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**NEPAL: MALARIA DATA SYSTEM  
PART III**

**January 16 - February 1, 1989**

**by**

**Barry A. Silverman, Sc.D.**

**AR-108-4**

### Author

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### Acknowledgement

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## EXECUTIVE SUMMARY

The development of a computerized data management system began in August 1988 following a review of the Nepal Malaria Eradication Organization's (NMEO's) information system in November 1987. The Scope of Work of the current consultancy includes: (1) an assessment of progress since installation of equipment at National Headquarters and the NMEO regional training center (RTC) at Hetauda in August 1988; (2) an assessment of the feasibility of expanding the Malaria Information System into the Eastern and Western Regions; (3) a review of modified forms now being used as integration continues; and (4) continued database development.

Progress in developing the information system has been somewhat hampered by a change in collection format created during the integration process, but district-wide data has been entered at the National Headquarters and in the Central Region. Changes in the databases were made to accommodate the changes in collection format. Staff members at the RTC at Hetauda have also been using their computer to prepare course material and their annual report. National Headquarters staff members have been using their computer to analyze Japanese encephalitis data and have developed several personnel databases.

The feasibility of expanding the information system was assessed during visits to the Eastern and Western Regions. The regional director of the Eastern Region Health Directorate suggested that Biratnagar would be a suitable site for a regional information center. The Morang District Health Office at Biratnagar proved to be an excellent choice. The regional director of the Western Region Health Directorate selected Bhairawha as the location for a computer in the Western Region. The Regional Malaria Office would be a good location. Both regional directors indicated that they would support expansion into their regions.

The background and progress of the Malaria Information System was explained to Mr. B.K. Shrestha, Additional Secretary, Ministry of Health. Future plans for the system were also discussed. Mr. Shrestha agreed with the plans and suggested that long range plans include computers at the district level.

Recommendations included the purchase of equipment of the Eastern and Western Region. A computer should be installed at Biratnagar and the district and regional staffs should be trained using the method developed for the Central Region. This training should be followed in five to six months by installation of a computer and training of staff in the Western Region. The development of epidemiology, entomology and operations databases should continue.

## INTRODUCTION

### A. Background

During November 1987, in response to a request from USAID/Kathmandu and the Nepal Malaria Eradication Organization (NMEO), the Vector Biology & Control Project (VBC) provided technical assistance in determining the feasibility and usefulness of computerizing the NMEO epidemiological and entomological database. Recommendations for the design of a computerized database for epidemiological, entomological and operational data were developed based on the information gathered at NMEO facilities.

Following this initial consultancy USAID/Kathmandu agreed to the plan for upgrading NMEO's data management functions and agreed to purchase two computer systems and various software. Hardware and software purchased by USAID/Kathmandu were delivered and installed at the National Headquarters and at the NMEO Regional Training Center (RTC) at Hetauda during a second consultancy.

Databases were developed for:

- A. Form PD1 - Code Sheet of Positive Cases. This form will be used in the upcoming efforts to restratify malaria control efforts.
- B. Form SF3 - Source-wise slide collection and Positives
- C. Form SF4 - Species-wise Classification of the Positive Cases.
- D. Form LF3 and LF3A -Monthly Summary Report of Laboratory.

In addition to the development of these databases, menus were written for the district, region and headquarters. These menus simplify data entry and editing functions. A plan was developed for the district malaria officers to come to the RTC to enter their monthly data into these databases. A program was written to transfer the data entered during a given month to a 3.5 inch diskette. This diskette will then be sent to National Headquarters and appended to the national database. An instruction manual was prepared for these activities.

Mr. R.G. Vaidya and Mr. T.B. Shrestha received extensive training at NMEO Headquarters in the use and care of hardware and the software. They also received training in database development and the use of the newly developed NMEO databases. A

four day (8 hours/day) course in computer literacy was taught at a Kathmandu commercial training institute. The course covered the general features of the computer, DOS operating system and the use of Lotus and DBase III Plus. Twelve district officers, Mr. Shambu Nath Jha, director of RTC, and four National Headquarters staff members attended the course and learned to use the various software packages. Trainees were also instructed in the use of the Dbase district menu and data entry forms for SF3 and SF4.

Following installation of equipment at the RTC, Central Region staff and the USAID malaria advisor received intensive training in the use of the hardware, software and the NMEO databases and menu systems.

#### B. Progress Since Second Consultancy

In NMEO Headquarters, SF3 and SF4 are being used to enter epidemiological information. Headquarters staff is entering the district-wise, monthly and receptivity-wise data received from the districts. Japanese encephalitis virus records from the districts have been entered into a spreadsheet. The analysis has begun but is being hampered because of a lack of statistic software. Complete records of NMEO personnel have been entered into a database. The budget for the current fiscal year and projections for the next fiscal year have been entered into a spreadsheet.

Progress in the district has been slowed by the process of integrating the various health sectors into a single public health division. There has been a change of the basic reporting unit from the Vek to the Panchayat system. The original SF3 and SF4 formats were prepared using the Vek and malaria unit as the reporting units. This led to some confusion in the data entry process. In addition, as the trained district malaria officers were brought into the integration process, there was additional confusion as to whether they were still supposed to report the data at Hetauda. Many of the problems that have been created by the integration process were dealt with at a recent malaria seminar held at Pokhara in December 1988. In spite of these problems, staff from three districts, Dhanusha, Sindhuli and Nuwakot, have entered data into the database at Hetauda. In addition, Mr. S.N. Jha has been using the computer to prepare the RTC's annual report.

#### C. Scope of Work

The Scope of Work of this consultancy included: (1) an assessment of progress since installation of equipment at National Headquarters and the RTC at Hetauda; (2) an assessment

of the feasibility of expanding the Malaria Information System into the Eastern and Western Regions; (3) a review of modified forms now being used as integration continues; (4) continued database development.

## FINDINGS

### A. NMEO National Headquarters

National Headquarters staff members have been using the databases to enter district malaria information. There are now 580 entries in the SF3 database. In addition, nation-wide Japanese encephalitis data has been entered into the computer and is being analyzed, but analysis is hampered by a lack of statistics software. An NMEO personnel database has also been developed by National Headquarters staff. Since new forms had been developed to reflect changes in data collection resulting from the integration process, the databases also had to be modified. Training of staff continues at the National Headquarters. Because of the changes caused by the integration process, the stratification data for the PDI database has not been collected. This database also required modification because of the change in the basic recording unit.

### B. Eastern Region

Meetings were held with Mr. J.D. Shrestha, senior public health officer, Morang District, and Dr. Kallyan Raj Pandey, regional director of the Eastern Region Health Directorate. Discussions focused on the possibility of expanding the information system into the Eastern Region. Dr. Pandey and Mr. Shrestha agreed that the district office at Biratnagar would be the best site for installing a computer. Dr. Pandey indicated that he would support this expansion and would direct district officers to enter malaria information into the computer at Biratnagar once it was installed. Dr. Pandey also suggested that it would be best to train two individuals at the regional level to supervise the Malaria Information System. Examination of the district health office revealed a suitable room for the installation of a computer. Mr. Shrestha is computer literate, having used computers during his training at Tulane University.

### C. Western Region

Following a meeting at the regional malaria office at Bhairawha with the regional malaria officer and examination of the building, discussions were held with Dr. Badri Lal Shrestha, regional director, Western Region Health Directorate, about expansion of the information system into the Western Region. These discussions were held at the regional health office at

Pokhara. Dr. Shrestha suggested that the regional malaria office at Bhairawha would be the appropriate location for a computer. He indicated that he would support expansion into the Western Region and that would instruct district officers to enter malaria data into the computer.

#### D. Central Region

Meetings were held with Mr. S.N. Jha to review progress and to discuss problems with the Malaria Information System. Due to a change in the basic reporting unit from the Vek system to the Panchayat system, there has been some confusion about how to enter the data into the computer. The database was revised to reflect this change in reporting unit. It was also indicated that since the district malaria officers now are under the direction of the Regional Health Directorate, there was some confusion about their reporting the monthly data at Hetauda. Mr. R.G. Vaidya said that this situation had been clarified following the Regional Seminar for Health Officer held in Pokhara in December. The regional director for the Central Region Health Directorate, Dr. K. Vaidya, indicated at the seminar that she supported the development of the Malaria Information System and would instruct district officers to report to Hetauda to enter the monthly malaria data. During an informal meeting with Dr. Vaidya in Kathmandu, she reiterated her support for the development of the information system.

Following these discussions and revision to the database, monthly district-wide reports were programmed in Dbase III. After district officers enter their data, they will be able to generate monthly reports for their districts. Malaria information will, therefore, be rapidly available at the district level.

#### E. Ministry of Health, Teku, Kathmandu

During a meeting with Mr. B.K. Shrestha, additional secretary, MOH, the background and progress of the Malaria Information System and future recommendations for expansion of the system were discussed. Mr. B.K. Shrestha suggested that the expansion of the system should include computers at the district level because that was where many decisions were made. Mr. B.K. Shrestha indicated that the Ministry would be willing to seek loans to pay for the district level computers. It was agreed that this was a good long range goal, but development of the system would have to be done with computers at the regional level.

## RECOMMENDATIONS

### I. Database

The modified NMEO databases should be field tested during the next five to six months. Additional modifications should be made if necessary. Data for the stratification database PDI should be collected and entered into the database during February-June 1989.

The development of computerized mapping capabilities based on the newly developed databases should begin. The VBC Project has reviewed the mapping software formerly used by NMEO and has concluded that it would not be feasible to convert this software so that it could be used with the new databases. Mapping software and associated hardware is recommended (See below).

### II. Expansion of the Information System

It is recommended that the information system should be expanded to include the Eastern and Western Regions. The next computer should be installed in the Eastern Region, followed in five to six months by one in the Western Region. Required hardware and software are listed below. Training of regional and district staff should be conducted in Kathmandu and should follow the curriculum established for training Headquarters and Central Region staff.

### III. Suggested Computer Hardware and Software with Cost Estimates

In order to expand the information system into the Eastern and Western Regions, procurement of the hardware and software listed below is recommended. After a discussion with Allen Eisenberg, procurement officer, USAID/Kathmandu, it was decided to follow the same procurement scheme used previously. The VBC Project will obtain price quotes from vendors in the United States and will evaluate those quotes on their technical merit. Price quotes will be forwarded to USAID/Kathmandu. After a vendor has been selected, VBC will supervise the preparation of the equipment and will send it as excess baggage during the next consultancy.

There are two options for purchasing the suggested equipment. Equipment for both regions could be purchased at the same time. The computer for the Western Region could be used at the National Headquarters for five to six months until it was installed in the Western Region. This machine could be used to enter stratification data and for further training of National Headquarters staff. The alternative is to prepare two PIO/C's

and purchase the equipment separately.

Also listed below is additional software for the National Headquarter.

A. Hardware

Regions (2 Systems)

-An 80286-based microcomputer, extended RAM(2 meg.), one 3 1/2 inch 360k floppy drive, 30 meg hard disk, monographic card and monitor, external tape back-up	\$3,000		
-Wide carriage dot matrix printer	1,000		
-Uninterrupted Power Supply	600		
-Sheet Feeder for Printer	150		
	TOTAL	\$4,450	\$8,900

B. Software

1. Two each

-dBASE III Plus	\$450		
-Lotus 1-2-3	300		
-Lotus Metro	85		
-WordPerfect	200		
-DOS 3.3	85		
-Norton Utilities	100		
-Diagnostic software	100		
	TOTAL	\$1,320	\$2,640

2. National Headquarters Only

-SPSS/PC with graphics, tables and advance statistics	1,500		
	TOTAL	\$1,500	\$1,500

C. Supplies (for 2 systems)

- antistatic mats	\$50	
-cleaning kits	35	
-100 diskettes	60	
-printer ribbons (36)	300	
-Cassette tapes (For Backup)	150	
TOTAL	\$595	\$1,190

D. Mapping Software and Hardware

<u>Mapping</u>		
Plotter	\$1,700	
Mouse	500	
Digitizer	2,000	
Software	1,500	
TOTAL	\$5,700	\$5,700
TOTAL (A-D)		\$19,930

#### IV. Training

Following the delivery of the equipment for the Eastern Region, the region's staff should be trained in a manner similar to that used to train Central Region and National Headquarters staff. Following this training, the computer should be installed at Bhairahawa and on-the-job training should continue. This procedure should also be followed prior to the installation of equipment in the Western Region.

Advance computer training is recommended for key personnel. According to Mr. S.P. Pradhan, fellowships for region information supervisors has been approved by USAID/Kathmandu. In addition, USAID/Kathmandu should consider the course on the use of computers in malaria control programs offered at The Wedge, South Carolina, for Mr. S.P. Pradhan.

#### V. Malaria Information Committee

A committee, described in the report of the August 1988 consultancy, should be established to plan and coordinate future development of the malaria information system. Minutes of these meetings and progress reports should be submitted to the acting chief of NMEO and to the USAID malaria advisor. To maximize collaboration between NMEO and the VBC Project, reports could be forwarded to the VBC Project.

#### VI. Next Visit of VBC Project Biomedical Computer Specialist

The proposed next visit of Dr. B. A. Silverman is June/July 1989 following the purchase of the equipment. The Scope of Work for this visit would include: (1) assessment of progress in the implementation of the Malaria Information System; (2) training of Eastern Region staff; (3) installation of equipment in the Eastern Region; (4) further development of the databases, including development of additional entomological and operational databases; and (5) further development of the stratification database.

ITINERARY

- Jan. 18            Arrive in Kathmandu.
- Briefing with Mr. Jay Anderson and Ms. Ursula Nadolny, USAID/Kathmandu, and Mr. S.P. Pradhan, Malaria Advisor USAID/Kathmandu.
- Briefing with Mr. J. P. B. Shrestha, Chief Officer NMEO, Mr. R.G. Vaidya, Sr. Entomologist and Dr. M.K. Banarjee, Epidemiologist.
- Jan. 19            Flight to Biratnagar cancelled.
- Further discussions at NMEO Headquarters.
- Jan. 20            Proceed to Biratnagar (Eastern Region) with Mr. Vaidya.
- Meeting with Mr. J.D. Shrestha, Sr. Public Health Officer, Morang District, and Dr. K.R. Pandey, Regional Director, Eastern Region Health Directorate.
- Jan. 21            Proceed to Hetauda.
- Jan. 22            Assessment of computer facilities at RTC.
- Modification of SF3 and SF4 to reflect change to Panchayat as basic reporting unit.
- Jan. 23            Further training of Mr. S.N. Jha.
- Programming of monthly district-wise reports for SF3 and SF4.
- Jan. 24            Proceed to Bhairawha (Western Region).
- Meeting with Regional Malaria Officer, Mr. R.C. Chaudhary.
- Assessment of Regional Malaria facility for future computer installation.

Jan. 25            Proceed to Pokhara.  
                 Meeting with Dr. B. L. Shrestha, Regional  
                 Director, Western Region Health Directorate.

Jan. 26            Return to Kathmandu.

Jan. 27            Meeting with Mr. B.K. Shrestha, Additional  
                 Secretary MOH.  
  
                 Informal meeting with Dr. Kokila Vaidya,  
                 Regional Director, Central Region Health  
                 Directorate.  
  
                 Discussions with Dr. David Calder, Health  
                 Officer, USAID/Kathmandu, and Mr. Jay  
                 Anderson.  
  
                 Discussion with Mr. Allen Eisenberg,  
                 Procurement Officer, USAID/Kathmandu.

Jan. 28            Report writing.

Jan. 29-            Database development.  
Jan. 30

                 Planning for future expansion of the Malaria  
                 Information System.

Jan. 31            Final discussions with NMEC staff.  
  
                 Debriefing at USAID/Kathmandu.

Feb. 1             Depart Kathmandu.