

PD-ABE-548

AGENCY FOR INTERNATIONAL DEVELOPMENT PPC/CDIE/DI REPORT PROCESSING FORM

ENTER INFORMATION ONLY IF NOT INCLUDED ON COVER OR TITLE PAGE OF DOCUMENT

1. Project/Subproject Number 9365948	2. Contract/Grant Number DPE 5948-C-00-5044-00	3. Publication Date May 1990
---	---	---------------------------------

4. Document Title/Translated Title

Trip Report
Assessment of the System for Collection and Management of
Vector-Borne Disease Information in Nepal
March 21 - April 11, 1990

5. Author(s)

- Sullivan, Peggy S., Ph.D.
- Silverman, Barry A., Sc.D.
-

6. Contributing Organization(s)

Vector Biology and Control Project
Medical Service Corporation International

7. Pagination 21	8. Report Number AR-134-5	9. Sponsoring A.I.D. Office S&T/H
---------------------	------------------------------	--------------------------------------

10. Abstract (optional - 250 word limit)

11. Subject Keywords (optional)

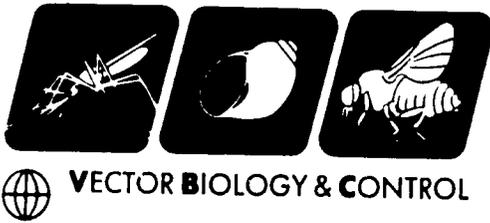
1.	4.
2.	5.
3.	6.

12. Supplementary Notes

13. Submitting Official Robert W. Lennox, Sc.D.	14. Telephone Number 703-527-6500	15. Today's Date June 30, 1992
--	--------------------------------------	-----------------------------------

.....DO NOT write below this line.....

16. DOCID	17. Document Disposition DOCRD [] INV [] DUPLICATE []
-----------	---



Vector Biology & Control Project

1611 North Kent Street, Suite 503
Arlington, Virginia 22209
(703) 527-6500

PD-ABE-548
Telex 248812 (MSCI UR)
Cable MSCI Washington, D.C.

78441

Trip Report

**Assessment of the System
for Collection and Management of
Vector-Borne Disease Information in Nepal**

March 21 - April 11, 1990

by

**Peggy S. Sullivan, Ph.D.
Barry A. Silverman, Sc.D.**

AR-134-5

Authors

Peggy S. Sullivan, Ph.D., is the VBD Project's epidemiologist
Barry A. Silverman, Sc.D., is VBC's health and management information specialist (HIS/MIS).

Acknowledgement

The authors acknowledge with gratitude the energetic support of Mr. Shreedhar Pradhan, USAID Program Specialist; the generous allotment of time to assessment needs in Morang District by Mr. Janek Das Shrestha; the assistance and cooperation of NMEO staff, especially that of Mr. Jitendra Shrestha, Acting Chief, NMEO, Dr. M.K. Banerjee, MOH Medical Officer assigned to NMEO, Dr. B. L. Shrestha, Regional Director, Western Region, and Dr. D. N. Regmi, Additional Secretary, MOH Technical Branch. We also thank Dr. David Calder, Chief, USAID HPN, and Mr. David Piet, HDP Officer, for their suggestions and support throughout the assignment.

Preparation of this document was sponsored by the Vector Biology and Control Project under Contract No. DPE-5948-C-00-5044-00 to Medical Service Corporation International, Arlington, Virginia, U.S.A., for the Agency for International Development, Office of Health, Bureau of Science and Technology.

Table of Contents

Executive Summary	1
1. Introduction	3
2. Methods of Assessment	4
3. Findings	5
3.1 VBD control priorities	5
3.2 Current status of VBD control activities	6
3.2.1. Level of integration into HMG health services ...	6
3.2.2. Human resource allocation, training, and supervision	7
3.2.3. Health education	10
3.2.4. Community participation	10
3.2.5. Operational research	11
3.3 Generation of data	12
3.4. Utilization of data	12
3.4.1 Data flow and timelines	13
3.4.2 Data aggregation and utilization at regional and national levels	13
3.4.3. Automated data storage and analysis	14
4. Recommendations	15
4.1 Further strengthening of the automated capabilities of the NMEO Malaria Information System	15
4.1.1 Staffing Pattern	15
4.1.2 Training	15
Three-week course	15
Three-month course	16
4.1.3 Malaria Regional Training Center at Hetauda ..	16
4.1.4 Expansion of the computerized malaria information system	16
4.1.5 Hardware and software	16
4.1.6 Existing database additions	17
4.2. Development of an integrated information system	17
4.2.1. Vector-borne diseases	17
4.2.2. Other diseases	18

Appendices

Appendix A 19

Executive Summary

The Vector Biology and Control (VBC) Project provided a team composed of an epidemiologist and a health and management information (HIS/MIS) specialist to assess the public health sector system for vector-borne disease information collection and management in Nepal.

The assessment was conducted through a series of meetings with USAID officers and staff associated with the current malaria control program, officers of the Nepal Malaria Eradication Organization (NMEO), and officials of the Ministry of Health at central, regional and district levels. Interviews and observations took place in five district health posts, two regional malaria offices and two training centers.

Malaria surveillance and control activities conducted by the NMEO since 1958 are gradually being integrated into a health services delivery system that includes attention to other diseases for which surveillance and control through case management or immunization have been implemented by other donor-assisted vertical programs.

Active surveillance for Japanese encephalitis, leishmaniasis and filariasis does not occur at present. Malaria surveillance includes active case detection by village health workers and a variety of procedures for passive case detection by health facilities employing microscopists, malaria clinics associated with hospitals, and several classifications of community volunteers.

Health post staff and visiting village health workers are the primary collectors of community disease data. Patients are routinely described by age, sex, address, marital status and family planning acceptance status. Head of household occupation is not recorded, nor is severity or duration of diseases in general. Parasite density is recorded for patients with malaria as a measure of severity. There is no system to track and record malaria treatment failures.

A Public Health District is directly budgeted from the MOH. Public health officers are at liberty to allocate funds to support district needs such as epidemic investigations or interventions without authorization from regional or national directors. Action on malaria-specific data continues to be directed from NMEO regional or national offices, however, as are vector control-related activities.

Trends of malaria incidence in monitored regions are described in terms of traditional indicators of parasite incidence, blood slide examination rates, and slide positivity rates for detected cases. En-

tomological investigations are conducted at the regional level, where monitoring for density, insecticide susceptibility and effectiveness of spray operations occurs.

Entomological data are both generated and utilized at the regional level of the NMEO organizational structure. This is expected to continue as control activities are integrated into the public health system. Malaria data, currently indicated by the presence of blood parasites, are generated at the village level, where case management is initiated and indicators of malaria foci originate.

Provision of the NMEO with an automated capability to quickly detect and rapidly respond to malaria outbreaks was initiated in 1988. Databases have been created to accommodate parasite and vector data. The system's lack of effectiveness to date may be attributed to several factors, the most important of which are inadequate training of computer users and failure to assign staff full-time to positions of automated data management.

Recommendations for strengthening the NMEO malaria information system include the identification of at least one person at each of the three computer sites whose primary responsibility is data management; provision of a series of courses of varying duration and intensity; and revision of the NMEO Training Center curriculum to include computer-based training in epidemiologic and entomologic operations.

Also recommended is the capture of unconfirmed cases of malaria and the inclusion in village health worker training programs of clearly defined criteria for differentiating malaria from other diseases. Additional variables that should be incorporated into data collection forms are occupation of head of household, an index-derived severity score, duration of illness, response to treatment, and outcome of illness.

There is an increasing need for a unified system of managing surveillance, preventive and curative services information in Nepal. Specific recommendations for restructuring the current information system must await the outcome of governmental and MOH reorganization that is presently occurring.

1. Introduction

The Vector Biology and Control (VBC) Project began helping the (NMEO) develop a computerized data management system in November 1988. More recently, Nepal's Ministry of Health (MOH) established a target date of July 1990 for incorporation of the NMEO into the general health services organizational infrastructure. USAID/Kathmandu's new five-year health agenda also becomes effective in July of this year.

In light of these scheduled events, VBC Epidemiologist Peggy S. Sullivan, Ph.D., and VBC Health and Management Information (HIS/MIS) Specialist Barry A. Silverman, Sc.D., went to Nepal March 21 - April 11, 1990 to assess the public health sector system for vector-borne diseases information collection and management. Drs. Sullivan and Silverman were further requested to recommend a viable strategy for strengthening the malaria information system to accommodate the national mandate for integration of vertical health programs into His Majesty's Government (HMG) health services. The scope of work (SOW) contained the following specific objectives:

- o to ascertain the priority given vector-borne (VBD) control integration into the national health services by the Ministry of Health (MOH), the Nepal Malaria Eradication Organization (NMEO) and USAID/Kathmandu;
- o to assess the current status of VBD control activities as they relate to the mandate for integration;
- o to describe the generation of VBD data;
- o to describe the transmission of data from the field to the users of data;
- o to recommend action that may be taken to strengthen the automated capabilities of NMEO data collection activities and to further integrate VBD data with other communicable disease data obtained from surveillance of the population receiving public health services.

2. Methods of Assessment

Meetings were held with USAID officers and staff associated with the current malaria control program NMEO officers, officials of the MOH at the central levels of both organizations, and regional and district public health officers. Visits were made to five health posts, two regional malaria offices, and two training centers. One training center specialized in malaria surveillance and the other in training village health workers (VHWs) and the surveillance activities associated with the various components of Primary Health Care (PHC) services delivered by the MOH. Facilities visited were located in three of the country's five regions and included remote posts as well as those in more populated areas of districts. Several villages were visited and the method of VHW attendance to the community was confirmed by villagers. In one instance, a malaria courier was observed and interviewed en route from a remote health post to a district office.

Meetings also were held with computer users at NMEO National Headquarters, the Hetauda Malaria Training Center and the Morang District Public Health Office to identify and resolve problems with the databases recently established in those locations. (The Morang District Public Health office serves as the Regional Malaria Center for the Eastern Region.)

A list of persons consulted and places visited is contained in Appendix A.

3. Findings

3.1 VBD control priorities

Foci of vectors and human cases of Japanese encephalitis (JE), leishmaniasis, and filariasis have been identified in Nepal, but the initiation of the malaria eradication program in 1958 and establishment of the National Malaria Eradication Organization concentrated human and financial resources on malaria. These resources are gradually being integrated into a health services delivery system that includes attention to diarrheal diseases, acute respiratory infections (ARI), leprosy, tuberculosis (TB) and immunization coverage (EPI) as well as malaria. Diarrheal diseases, ARI, TB, leprosy and EPI have been the focus of USAID and other donor-assisted vertical programs for which surveillance and control through case management or immunization have been implemented.

Active surveillance for JE, leishmaniasis and filariasis does not occur. The resources of the NMEO or the MOH, combined with a perception that the prevalence of these diseases is low, do not permit incorporation of surveillance activities into future action plans. Some current and former NMEO staff trained to identify other vector-borne diseases in addition to malaria have been placed in national health service positions to act on the occurrences of these diseases. Their efforts have been important in containing vector-borne diseases.

In one of the health posts visited in the Central Region, a village health worker reported that as many as 20 persons in one of the two village foci in the four villages regularly attended were thought to have leishmaniasis. Although the capability for confirmation exists at the Central Health Laboratory, Kathmandu, most non-malaria vector-borne diseases are clinically diagnosed and are not reportable by District Public Health offices; thus, the prevalence of these diseases is largely unknown. A WHO-assisted MOH house-to-house survey of leishmaniasis is being planned for implementation in the southern part of Nepal's Eastern Terai region. The survey is expected to begin in the latter part of this year.

The Cabinet of Ministers is considering a proposal that would transfer some variation of NMEO's present vertical organizational structure under the aegis of the MOH to a division within the Ministry's technical branch. The probability of acceptance of the proposal is generally considered to be quite high. While the final product of Cabinet and MOH deliberations is speculative, it is also generally

agreed that MOH resources for strengthening the VBD control program will have to be increased.

The long-term commitment to health development by USAID/Kathmandu contains a VBD component that no longer includes the provision of insecticide for vector control purposes. Instead, it focuses on strengthening the entomological capabilities of the Hetauda Training Center, located in the Central Region of the country. Expected resources will target construction of new facilities, including a dormitory, classrooms and laboratories, and provision of equipment for manpower development in vector and disease surveillance. Continued assistance to strengthen the computerized reporting system initiated in three NMEO locations in two of Nepal's regions and expansion of the system to the other three regions also is expected.

The NMEO has submitted a proposal to the World Bank that would provide similar health development assistance in the form of a soft loan to specific areas of need identified by the NMEO. Provision of insecticide is included in the plan, but funding, if approved, will not be available for approximately two years.

3.2 Current status of VBD control activities

3.2.1. Level of Integration Into HMG health services

Integration of vertical programs into the national health system was initiated in 1972 in two of the 75 districts that are distributed in Nepal's five regions, classified as Eastern, Central, Western, Mid-Western and Far-Western. Implementation was subsequently begun in the remaining districts, in which varying levels of integration are presently practiced. Staffing patterns within the districts differ according to three classifications of geography and population size and district-specific prevalent diseases.

To accommodate the mandate to integrate, employees of vertical health development programs have been reassigned to different positions in some instances. In others, they have been given additional responsibilities for detection and treatment of diseases in which they have neither the interest nor the training necessary for optimal performance.

The present system of malaria detection exists in varying degrees in fifty districts with elevations of 4,000 feet and below to

which NMEO services are provided. It includes active case detection (ACD) by VHWs, who are employed by the MOH and trained to take blood and prepare slides for villagers who have fevers during the health worker's monthly household visit. VHWs also are trained to ask questions about the other five areas described in section 3.1.

Passive case detection (PCD) is practiced by several classifications of health facilities and health workers:

- o PCD/H occurs in any hospital or health facility with trained microscopists to confirm diagnoses. This classification also refers to the private practice clinician. (Approximately 86 percent of physicians in 1988 were employed in some capacity by the MOH.)
- o PCD/MC refers to malaria clinics staffed by District Public Health Office personnel and established in hospitals in areas where ACD cannot be practiced effectively or where no other detection mechanism is available.
- o PCD/V refers to community volunteers such as shopkeepers or traditional healers who have been trained to prepare blood slides from community members who have fever, suspect malaria and request the service.
- o PCD/W refers to a classification of health worker that is not yet present in all districts. The community health volunteer will be further described in the following section.

Investigation of the origin of confirmed cases of malaria is still conducted where possible. The data collection form has been simplified for use by health workers with minimal malaria training. Follow-up of radical treatment administered to confirmed cases is supposed to occur once during the month following treatment, but this is no longer possible under MOH staffing patterns in some districts.

3.2.2. Human resource allocation, training, and supervision

The five regions of Nepal are divided administratively into fourteen zones containing a total of 75 districts. Districts are further divided into Ilakas containing subdivisions called panchayats, of which there are 4,048. Each panchayat contains nine wards. The population is approaching 18 million. Approximate

mately 10.5 million persons reside in potentially malarious areas of the country. The 1988 estimated ratio of physicians to total population was 1:20,471¹.

Physicians are distributed in hospitals and private clinics and are not employed in the 816 health posts that serve the 4,000 panchayats. The usual health post staffing pattern, dependent on size of the catchment area and the population served as well as on budgetary resources, consists of a Health Post-in-Charge, who receives approximately two and one-half years of training conducted in Kathmandu by the Institute of Medicine (IOM), two nurse midwives, also with two years' training by IOM staff conducting programs outside of Kathmandu, and two IOM-trained auxiliary health workers. In malarious areas, budget permitting, health posts also employ a microscopist and a malaria inspector who has in the past investigated the origins of confirmed cases of malaria.

In addition to core staff, a VHW is assigned to each panchayat served by the health post. A VHW spends approximately 20 days per month making household (HH) visits in each of the villages in the panchayat. VHWs receive seven weeks of basic training and refresher courses once a year thereafter.

VHW responsibilities include HH interviews about the six topic areas described in section 3.1, administration of ORT and other supportive treatment where indicated, collection of blood for slides from fever cases, and referral to the health post for moderate/severe respiratory infections, a cough of more than two weeks duration, and identified cases of leprosy. VHWs are also trained to immunize children as part of health post EPI programs. This is usually done on five designated days each month in fixed locations within the panchayat. Two of the health posts visited during the assignment provided rotating core staff to four outreach health posts strategically placed in remote localities in respective catchment areas.

A former Minister of Health recently initiated a program to recruit and train Community Health Volunteers (CHVs). The program requires that a married woman be selected from each ward to work out of her home equipped with drugs for supportive therapy for ward residents with diarrheal diseases and ARI. It is expected that literate CHVs will be instructed to draw blood and prepare slides for persons presenting with fever. Those who are not literate will report cases of fever to VHWs during the following visit, when blood slides will be prepared.

Nepal has four regional public health training centers where training programs for VHWs and public health workers at other levels are developed and conducted. The public health training center in the country's Central Region also trains trainers of CHVs as that program is gradually implemented within the national health system.

The CHV selection process requires that four candidates from each ward be reviewed by representatives of the Nepal Women's Organization in the panchayat and of the women's group in the candidates' ward and by the District Public Health Officer. There is no provision for removing from service CHVs who perform unsatisfactorily, and there is some concern that the high percentage of illiteracy among women will reduce program effectiveness.

To accommodate women recruited to CHV positions who are illiterate but otherwise capable and respected members of their communities, a training manual has been developed by the MOH Division of Public Health that pictorially describes the major health problems CHVs are expected to address. The manual does not contain a section on malaria or other vector-borne diseases. Malaria detection will be incorporated into the second year's refresher training course. The first-year training program consists of 24 days distributed into one 12-day block of instruction, followed by two six-day blocks.

Supervisory activities are supposed to be conducted at the district health post, panchayat and ward levels of the public health care system. Malaria program integration into the public health system has necessitated the establishment of new procedures for supervision based on those that have been successfully employed by the NMEO. The implementation of these procedures is admittedly a weak link in the system, which is attributed to the lack of adequate resources and in some instances, a lack of commitment to a job to which one has been assigned as a result of the integration process.

The established procedure calls for direct and indirect verification of VHW and CHV activities monthly in health posts with sufficient staff to do so. In less well-equipped health posts, quarterly verification is encouraged. The indirect method requires spot visits to the population served to ascertain that the VHW/CHV has carried out assigned tasks, such as slide collection from fever cases, as well as the distribution of birth control

devices and ORT. This method was applied in several villages visited during the course of the assignment where signature and date of the HH visit by each VHW was recorded on the outside wall of the houses. Residents were questioned about services received and women were asked to produce their MCH health cards on which infant immunizations were recorded as timely and current. These villages are located in a district whose Public Health Officer was trained in the NMEO and who has applied the organizational skills acquired in that program to the integrated services he manages and supervises in the district of Morang in South Eastern Nepal.

In addition to monthly supervision of health post staff during peak disease transmission months, staff generally meet quarterly with the District Public Health Officer to address problems that have been identified but not resolved at the health post level. This procedure is undertaken once a month between health post staff and VHWs. A Regional Director may meet more than once every three months with District Public Health Officers, to whom per diem to seminars or workshops is provided.

3.2.3. Health education

Patients who utilize health post services receive instruction in the preparation of ORT and other topics included in health post MCH programs, such as nutrition, family planning and immunization schedules. Instruction is reinforced by VHWs during monthly HH visits. Neither instruction (except in reporting episodes of fever for blood slide collection purposes) or educational materials concerning vector-borne diseases are available to health post populations. While a larger role for health education is forecast as the CHV program continues to grow, it is currently the least developed component of the services delivery system.

3.2.4. Community participation

In Morang District, six facilities called sub-health posts have been established by local communities with encouragement from the District Public Health Officer, who provides free ORT and drugs for TB, leprosy and ARI. In each case, communities constructed or provided a building, furniture and salary support for one IOM-trained auxiliary health worker, who may see as many as 50 patients per day during a peak disease transmission season. Blood for slides is collected from patients with fever in these facilities, and slides are forwarded by courier to the nearest health post for examination. Immunizations and other MCH

services are provided once a month in the sub-health post by visiting staff from the nearest health post. A seventh sub-health post is known to exist in the Kaski District of Nepal's Western Region.

Further evidence of community collaboration was observed in Morang District, where the District Public Health Officer personally provides instruction on health issues in community school classrooms. The officer's interaction with community leaders is a continuous process to elicit their participation. He obtained the assistance of the local Red Cross when district manpower was insufficient to apply insecticide in an area of leishmaniasis transmission.

In the past, NMEO recruitment of at least two volunteers in each panchayat of malarious districts has produced a unique and important player in the malaria control strategy. Volunteers (PCD/Vs) are usually local shopkeepers or traditional healers given rudimentary training in blood collection, slide preparation and the administration of presumptive treatment when consulted by community residents who have fevers. Prestige within the community has been associated with this volunteer position, which still exists, although there is some concern that these volunteers will gradually be replaced by women in CHV positions.

Health post services are no longer free. Cost-recovery practices include a small fee for services at the time of a health post visit. While there is no charge for drugs obtained at the health post, in at least one rather well-off district in the Western Region, a drug depot has been established in each panchayat. One CHV is appointed 'depot holder' and charges a fee for drugs dispensed from the depots. Ninety percent of proceeds are reinvested in the panchayat depot and 10 percent represent profit for the CHV depot holder.

Community participation in operational research activities has been elicited in the past during NMEO comparative studies of environmental management and insecticide application.

3.2.5. Operational research

Operational research activities identified in the NMEO 1989-90 Plan of Action as necessary to continued malaria control include monitoring of drug-resistant *P. falciparum*, clinical drug trials, appropriate bio-environmental methods of control, and

longitudinal entomological studies. The latter are currently being conducted and a new proposal to continue research on environmental management issues has been approved.

Research aimed at the acceptance of personal protection methods of VBD control or low-cost research on operational problems associated with management of the control program are not currently planned.

3.3 Generation of data

The primary collectors of community disease data in general are health post staff, visiting VHWs and, in those districts where the new volunteer program has been initiated, the CHVs. Information about malaria is also provided by hospitals where malaria clinics exist for the purpose of case confirmation and radical treatment, malaria check posts for immigrant screening at Nepal/India border locations, and the community volunteers, or VHWs, described earlier.

Health post patients are routinely described at the time of visit by age, sex, address, marital status and family planning acceptance status. A registry of births and deaths notated by VHWs is regularly maintained and in/out migrations are recorded in the annual census update. Head of household occupation is not recorded, nor is severity or duration for diseases in general. Parasite density is recorded for patients with malaria as a measure of severity, but malaria cases are not recorded until confirmed by blood slide examination. VHWs are not trained to differentiate clinically suspected malaria patients with fever from those with diarrhea, ARI, JE or other fever-generating diseases. As the CHV program develops and malaria detection is included in the training curriculum, cases of fever will be recorded at this level. There is no system to track and record malaria treatment failures.

3.4. Utilization of data

Results of the decentralization process begun several years ago in Nepal's health sector were quite evident in the districts visited during the assignment. General community disease data collected by VHWs and returned to the health post following HH visits are reviewed and compiled by staff who are free to act upon those data within the limits of local resources and without permission from the District Public Health Officer. In turn, the district is directly budgeted from the MOH and the Public Health Officer allocates funds to support district needs such as epidemic investigations or interventions without

authorization from regional or national directors. Action taken on malaria-specific data, however, continues to be directed from NMEO regional or national offices, as are vector-related activities.

3.4.1 Data flow and timelines

The NMEO foot courier has long played a critical role in transmitting data and blood slides from the field to a site where microscopic examinations occur and in returning results indicating whether there is a need for radical treatment. The turn-around time for this process is reportedly seven to 10 days. Couriers are still very much utilized as the malaria control program becomes progressively integrated into the public health services, serving as conduits between VHWs and health posts, and between health posts and district offices.

Because mail services are erratic throughout the country, a plan to expedite malaria-specific information from central region districts to regional and national NMEO headquarters was pilot-tested in 1988. The plan required that data be hand-carried by a member of each District Public Health Office staff to the NMEO Regional Training Center in Hetauda. The staff member, trained in data entry, would enter district data in the computer provided by the Regional Training Center. The plan was expected to generate greater interest in transmitting data from districts upward, thus reducing the lag-time between district review and regional and national review. Although transit time was reduced, low per diem pay for travel between districts and the Training Center produced little incentive for participation, and the plan was aborted. The time currently required to transmit data between district and regional offices is reportedly four to six weeks.

3.4.2 Data aggregation and utilization at regional and national levels

Trends of malaria incidence in monitored regions of Nepal are described in terms of traditional indicators of parasite incidence, blood slide examination rates and slide positivity rates for detected cases. Entomological investigations are conducted at the regional level, where monitoring for density, insecticide susceptibility and effectiveness of spray operations occurs.

Entomological parameters that are periodically reviewed at regional and national levels are morning indoor handcatches, outdoor resting collection, night biting collection and animal-

baited net trap collection. The type of entomological surveillance activity and the response to the various indicators are based on factors including season, local ecology, and density and behavior of vectors.

Entomological data are generated and utilized at the regional level of the NMEO organizational structure. This is expected to continue as control activities are integrated into the public health system. Human disease data, currently indicated by the presence of blood parasites, are generated at the village level, where case management is initiated and indicators of malaria foci originate.

Other communicable disease data are reportedly sent directly from districts to the appropriate MOH division, where data are further aggregated and reported to the Division of Planning and Evaluation. Data are only utilized at this level to measure target achievement.

3.4.3. Automated data storage and analysis

Efforts to provide the NMEO with an automated capability to quickly detect and rapidly respond to malaria outbreaks began in 1988. Computers have been installed in three key locations in the Eastern and Central Regions. Databases have been created to accommodate parasite and vector data. The system's lack of effectiveness to date may be attributed to several factors, the most important of which is inadequate training of computer users and the absence of local trouble shooters for software problems that have occurred. Full time assignment of at least one person per locality to manage data entry and tabulated retrieval has not been possible under the current staffing pattern in these three locations.

Computers exist in various other MOH regional and national offices, but full-time employees assigned to data management and analysis are reportedly rare.

4. Recommendations

4.1 Further strengthening of the automated capabilities of the NMEO Malaria Information System

4.1.1 Staffing Pattern

To assure effective utilization of a computerized information system, it is essential to have at least one staff member at each site whose primary responsibility is data management. As NMEO's functions are integrated into the MOH, it is recommended that consideration be given to establishing positions within the new division for a data management specialist in Kathmandu and one person in each region to serve as regional data management specialists. The officer assigned to Kathmandu should be responsible for the analysis of national data and supervision of regional information systems.

4.1.2 Training

The most serious impediment to optimal management of the current NMEO information system is the minimal training provided staff assigned data entry and retrieval responsibilities. The following courses are recommended for existing or additional staff:

Three-week course

A three-week course covering an introduction to the computer, Lotus 123, Dbase III Plus and the malaria database application should be attended by two staff members from the Eastern Region, one staff member from the Central Region and two from the NMEO headquarters. This course should be offered in August/September 1990 and repeated in May/April 1991 for two staff members from the Western Region. Basic training needs should be supplemented by regular visits to regions by the person in the recommended position of data management specialist described in 4.1.1.

Three-month course

The officer assigned responsibility for the information system at the national level should be provided an intensive course in computer science. USAID/Kathmandu has in the past reserved two seats in a similar course for NMEO staff. This type of intensive training is most appropriate for staff assigned to full-time data management specialist positions.

4.1.3 Malaria Regional Training Center at Hetauda

The curriculum used by the NMEO Training Center at Hetauda should be critically reviewed with assistance from the VBC ID/HRD Specialist. Augmentation of the current syllabus to include computer-based training in epidemiologic and entomologic operations is strongly recommended.

4.1.4 Expansion of the computerized malaria information system

After members of the Western Regional staff have received training, it is recommended that a computer be installed at the regional malaria headquarters in Bhairahawa. Software problem-solving and supervision of trained staff members should be regularly provided by the national headquarters specialist.

Further expansion into the Mid and Far Western Regions should be considered when current capabilities have advanced to more effective levels of operation.

4.1.5 Hardware and software

As transformation of NMEO from a vertical program to an MOH division occurs, installation of a computer in the Western Region and a second computer to relieve the burden on the single machine in NMEO national headquarters may considerably enhance control program integration. Their purchase is recommended.

4.1.6 Existing database additions

Also recommended for serious consideration is the capture of unconfirmed cases of malaria in persons from whom blood is not obtained during VHW household visits. Detection of clinically suspected malaria by applying clearly defined criteria for differentiating malaria from other diseases would substantially enhance the existing disease surveillance system.

Five variables should be added to data collection forms for entry into the malaria information system data file containing patient information:

- occupation of head of household
- an index-derived severity score
- duration of illness
- response to treatment
- outcome of illness

Inclusion of these data would strengthen surveillance of drug-resistant malaria and would provide the additional information with which to further analyze the impact of malaria on various population parameters.

4.2. Development of an Integrated Information system

4.2.1. Vector-borne diseases

Should the NMEO vertical organizational structure be transferred to divisional status within the MOH as expected, the NMEO's responsibility for malaria control activities and control of vectors that transmit other vector-borne diseases will continue. The control of human disease caused by the vectors of JE, leishmaniasis and filariasis, however, will remain the responsibility of the Public Health Division of the MOH and the hospitals to which patients with these diseases are referred for treatment.

At present, suspected cases of these three diseases are not recorded at the health post level of the system. Laboratory confirmation at hospital facilities or the National Central Health Laboratory may or may not be reported to the District Public Health Office. Thus, the prevalence of these diseases is unknown.

The establishment of case definitions that would enable health post staff, VHWs and CHVs to identify suspected cases for immediate referral, record those cases and track them for treatment outcome, and incorporation of such definitions into training curricula would provide a form of surveillance that would be very useful to District Public Health Officers and the proposed Division of Malaria and Vector Control.

These data could be entered into separate disease files of the malaria databases currently maintained in the existing NMEO automated information system, which will be an integral part of the proposed division.

4.2.2. Other diseases

As the horizontal integration of all vertical health programs into a national services delivery system occurs in Nepal, there will be a critical need for expert and unified management of surveillance and preventive and curative services information. A coordinating unit that uses a single coding dictionary and an interrelational system including health-related databases that can meet different needs at varying levels of the health care system will be required to manage information of such magnitude. A Field Health Services Information System (FHSIS) model has recently been initiated as a first step in the restructuring of the health information system in the Philippines². Its application in Nepal, however, will require the active participation of cabinet-level policy makers and the commitment of MOH administrators and program managers to implementing a dramatically different system of information management.

Given the present framework and the fact that districts do not have computers to facilitate examination of disease data for planning and intervention, multi-disease data would have to be transmitted to regional levels, where NMEO computers exist. This would place too great a burden on both district and regional staff for the time being. Specific recommendations for restructuring the current information system must await the outcome of governmental and MOH reorganization that is presently occurring.

Appendix A

Itinerary

- March 21** **Arrival**
- Briefing with Dr. D. Calder, Chief, HPN, Mr. D. Piet, Health Development and Population officer, and Mr. S. P. Pradhan, Program Specialist.
- Revision of agenda.
- March 22** **Briefing with Mr. J. P. Shrestha, Acting Chief, NMEO, and Dr. M.K. Banerjee, MOH Medical Officer, assigned to NMEO as program epidemiologist.**
- Meeting with Dr. M.B. Parajuli, Chief Epidemiologist, Division of Epidemiology, MOH.
- Meeting with Dr. S.L. Shrestha, Division of Epidemiology, MOH, and Dr. R. P. Lane, London School of Tropical Medicine and Hygiene.
- March 23** **Meeting with Mr. S. P. Pradhan.**
- Meeting with Dr. D. Piet.
- Meeting with Mr. A. Shrestha, Deputy Director, New ERA.
- March 24** **Travel to Biratnagar, Morang District, Eastern Region by air, accompanied by Mr. S. P. Pradhan.**
- Meeting with Mr. J. D. Shrestha, District Public Health Officer, and senior staff member.
- March 25** **Visit to rural health post and to several villages in Morang District served by the health post-based VHW.**
- March 26** **Visit to community-supported and managed sub-health post and to a second remote rural health post in Morang District.**

- March 27** Travel by USAID vehicle to health post in Central Region.
- Travel to Central Regional Public Health Training Center and meeting with Mr. Bajracharya, Director.
- Travel to Hetauda.
- March 28** Visit to Hetauda NMEO Training Center and meeting with Mr. S.N. Jha, Acting Chief.
- Visit to Regional Malaria Office, Hetauda.
- Travel to Bhairahawa Regional Malaria Office with brief stop at district public health Office in Chitwan District.
- March 29** Travel by USAID vehicle to Pokhara, Western Region.
- March 30** Meeting with Dr. B. L. Shrestha, Regional Director, Western Region.
- Visit to health post in Shishuwa, Kaski District accompanied by Dr. Shrestha.
- March 31** Travel by air to Kathmandu. Report preparation.
- April 1** Report preparation
- April 2** Meeting with Mr. J. P. Shrestha, NMEO.
- Meeting with Dr. D. N. Regmi, Additional Secretary, MOH Technical Branch.
- Meeting with Dr. J. M. Tuladhar, Demographer and Division Chief of FP Section of MOH.
- Meeting with Mr. C. Tamangdeng, Acting WR/WHO, cancelled due to public demonstrations.
- April 3** Briefing with Dr. Calder and Mr. Piet cancelled.
- Report preparation.
- April 4** Dr. Sullivan's departure from Kathmandu.
- April 4** Dr. Silverman continues working at NMEO HQ.

- April 5** Continued system development at NMEO HQ.
- April 6-8** Demonstrations and curfews.
- April 9** Meetings at USAID and NMEO.
- April 10** Debriefing NMEO and USAID.
- April 11** Dr. Silverman departs Kathmandu.

-
- ¹ Country Health Profile HMG of Nepal Ministry of Health and the World Health Organization, Policy, Planning, Monitoring and Supervision Division, June 1988.
- ² Robey, J.M. & Lee, S.H. Information System Development in Support of National Health Programme Monitoring and Evaluation: The Case of the Philippines. World Health Statistics Quarter.43 (1990).