



**Activity Report 131**

The Evolution of a Pilot Strategy  
to Improve the Management of  
Kala-Azar and Malaria in Nepal  
A Review of EHP Support to the  
Ministry of Health

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# Contents

Acronyms .....	v
Executive Summary .....	vii
1. Overview of vector-borne diseases in Nepal .....	1
2. The context of the review .....	3
3. Activities contributing to the development of the pilot intervention strategies.....	7
4. The ‘whiteboard sessions’ and intervention planning workshop.....	13
5. The special case of kala-azar .....	25
6. Implementing the pilot interventions for kala-azar: a short history.....	27
7. Measures of progress for the kala-azar pilot interventions.....	35
8. The different scope for Japanese encephalitis .....	49
9. Specialized activities for malaria .....	51
10. Synergy and interaction with other EHP objectives .....	53
11. Next steps, future directions, and recommendations .....	55
References.....	59



# Acronyms

AFRIMS	Armed Forces Research Institute for Medical Science
CARE	Cooperative for Assistance and Relief Everywhere, Inc.
CDC	U.S. Centers for Disease Control
CECI	Canadian Centre for International Studies and Cooperation
DHO	District Health Officer
DPHO	District Public Health Officer
EDCD	Epidemiology and Disease Control Division
EHP	Environmental Health Project
EWARS	Early Warning and Reporting System
FCHV	Female Health Volunteer
GIS	Geographic Information Systems
HMG	His Majesty's Government
HMIS	Health Management Information System
IMCI	Integrated Management of Childhood Illness
MOH	Ministry of Health
NFHP	Nepal Family Health Project
NGO	Nongovernmental Organization
NTAG	Nepal Technical Assistance Group
PHC	Primary Health Center
SAG	Sodium Antimony Gluconate
USAID	United States Agency for International Development
VBD	Vector Borne Disease
VBDRTC	Vector-borne Disease Research and Training Center
VDC	Village Development Councils
WHO	World Health Organization



# Executive Summary

The Environmental Health Project (EHP) was designed as part of the United States Agency for International Development's (USAID's) support to the government of Nepal for improving the management of vector-borne diseases. The project had specific objectives to address three reemergent vector-borne diseases that were posing an increasing threat to the population. These objectives were to build institutional capacity, strengthen surveillance activities, increase overall epidemiologic understanding, pilot interventions designed to improve control of the diseases, and establish cross-border cooperation in disease prevention and control. The project focused on malaria, Japanese encephalitis, and kala-azar.

The development of the pilot intervention strategy benefited from the work done on reaching the other objectives, specifically, improving laboratory diagnosis, strengthening understanding of these diseases among peripheral health workers, completing a comprehensive national baseline survey, and completing a number of operation research efforts.

Two linked events provided the mechanism for the development of the preliminary interventions strategy. First, the project team completed a technical brainstorming session (the whiteboard session) in which they reviewed all possible interventions, weighed these against a series of criteria, and enabled discussion on policy constraints and feasibility in the context of rural Nepal. Immediately following the whiteboard session, a national planning workshop was held to review the narrowed list of potential interventions and to gain consensus on a preliminary strategy. This session included technical experts, donors, senior government officials, and field health staff.

As a result of this process, the intervention strategy focused on the following activities, primarily directed toward kala-azar:

- Identification of high-risk villages
- Promotion of care seeking and prevention in target Village Development Councils (VDCs)
- Motivation and support for suspected cases
- Strengthening of referrals and follow-up
- Improvement in diagnosis and treatment at peripheral facilities
- Improvement in district surveillance and reporting

Activities were implemented through contracts with nongovernmental organizations (NGOs) and later through direct oversight. Field staff were hired to work with district health staff and provide support to peripheral health facilities and to female community health volunteers (FCHVs) who were trained in community-based case identification and referral. Following some delays, the project was able to establish a

significantly different approach to the identification and management of kala-azar in two pilot districts and to strengthen the approach to malaria control in a third district. The data from the project are not yet mature. It is clear, however, from a review of existing reports and the quantitative and qualitative information available that the project has significantly altered the government's previous approach to managing kala-azar, with results suggesting that more cases are being identified and better managed.

The behavior change and communication materials developed for the project have succeeded in building awareness and understanding of the management of kala-azar. These materials have been applied in the pilot districts and in other districts during Kala-azar Week—a cross-border initiative consisting of week-long activities designed to create awareness of the disease. Evaluation of the impact of Kala-azar Week suggests that the materials used were well received and understood, and affected the public's awareness and understanding of the disease. These materials are now available as well-tested resources that the government can consider for use in other districts.

The use of FCHVs as community agents to assist with case identification, support patients in the referral process, and follow up with treated patients has been very successful. As with other programs using FCHVs for well-defined tangible interventions, the project has given patients and their communities confidence in the management of kala-azar. FCHVs have been shown to register patients properly, and they consistently follow up on all cases identified. The referral slip system developed by the project team has been successful in facilitating patient care at health facilities, although it has not been as useful in tracking patients. The qualitative interviews with patients, FCHVs, community members, and health facility staff all suggest that this community-based approach has improved case identification and management. FCHV involvement with malaria, particularly with slide collection, needs further review.

Building the capacity for provision of care at peripheral facilities has also had a significant impact on case management. Although diagnosis and treatment at the Primary Health Center (PHC) level, with follow-up at health posts and subhealth posts, has been accepted government policy, this policy was not followed in practice. With the project's support, these services were strengthened. As a result, many cases have been managed at the PHC, with preliminary information suggesting increased patient satisfaction and good compliance and follow-up.

The additional information provided by the project through monitoring activities continues to suggest strong clustering of kala-azar, and this raises the possibility that interventions can be focused in high-risk VDCs. The project's monitoring system needs to be strengthened to allow it to more effectively track patients from referral to treatment and follow-up and to increase understanding of how new cases evolve. Data will need to mature before one can determine the effect this has had on transmission and longer term prevalence.

# 1. Overview of vector-borne diseases in Nepal

Vector-borne diseases have figured prominently in Nepal's history and are likely to have affected the sparse population living in the Terai lowlands before 1950. Although infant and child mortality remains a major health concern, the spread of vector-borne diseases appears to be increasing in Asia, posing a growing threat to the most populous area of Nepal.

Malaria once affected the entire Terai, which was sparsely populated. Today it is the most agriculturally productive part of the country and contains the majority of Nepal's population. The earliest study in 1925 showed that a large proportion of the children suffered from spleen enlargement, and in a population of 5 million, an estimated 2 million cases of malaria were reported. The earliest program to address malaria began in 1950 and rapidly expanded into the Nepal Malaria Eradication Program as part of the global eradication effort, with a focus primarily on spraying. The program reduced malaria significantly in the Terai, and contributed to the rapid population increase. The program failed to eradicate malaria, however, and therefore changed its focus on spraying to a more active program of case detection and treatment. By 1986 the program was administered through primary health care (rather than a vertical program) and focused almost entirely on prevention of mortality, control of epidemics, and containment of *p. falciparum*. In 1993 the residual vertical Malaria Control Division was dissolved, and activities are now carried out under the Epidemiology and Disease Control Division (EDCD), Disease Control Section. The government's current approach to malaria is to improve case management, identify epidemic situations, and reduce the evolution of falciparum malaria.

Kala-azar has also likely been present in the Terai for some time. Minimal recorded information exists before the 1980s, although it is believed that there was a significant decline in cases related to the malaria spraying effort from 1950-1970. Hospital records available since 1980 demonstrate a gradual rise in the number of reported cases of kala-azar. These figures are believed to be significant underestimations of the prevalence of the disease, since many cases go unreported or receive treatment from other sources. There has been no vertical program for kala-azar, and efforts have relied on passive case detection, with hospitals treating cases using either sodium antimony gluconate (SAG) or fungizone. In 1992, a program for indoor residual insecticide spraying was initiated, but it has not been widely implemented. The current Ministry of Health (MOH) approach is to continue with passive case detection while ensuring free medication in hospitals.

Japanese encephalitis also continues to affect the Terai population, but has a shorter history in Nepal. Early reports document the presence of Japanese encephalitis in Sri Lanka and India in the late 1940s and in Nepal by 1975. The disease is known to be expanding in Asia, with major epidemics in Japan in the 1960s, and an increasing number of sporadic outbreaks in different districts in Nepal. Hospital records of “viral encephalitis” (without lab confirmation for Japanese encephalitis) suggest a gradual increase in cases since 1978 with a decline in case fatality. The disease remains highly seasonal, with cases peaking in September following the rainy season. Currently, 24 districts are endemic, with an estimated 11.5 million at risk, and 2,000–3,000 cases documented each year. The government is currently monitoring Japanese encephalitis but is considering implementing a limited vaccine program.

Other vector-borne diseases are present in Nepal, including some dengue and lymphatic filariasis. Recently, Nepal began a program for elimination of lymphatic filariasis in accordance with the global effort. The program began in Parsa district with mass drug administration (diethylcarbamazine and albendazole), achieving over 80% coverage. Recent mapping suggests that lymphatic filariasis is endemic in at least 34 districts.

It was into this vector-borne disease climate that the Environmental Health Project (EHP) was introduced.

## 2. The context of the review

This review is one of several that focuses on each of the five key objectives for EHP. The review of this component of the project should be seen in the context of the broader EHP, which addressed many aspects of the vector-borne disease situation in Nepal, as stated in the midterm review:

“USAID/Nepal, in conjunction with HMG/Ministry of Health, launched a program in 1998 to strengthen capacity and to prevent and control selected infectious diseases of Nepal. One component addresses the issue of re-emergent vector-borne diseases—malaria, kala-azar and Japanese encephalitis—and is carried out by the Environmental Health Project. The goals of this component are to strengthen the Vector-borne Disease Research and Training Center (VBDRTC) in Hetauda as a national institution and enhance the capacity of the Ministry of Health/Nepal for vector-borne disease surveillance, reporting, response and control.” (EHP Midterm Review 2001)

This general support for addressing three vector-borne diseases is further refined by the explicit objectives for the project, defined at the outset. These objectives are outlined in the diagram in Figure 1.

# USAID / Nepal

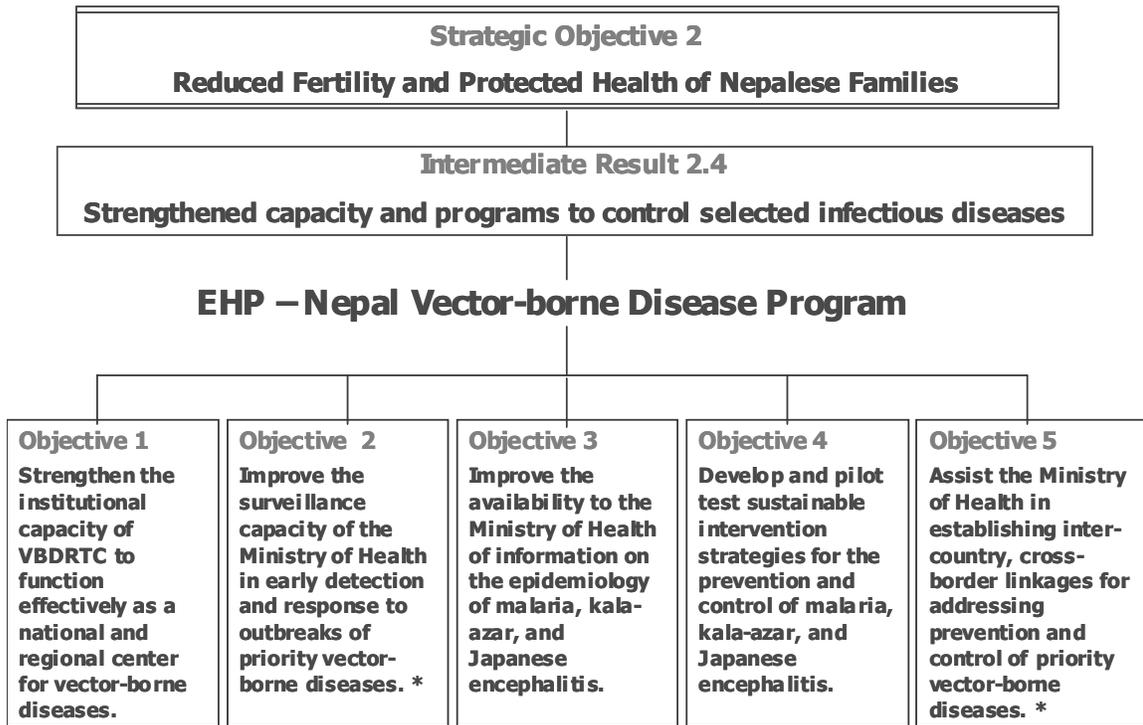


Figure 1

The program focused on malaria, kala-azar, and Japanese encephalitis because the MOH was concerned that these three diseases were “emerging,” or expanding their territory, and thus posing an increasing threat to the population. Evidence for this “emergence” included regional reports and increases in hospital-based case reporting. Despite the fact that available data from Nepal may not be complete or of high quality, the government determined that these three diseases should be the current focus of its vector-borne disease effort. Although the government recently established a program to address filariasis, this disease was not included in the mandate for EHP.

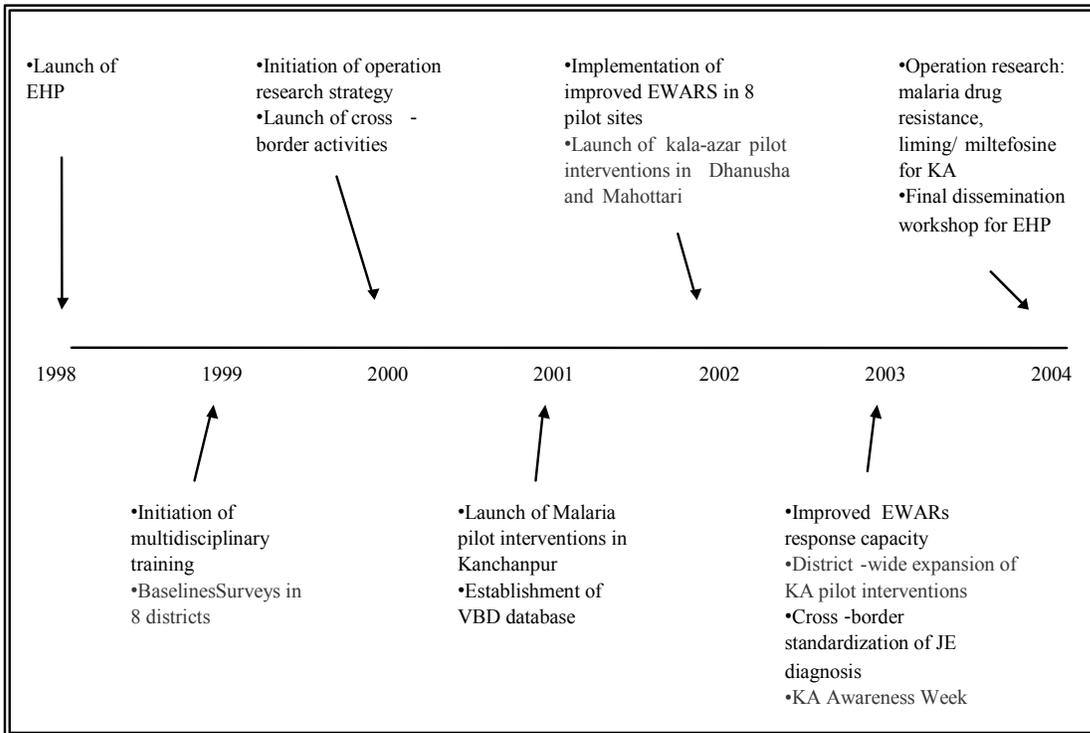


Figure 2

EHP has accomplished a great deal, and has produced a wide variety of documents pertaining to the different objectives. A bibliography listing all the reports, proceedings, and papers EHP has produced is available, along with a CD-ROM that not only presents the full program, but archives the critical documents. The project will update the CD-ROM to ensure a full record of project activities.

While the main purpose of this report is to review Objective #4—develop pilot intervention strategies designed to prevent and improve control of the diseases—it is important to do this in the context of other activities and their progress. The abbreviated timeline shown in Figure 2 highlights the progression of program activities for all objectives.

Finally, this project was implemented as one of several efforts trying to improve the vector-borne disease situation in Nepal. The government has adopted the World Health Organization’s (WHO) Roll Back Malaria concept, and is incorporating elements of that program into the existing national strategy. The government, in cooperation with several universities, is reviewing drug resistance and appropriate use of drugs, including drugs for malaria and kala-azar treatment. EHP has assisted with this effort along with other partners. Various nongovernmental organizations (NGOs) include vector-borne disease activities as part of their more focused programs in different districts. This has included mainly malaria activities, and has involved community-based health workers including female community health volunteers (FCHVs) as a means of increasing awareness and appropriate care seeking. Other partners, including the U.S. Centers for Disease Control (CDC) and the Armed Forces

Research Institute for Medical Science (AFRIMS) in Thailand, have assisted with laboratory capacity building, outbreak investigation/response, and operation research.

### 3. Activities contributing to the development of the pilot intervention strategies

The other four EHP objectives contributed significantly to the development of the intervention strategies. When combined, the activities of the EHP both strengthened capacity and provided much epidemiologic information about these vector-borne diseases. Drawing from this experience, the project was in an excellent position to explore ways to change the existing approach to case management, pilot interventions that could broaden the approach, improve both preventive and curative services, and begin trying to limit transmission. The intervention strategy was designed to test a selection of strategies and thus provide the MOH with further information with which to improve the national program.

It is important to note that the EHP was not designed as a program to launch large-scale interventions against these diseases, measuring success as reduction in incidence and mortality. Four of the five objectives focus on improving the understanding of the three diseases, improving the ability to train in elements of disease identification and management, improving surveillance and understanding of the epidemiology of each disease, and assessing issues pertaining to transmission across borders. The intervention component was only one of the five components, and focused on piloting new approaches, with an emphasis on kala-azar.

In addition, none of these diseases presents simple intervention solutions. Despite more than two decades of the government's massive vertical program directed toward the eradication of malaria, the disease persists. Drug resistance is growing, with an increasing number of falciparum foci. Japanese encephalitis has no curative treatment, and the government currently has no policy for a population-based immunization program. Kala-azar causes immense hardship for families, but it takes time to diagnose the disease, and it can only be cured with injectable or intravenous facility-based therapy of long duration. There are no clear and immediate solutions for any of these diseases.

Furthermore, despite years of scientific research on each of these diseases, many of the diseases' programmatic aspects remain unclear, particularly in the context of life in Nepal. For example, in a village of mud and brick houses where residents live in close proximity to livestock and use livestock dung for fertilizer, understanding the

patterns of vector breeding and their interaction with the human population is difficult. Thus many logical potential approaches for prevention remain unproven.

### 3.1. Pre-pilot strategy activities

Prior to formulating interventions to pilot, the project completed a number of activities that directly contributed to the evolution of the intervention strategy. These activities fall roughly into several categories, as follows:

- Review baseline epidemiologic information, including completion of baseline surveys, review existing surveillance and disease reporting, and review cross-border issues
- Review the MOH vector-borne disease strategy and exploration of policy constraints
- Assess laboratory capacity and other human resources for vector-borne disease control
- Review recent operation research studies and completion of additional focused research
- Review existing behavior change efforts and development of improved methods

### 3.2. Epidemiology and surveillance

Project objectives #2 and #3 address the issue of surveillance and epidemiologic review, and are not covered in depth in this report. However, the project did complete a national “baseline” survey designed to provide comprehensive current information on perceptions, behaviors, and environmental factors related to malaria, kala-azar, and Japanese encephalitis, and helped build capacity for use of geographic information systems (GIS) in health programs.

The survey included three components: a household-based questionnaire, a vector assessment, and a serologic investigation—the latter was done in a subsample from the same sampling areas. The questionnaire provided good information on awareness, and allowed comparison across ecoregions for each disease as well as stratification across a variety of socioeconomic and other variables. The vector and serologic studies were limited by sample size constraints and did not provide adequate positives to enable linking of positives with the household questionnaire data.

Survey results were helpful in designing the interventions, and provided national data on the degree of awareness about aspects of the diseases and on perceptions about prevention and treatment. Relevant results are summarized in a subsequent section describing the intervention-planning workshop.

### 3.3. Policy

Intervention planning was done in the context of the MOH infectious disease policy evolution. This affected the pilot intervention planning in several ways:

- There was no immunization policy for Japanese encephalitis, and thus no specific intervention for prevention. Although some immunization was conducted following donation of antigen, discussions concerning the future MOH policy on immunization are ongoing.
- Spraying for both malaria and kala-azar, although government policy, was incompletely implemented and was affected significantly by local politics, insecticide cost and availability, and limitations in district staff—all of which were beyond the control of the EHP.
- Bednet use for malaria is being promoted, along with insecticide-treated nets. However, this program has suffered from difficulty with availability of treated nets, difficulties with re-treatment of nets, and limited use of treated nets. In addition, at the time of intervention planning, USAID had limited interest in becoming involved with supplying treated bednets, thus limiting inclusion of this intervention in the pilot strategy.
- Policy for kala-azar diagnosis treatment was well established, with clear protocols. Government policy permitted treatment with the first line drug, SAG, and diagnosis with K39 at the primary health center (PHC) level. However, most treatment was being done only at hospitals, and physicians exercised their judgment on both the clinical diagnosis (favoring bone marrow and aldehyde tests over K39 serology) and the treatment (favoring fungizone over SAG because of concerns about resistance and compliance). Although oral treatment (miltefosine) is being tested, it was not approved even for pilot use at the time of intervention planning. Thus at a practical level, there were significant constraints to altering an existing system at the district level for diagnosis and treatment of kala-azar at district and zonal hospitals.
- Data available on these diseases are primarily from the VBDRTC Annual Assessment Report and the health management information system (HMIS)—the latter includes hospital-reported cases and cases reported at peripheral facilities (which do not have diagnostic capacity and therefore report only suspected cases). The HMIS has a well-established set of diseases and protocols for reporting, and is difficult to change. In addition, data quality varies, resulting in the potential for significant underreporting. The project assisted with strengthening the Early Warning and Reporting System (EWARS), and developed data collection systems to demonstrate results of the pilot interventions. Yet beyond these data systems, the project did not have the capacity or mandate to establish alternative national surveillance methods.

### 3.4. Laboratory and other human resource capacity

The project specifically addressed issues of laboratory capacity in addition to training of district health staff on key issues for vector-borne diseases. Much of this effort was done through the VBDTRC and the project's explicit goal of strengthening this institution. Partnerships were developed with other institutions, and experts were brought in from CDC, AFRIMS, the National Institutes of Health in Thailand, and different universities to assist with strengthening the capacity of both the institution and district staff.

Laboratory training was done to assist staff with serologic assessment of Japanese encephalitis, thus increasing their ability to confirm suspected cases. Vector studies were done to assess vector susceptibility to different insecticides and vector bionomics, and to strengthen diagnostic capacity. Training in the use of the falciparum dipstick and K39 tests were completed, and a procurement and tracking system was established to ensure K39 test availability at peripheral facilities.

### 3.5. Operation research

The project carried out a number of small operation research efforts, and several of these had direct bearing on intervention planning. Additional research topics were derived from the discussions during the intervention planning, and are either proposed or being carried out by the project. Among other research efforts, the following were particularly relevant to pilot intervention planning:

- Kala-azar economic impact review
- Ecology of Japanese encephalitis in the Kathmandu Valley
- Biting rhythm and insecticide susceptibility in sand flies
- Kala-azar diagnostics and treatment failure review
- Kala-azar vector-breeding study

Several other operation research efforts were initiated following the intervention planning, specifically to address the need to clarify the potential for community-based preventive measures, such as liming to reduce vector density.

### 3.6. Behavior change and communication

An important component of most interventions is the awareness building component, which is usually directed toward specific target groups and specific behavior change, and often termed the behavior change and communication, or BCC, component. EHP was involved in both the assessment and strengthening of this component for kala-

azar and malaria (as well as in contributing to the successful initiation of the Nepal filariasis effort through support for this component). While the pilot interventions included a significant BCC component (see below), health education activities were included in VBDTRC activities and in various training activities.

The project successfully developed and tested the following:

- Radio messages for kala-azar, in local language
- Street drama scripts promoting improved case detection and management
- Songs with kala-azar messages and community miking
- Posters, wall paintings, display boards, leaflets, and flip charts for kala-azar

These BCC materials were used throughout the project. In addition, they were used extensively during a coordinated Kala-azar Week designed in collaboration with health facilities in adjacent districts in India as part of a cross-border initiative. The activities that took place during Kala-azar Week were professionally evaluated to determine their impact on perceptions among the target population.

The evaluation was designed to be representative of the target area and was based on questionnaires administered at the household level and within health units. Data were collected from village development councils (VDCs) within the target districts (Dhanusha and Mahottari) and from the adjacent district (Jhapa) where EHP activities were not taking place (although there was cross-over for mass media, particularly radio). Stratification was possible by age, gender, and socioeconomic status, and by awareness of Kala-azar Week.

The results are summarized in a comprehensive report (Assessing Influence of KA Week Activities in 7 Districts, Bhattacharaya, Palash, Environmental Health Project, January 2004). Highlights of the report include the following:

- Awareness of kala-azar was higher in campaign areas, where the population had a better understanding of symptoms and available treatment
- Radio was the most important information source, although in project areas a FCHV cartoon was also widely cited.
- Mention of family members or neighbors with kala-azar was much higher in project districts, perhaps reflecting sensitization to this disease from other project activities, including the work of the FCHV. In project districts family members and neighbors were important sources of awareness, while this was not true for the control district.
- The project activities and Kala-azar Week increased the understanding of the availability of free medicine for kala-azar.



## 4. The 'whiteboard sessions' and intervention planning workshop

A sentinel event in the planning process for the pilot interventions was an intensive series of brainstorming sessions followed by a workshop involving government planners and a variety of experts in vector-borne disease. These sessions provided a process to review the possible interventions that EHP might pilot, ruling out those that were either not feasible, not based on proven results, or outside the policy considerations of the ministry. The progression of planning activities that occurred in April/May 2001 are shown in Figure 3.

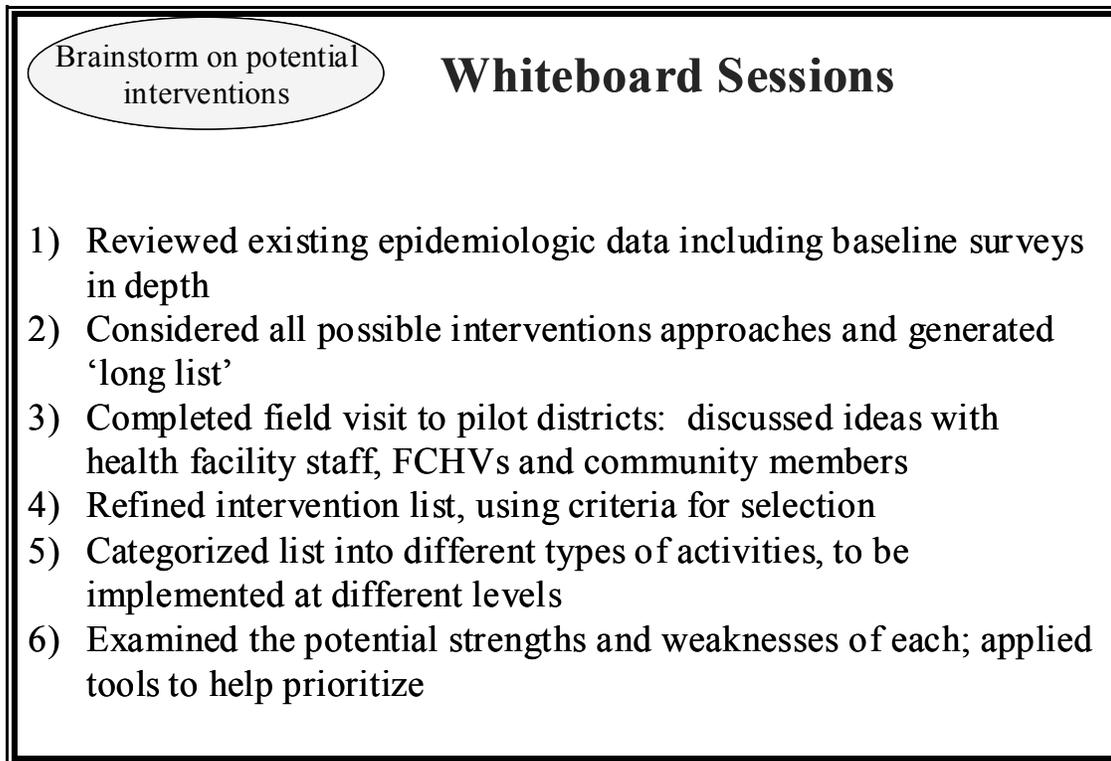


Figure 3

The whiteboard sessions reviewed a long list of interventions, taking into consideration a number of potential selection criteria. The criteria were important, since there were some interventions that might have been logical under different circumstances (i.e., a different policy environment), and superficial review of the EHP choices might second-guess the choices made. The following criteria were applied, and relate to earlier discussion in this section:

## **Criteria for Considering an Intervention**

- Are there data to support the intervention?
- Does the intervention fit within the 3 year scope of the project?
- Can the existing health system support the intervention?
- Is it possible to measure the effect of the intervention?
- Is the intervention acceptable to the community?
- Is the intervention affordable, with potential for being sustained?

Figure 4

From this process, a refined list was generated and then used as the starting point for further discussions during the intervention workshop. The workshop involved didactic discussion, which included a review of the baseline survey, presentation of the process of generating the initial intervention list, and consideration of tools to be used in finalizing the list. Once a final list was generated, further discussion ensued on the following:

- Policy implications for the interventions chosen
- Specifics of implementation by a partnership between an NGO and the government
- Details of support from EHP for the pilot intervention implementation

The final pilot intervention list included the activities presented in Figure 5.

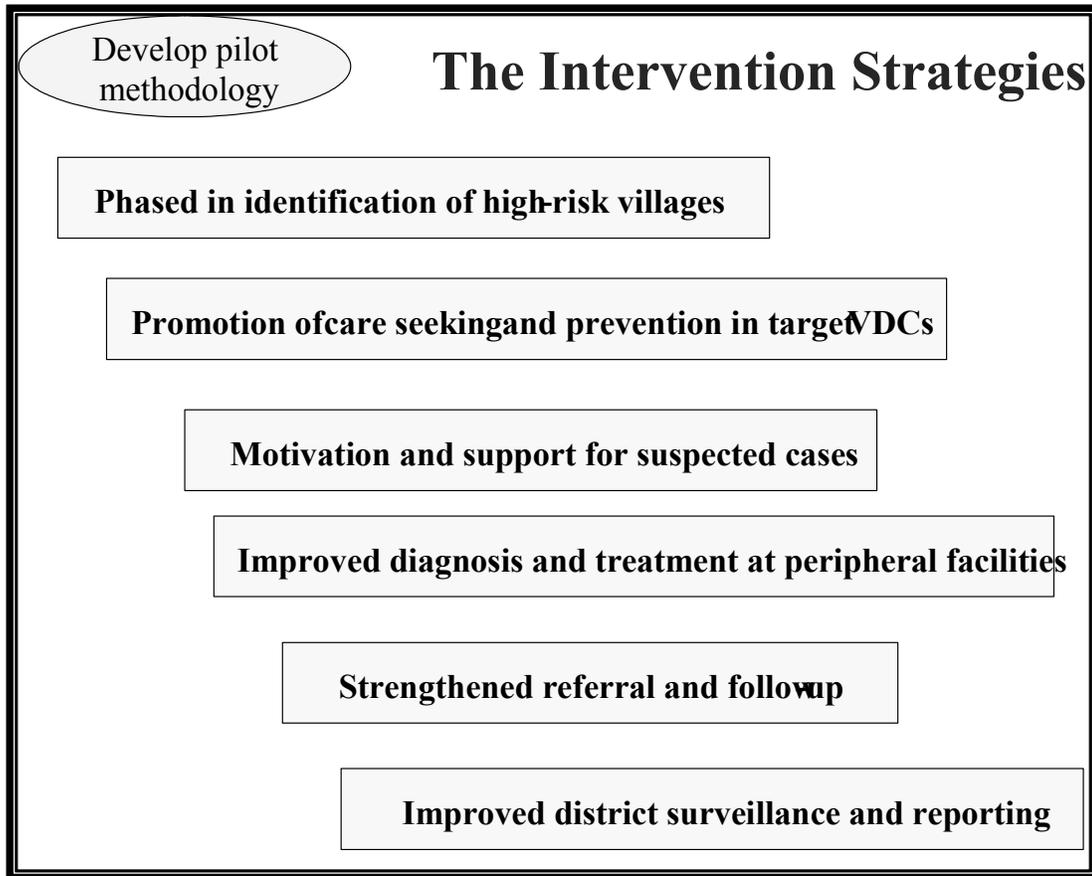


Figure 5

It is important to note that each of these intervention strategies resulted from much discussion and had a specific rationale for inclusion. Furthermore, there were specific reasons for not including other interventions that may have seemed reasonable choices.

The intervention list was applied primarily to kala-azar in two endemic districts (Dhanusha and Mahottari), which were chosen because they had treatment facilities, a high reported endemicity, and an established working relationship with health facility staff. The intervention concepts also apply to Japanese encephalitis and malaria, and pilot interventions for these diseases are covered briefly in the following sections.

The discussion that follows pertains primarily to the kala-azar pilot in Dhanusha and Mahottari.

### ***Identification of high-risk villages***

Existing information from EDCD reports, hospital case reporting, smaller research studies, and reports from other endemic countries suggests that cases of kala-azar tend to be concentrated or clustered in some villages within a geographic area. However, a thorough review of clustering in Nepal had not been done.

This issue is of particular importance because of the limited resources available for kala-azar and the need for pilot interventions to be sustainable. Provision of adequate diagnosis and treatment for kala-azar requires some attention to the logistic supply of drugs and diagnostics. Since the drugs themselves are provided free, government resources are necessarily focused in areas with highest endemicity. The rationale for exploring this clustering of cases was to be able to do the following:

- Provide more definitive data with which to determine the degree of clustering of cases
- Provide recommendations for the use of these data on geographic distribution of cases to direct interventions
- Determine the most efficient methods to identify high-risk villages, including the potential use of FCHVs
- Provide the MOH with a strategy to more efficiently direct limited resources

This intervention was initially planned to explore several methods to assess concentration of kala-azar in selected VDCs. First, the project team planned to thoroughly review hospital and health facility records to map the location of past cases. Second, the team would follow new cases to monitor their location in relation to expected high-risk areas. Third, the hypothesis that FCHVs would be familiar with kala-azar in wards where cases existed would be tested against known cases. If this hypothesis proved correct, districts could use FCHV awareness as an additional data source to identify high-risk wards and VDCs.

The main potential obstacle for this intervention was the inability of the project team to identify all cases, particularly in VDCs that were not targeted. Since the initial approach was to target interventions in only 18 VDCs, there was some chance that cases (clustered or not) could exist in other VDCs that would not be recognized. Furthermore, the extent to which patients sought care through private practitioners or other means, or sought care in India was unknown, and without enumerating these cases, the exact extent of clustering could not be determined.

The expected outcome from this intervention was a more thorough understanding of the degree of clustering of kala-azar cases, and thus clearer recommendations for the government on how best to direct resources against this disease. Ideally, the existing HMIS data coupled with information from FCHVs would be adequate in other districts to identify those VDCs in which the remaining interventions should be implemented.

***Promotion of care seeking and prevention in target VDCs; Motivation and support for suspected cases; Strengthened referral and follow-up***

These three interventions can be discussed together, as they primarily involve expansion of case detection and management to the community level.

Very little information was available in Nepal on care-seeking practices for kala-azar. In addition, not much had been done to increase awareness of the disease, further

knowledge of available treatment, provide motivation to seek care, or improve constraints to seeking and completing recommended treatment regimens. Case management appeared to be in a “steady state” with hospitals providing diagnosis and treatment for patients seeking care. Little was known, other than anecdotal evidence and the qualitative case studies done by EHP, about constraints to seeking care, the lag time from identifying symptoms to initiating adequate care, or possible ways to improve these behaviors.

Interventions directed toward improving case management are particularly important because earlier and improved treatment may reduce the overall impact of the disease on both the patient and the family, and such improvement may reduce the potential reservoir within the community that allows continued transmission. Recent meetings within WHO have suggested that this approach may be critical in efforts to eliminate the disease.

The rationale for this community-based approach related specifically to past experience with community-based work with FCHVs in Nepal, and to the issue of reducing the potential transmission exposure of communities by improving case detection and treatment. Specifically, the rationale for this approach was to do the following:

- Improve case management by reducing inappropriate care, facilitating appropriate care, reducing noncompliance or failure to complete treatment, improving case follow-up, and improving peripheral diagnosis and care at PHCs with continuation of treatment at subhealth posts
- Capitalize on the existence and proven track record of FCHVs as community mobilizers and care providers
- Improve understanding of patient and care-provider attitudes toward current treatment recommendations, and increase community awareness and knowledge about kala-azar, including knowledge of symptoms, appropriate care, and transmission vectors as a means to improve case management
- Increase the number of cases identified and reduce the time taken for identification
- Reduce the overall contribution to transmission from existing cases in targeted communities

Anticipated activities related to this approach included reviewing current attitudes and practices; developing a BCC strategy to increase awareness and promote appropriate care-seeking behavior; involving the FCHVs in case detection, initial diagnosis, referral, and follow-up; and establishing community support mechanisms through working with mothers’ groups, village development committees, and other community groups. In addition, the project team would orient and support health facility staff to help improve referral services. These rather intensive activities were believed to be potentially sustainable on the basis that they would be directed toward high-risk communities and thus limited in scope.

This approach presented a number of potential obstacles. First, FCHVs might not be interested in or able to manage kala-azar patients. Currently there is no treatment that could be implemented at the community level, thus the role of the FCHV mainly involves referral and follow-up—activities that are less tangible than other successful FCHV interventions. Second, the data on time delays from diagnosis to treatment and on compliance are limited. Case studies suggest that patients usually seek several different treatments before they are correctly diagnosed, increasing the time delay before they receive adequate treatment. In addition, these studies suggest significant costs for these private or alternative treatments, and higher costs if treatment is sought in India. Furthermore, the studies suggest significant misperceptions about costs for care in Nepal. However, it is not clear whether these issues affect the majority of patients and whether they contribute significantly to time delays that would increase the transmission exposure of communities. In addition, the only way to determine if transmission has decreased is to see a decrease in incidence—something beyond the scope of the project to measure accurately. Finally, the prevalence of sub-clinical cases within communities and their contribution to disease transmission is not known.

The expected outcome from these activities was an increase in cases identified, referred, diagnosed, and treated completely. By improving this dimension of patient care, the number of patients serving as reservoirs of disease in communities should decrease, thus having the potential to reduce the number of infections in the future.

### ***Improved diagnosis and treatment at peripheral facilities***

The current treatment requires health facility care, and before this project, care was provided only at hospitals. Diagnosis was done by clinical assessment and either aldehyde or bone marrow diagnostic testing. Physicians tended to favor bone marrow as the definitive diagnosis. SAG was generally prescribed as the first line of treatment, followed by fungizone, though as mentioned earlier, physicians tended to use fungizone because they feared resistance and desired a more rapid successful treatment.

The limited information on patient perceptions about treatment suggested considerable variation, with treatment potentially sought both in India and through private practitioners and alternative sources of care. Costs for such treatment could be considerable and posed substantial problems for families. Although free medicine was offered at hospitals, there were additional costs for IV materials and other supplies that created misperceptions and resentment due to unmet expectations. There was no mechanism for tracking completion of treatment, particularly for SAG.

The rationale for addressing care at peripheral facilities was to accomplish the following:

- Improve adequate follow through on referral recommendations by strengthening the referral system, thus supporting the community-based activities
- Increase appropriate care-seeking behaviors by bringing services closer to communities, since distance to care and time required for treatment as well as

misperceptions about cost create a disincentive for patients to seek care at the hospital

- Reduce non-completion of SAG treatment by supporting service delivery at more distal facilities closer to communities (according to existing policy)
- Increase patient compliance with treatment recommendations by improving perceptions about cost and availability of treatment and by working with physicians to improve communication with patients regarding treatment decisions, thus improving patient confidence in care available to them

The project included activities that attempted to improve the overall system for provision of care. This was done by improving the link between hospital care and public health approaches, by improving patient perceptions about existing care, by working with physicians on treatment protocols and approaches to patients, and perhaps most importantly, by supporting expansion of provision of first line treatment at more peripheral facilities—namely the PHC.

There were a number of significant potential obstacles to this approach. First, physician care in hospitals was primarily dictated by clinical judgment, and thus policy approaches to change are not always accepted. Bone marrow assessment lacked quality control, and the aldehyde test was outdated. Strong perceptions about resistance persist, but there are no definitive data to confirm this impression. Technical provision of care is acceptable, and since most physicians carry a large patient load, changing patient counseling is also difficult.

Discussions on policy were required to gain full acceptance of bringing diagnosis and first line treatment to the PHC level and for continuation of SAG at health posts. Given the severity of the disease and the complexity of treatment, there was risk that policy change might be difficult, and if established, might be vulnerable to reversal.

Although kala-azar medicines are free, hospitals have variable charges for supplies related to treatment, and this poses a continuing obstacle to improving patient perceptions about free care.

The expected outcome from this set of interventions was to increase utilization of PHCs and health posts for first line diagnosis and treatment, and to provide FCHVs with a clear referral pattern that was easier for their patients. As these areas improve, completion of treatment should also improve throughout its process of implementation.

### ***Improved district surveillance and reporting***

The amount of information available on kala-azar cases is limited. The overall number of kala-azar patients in a given district for a given year is small. Currently, data sources used to determine the actual number of patients include the hospital register and any outpatient reporting of suspected cases—all aggregated and reported through the quarterly reporting system of the EDCD (and included ultimately in the HMIS report). The HMIS thus provides an annual estimation of cases and a trend

over time. Qualitative data suggest that some proportion of patients seek care outside the government system, including clinics in India, but the actual proportion is not known. Furthermore, anecdotal evidence suggests that some proportion of patients fail to complete treatment courses, though again, the proportion is not known.

Such data limitations pose several questions:

1. Is there significant underreporting of kala-azar in endemic districts?
2. If there is underreporting, is there any pattern to the cases not detected?
3. What proportion of cases receives inadequate care through use of private and foreign practitioners?
4. Can improvements in district case detection, management, and reporting provide a more accurate picture of kala-azar in the district?
5. Is there significant use of hospitals outside of the district, and should there be a better intra-district reporting system, including improved reporting on mortality?

The rationale for addressing case reporting and surveillance was to do the following:

- Attempt to confirm the cluster pattern of disease within districts (and thus confirm the ability to focus resources on high-risk VDCs)
- Clarify the situation regarding seeking care outside the existing system
- Provide additional information on patterns of treatment compliance
- Provide further data to help understand the degree of underreporting and thus improve overall district case detection and management
- Strengthen the link between hospital care and the public health system to improve surveillance and help capture cases within the private sector

The intervention to strengthen surveillance and reporting focused on increasing case detection at the community level and ensuring that these cases were registered and followed. In addition, the intervention included collecting additional data on cases seen at the PHC and through supervisory visits to help answer some of the above questions.

Although the HMIS is well established, there were significant obstacles to improving data collection systems. First, at the community level, although FCHVs are excellent at identifying cases, they are not accustomed to recording information so that it feeds easily into a data management system. Thus while it is likely that FCHVs could register patients, some other mechanism would need to be used to collect this information—a link traditionally weak in Nepal. Second, patients who choose to seek care from private physicians in Nepal or elsewhere remain outside any recording system. If these patients elect not to involve the FCHV at the community level, they

will remain outside the system. Determination of morbidity through surveys is difficult and costly because of the low prevalence of disease.

The expected outcome from this intervention was to capture a larger proportion of cases in the existing reporting system through community-based registering of detected cases. In addition, cases identified at the community level would be followed, providing additional data on compliance.

### ***Interventions not chosen***

Without the benefit of the extensive discussions during the whiteboard session and intervention workshop, it would be easy to question why certain interventions were not included. It is important here to describe the rationale for not including some of the more obvious possible interventions.

## **Bednets**

The baseline survey suggested that bednet use was actually quite high in the Terai and that most family members slept under a net. This does not imply that the nets used were of adequate quality, nor does it address the issue of treated bednets. Thus there was a logical opportunity to promote use of treated bednets.

There were two primary reasons why this intervention was not included as a major part of the project. First, other organizations were involved with promotion of treated bednets as an intervention for malaria, and USAID/Nepal was not interested in becoming a supplier of treated nets at the time of this project. Second, initial efforts with treated bednets in Nepal had mixed results because of the cost and need for re-treatment. When long lasting nets are introduced in Nepal, the re-treatment issue is likely to be resolved, but cost issues may remain. Promotion would thus need to include some mechanisms for cost recovery, which the project team believed would be better managed through a different mechanism. As part of the BCC effort, the project did include messages promoting bednet use, and initially it included some pilot exploration of small enterprise at the community level to promote treated nets. However, bednets were not considered a major intervention for the project.

## **Spraying**

Nepal has a legacy of insecticide spraying for malaria and has targeted kala-azar with some spraying. This logical intervention was not included for several reasons. First, the current situation with regard to spraying was not optimal. Resources for spraying have been chronically limited, creating an environment with the potential for dilution of insecticide (and selling the remaining), political determination of sites to spray, and idiosyncrasy in spraying schedules. Funds for travel, equipment maintenance, and spare parts are minimal; spraying equipment is used for agricultural purposes; and refresher training often does not happen. Furthermore, USAID was not interested in purchasing insecticide or becoming overly involved with spraying in Nepal.

The project did consider exploring highly targeted spraying for those villages identified as high risk for kala-azar. However, although this may appear to be a logical approach to improving the government's spraying program, the project team believed it was beyond the scope of the project to significantly change that system. The project did fund some operation research on insecticide resistance.

## **Household preventive measures**

Scientific studies have attempted to clarify household factors contributing to kala-azar transmission. These have included review of factors related to proximity to livestock, presence of breeding sites, avenues of vector entrance to households, and preventive measures that might reduce breeding and production of larvae. None of these studies has provided definitive evidence either of risk factors or of preventive measures proven to reduce transmission.

Furthermore, some of the factors likely to increase vector breeding and transmission are factors that may be extraordinarily difficult to change in Nepal. For example, economic and cultural factors may prevent changes in practices related to livestock management (and proximity to households) and the management of dung for fertilizer.

The project team did not choose to focus on any specific set of preventive measures for several reasons. First, it is beyond the scope of the project to perform controlled scientific studies on risk factors or on the efficacy of preventive measures. Second, the project team did not wish to promote preventive measure in the absence of definitive proof of efficacy. EHP did support some early case control work on risk factors in Nepal (through partnership with CDC), and completed some vector-breeding studies. Further operation research is proposed to study liming for larval control as a potentially promising preventive measure for Nepal.

## **Oral treatment**

Field trials of miltefosine are nearing completion, and there was some consideration of whether this intervention could help bring services closer to communities. However, until background work is complete and the MOH makes a policy decision regarding this intervention, it is not a possibility. An operation research protocol has been developed to explore use of miltefosine as an alternative treatment regimen.



## 5. The special case of kala-azar

In the course of the intervention planning sessions, it became clear that the main focus would be on kala-azar. The reasons for this were mainly related to the difficulty in defining clear community activities related to Japanese encephalitis and to defining new approaches to malaria that afforded EHP an opportunity not being addressed by other partners. Furthermore, there was a growing appreciation of the extraordinary case of kala-azar as a devastating but forgotten disease.

Justification for focusing limited resources on a disease of low prevalence is difficult. Considering all the health problems Nepal faces—including continued high mortality rates of children under five from common diseases—using resources to improve the situation for a relatively small number of individuals suffering from kala-azar is difficult to justify. However, the nature of the disease creates a different scenario in which the magnitude of the impact goes well beyond the individual affected.

The project supported a number of activities exploring the ramifications of this disease on individuals, families, and communities. These included the following studies:

- Rapid Assessment of Treatment Practices for Kala-azar in Terai districts (2000)
- Literature Review and Fact Finding on Kala-azar Treatment Failure in Nepal and India (2000)
- Study of the Economic Effects on Households and Local Health System (2001)
- Treatment Practices for Kala-azar and Malaria in Terai Districts (2001)

In addition, field staff and partner organizations conducted numerous patient interviews over the course of the project. These provided additional qualitative information on the far-reaching effects of the disease.

The economic study provides a discouraging view of kala-azar patients. Most of the patients interviewed were poor, most were familiar with kala-azar because of cases in their community or within their family, and most suffered significant financial loss in spite of main medicines being free. The report found that the average family spent nearly 50% of their annual income on a kala-azar episode, household members lost an average of 117 workdays due to illness, and children lost an average of 63 school days. Patient interviews ascertained that initial treatment was often given for other presumptive diagnoses, patients had difficulty reaching appropriate care facilities,

they incurred substantial additional costs above and beyond the provided medicines, and family members endured substantial hardship.

Kala-azar is not a disease known only to adults. Based on patient listings from a number of sources, more than 20% of cases are children under 15-years old. While this reflects the proportion of under 15-year olds in the population, it also indicates that the disease is not just a disease of older adults. The degree to which infection at a younger age contributes to transmission is not known.

## 6. Implementing the pilot interventions for kala-azar: a short history

Following the intervention workshop in May 2001, an implementation strategy was developed with the Canadian Centre for International Studies and Cooperation (CECI)—the NGO chosen for implementing the pilot project in Dhanusha and Mahottari. This implementation plan was designed to include each of the six pilot interventions, and CECI produced a detailed implementation plan and budget.

The activities for each of the interventions were initiated by November 2001, and the project has accomplished a great deal in a relatively short period of time. The duration of time since initiation is short, and more time is needed for a full understanding of the impact of these interventions on the pattern of disease and disease management.

### ***Initial activities: Identifying high-risk VDCs and completing benchmark survey***

CECI held a series of meetings with MOH experts and hospital staff to select high-risk VDCs. This process involved a review of hospital records over several years and discussion between CECI, hospital staff, and EHP. The result was the selection of 18 high-risk VDCs in which interventions would be undertaken.

Once the high-risk VDCs were selected, CECI completed profiles on each VDC that included information about population, health and education infrastructure, and other information. This was followed by the design and completion of a benchmark survey to provide baseline information about attitudes and behaviors related to vector-borne diseases, and kala-azar in particular. The benchmark survey included questions similar to those in the original baseline survey, with data specific to the intervention districts. Completed in September 2002, the survey involved a total of 1,114 households for kala-azar questions and 331 for malaria. The resulting profiles and information have provided district-specific information on patient attitudes and practices with regard to kala-azar and malaria.

An initial step towards identifying VDCs with high risk for KA was to test the hypothesis that the risk for KA was higher in the VDCs where the FCHVs were knowledgeable and aware of the presence of the disease in the community. This data could be compared with data about the residence of KA patients from hospital registers to see if there was convergence in the VDCs with high risk. An initial

concept behind identifying high-risk communities was to test the hypothesis that FCHVs who know about the presence of kala-azar in their communities can distinguish between high- and low-risk wards, and thus identify high-risk VDCs. This information could be compared with hospital register information on patient residence to see if there was reasonable convergence. This approach has not yet been tested.

### ***Community promotion activities***

Early in the program, EHP, CECI, and MOH representatives developed a comprehensive BCC program. CECI completed an informal analysis of community awareness, organized a workshop on key messages, and helped develop and test materials. The key message workshop, held in May 2002, involved government staff, hospital physicians, district development committee chairpersons, community workers, and social marketing experts. Following the workshop, a private social marketing company worked with CECI to develop and test materials. Materials included a logo, posters, leaflets, comic wall posters, flip charts, miking scripts, a street drama script, and wall painting designs, all of which have been used as part of the education effort.

CECI also completed a community promotion strategy that included some mass media messages and an orientation and training at multiple levels, including different levels of clinic-based health workers and FCHVs. Between April and September 2002, a total of 6,988 people were oriented to the new activities. This included nearly 2,000 mothers' group members, nearly 1,500 community members, and 171 FCHVs.

### ***Support for seeking care***

The orientation of community members and FCHVs was designed to help with case identification and referral and with compliance with treatment, and this was to be complemented by a more formal training of FCHVs. CECI completed a care-seeking flowchart and developed profiles on all involved FCHVs. In June 2002 the project team decided to involve the Nepal Technical Assistance Group (NTAG) in the community-based component because of its expertise in working with FCHVs in focused treatment for the community-based pneumonia program. CECI conducted a full training program for the field assistants, while NTAG conducted FCHV training. The result of these training efforts was to establish a cadre of community-based workers with expanded knowledge about kala-azar and appropriate treatment, along with an oriented health facility staff better equipped to manage referred cases.

### ***Improvement of health care services***

The original package of interventions included expansion of services at the PHC level, use of the K39 test for diagnosis, and provision of first line treatment. CECI initiated this intervention through monthly meetings with District Public Health Officer (DPHO) and hospital staff, and a draft training manual for health workers was begun. In June 2002, this approach was revised, with responsibility for this intervention taken over by EHP directly, in collaboration with the EDCD. This

involved the technical subcommittee of the national vector-borne disease (VBD) committee, with representation from national laboratories, Teku (the key central hospital), and EHP. These combined efforts resulted in the capacity for diagnosis and treatment at the PHC level and for follow-up care at the HP/SHP Health Post/Sub Health Post level.

### ***Improvement in referral, information management, and surveillance***

CECI worked closely with district staff to review the existing case recording systems and to establish an improved referral mechanism. This involved development of a referral card and letter system to facilitate care recommended by FCHVs. CECI developed a supervision system designed to provide follow-up information on patients and FCHV activities. This evolved into a system whereby project staff and MOH staff jointly supervised activities. An additional dimension to the monitoring system was to select a proportion of hospital cases and complete patient visits to determine compliance with treatment.

CECI conducted an orientation on the EWARS as a means to improve case detection. CECI also explored computerization of different facilities to help with overall data management. However, the EHP Nepal project team decided to limit the purchase of computers, and only the Dhanusha District Health Officer (DHO) achieved access to the Internet and evolving Websites.

As the project evolved, EHP became more directly involved with the development of the FCHV referral slip system, and later took responsibility for further strengthening of the monitoring system.

The initial goal for these interventions was to ensure that all cases were rapidly identified, patients completed treatment, and the process was adequately recorded and monitored. Close monitoring would provide data that would help understand patterns in disease occurrence and in care-seeking behavior. The referral system was meant to help link patients recorded at the community level with recording at the PHC and hospital levels. While data collection to address most of these goals was established, the project team determined that some refinement was needed to improve data quality, clarify the specific indicators to be followed, and integrate all activities into a clearer overall monitoring strategy.

### ***Modifications in the evolution of the intervention package***

A number of different factors affected the implementation of the intervention strategy and thus had an influence on both the timing and final results of the pilot effort. Some changes resulted from evolution in thinking during implementation. Others resulted from MOH requests, while others reflected administrative changes. In combination, these changes hindered implementation according to the original schedule, thus significantly shortening the time period for actually carrying out the intervention package prior to the ending of the EHP project. As a result, the data available to help

assess the success of the pilot project need some refinement and more time to mature. The following factors affected implementation:

*(1) Expansion to a district-wide approach*

The original design for the intervention package was to focus resources and activities on VDCs that were identified as high risk, as described above. However in December 2002, the EDCD called several meetings to discuss a district-wide approach, which staff and participants decided was in the best interest of the government. District staff agreed that kala-azar was affecting the majority of VDCs, and thus a district-wide approach would be more appropriate.

The implications of this change were significant. The expansion required moving from 18 VDCs to 159 VDCs and expanding training from less than 200 FCHVs to more than 1,400 FCHVs. Furthermore, the expansion diluted the ability of field staff to visit and support FCHVs and to monitor data as patients were identified. The district-wide approach allowed intervention activities throughout the district, with a stronger focus on the original 18 VDCs.

*(2) Delays in contract settlement*

Following the finalization of the interventions strategy, CECI developed a proposal for implementation, which was negotiated with EHP. This contracting process required several rounds of discussion and amendments. The process took nearly 11 months, resulting in a significant delay in the ability of CECI to hire staff and begin implementation. Since EHP was nearing its completion, this delay had major consequences with regard to allowing maturation of the pilot projects and accumulation of adequate data on which to assess success.

*(3) Changes in implementing organization*

Several changes were made regarding the implementing organization for some of the interventions. Initially, CECI was responsible for all interventions, and the staff developed the intervention strategy. In the interest of having the project benefit from NTAG's community-based treatment expertise, NTAG was asked to assist with the FCHV training. This resulted in division of responsibility between the two organizations, with some lack of clarity for full roles and responsibilities.

Later, on the basis of discussions between EHP and EDCD, further changes were made regarding the facility-based dimension of the pilot interventions. Expansion of services to the PHC and attempts to address patient concerns about hospital care required extensive discussions with senior hospital staff, who maintained the need to exercise clinical judgment over more broadly applied public health protocols. These discussions were made easier by more direct involvement from EHP, which ultimately took responsibility for this intervention.

#### *(4) Changes in method for identification of high-risk villages*

One dimension to this intervention involved determining the best approach for identifying high-risk villages, comparing FCHVs' assessment of their community with trends in hospital records. This concept was not tested. Instead, hospital records were used as the primary means for identification, with verification from FCHVs. With the district-wide approach, the concept of focusing resources only on identified high-risk VDCs was lost, and this also had implications for the sustainability of the intervention package should the government decide to scale-up to other endemic districts.

#### *(5) Development of a monitoring strategy*

The discussions leading up to the selection of the interventions to be piloted included some review of the types of indicators that would be useful for monitoring and evaluation. While the program did develop mechanisms for data collection and addressed a number of monitoring issues, a fully integrated monitoring system was not developed.

Existing mechanisms provided a summary of cases seeking care at hospitals. With the addition of provision of care at PHCs, as well as the availability to review FCHV referrals, a more complex longitudinal system was needed to ensure adequate tracking of patients and the outcome of their treatment.

Table 1. Summary of the Changes that Occurred and Their Implications.

Modification to Intervention Strategy	Implication
Expansion to a district-wide approach	<ul style="list-style-type: none"> <li>• Substantial increase in training</li> <li>• Limitations in ability of field staff to support FCHV activities</li> <li>• Expansion of monitoring needs</li> <li>• Increased cost, particularly with scaling up to other endemic districts</li> </ul>
Delays in contract settlement	<ul style="list-style-type: none"> <li>• Significant delay in implementation</li> <li>• Limitations in overall data available for assessment</li> <li>• Lack of adequate time for program maturation</li> </ul>
Changes in implementing organizations	<ul style="list-style-type: none"> <li>• Loss of continuity in program implementation</li> <li>• Confusion in roles and responsibilities for some program elements</li> <li>• Impairment in "team development" and program motivation and momentum</li> </ul>
Identification of high-risk villages	<ul style="list-style-type: none"> <li>• Less data available concerning clustering and ability to focus resources on high-risk communities</li> <li>• Lack of proven method for identification of high-risk areas</li> </ul>
Development of a monitoring strategy	<ul style="list-style-type: none"> <li>• Difficulty in tracking patients from community identification to facility treatment</li> <li>• Difficulty in assessing project implications for reservoirs of transmission</li> <li>• Difficulty in assessing the usefulness of referral system at PHC and hospital levels</li> </ul>

In summary, the changes in implementation of the pilot interventions had a significant impact on the ability to assess those interventions and determine the degree to which each contributes to improvement in case management. Of perhaps greatest significance is the fact that the pilot has not had time to mature, and thus its true value may not be as apparent at this point in its evolution. There are good lessons to be learned from the changes in direction as well. The expansion to a district-wide approach may help clarify the presentation of disease in different VDCs—determining whether mostly the same or adjacent communities are infected or

whether there is spontaneous unexplained infections in new communities. This district-wide approach may also help determine the best way to focus resources, based on the experiences of FCHVs over time in wards with and without cases. More time and improvements in the monitoring system will help understand the dynamic of kala-azar in Dhanusha and Mahottari.



## 7. Measures of progress for the kala-azar pilot interventions

There is some difficulty in assessing results from interventions that have been implemented for only a few months and will undergo significant changes with the completion of the EHP project. Such an assessment cannot benefit from adequate program maturation that would allow modifications in monitoring, improvement in skills at all levels, and greater acceptance and understanding of the program by community members (with all the implications for support to FCHVs and for patients with disease).

However, much has been accomplished, and there is clear evidence that the attention given to kala-azar is changing the perception about this disease and the way it can be managed. In addition, there is evidence of increased community confidence in treatment being provided and appreciation for the support FCHVs provide. Furthermore, the project has provided and continues to provide a greater breadth of information about kala-azar with which to refine case management approaches and determine the longer term impact on transmission and prevalence.

In reviewing the outcomes from the pilot interventions, this report has attempted to pull together all the data available from multiple sources and to look for congruency in what the data reveal about different elements of the project. In addition, to complement this available data, NTAG completed a qualitative assessment consisting of field visits to the districts and interviews with FCHVs, health facility staff, hospital staff, and patients, and a series of focus group discussions with mothers' groups and community members. This qualitative review was completed in 27 VDCs, and focused on a number of questions about the effect of the pilot interventions.

Rather than organize the results according to each intervention, it may be more useful to frame the discussion around a number of questions that relate back to the original goal for the intervention package. For each question presented below, both the available data and impressions of the staff and NTAG assessment team are included in the discussion.

**How has awareness of kala-azar and appreciation for the treatment available changed in response to the interventions?**

In the original baseline survey, the general public’s understanding of kala-azar was explored and compared with understanding of the other vector-borne diseases. Awareness and understanding of kala-azar were quite low, particularly when compared with awareness and understanding of malaria. The CECI benchmark survey included questions similar to those of the baseline survey, and the responses were then compared with those of the rapid assessment that Solutions Inc. conducted a year later. Direct comparison of the latter two surveys is limited by the small sample size used for the rapid assessment.

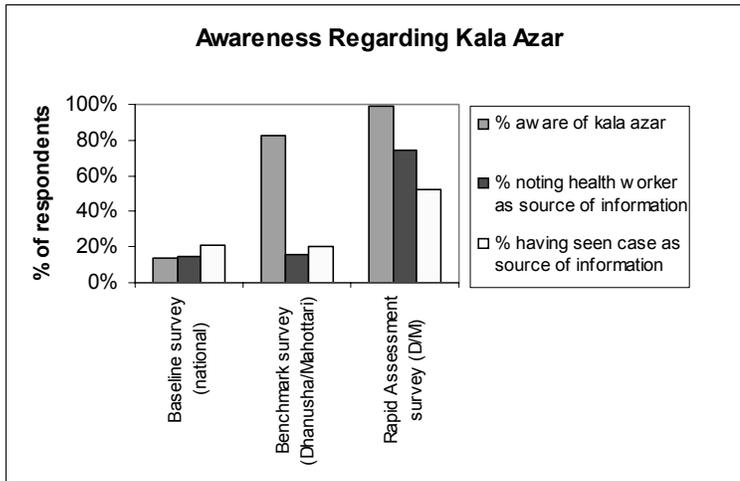


Figure 6

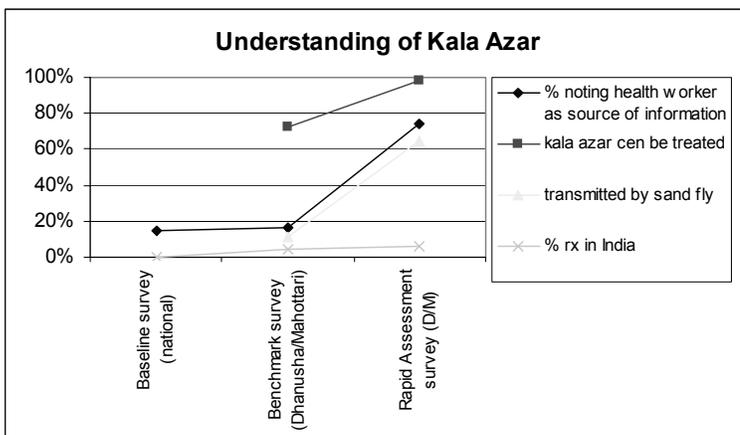


Figure 7

These data, as well as patient, community, and FCHV interviews, confirm the impression that there has been a marked increase in understanding about the dynamics of kala-azar and the treatment available as a result of EHP. FCHV involvement has not only improved awareness, but appears to have improved confidence within communities that this disease can be treated with good results.

Limited monitoring data are available regarding patient or community impressions concerning the cost of treatment. The qualitative analysis implies that there is both lack of understanding and continuing irritation with the ancillary costs for treatment of kala-azar. Although patients did not relate incidents of being charged for medicines, they did complain about the costs for the supplies needed for treatment. However, it was discovered in assessing the results of Kala-azar Week that 40% of those aware of Kala-azar Week knew about the provision of free medicines and recognized that other items related to care were not free.

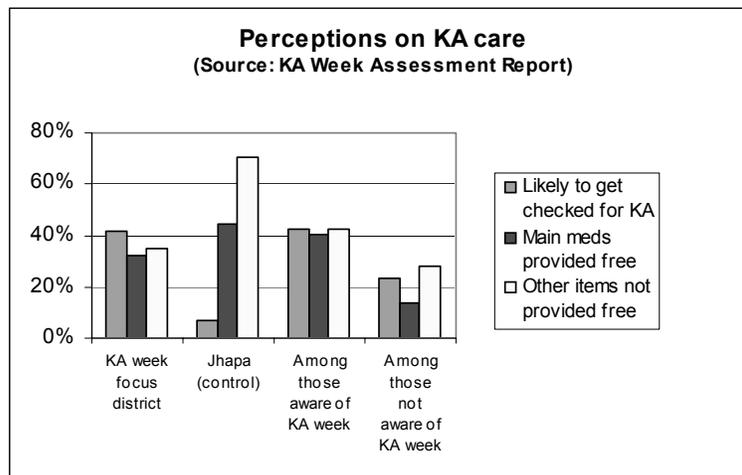


Figure 8

In the qualitative analysis, satisfaction with treatment differed from facility to facility. The public's perception of Janakpur Zonal hospital was that it had good diagnostic and treatment facilities, but was more impersonal, more costly, and generally more imposing. They viewed Mahottari hospital as more user-friendly. The most striking change, however, was how well the public accepted the PHC as a diagnostic and care center and how much they appreciated the care FCHVs provided.

***How has care seeking changed in response to the interventions?***

Prior to this program, awareness of kala-azar was low and little information was available about care-seeking behavior. Anecdotal evidence suggested that patients sought care from a variety of sources and often endured a variety of treatment regimens before being seen at a hospital where diagnosis and treatment were possible.

The program has provided additional information on care seeking through the benchmark survey, the follow-on survey, and the assessment of Kala-azar Week. Information from these surveys is complemented by NTAG's qualitative assessment, which includes impressions of care-seeking behavior from patients, FCHVs, community members, and health facility staff. The data suggest that gradual changes in care-seeking attitudes and practices have occurred. Interpretation is hampered slightly by the difficulty in distinguishing behavior related to more recently reported cases from those cases that occurred at a later date.

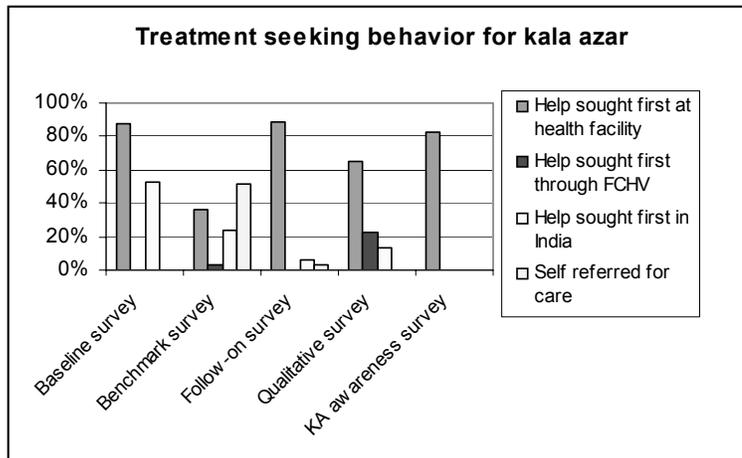


Figure 9

With the introduction of FCHVs as facilitators, suspected patients were given a community support mechanism. Within the first two months after interventions were launched, FCHVs became involved with and referred more than 100 patients, as recorded during supervisory visits. In reality, this represents an underestimate of referrals by FCHVs since the district-wide approach limited visits to FCHVs. In the process of introducing FCHVs, however, the following became clear:

- FCHVs can identify suspected cases of kala-azar
- Patients are willing to use FCHVs as care facilitators and appreciate them as such
- FCHVs refer appropriately to the nearest facility and follow up on referred patients

FCHVs appear to universally follow up on patients in their charge. This was reflected both in FCHV interviews and in the supervisory visit reports. Among those interviewed, there was no evidence of significant noncompliance. FCHVs appear to be a good source of information about compliance, at least for the patients with whom they are involved.

The project’s monitoring system provided information on care seeking based on supervisory visits to FCHVs and on follow-up visits of patients selected from hospital registers. This system does not currently ensure that all patients are “captured” by the system, or that compliance and other information from the selected patients is representative of all kala-azar patients.

### ***How has the referral system affected patient care?***

No formal referral mechanism for kala-azar existed prior to this project. Suspected cases presenting to a distal health facility were either treated for a presumptive diagnosis or referred to a hospital using variable referral criteria. With the introduction of the project and orientation of health facility staff and FCHVs, a referral system was developed.

FCHVs then used the referral system, and “stubs,” or referral slips, issued for each patient served as a register of their referral activity. Patients also used the referral slips, and reported that these help to facilitate care—they are better received at PHCs or hospitals if they have the referral slip.

Referral slips are basically lost to follow-up once they reach the health facilities. As a result, they are not useful sources of patient data as they move through the system—that is, for longitudinal tracking of patients.

Some patient tracking is possible through other mechanisms. The project field assistants had a schedule for supervisory visits to FCHVs (for all VDCs, with a concentration on the original 18 pilot VDCs) and recorded all patients seen by the selected FCHVs. Although this listing does not reflect all FCHV patients, it does provide some evidence that FCHV involvement is significant. Using this list, of the field assistants an attempt was made to compare the names of patients seen with those recorded in the hospital register for the same district, over the same time period. Only one patient was identified in both the hospital register and the FCHV listing. However, most FCHVs referred patients to peripheral facilities and onward to the PHC. The register from the PHC shows significant referrals from the HP and SHP levels, presumably patients referred by FCHVs. Figure 10 illustrates the tracking of patients in the two sets of lists.

Mahottari 6 Anaitha	1	6	8.2.060	2	60	Ram Bali Sada	24	m
Mahottari 6 Anaitha	1	6	17.12.059	12	59	Rameshwor Sada	14	m
Mahottari -7	1	7	08.02.060	2	60	Ram Bali Sada	24	m
Mahottari -7	1	7	25.04.060	4	60	Umesh Sada	30	m
Mahottari -7	1	7	17.12.059	12	59	Ram Ishwor Sada	14	m
Parsa Dewar -9	1	9	05.03.060	3	60	Nasim Sekh	55	m
Parsa Dewar-1	1	1	25.03.060	3	60	Khushbu Kumari	18	f
Parsadewar 4	1	4	30.3.060	3	60	Urmila devi	40	f
Parsadewar-1	1	1	10.01.060	1	60	Nagendra Sah	24	m
Parsadewar-1	1	1	20.02.060	2	60	Sikindar chaudary	23	m
Parsadewar-1	1	1	25.03.060	3	60	Khushbu Kumari	18	f
Parsadewar-1	1	1	22.12.059	12	59	Bikram Thakur	22	m
Parsadewar-2	1	2	10.03.060	3	60	Priariva Chaudhary	58	f
Samsi	1		01.02.060	2	60	Ruksana Khatun	27	f
Shreepur 7	1	7	23.1.060	1	60	Ram Dulari Devi	35	f
Shreepur 7	1	7	4.4.060	4	60	Kisun Dev Yadav	40	m
Shreepur -7	1	7	23.01.060	1	60	Ramdulari	35	f
Shreepur -7	1	7	04.04.060	4	60	Kisundev vadav	40	m

Hospital register								
Mahottari	7			2	60	Kumar Bali Sada	25	m
Mahottari?	9			5	60	Shoto Kumari Mahusa	32	f
Parsadewar	8			5	60	Jannti Khatun	13	f
Samsi	2			12	59	Ambiya Shekhin	10	f
Samsi	4			11	59	Chhote Sha	16	m
Samsi	8			3	60	Geeta Kumari Yadav	12	f
Samsi	1			3	60	Hiraya Khatran	23	f
Shreepur	2			11	59	Dasrath Roy	55	m
Shreepur	1			11	59	Phulpari Ram	25	f
Shreepur	6			11	59	Sajan K. Mulehiya	5	f

Figure 10

The field supervisory summary report, “An Overview of Achievements and Challenges of Dhanusha-Mahottari VBD Program, 2003,” (Virendra Lal Karn 2003) notes that a total of 91 FCHVs referred 197 suspected cases of kala-azar from 53 VDCs. Prior to the project, FCHVs were not involved with referrals, and in the initial benchmark survey, among those with a family member with kala-azar, 11% were initially self-diagnosed and 16% were initially diagnosed by a private practitioner or

medical shopkeeper. Between April and November of 2003, the project reported 92 patients seen at PHCs, with the majority (79%) successfully followed up at health posts.

Currently, although hospitals, PHCs, and FCHVs record registration data, the project has not systematically collected these data in a way that simplifies tracking patients through the referral system. As a result, it is difficult to determine changes in referral, and the degree to which these changes have increased both the number and rapidity of case detection and referral is not clear.

***What was the effect of providing improved diagnosis and treatment at peripheral health facilities?***

Government policy permitted diagnosis and treatment at PHCs and follow-up treatment with SAG at the HP and SHP levels. However, in practice, all diagnosis and treatment were done at hospitals.

The most dramatic change resulting from the pilot interventions was the use of the PHC for initial diagnosis and treatment following FCHV referral. Focus group discussions and interviews with patients, community members, and health facility workers provide some further insight about the use of peripheral facilities. Patients reported feeling more comfortable going to the PHC, they believed that care was less costly, and, in general, they had few complaints about service received.

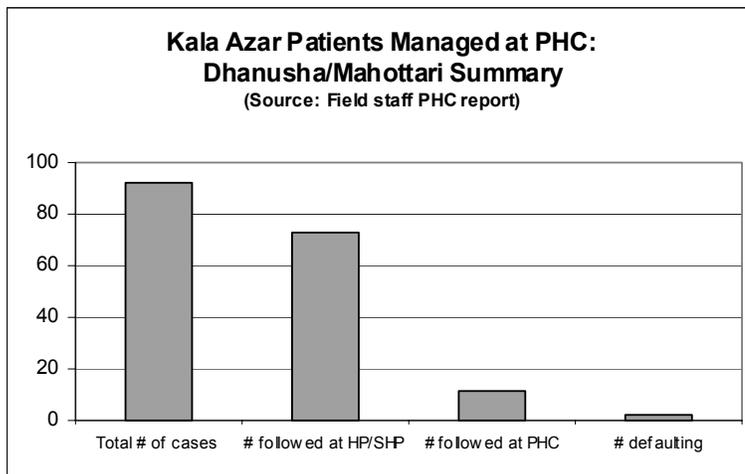


Figure 11

***What was the effect of the interventions on the time from onset of symptoms to initiation of treatment?***

Prior to this project, information on patient history and compliance with treatment was available solely from the hospital registers. For some patients, the duration of illness was recorded (on the K39 register) before diagnostic testing, although there may be confusion between duration of symptoms and the amount of time before a patient sought referral. Completion of treatment was recorded for all in-patient

fungizone treatment and for completion of SAG treatment, but only for those being treated at the hospital, or returning to report completion of treatment. Thus it was difficult to determine the exact time of onset of treatment or exact rates of noncompliance for the broader patient population.

With the initiation of the project, field assistants followed a schedule for follow-up visits on patients seen at the hospital. This dataset represents a selection of patients visited to confirm completion of treatment, and thus is not necessarily representative of all patients. The dataset included a question about the time from the onset of the disease to treatment. It is difficult to interpret the results since they may reflect both misinterpretation of the question and changes in the patients seeking care in response to the pilot activities.

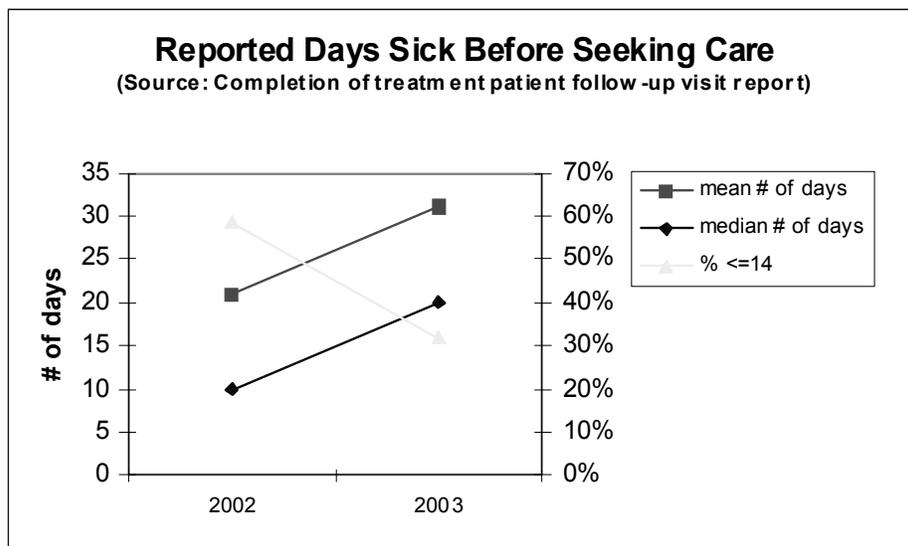


Figure 12

A review of the K39 register data for Nepali year 2059 and 2060 (2003) suggests that care-seeking behavior may have improved, and there may be a slight decrease in the mean number of days ill before initiating treatment:

All FCHVs interviewed reported following up on patients they referred, and there were no reports of noncompliance with treatment.

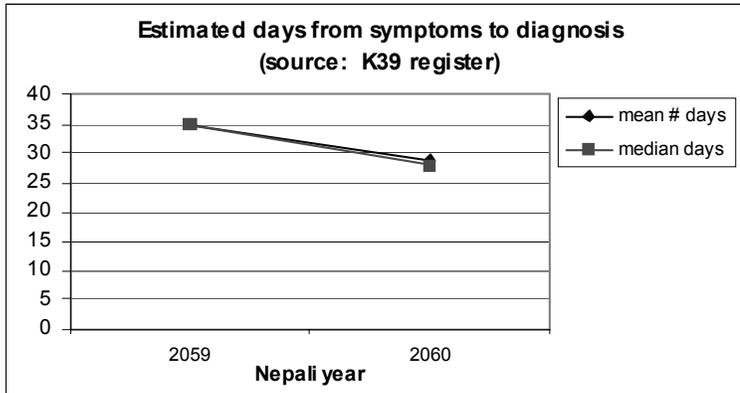


Figure 13

These data should be interpreted cautiously, recognizing that the number of cases that are not seen by FCHVs or that do not self-refer to PHCs or hospitals is not known. These cases may be more likely to be noncompliant, and may wait longer to seek care. The current monitoring system cannot positively track all patients entering the system, either through FCHV referral, self-referral to peripheral facilities, or hospital registers alone. Some duplication of patient registration may occur at multiple sites, since initial referral by the FCHV may result in a visit to a health post or subhealth post where the patient may be referred onward to the PHC or hospital for definitive diagnosis and initiation of treatment. Similarly, patients seen initially at the PHC or hospital level commonly receive follow-up care at health posts or subhealth posts.

***How were FCHVs affected by these interventions?***

One concern about the FCHV’s involvement in new interventions was whether the intervention would be suited to the FCHV and whether the addition might overload her. The successes FCHVs have had with Vitamin A and community-based pneumonia treatment, however, made it logical to turn to FCHVs for all interventions and generate community support in the process.

For kala-azar, FCHVs in endemic areas were enthusiastic about being able to respond to their patients. The orientation and provision of a kala-azar register provided a tangible activity that the community appeared to accept. As a result, one critical ingredient was present—the positive feedback loop between the community and the FCHV, which resulted in strengthening community support for the FCHV. The impressions from field staff and the NTAG qualitative assessment are overwhelmingly positive for FCHV involvement with kala-azar, and the referral evidence suggests success in patient management.

Information from the field interviews with FCHVs suggest that FCHVs were very pleased to have the capacity to help kala-azar patients, and that patients appreciated the FCHV’s role in facilitating referral and helping to ensure that their treatment was completed. All 35 FCHVs interviewed expressed confidence in knowing how to identify cases for referral. Community members reported that this system helped them understand how to get treatment, and that referral to PHCs and understanding about

K39 diagnostics made care seeking easier and saved them money. In 34 of 59 focus group discussions, community members noted that they had received information about kala-azar from FCHVs. Interviews with PHC staff suggest that FCHVs are not referring spurious cases, and that between 25% and 50% of referrals have proved to be positive. The overall impression from the interviews was that the community-based dimension of the project significantly improved community motivation for managing kala-azar.

***Have the interventions helped understand the patterns of disease in the pilot districts?***

Prior to the project, hospital register data provided an impression of the geographic distribution of cases, with cases appearing to be concentrated in some villages. However, these data were not analyzed systematically, nor was there a mechanism to know what proportion of cases were being recorded in the register.

The project focused attention on data management and analysis, provided a mechanism for case detection at the community level, and established diagnosis and treatment at more peripheral levels. This has provided a broader dataset from which to assess the degree of clustering of kala-azar cases and the implications for program expansion.

Reported cases from several sources were analyzed retrospectively to determine what proportion of VDCs represented the majority of cases. In addition, the cases reported at the PHC level were also reviewed. This latter dataset reflects the contribution of FCHV involvement, since the majority of FCHV referrals were to PHCs.

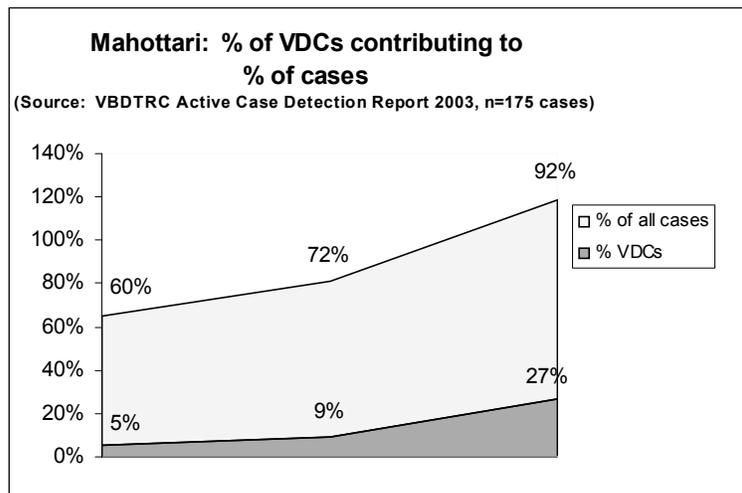


Figure 14

In the absence of a comprehensive review of all cases seen by FCHVs, however, it is not possible to determine the degree to which new cases are arising in villages or VDCs.

***Has the project helped capture the majority of cases in the district?***

Prior to the project, the only information available on the number of kala-azar cases in the district came from EDCD and HMIS reports. The number of reported cases from the HMIS for a given district varies considerably from year to year. This variation may reflect differences in outbreak patterns, but may also reflect differences in reporting or changes in treatment patterns. Thus it is difficult to monitor overall trends in case detection over time.

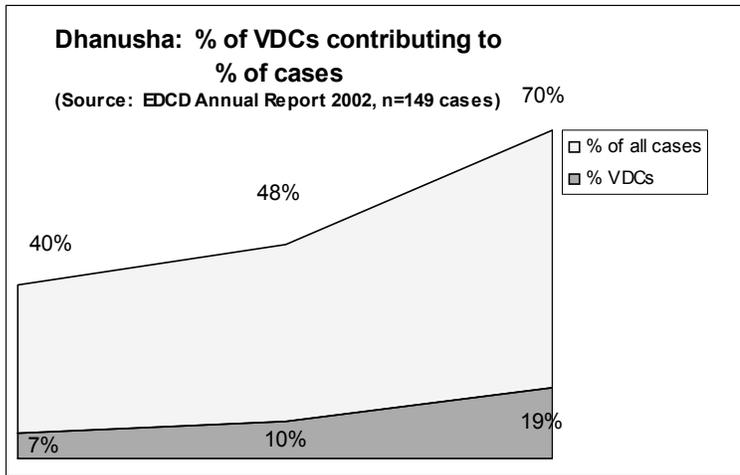


Figure 15

The project has provided a mechanism to record cases at the community level (through the FCHV referral stubs) and to add the cases registered at the PHC level. However, the current system depends on active review of these sources of information, and not all FCHVs are visited annually. The expectation is that, with community-based case detection and improved service delivery at peripheral facilities, the vast majority of cases will be detected. The current system does not ensure that all cases are recorded.

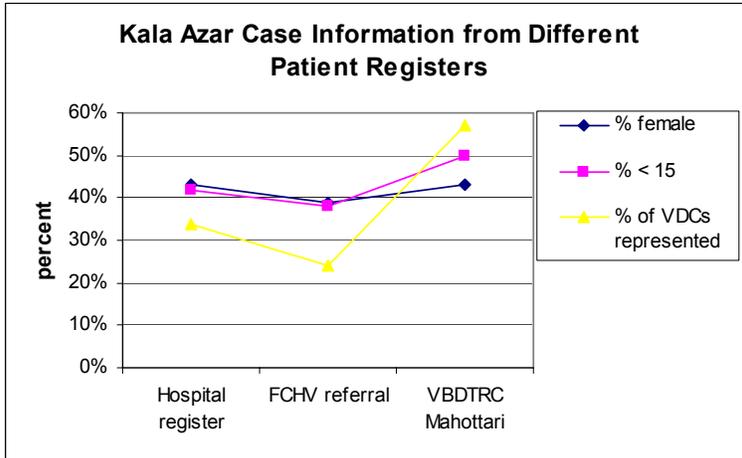


Figure 16

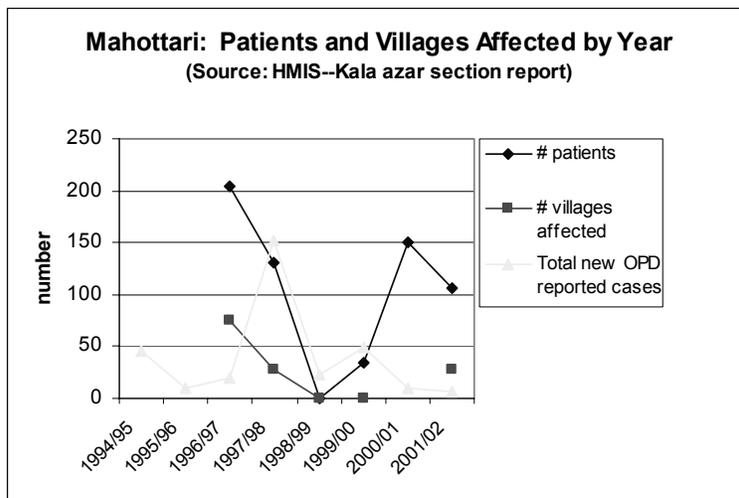


Figure 17

National HMIS data may present trends more clearly than district-specific data. Despite this, no clear trend is evident in kala-azar cases over the past decade. This may be due to the sporadic nature of outbreaks and incomplete case detection and recording.

There may be some benefit to examining the age and gender distribution of kala-azar cases over time. With improved case detection from the pilot districts, there may be some changes in data on age distribution and gender distribution of KA as more cases are detected. Interpretation must reflect any changes in population age distribution.

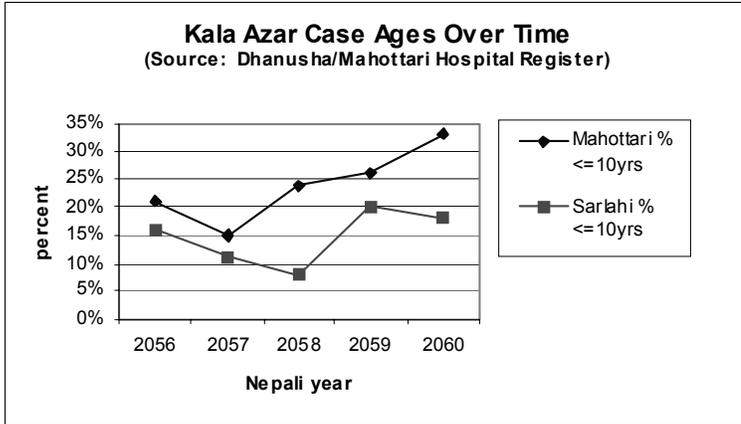


Figure 18

In summary, it is not yet possible to determine whether there has been more complete detection of cases in the pilot districts. While there has been an increase in the use of PHCs and an increase in identification of cases at the community level, whether these represent cases that would have sought care elsewhere or may not have sought care otherwise is not clear.

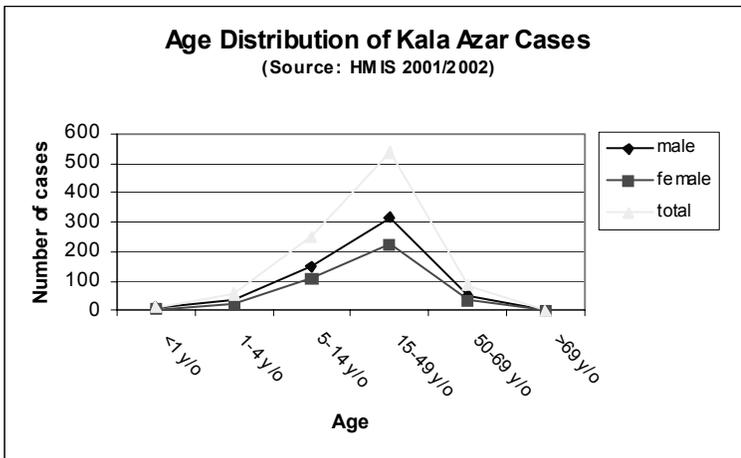


Figure 19

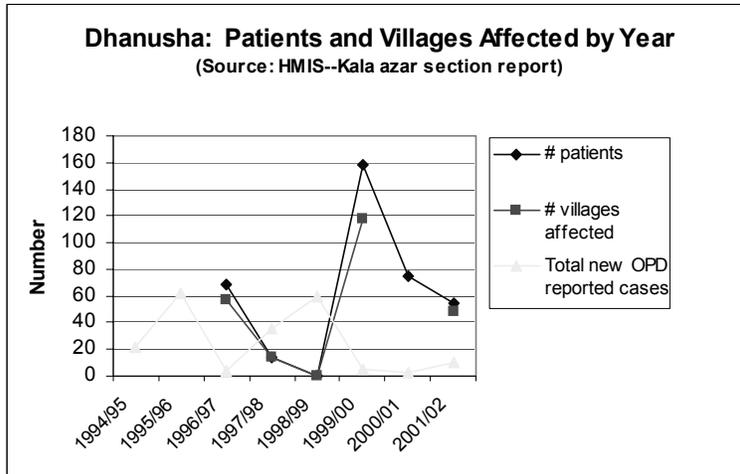


Figure 20

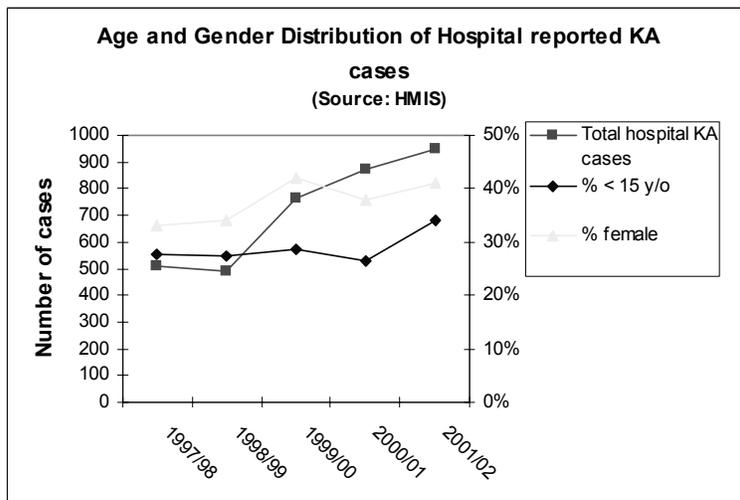


Figure 21



## 8. The different scope for Japanese encephalitis

Japanese encephalitis is one of the three vector-borne diseases that EHP focused on, and thus, in theory, one of the diseases for which pilot interventions would be undertaken. However, without the potential for an immunization strategy and without clear evidence for specific preventive measures, the approach for this disease had to be different than for kala-azar.

Most of the EHP activities for Japanese encephalitis concerned improving surveillance, improving assessment capacity, and understanding the epidemiology of the disease in Nepal. This involved extensive review of laboratory capacity, training in entomologic collection and analysis, assessment of the disease in the Kathmandu valley, and work on cross-border issues related to Japanese encephalitis. In addition, the project produced a number of related manuals to improve diagnostics and field assessments. Pilot interventions were not undertaken.



## 9. Specialized activities for malaria

As with Japanese encephalitis, project pilot interventions did not focus on malaria, although some specific activities were explored in one district in partnership with Cooperative for Assistance and Relief Everywhere, Inc. (CARE). General activities supporting the treatment of malaria were similar to those supported for Japanese encephalitis and included improving laboratory capacity, strengthening surveillance, and providing additional information on the epidemiology of malaria in Nepal, such as information on the emergence of falciparum malaria.

In addition to these activities, the project supported elements of a new approach to community diagnosis and management through the use of FCHVs. Activities were done as part of a CARE-supported child survival program in Kanchanpur district. The approach was being developed outside EHP, and the project's involvement was limited.

However, the approach is a pilot in the use of FCHVs to improve case detection and management at the community level.

Activities implemented in Kanchanpur included collection of blood slides by FCHVs, use of the falciparum dipstick, and initial treatment for vivax by FCHVs. Although it had some similarities with the development of the kala-azar community-based approach, the malaria effort in Kanchanpur district was more limited, and EHP staff had less involvement.

The overall project was recently evaluated using a well-developed standardized sampling and questionnaire approach. The evaluation reviewed all of the child survival interventions with the following conclusions related to the malaria activities:

- Bednet use by all family members increased from a baseline of 43% to 62%.
- The total malaria slides examined increased from 7,216 in 1999 to more than 32,000 in 2002, with 1,778 prepared by FCHVs.
- FCHVs can have a role in malaria management, and preventive measures can be promoted through mothers' groups with assistance from FCHVs.
- Slide collection is possible, but there are transport and sustainability issues.

The evaluation did not comment on the use of the falciparum dipstick and the role of FCHVs in surveillance for falciparum outbreaks.

The project's involvement in this pilot intervention helped to confirm that FCHVs can be trained to manage new diseases in different ways, and gave some insight into their potential role in surveillance. However, a weak link identified in the evaluation was the movement of slides and data upwards from FCHVs—a concern in all other FCHV activities. It is likely that any data FCHVs collect will need to be collected by those who need the data rather than to expect this cadre of volunteer workers to systematically report their data upwards. However, with the availability of falciparum dipsticks and the close familiarity of FCHVs with their communities, the possibility exists for better detection of falciparum outbreaks if a method for collecting community data is developed.

The project certainly demonstrated that FCHVs can have a supportive role as care facilitators, much like their role in Integrated Management of Childhood Illness (IMCI). This may involve assisting with referrals, expanding their efforts in epidemic situations, and helping to build community awareness about malaria, including treated bed nets and spraying efforts. Further work is needed to clarify the role of FCHVs and the specific part they play in improvement in malaria case detection and management.

## 10. Synergy and interaction with other EHP objectives

Activities related to the other EHP objectives have been synergistic with the pilot interventions in a number of ways. While it is not possible to measure directly the benefit from these other activities, the following clearly supported the pilot interventions:

- The VBDTRC contributed to training and capacity development to improve service delivery at the peripheral facilities. In addition, the VBDTRC provided expert input in the formulation of the specific intervention implementation plan. Finally, the VBDTRC assisted with operation research related to intervention planning.
- The experience with EWARS and other surveillance activities was used to emphasize the importance of data management in the intervention districts. The Dhanusha and Mahottari hospitals are included in the EWARS.
- The initial baseline surveys, as well as subsequent data reviews and smaller surveys, have contributed to the overall understanding of kala-azar and helped with the formulation of the intervention plan. The baseline survey questions were used in the development of both the district level benchmark and follow-on surveys.
- The EHP cross-border activities were directly beneficial to the pilot interventions through collaboration on Kala-azar Week. This activity not only highlighted the pilot intervention activities, but also provided additional BCC information through the Kala-azar Week assessment survey.



# 11. Next steps, future directions, and recommendations

With the conclusion of EHP, the pilot activities will be modified. Reduced activities (with more limited field staff) will be carried out by the Nepal Family Health Project (NFHP). This not only will allow a transition to more district control, but will allow modifications in monitoring and program direction in response to the assessment of progress to date. Future activities will depend on the ongoing results and the degree to which clear recommendations can continue to be made to the government and the resources available for kala-azar.

The pilot interventions have not been underway long enough to make conclusive recommendations—neither the data nor the program activities have matured enough to understand their implications fully. In light of this caveat, the following conclusions and suggestions are made with regard to the program direction and areas of likely success:

- The BCC materials and tools that have been developed, including Kala-azar Week, have been successful in improving awareness and care-seeking behavior, and can be applied in other districts.
- The use of FCHVs for case detection and referral has been successful in facilitating case management, particularly at peripheral facilities. This community-based approach for kala-azar should be considered for other endemic districts.
- Diagnostic and treatment services for kala-azar provided at PHCs have been widely used. Strengthening and promotion of these services should be considered with expansion of the program to other districts.
- The project has improved the quality and quantity of data available to assess the distribution of cases within the district, suggesting strong clustering of cases. Depending on resources available, interventions can be directed toward VDCs identified as high risk.
- The pilot interventions provided the opportunity to develop and test a wide variety of promotional materials, and these have been shown to be effective in raising awareness about kala-azar and its appropriate management. With appropriate adaptation to meet specific district characteristics, these can be more broadly applied.

- Kala-azar Week, as a cross-border activity, was very successful, and its evaluation provided valuable information on patient and provider attitudes toward kala-azar. This activity was shown to improve understanding of current case management procedures in Nepal, and serves as a model for other districts.
- Interviews with patients, community members, and FCHVs suggest that involvement of FCHVs with kala-azar has increased community awareness of and confidence in treatment available in Nepal.
- Implementation of a referral slip system has been useful in facilitating care, but has not proved useful in providing ongoing data on patient tracking.
- There is no evidence suggesting that involvement with kala-azar has overloaded FCHVs, with most managing a small number of cases. It is not clear whether involvement of FCHVs from areas without reported cases has been valuable in case detection or management.
- Methods should be developed to provide ongoing support to FCHVs, through work with VDCs and other community organizations. Community orientations for mothers' groups, community leaders, and others should be continued, as this provides support for FCHVs.
- Patient satisfaction, and likely compliance with care for kala-azar, has improved with the addition of PHCs, as noted in the qualitative analysis.
- More time is needed to allow monitoring data to mature to determine whether provision of services at peripheral facilities has reduced the time to treatment and improved compliance.
- Further attention needs to be given to the monitoring system to ensure that it provides accurate cross-sectional and longitudinal information on cases detected.
- The overall monitoring system for the project should be reviewed in depth, and a comprehensive strategy developed. The ability of this system to help with the development of a national kala-azar registry should be explored.
- There is inadequate information on vector behavior and transmission of kala-azar. However, there appears to be significant clustering of cases in Nepal and elsewhere, suggesting that once the disease becomes established, new cases may arise among those residing near existing cases.
- A district-wide approach can be used to review all existing data over time to identify VDCs with known cases, and to include orientation about kala-azar during FCHV annual refresher training.
- The hypothesis that FCHVs residing in VDCs with kala-azar cases are aware of the disease (prior to any orientation) and can thus serve to identify high-risk VDCs should be tested against historical data.
- Full training of FCHVs in case detection and referral may be most efficiently done for VDCs identified as high risk.
- The project has the potential to continue to shed light on this important issue. If kala-azar appears in a village as a clustered disease, and if future outbreaks are

linked to these clusters, this carries significant implications for management of limited resources to direct toward this disease. Focalized spraying, preventive measures (once clarified), and close monitoring of cases and their treatment all can be focused on these high-risk communities. However, if the disease is clustered, but future outbreaks are sporadic and unrelated to the initial clusters, then other factors are in play beyond the increased likelihood of transmission within the initially affected communities. This would lead to the need for further investigation of the kinds of environmental factors that might affect vector densities and work patterns that might affect introduction of the disease into new communities.

- Experience with other programs involving FCHVs has demonstrated that community support for their activities is vital in maintaining their commitment to the intervention. The vitamin A program, for example, is establishing endowment funds for FCHVs to provide them with tea and other demonstrations of community support.
- Involvement of FCHVs with kala-azar should be accompanied by ongoing efforts to generate support for their work from community groups.
- Efforts to strengthen health facility care have been successful at the PHC level, and may have improved logistic supply and attention to patient costs at the hospital level. Further work is needed to strengthen the link between hospital care and community case detection
- The project has the ability to improve the quality and completeness of patient register information at hospitals and PHCs. If linked properly with FCHV cases, a national registry can be generated providing a more accurate description of cases detected.
- Attention needs to be given to the possibility that patients may be registered in more than one facility (e.g., a patient may be seen and diagnosed at a PHC, but treated at the hospital). The monitoring system needs to accommodate both cross-sectional and longitudinal information on the patient population.
- The monitoring system can be strengthened through a review of the supervisory checklists currently used and the sampling methods used to determine which FCHVs are visited and which patients are followed. Integration with the NFHP field monitoring system may improve the ability of the supervisory visits to provide information on compliance, clustering, and time until onset of treatment.
- Additional monitoring activities are needed to help determine the proportion of all cases that are detected and registered. This is important to provide data over time to determine whether there are new “clusters” of cases, or whether new cases arise solely in high-risk VDCs.
- The project may have an effect on several aspects of patients seeking care. First, the overall number of cases identified may increase through the involvement of FCHVs and the confidence in care available. Second, the number of cases seeking care in India or through private practitioners may decrease for the same reasons. Third, there could possibly be some impact on transmission, with a reduction in

- the overall number of cases. Data from all sources (EDCD, HMIS, supervisory visits, FCHV referral stubs) should be used to help assess these issues.
- The pilot interventions have improved case detection through use of FCHVs and increased use of peripheral health facilities. However, the link between community case detection and provision of care at hospitals remains weak.
  - Periodic meetings involving hospital staff, district staff, PHC staff, and FCHV representatives should continue, stressing the importance of both service delivery and monitoring.
  - The costs for the key components of the overall intervention package should be estimated to help the Ministry develop a strategy for expansion to other endemic districts.
  - The pilot interventions offer an opportunity to assess which elements are most critical and to determine the most efficient way to establish the interventions in a district. Cost estimates should be generated to enable the Ministry and donors to determine the feasibility of scaling up to other districts.
  - The use of FCHVs for malaria case detection and management should be reviewed in depth to determine whether their role is tangible and perceived as important to their constituency. Their role in moving slides and data to health facilities should be critically reviewed regarding practicality, sustainability, and usefulness.
  - The project's involvement in this pilot intervention helped to confirm that FCHVs can be trained to manage new diseases in different ways, and gave some insight into their potential role in surveillance. However, a weak link identified in the evaluation was the movement of slides and data upwards from FCHVs—an issue that has been a concern in all other FCHV activities. It is likely that any data FCHVs collect will need to be collected by those who need the data rather than expecting this cadre of volunteer workers to systematically report their data upwards.
  - FCHVs can have a supportive role as care facilitators, much like their role in IMCI. This may involve assisting with referrals, expanding their efforts in epidemic situations, and helping to build community awareness about malaria, including treated bed nets and spraying efforts.
  - Further work is needed to clarify the role of FCHVs and the specific part they play in improvement in malaria case detection and management.
  - Further work is also needed to determine if the availability of falciparum dipsticks and the close familiarity of FCHVs with their communities create an opportunity for better detection of falciparum outbreaks if a method for collecting community data is developed.

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