野である貧困対策の一環として優先課題に取り挙げられている。また2005年の我が国の対インド国別援助計画においては、保健医療分野での人材育成や既存のレファレンスシステム強化等ソフト面での支援は、政府開発援助の重点目標の一つに掲げられている貧困・環境問題の改善のために有効であることが明示されている。
	手段としての適切性	プロジェクト目標・アウトプットの選択・ターゲットグループの選定は妥当であったか。	計画プロセスの経過	プロジェクトの計画は、NICED研究者の個々の研究目標をもとに、日本側専門家はその後方支援を担うという形で、立案されている。そのため、各研究員のニーズとプロジェクトの内容（活動、本邦研修先、供与機材等）がよく合致している。
			NICEDの組織分掌に対しての活動計画の適切性	NICEDの組織分掌は主に「腸管感染症の同定」、「腸管感染症対策（治療、コントロール、予防）のための戦略を作るため、横断的な研究を進める。」、「同じビジョンを持つ機関との連携」を挙げているため、プロジェクトの活動計画は、NICEDの組織分掌に沿ったものだったといえる。

評価項目	評価設問		必要なデータ	調査結果
	大項目	小項目		
			ターゲットグループの選定根拠	NICEDは下痢症疾患研究の中枢的役割を担う機関として、インド医科学評議会（ICMR)にも “Center of Exellence”と選ばれた、インド国においても第一線の研究機関である。そのようなターゲットグループを選択することにより、プロジェクトの有効性を高め、また費用対効果を上げることができる。
	その他	大きな政策・周辺環境の変化はあったか。	保健分野の政策動向とNICEDの研究機関としての位置づけ	下痢症疾患は依然として、国家の死亡率に寄与する重大な疾患であり、特にコレラ等集団感染症発生を未然に防ぐことにインド国保健政策は重点をおいている。そのため、集団発生の原因を特定したり、その拡大を防ぐための対策を提案を出すための、高度な診断能力を持つNICEDの役割は、今後ますますその重要性が高くなると思われる。
			その他プロジェクトの周辺環境の変化とその影響	NICEDにおいては、近年ウィルス学部門、免疫学部門によるHIVエイズ研究も注目を集めており、施設・人材供に整備も進んできてた。2006年２月にインドで鳥インフルエンザが発見されてからは、NICEDのウィルス部門による鳥インフルエンザの研究も始まることが期待が高まっている。
４．有効性	プロジェクト目標の達成予測	プロジェクト目標の達成度合いは。	NICEDにおける下痢症の全鑑別診断数	NICEDの全鑑別診断数(分子レベル外も含む）は以下のとおり。(2001年度：5,374件、2002年度：4,920件、2003年度：4,049件、2004年度：5,513件、2005年度：3,452件)。
			診断技術の習得者数	当プロジェクトの研修受講生に限ると80人。
			NICED研究員の論文発表数（主な学会発表等を含む）	NICEDのプロジェクト関連部門の学術論文発表数：(2003年度：20、2004年度：18、2005年度：16)。
			NICEDにおける診断において判定不能検体数	データ入手不可能
		プロジェクト目標の達成を阻害する要因はあるか。	阻害要因と対処方法	プロジェクト目標の達成を阻害する要因として挙げられるのは、NICEDの技術を普及させるための計画が、明確な形で関係者の間に共有されていないことにある。他の阻害要因としては,NICEDからの技術支援を受ける側の研究所のキャパシティ、特に施設・機材等が整備されていない場合は、NICEDが普及する技術を適用できない状況が生じる。
	アウトプットとプロジェクト目標との因果関係	アウトプットはプロジェクト目標達成のために十分であったか。	外部条件と因果関係から確認される計画の論理性	現在達成度合いが低いアウトプットに進捗がみられれば、プロジェクト目標は到達できると思われる。外部条件は全件ともに満たされつつある。
		アウトプットからプロジェクト目標に至るまでの外部条件は現在においても正しいか・またその影響はあったか。	国と州政府の関係が及ぼすプロジェクトへの影響	NICEDは保健家族福祉省傘下の中央政府機関であるが、想定される技術の普及先である研究・医療機関の中には地方政府管轄の機関も含まれている。中央と地方政府の間に良好な関係が保持されない限りは、中央と地方政府管轄双方の研究機関との充分な連携を促進できない。
			他の関連研究機関との協力関係	NICEDは国内40以上の研究機関と協力関係を築いてきた。（菌株の同定依頼、コレラ菌血清の供給、研修期間の提供、集団感染症調査（outbreak investigation）等。その他、国内研修の受講生の間で緩やかなネットワークが構築されつつある。
			NICEDの職員数と増減傾向	NICEDの職員数は定員143人と変化はないが、新研究棟に移動した際には、清掃員や運転手等、セキュリティの人員を全員外部委託する予定であり、空く定員数分、研究部門のスタッフを増加させる計画をたてている。
５．効率性	アウトプットの産出	アウトプットの達成度は適切か。	「アウトプットの実績」の調査結果	アウトプット１、２、４、６に関しては進展しているが、アウトプット３、５、及び４の研修のフォローアップ活動に関しては、あまり進展がみられなかった。
		アウトプット達成を阻害した要因はあるか。	阻害要因と対処方法	アウトプット３、５に関しては、プロジェクト及びNICEDからの投入があまりなかった、NICED側の担当部署が明確に決まっていない、また詳細な計画がない等があげられる。対処方法としては、アウトプット３と５への投入を集中し、詳細計画の策定等があげられる。
	因果関係	アウトプットを産出するために充分な活動であったか。	「活動実績」と「アウトプット実績」より判断	アウトプット３と５においては、必要な活動は明記されているものの、それら活動を実施するため、より詳細な計画がなかった。
		アウトプットを産出するために充分な投入であったか。	「投入実績」と「アウトプット実績」より判断	アウトプットの中で、中間評価時においてあまり進展がなかったアウトプット（３と５）はプロジェクト及びNICEDからの投入がほとんどなかった。
		活動からアウトプットにいたるまでの外部条件は現時点においても正しいか。外部条件の影響はあったか。	技術指導を受けた研修員の定着度	技術指導を受けた研修員の定着度は高い。本フェーズで本邦研修を受けた研修員は皆NICEDに定着している。寄生虫学部門長がプロジェクト実施期間中に移動。新たに別の研究員が配置されたが、前の部門長も継続してNICEDの研究に携わっている。
			NICEDの過去５年間の予算の変化率	NICEDの2001年度から2005年度の変化率を計算したところ、2001年度から2003年度は一定しているものの、2004年、2005年度の予算から約4.64倍に増額した。これはICMRによる新研究棟建築及び機材調達用の予算と考えられる。５年間の延べ平均変化率は約64%/年。

評価項目	評価設問		必要なデータ	調査結果
	大項目	小項目		
			数種類の病原体変異株が存在するかどうか	外部条件から現地調査前に削除。
	タイミング・質・量	活動を実施するために過不足内量・質の投入がタイミングよく実施されたか。	専門家派遣（人数、タイミング、分野）	人数・タイミング・分野ともに適切。ただ、現地滞在期間をもっと長くしてほしいとの声あり。
			供与機材（種類、機種、数、タイミング）の適正度	種類・機種・数・タイミングともに適切。
			研修員受入（タイミング、人数、研修内容）	タイミング・人数・研修内容につき、適切。
			プロジェクト運営費（量、タイミング）	プロジェクト運営費は、主に事務管理費にあてられた。
			活用されなかった投入の有無	特になし。機材の一部は新研究棟で使用されるために調達されたので、NICEDの移転待ち。
			CPsの配置（人数、タイミング、分野）	人数・タイミング・分野供に適切。
			コストシェアリングによるプロジェクト運営費（量、タイミング）	NICEDの2003年度から2005年度までのローカルコストシェアリングで賄われるプロジェクト運営費は139,600,000ルピー（348,303,390円相当）。
			提供された施設設備の適正度（規模、タイミング、質）	規模・タイミング・質ともに適切。
6．インパクト	上位目標達成の見込み	下痢症疾患による死亡率の減少はプロジェクト終了後３～５年で見込めるか。	全国の医療施設の下痢診断患者数	データ入手不可能
			全国の医療施設により、NICEDにレファーされた患者数。	データ入手不可能
		上位目標の達成を阻害する要因はあるか。	社会経済的要因、社会文化的要因、アクセスなどの状況の動向	NICEDは中央政府参加の研究機関だが、NICEDが技術を普及していくべき研究機関の多くは、地方政府管轄のものもある。現在NICEDは地元である西ベンガル州との連携は良好だが、全国他の地域と連携する際には、やはり各地域の地方政府との協力関係の構築をしない限り、阻害要因となりうる。
	因果関係	上位目標とプロジェクト目標は乖離していないか。	プロジェクトのログフレームと想定されるロジックモデル	PDMバージョン１の場合は、上位目標が「インド国の下痢症疾患によるによる死亡率が減少する」と設定されていたが、プロジェクト目標との乖離が指摘されたため、PDMバージョン２の段階で、これをスーパーゴールにして、別途「インドにおける医療機関の下痢症対策が改善する」という上位目標を加えた。
		プロジェクト目標から上位目標にいたるまでの外部条件は現時点においても正しいか、外部条件が満たされる可能性は高いか。	政府によるプロジェクトで確立した技術の採用度合いと範囲。	ここでいう「技術」は診断技術自体ではなく、診断したことによって得た「研究成果」（腸管病原体の発生動向や薬剤耐性携行等）のことを指す。NICEDの診断や研究の末得た情報は、中央・地方政府のみならず、他の研究機関や保健従事者にフィードバックされ、それぞれ下痢症対策に生かされていることが報告された。
			政府が疫学的調査を実施する可能性。	政府自体が全国的疫学調査を実施するというよりは、集団感染症の疑いがある場合は、県及び州政府が調査を実施することが多い。
	波及効果	想定されていなかったプラスの影響はあるか。	NICED内、および他の機関への波及効果の事例	NICEDが「Pulse Net Asia」という国際的な、食品媒介感染症に関するネットワークに加入することができた。
		想定されていなかったマイナスの影響はあるか。	NICED内、および他の機関へのマイナスの波及効果の事例	特に無し。
			政策、法律・制度・基準等の整備（NICEDの役割・機能の変遷）、ジェンダー・人権・貧富など社会・文化的側面、技術面での変革、対象社会・プロジェクト関係者・受益者などへの経済的影響など	特に無し。

評価項目	評価設問		必要なデータ	調査結果
	大項目	小項目		
7. 自立発展性	政策・制度面	政策的支援は協力終了後も継続するか。	イ国の方針、下痢症疾患・死亡に関する対応策	2002年に発表されたインド国の保健政策では、下痢症が依然として全国の死亡率に大きく寄与していることが明示され、下痢症をはじめとする感染症の大量発生に備えたサーベイランス・ネットワークの強化をその優先課題とすることを謳っている。
			NICEDの活動とその成果の普及・持続に対して、政府による具体的支援体制があるかないか。	ICMRは2004年からNICEDの設備投資を大幅に実施している（新研究棟と機材供与）それも、NICEDが今後ともインド国内の第一線にある研究機関としてその活動を拡大することを支援するためであり、またそれだけNICEDに期待がよせられていることの証拠である。
		関連規制、法制度は整備されているか、またその予定か。	イ国の方針、下痢症疾患・死亡に関する対応策	2002年に発表されたインド国の保健政策では、下痢症をはじめとする感染症の大量発生の対策として、サーベイランス・ネットワークの強化をその優先課題とすることを掲げている。
	組織面	NICEDは協力終了後も効果を上げる活動を実施するに足る組織能力はあるか。	NICEDへの年間計画の執行状況。予算執行状況。	NICEDの年間計画とは、研究員の研究計画を集約したものを指す。現段階では、プロジェクトに関連する分野での研究活動は順調な進捗がみられるので、計画の執行状況は高いといえる。また予算執行状況も同様に、順調である。
	財政面	経常経費を含む予算の確保は行われているか。	NICEDの過去５年間の予算の変化率、プロジェクト外のNICEDへの財政支援の推移	NICEDの2001年度から2005年度の変化率を計算したところ、2001年度から2003年度は一定しているものの、2004年、2005年度の予算から約4.64倍に増額した。これはICMRによる新研究棟建築及び機材調達用の予算と考えられる。５年間の延べ平均変化率は約64%/年。なお、外部からの資金援助は色々な形で受けているが、特に中心的ドナーとしては、韓国の国際ワクチン研究所で、2002年から総額約300万ドルの資金・機材が供与されている。
		プロジェクト実施により将来の予算が増える可能性はどの程度あるか。予算確保のための対策は充分か。	今後の予算確保のしくみ	ICMRは2004年からNICEDの設備投資を大幅に実施した。そのため、一時的な予算の増額傾向からは減少することは避けられないが、過去10年の予算額をみても、NICEDの予算は増額の傾向にある。
	技術面	移転した技術の定着と普及の仕組みはあるか。	CPsの定着度（もしくはターンオーバーの度合い）	NICEDの研究員の定着率は非常に高く、プロジェクトのカウンターパートとしては、寄生虫学部門以外は、全員組織に残っている。
			技術の適用度	NICEDの研究員は分子レベルの病原体同定能力を日々研究活動に活用しており、プロジェクトが移転した技術の適用度は極めて高い。
			実施機関が普及のメカニズムを維持できる可能性は。	NICEDは当プロジェクト実施期間内だけでも６回の研修を企画・実施しており、またその他たくさんの研修を主催した実績をもっている。また、コルカタ大学との連携のもと、大学院生や研究員を受け入れているため、技術の普及のメカニズムを管理・維持する能力はある。
			施設・機材維持管理能力	施設・機材維持管理能力も高い。機材は、業者と一括メインテナンス契約を締結し、維持管理している。
		持続的効果の発現要因と阻害要因は。	プロジェクトで得られた効果が引き続き発現してゆくために必要な要因	①ICMRとの緊密な連携。②プロジェクト以外にも発生している、日本の専門家や研究機関との交流・共同研究。プロジェクトなしでもそれら協力関係のもとに、NICEDの能力が向上することが期待される。
			プロジェクトで得られた効果が引き続き発現してゆく際に阻害要因となるもの	①NICEDのカウンターパートの流出。②ICMRからの予算の極端な削減。特に試薬のための予算。
8. 軌道修正の必要性	このままでプロジェクト目標の達成は望めるか。		上記項目の評価結果を受けて検討	プロジェクト目標を達成する可能性は高い。ただ、後半には達成度合いが低いアウトプットにプロジェクトの焦点を移すべき。
	投入、活動、アウトプットの内容を軌道修正する必要はあるか。		上記項目の評価結果を受けて検討	投入をアウトプットの発現が比較的少ないものに集中すべき。（アウトプット３，５）
	プロジェクトに影響を与える新たな外部条件はあるか。		上記項目の評価結果を受けて検討	特になし。
	フェーズ１の終了時評価に指摘された問題・課題に対応しているか。		上記項目の評価結果を受けて検討	NICEDの技術を全国に普及していくという課題に対しては、国内研修等で、継続しているものの、プロジェクト後半には更なる進展が必要。
	事前評価時に指摘された問題・課題・リスクなどは、どのように変化しているか。		上記項目の評価結果を受けて検討	大きな変更はない。現段階で、外部条件は満たされつつある。（主なリスクは回避されている。）
	今後留意していかなければならないことは何か。		上記項目の評価結果を受けて検討	①プロジェクトのモニタリングシステムの改善、②アウトプット３、４、５、を戦略的に位置づける、具体的計画の策定、実施。

	活動	分子微生物 Microbiology	ウィルス Virolology	寄生虫 Parasitology	生化学 Biochemistry	免疫学 Immunology	病理生理学 Pathophysiology	疫学 Epidemiology
1-1	腸管病原体の型別を行う。	① 西ベンガル州伝染病院、B．C．ロイ小児病院およびインド各地からの腸管病原体の同定を行う。 ②～⑤ 継続する。		① 年間約300検体の下痢便からE. Histolytica，Gl. Lamblia等の腸管病原寄生虫を分離する。 ②～⑤ 継続する。	① 分離した腸管病原菌の表面蛋白、付着因子、定着因子を解析する。 ② 継続する。 ③ 継続するとともに分離した腸管病原菌の表現型を決める。 ④～⑤ 継続する。			
				① 病原性E. Histolyticaから病原因子を分離する。 ② 分離した病原因子を精製する。 ③ 精製因子の生化学的性状と構造の解析を行う。 ④ 精製因子のアミノ酸配列を決め、相同性のある蛋白を探索する。 ⑤ 精製因子の機能を解析する。				
1-2	腸管病原体の遺伝子解析（DNA分析）を実施する。	① PEGE，RAPD-PCR，リボタイピングを用いて分離した病原菌のDNA型別を行う。 ② コレラ菌、腸炎ビブリオ、赤痢菌、下痢原性大腸菌を中心にDNA型別を継続する。特に流行株に焦点を当てる。 ③～⑤ 継続する。	① 分離したロタウィルス、アストロウィルスのDNA型別を行う。 ② 継続する。 ③ アデノウィルスを加えて継続する。 ④～⑤継続する。	① 病原性E. Histolyticaの病原因子DNAを分離し、DNA型別を行う。 ② 分離DNAを用いてクローン陽性の株を選ぶ。 ③ ハイブリダイジェーションによってクローンを選別する。 ④ 陽性クローンのDNAの配列を決める。 ⑤ 得られたデータの解析を行う。				

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1-3	腸管病原対の分子生物学的診断方法の開発を行う。	① 腸管病原細菌を同定するためのPCR、DNAプローブを開発する。特に腸炎ビブリオの流行株の同定法、コレラ菌の新しいファージなどの同定法を確立する。②～⑤ 継続する。	① 病原ウィルスの同定のためのRT－PCR及び塩基配列決定法の改良を行う。(②～⑤ 継続する。		① 腸管病原菌の種々の表層蛋白の性状を明らかにする。②～⑤ 継続する。		① 腸管病原菌の病原機構を調べる。② 腸管病原菌の病原機構を生化学的に詳細に調べる。③ 継続する。④ 腸管病原菌の病原機構の分子遺伝学的研究を行う。⑤ 継続する。	
			② 種々の病原ウィルスの分子診断法を確立する。 ③ 継続する。 ④ 確立した診断法でウィルス性腸管感染症の診断をする。 ⑤ 継続する。		③ 表層蛋白の遺伝子をクローニングして性状を調べる。 ④ 表層蛋白の構造解析を行う。 ⑤ 表層蛋白の性状を基にして腸管病原菌の分子同定法を開発する。			
2-1	急性水幕下痢症患者の血清の収集・分析・分類・保存を行う。	①病院および野外サーベイランスによって収集した血清を分析、分類し保存する。 ②～⑤ 継続する。						
2-2	診断血清製造施設を整備する。	① 血清製造施設の管理・整備改善を行う。 ②～⑤ 継続する。						
2-3	適切な動物実験室の維持管理を行い、診断血清製造を促進する。	① コレラ菌の型別血清を製造する。②～⑤ 継続する。				① 血清作成のための蛋白を決める。② 目的とした蛋白を精製し、免疫反応を確かめる。③ 目的蛋白の免疫反応におけるトリライクレセプターを調べるとともに、目的蛋白に反応するシグ	① 腸管病原菌の免疫予防方法の開発のための動物モデルを開発する。② 開発した動物モデルを腸管病原菌で免疫する。③ 継続する。④ 免疫血清を解析し、特異抗原を同定する。⑤ 特	

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						ナル分子を解析する。④ 目的蛋白の交代を作成する。⑤目的蛋白の診断方法を開発する。	異抗原の性状を解析し、異なる免疫修飾効果を明らかにする。	
						④ 目的蛋白の遺伝子をクローニングし、発現を調べる。⑤ 目的蛋白を診断とワクチン開発に利用する方法を解析する。		
2-4	菌株や血清の保存ファイルを作成する。	① 収集した菌株と血清の由来を明確にして保存する。 ②～⑤ 継続する。						
3-1	病原体の疫学的常時監視体制を整備する。	① 下痢症流行時に腸管病原細菌を分離する。 ②～⑤ 継続する。	① 下痢症流行時に病原ウィルスを分離する。 ②～⑤ 継続する。					① 病院におけるサーベイランス・システム確立し、病原微生物を分離し、抗生物質感受性を調べる。 ② 継続するとともに下痢症流行の制御と予防方法を模索する。 ③～⑤ 継続する。
								③ 西ベンガル州でのサーベイランスを確立する。 ④～⑤ 継続する。
								④ コルカタの病院さらには全国の病院との共同調査体制を確立する。⑤ 継続する。
3-2	疫学調査フィールドを選定する。							① 疫学調査のためのフィールドを州衛生局と相談し決

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								定し、６万人の人口調査を目的とする。 ② 人口調査を12万人に拡大する。 ③ 野外疫学調査の方法を確立する。 ④ 下痢症の制御を目的とした野外調査を開始する。 ⑤ 継続する。
								① データの解析と管理方法を確立する。
3-3	水環境の微生物生態のフィールド調査を行い、腸管病原体の分布を調べる。	① コルカタの水環境から病原菌を分離し、下痢症流行との相関を調べる。 ②～⑤ 継続する。						
4-1	関連病院および周辺国の医師に対する研修を実施する。	① 下痢便から腸管病原菌の検査方法を指導する。 ②～⑤ 継続する。	① 下痢便からの腸管病原ウィルスの検査方法を指導する。 ②～⑤ 継続する。				① 動物モデルおよび培養細菌を用いて、腸管病原菌の病原性の検査方法を指導する。 ②～⑤ 継続する。	
4-2	技術を習得した医師および技師の活動状況のフォローを実施する。	① 国内研修・第三国研修において指導した医師および技師の活動についてフォローアップする。 ②～⑤ 継続する。	① 国内研修・第三国研修において指導した医師および技師の活動についてフォローアップする。 ②～⑤ 継続する。	① 国内研修・第三国研修において指導した医師および技師の活動についてフォローアップする。 ②～⑤ 継続する。			① 国内研修・第三国研修において指導した医師および技師の活動についてフォローアップする。 ②～⑤ 継続する。	
5-1	連携する病院施設における患者情報を蒐集する。	① 関連病院のサーベイランスの対象となる患者の情報を収集し整理する。 ②～⑤ 継続する。	① 関連病院のサーベイランスの対象となる患者の情報を収集し整理する。 ②～⑤ 継続する。	① 関連病院のサーベイランスの対象となる患者の情報を収集し整理する。 ②～⑤ 継続する。				
								② 全国の病院サーベイランスネットワークを確立し、患

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								者情報を収集する。 ③～⑤ 継続する。
								③ データを解析し、治療情報をフィードバックする。 ④～⑤ 継続する。
5-2	流行情報を迅速に捕捉するネットワークシステムを構築する。							①下痢症の流行を迅速に把握するための全国サーベイランスネットワークシステムを確立する。 ②～⑤ 継続する。
6-1	腸管病原体の薬剤耐性の試験を実施する。	① 腸管病原菌の薬剤耐性プロフィールを調べる。 ②～⑤ 継続する。						① 腸管病原菌の薬剤耐性プロフィールを調べる。 ②～⑤ 継続する。
								② 薬剤耐性と耐性伝達のメカニズムを調べる。 ③～⑤ 継続する。
6-2	試験の結果をもとに適切な抗生物質を患者に処方する。							② 薬剤感受性システムを確立し、その結果に基づいて適当な抗菌剤治療法をネットワークを通じて知らしめる。 ③～⑤ 継続する。
6-3	経口補水液の組成改良を行う。						② ORSの有効性を調べるための動物モデルを開発する。 ③ 動物モデルを用いて種々の組成のORSの有効性を調べる。④～⑤ 継続する。	① 経口補水液（ORS）の改良を行う。② 改良ORSの臨床試験を行う。③継続する。④ 改良ORSの実用化を試みる。⑤ 継続する。

注：①はプロジェクトの１年次、②は２年次、③は３年次、④は４年次、⑤は５年次を表す。