

Cross-border Collaboration on Vector-borne Disease Control in Bangladesh, Bhutan, India and Nepal

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Abstract

Vector-borne diseases such as malaria, kala-azar, Japanese encephalitis and dengue have re-emerged as grave health problems in South Asian countries. Due to cross-border population movement, inadequate health services and lack of coordination in implementing prevention and control strategies, these diseases are more prominent along the international border areas. Approximately 94 million people of Bangladesh, Bhutan, India and Nepal (BBIN) live in the border areas of the country, making them more vulnerable and susceptible to vector-borne diseases. Therefore, coordinated efforts among neighboring countries are needed to successfully tackle the challenge posed by the cross-border nature of the diseases.

Nepal, which features as one of the poorest countries in the world, is at greater risk due to the open border it shares with India. Twenty-six districts, out of its 75, border India. With 65 districts prone to malaria, 24 to Japanese encephalitis and 13 to kala-azar, His Majesty's Government of Nepal, Ministry of Health, has declared these as priority vector-borne diseases, for attention.

To address the spread of vector-borne diseases, the Environmental Health Project (EHP), a USAID funded program in Nepal, is working on facilitating integrated vector-borne disease prevention and control strategies among the BBIN countries in collaboration with national, cross-border and regional partners. It has identified various technical activities, which are at different stages of implementation in the region.

A milestone of EHP's cross-border efforts has been the inter-country agreement it secured from all four concerned countries on the need to share information, and standardize surveillance and laboratory diagnoses for priority vector-borne diseases. Consensus is being sought to find ways of bringing this about. Another of cross-border achievement is the establishment of an inter-country communication network for behavior change communication strategies, information dissemination, and data and information sharing. Launching of the BBIN web site (<http://www.bbin.org>), established by EHP following a mandate given to it by the July 2000 Inter-country Cross-border Workshop, has facilitated the sharing of information on vector-borne diseases and in monitoring regional trends in the four countries. Efforts are also underway to establish a database on malaria drug and insecticide resistance, and to assist the countries in conducting standardized surveillance for checking the development of drug resistance.

With continued commitment of all the four countries, a sustainable cross-border prevention and control of vector-borne diseases is becoming a reality.

Keywords

Vector-borne diseases, Cross-border population, Environmental Health Project

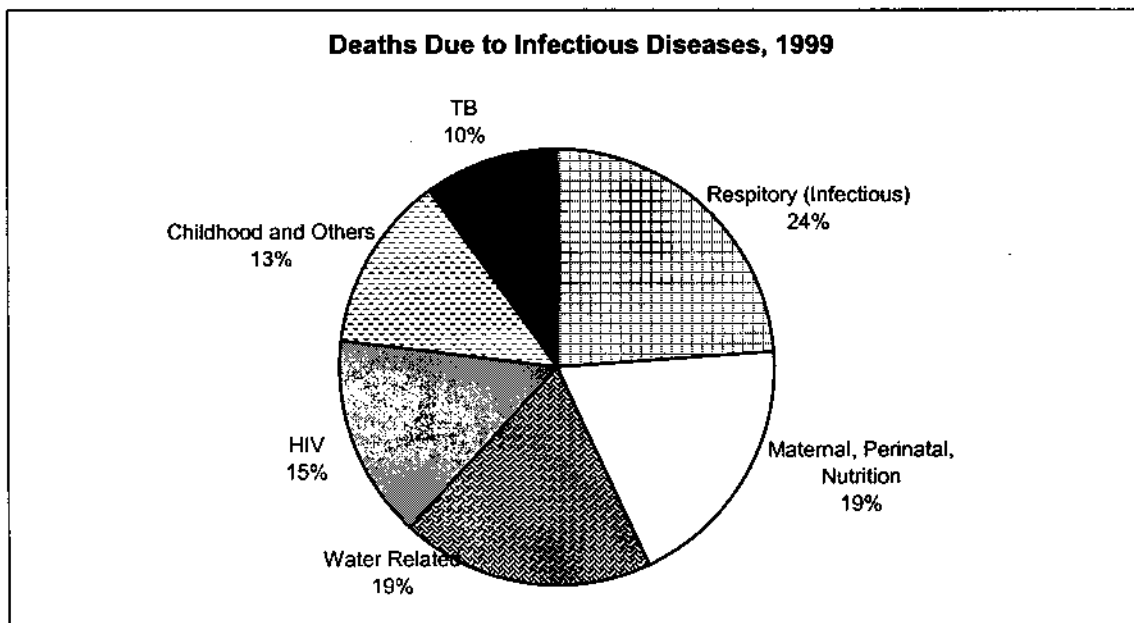
Introduction

In the 1960s, health specialists around the world considered that antibiotic drugs, vaccines against childhood diseases and improved sanitation would virtually eradicate infectious diseases.¹

Yet, today the threat of these diseases looms at large, remaining the world's leading cause of death, killing at least 17 million people a year.

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Illustration 1



Despite the increase in the average life expectancy from 48 years in 1955 to 68 years in 1998, attributed to the improvement of human health, infectious diseases still account for one in three deaths.² In people between 0-44 years of age, infectious diseases is responsible for almost half of all deaths; it is still higher, about 63%, among children of 0-4 years old.³

All indications are that the trend of increased infectious diseases will continue, as factors

responsible for it are not likely to disappear any time soon. Emergence of new infectious diseases, such as HIV/AIDS and the resurgence of illnesses, such as tuberculosis and dengue, previously thought to be under control are placing obstacles in achieving a healthful world. A good example of it is the marked resurgence, sometimes surpassing earlier recorded levels, of malaria in many regions where transmission of the disease had been almost eliminated.

Table 1. Global figures in 1998/99⁴

Infectious Diseases	Number of Individuals Affected
HIV/AIDS	34.3 million
People newly infected with HIV	5.4 million
AIDS deaths	2.8 million
People newly infected with TB	8 million
TB deaths	2 million
Clinical cases of malaria	300 million
Malaria deaths	1 million

The situation has been exacerbated by the reversal of gains made through breakthroughs in science and technology. Numerous factors make reversing the trends of increased epidemics of infectious diseases increasingly difficult:

- Overuse and misuse of antibiotics, causing germs to evolve into drug resistant strains

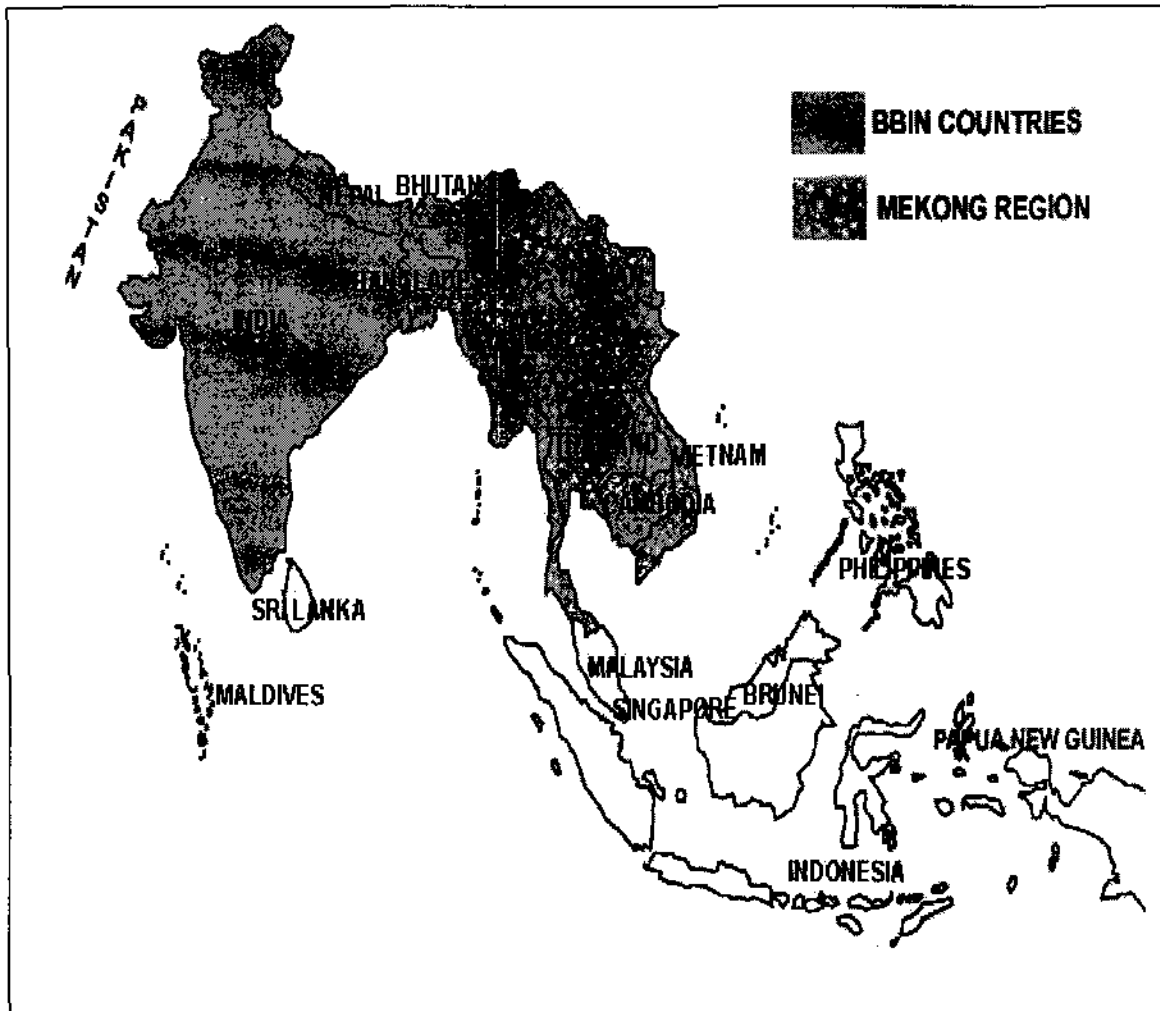
- Growing complacency of the health care profession
- Concentration of population, increasing the possibilities of transmission
- Inadequate provision for water, sanitation and garbage collection, facilitating in the proliferation of vectors
- Resistance to control/public health measures developed by pathogen or vectors that transmit diseases
- Eroding infectious disease surveillance and response capabilities, promoting the spread of diseases
- Movement of people because of trade, trafficking, travel, migration, disasters and conflicts, increasing opportunities for pathogens and vectors to spread to new areas
- Urbanization, deforestation and agricultural practices transforming the ecology
- Prolonged transmission season due to global warming and climate changes.

Resurgence of Vector-borne Diseases

For three centuries, from the 17th to the 20th century, infectious diseases needing a hematophagous arthropod for transmission among vertebrates were responsible for more sickness and deaths than all the other causes put together.⁵ By 1960s, effective prevention and control strategies based on controlling vectors contributed greatly to mitigating the spread of the diseases. Unfortunately, a decade later, in 1970s these vector-borne diseases started to reemerge. The past 20 years has witnessed an even greater downward turn in the situation.⁶

Vector-borne diseases, e.g., malaria, kala-azar, Japanese encephalitis and dengue are prevalent throughout Asia. There is increasing threat of these diseases exploding in an unprecedented manner if timely actions are not taken. The ever-growing trend of drug resistance is adding to the problem. There is real danger of malaria drug resistance spreading to South Asia from the Mekong region, the global epicenter from where many drug resistant parasite strains are transferred to other parts of the world.

Illustration 2

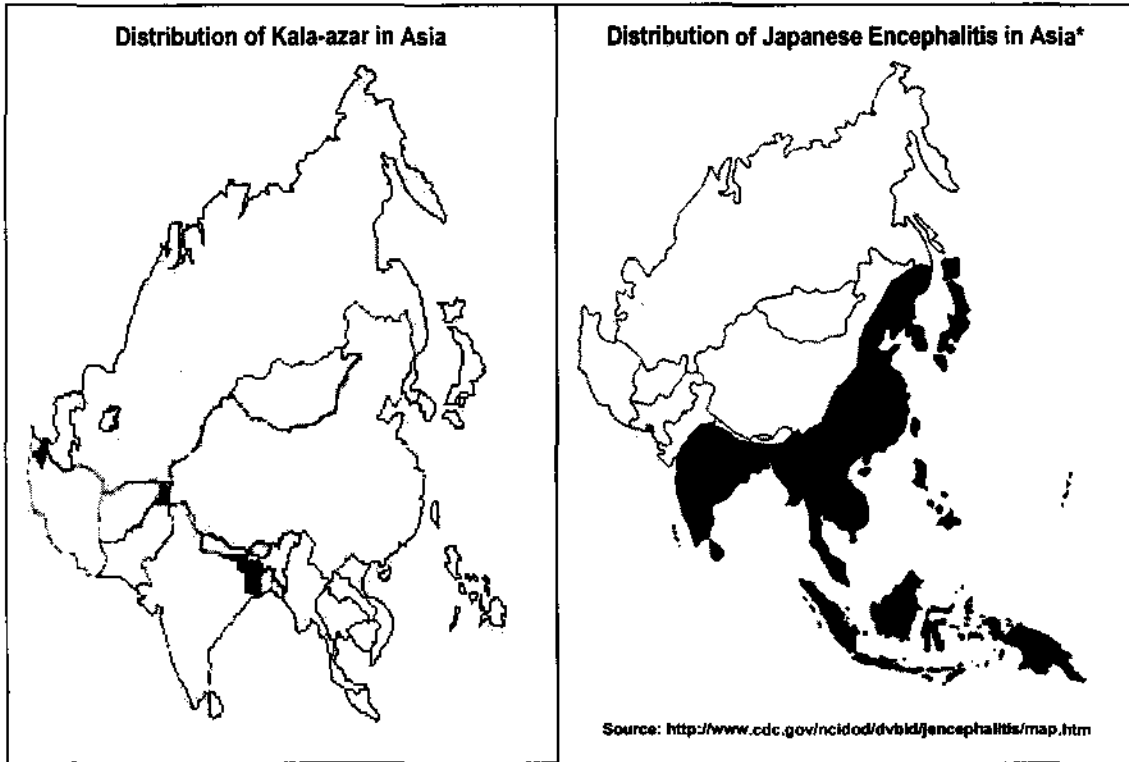


From the islands of the Western Pacific in the east to the Pakistani border in the west and from Korea in the north to Papua New Guinea in the south, 30,000-50,000 clinical cases of Japanese encephalitis are reported annually.

In recent years, there has been dramatic increase in the prevalence of dengue. Around 2500 million people – two fifths of the world's population in

more than 100 countries – are now at risk to dengue. Of the 500,000 new cases of kala-azar, which occur annually, 90% occur in Bangladesh, Brazil, India, Nepal and the Sudan.⁷ Twenty thousand cases of kala-azar were reported in 1999 in the South Asian countries of Bangladesh, India and Nepal alone. The overall situation of these vector-borne diseases in South Asia makes it imperative to take immediate control actions.

Illustration 3



Status of Vector-borne Diseases in Nepal

Malaria, kala-azar and Japanese encephalitis, proclaimed by His Majesty's Government of Nepal, Ministry of Health as priority vector-borne diseases, have been occurring at a disturbing rate in Nepal, especially in the southern belt of the Terai region. The de-acceleration of the malaria eradication program of the 1950s and the change in the strategy from elimination to control of the disease contributed to the decline in the situation.

Illustration 4

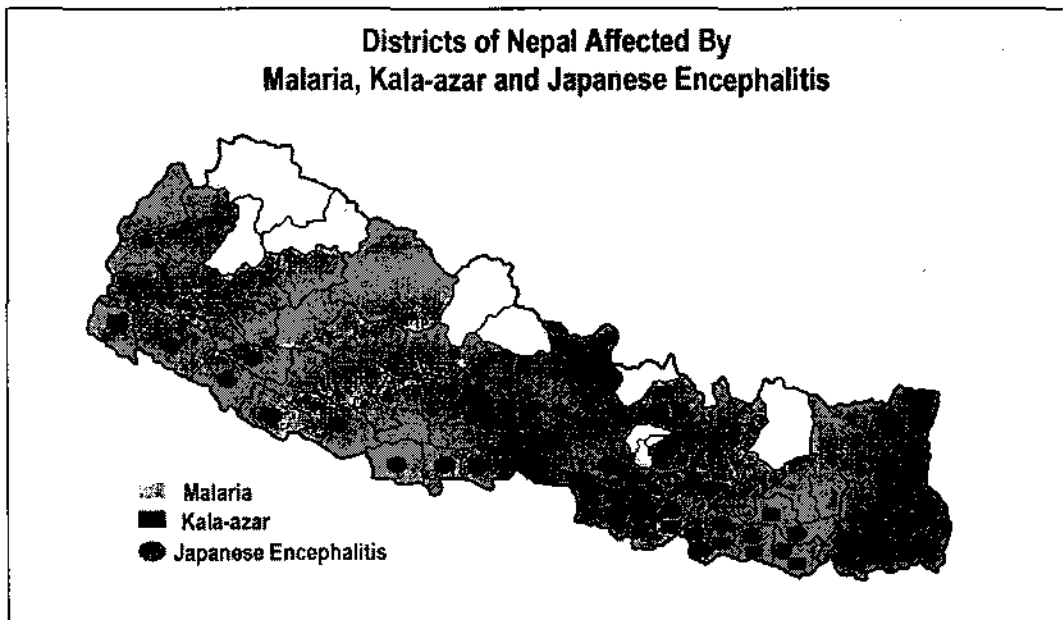


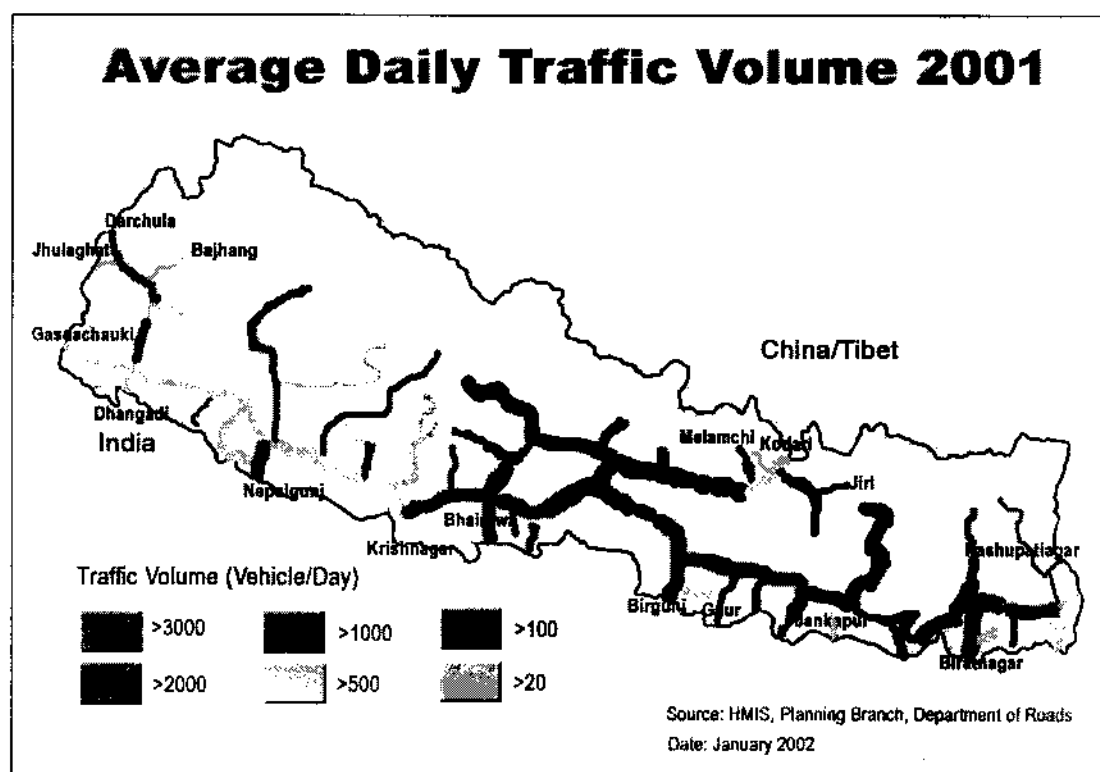
Table 2. Malaria, Kala-azar and Japanese Encephalitis Trends in Nepal^{8,9}

Diseases	Year			
	1997	1998	1999	2000
Malaria				
Total Reported Cases	8957	8498	8959	7981
Total Reported <i>P. falciparum</i>	1150	520	622	528
Kala-azar				
Total Reported Cases	1342	1409	1794	2090
Total Reported Deaths	36	42	24	50
Japanese Encephalitis				
Total Reported Cases	2336	1065	2924	1729
Total Reported Deaths	335	115	434	169

Nepal is also vulnerable to epidemics of gigantic proportion due to the porous, open border of approximately 550 miles it shares with India. Out of 75 districts in Nepal, 26 district borders three states of India - Bihar, Uttar Pradesh and West Bengal - two of which are India's most vector-

borne disease susceptible areas. On an average, a staggering number of 133,155 vehicles crossed the border between India and Nepal daily in 2001, ever-increasing the risk of disease transmission. A year before, the average daily traffic volume was just around 81,221.¹⁰

Illustration 5



Nepal's problem of cross-border diseases is compounded by the fact that there is easy access and free movement of population among the BBIN countries, making transmission of diseases very easy. And it is the border areas that are more

susceptible to infectious diseases. Around 94 million people that live in the border areas of Bangladesh, Bhutan, India and Nepal are vulnerable to the emerging cross-border nature of public health.

Table 3. Population Distribution in the Border Districts of BBIN¹¹

Country	Border Districts	Population in the Border Areas
Bangladesh	30	13.4 million
Bhutan	4	0.15 million
India	59 (11 States)	70.79 million
Nepal	26	9.5 million

Bangladesh: Approximately 88% of the 128 million people (1998 estimation) in the country are at malaria risk. Seventeen districts out of the 30 border districts in Bangladesh face malaria problem. Just 13 of them are responsible for more than 90% of the total cases reported in the country.

Above 20 million (18%) population is considered at risk to kala-azar in Bangladesh. Seven districts, bordering West Bengal, India, are reporting increasing number of kala-azar cases.

Table 4. Malaria and Kala-azar Trends in Bangladesh¹²

Diseases	Year			
	1997	1998	1999	2000
Malaria				
Total Positive Cases	68594	60023	63738	55599
Total Reported <i>P. falciparum</i>	42342	42222	44306	39536
Kala-azar				
Total Reported Cases	8846	7032	5799	7640
Total Reported Deaths	17	24	23	24

Bhutan: In Bhutan, more than 90% malaria cases are reported among the 40% of the total population that live in the border areas. Around 30% cases of malaria are imported from India. What is more worrisome is the fact that multi drug resistance is increasing in these border areas.

Table 5. Malaria Trend in Bhutan¹³

Diseases	Year			
	1997	1998	1999	2000
Total Reported <i>P. vivax</i>	5344	3498	5937	3197
Total Reported <i>P. falciparum</i>	3685	3403	6654	2738

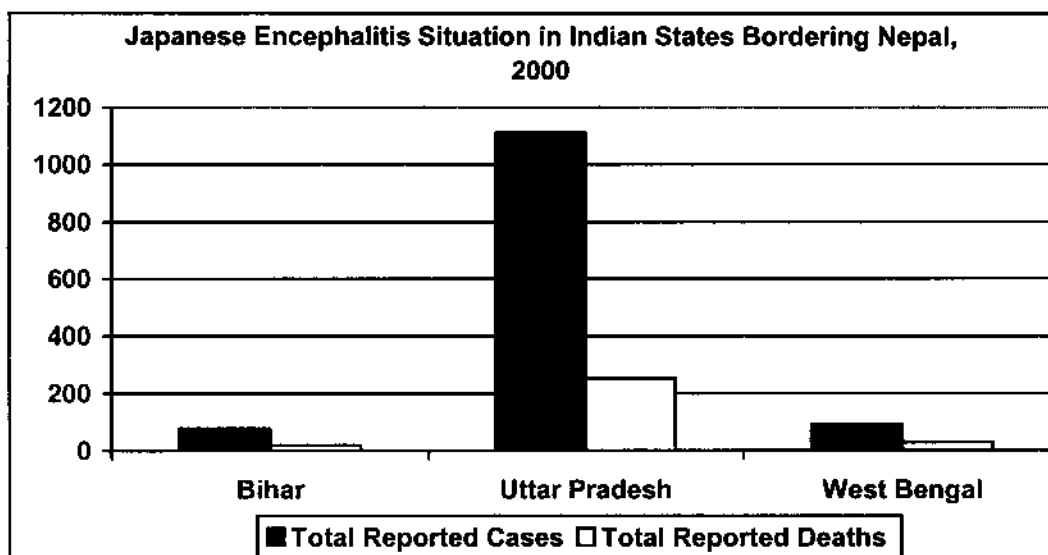
India: Four states with 17 districts in India that have malaria problem touch the east, west and south of Nepal. Six districts of West Bengal along the Indo-Bangladesh border, seven districts of Bihar and one district of Uttar Pradesh along the Indo-Nepal border have reported cases of kala-azar.

Table 6. Malaria and Kala-azar Trend in India^{14,15}

Diseases		Year			
		1997	1998	1999	2000
Malaria	Total Reported Positive Cases	2660057	2222748	2284713	244070
	Total Reported Deaths	879	664	1048	97
Kala-azar	Total Reported Cases	17429	13627	12886	14753
	Total Reported Deaths	255	226	297	150

Japanese encephalitis has been reported from 24 states in India and it is estimated that a population of 160 million is living at risk of Japanese encephalitis in India.

Illustration 6



Nepal: In Nepal, malaria is prevalent in all of the 26 districts bordering India - Uttar Pradesh, West Bengal and Bihar. Out of the 24 Japanese encephalitis prevalent districts, 20 share borders with India. Out of the 13 districts in Nepal with reported cases of kala-azar, 11 are border areas. A factor that needs taken into account is that kala-azar is highly endemic in Bihar, one of the states of India bordering Nepal. In fact, the greatest kala-azar epidemic that was ever documented took place in North Bihar in 1978, when over half a million people died from the disease.¹⁶

The situation in the BBIN countries makes it imperative to further develop mechanism to sustain cross-border collaboration. *Through the years, the health services have expanded and improved, bringing about a significant reduction of morbidity and mortality. But these improvements have not expanded to include the periphery and border districts. In order to facilitate the management of cross-border health problems, inter-country collaborative efforts are needed.*



Cross-border Approach of the Environmental Health Project

In 1998, the Environmental Health Project (EHP), funded by the United States Agency for International Development (USAID), launched its five-year program in Nepal to assist His Majesty's Government, Ministry of Health in the prevention and control of selected vector-borne diseases. Now with the support of the USAID Asia and North East Asia (ANE) Bureau, EHP has intensified its battle against vector-borne diseases across borders, with the intention of encompassing the BBIN region.

One of the objectives (Objective 5) of EHP is to "Assist the Ministry of Health in establishing inter-country linkages for addressing cross-border prevention and control of priority vector-borne

diseases^{*}. The intent of this effort is to work with Nepal's neighboring countries to develop common standards for diagnosis and surveillance of key vector-borne diseases and share information about disease outbreaks and trends. Because of the clear relationship between this objective and the ANE Bureau's regional interests and Strategic Objective 29^{**}, the Bureau and EHP are working together to provide technical support and coordination for the continued development of the BBIN network, comprised of representatives of the vector-borne disease control programs in Bangladesh, Bhutan, India and Nepal.¹⁷

EHP's first formal venture into cross-border collaborative activities began with a workshop at the Vector-borne Disease Research and Training Center (VBDRTC) in Hetauda, Nepal, July 25 to 28, 2000.

One of the important outcomes of the workshop was the establishment of the BBIN web site (<http://www.bbin.org>) to share information on vector-borne diseases, particularly on malaria, kala-azar and Japanese encephalitis. This was launched during the Inter-country Meeting on Cross-border Initiatives on HIV/AIDS, Tuberculosis, Malaria and Kala-azar convened by WHO/SEARO (South East Asia Regional Office) and the South Asian Association for Regional Cooperation (SAARC) in Kathmandu, March 6 to 9, 2001. The BBIN web site is being updated and is in the process of expanding to include regional trends of infectious diseases and anti microbial resistance.

Illustration 8

Home Page of <http://www.bbin.org>

BBIN NETWORK FOR VECTOR-BORNE DISEASES

Bangladesh, Bhutan, India and Nepal

Working Together
to be Vector-borne Disease Free BBIN Countries

The BBIN Network has been developed to coordinate inter country cross border issues on malaria, kala-azar, Japanese encephalitis and other vector-borne diseases in Bangladesh, Bhutan, India and Nepal.

This network emphasizes sharing of information on regional trends, including the prevalence and incidence of infectious diseases and anti microbial resistance.

Malaria

Kala-azar

Japanese Encephalitis

Bangladesh
 Bhutan
 India
 Nepal

Introduction to BBIN

Events

Feedback

Information Exchange

This website has been established by the Environmental Health Project/Nepal (EHP) for the BBIN countries, subsequently to be managed by the Vector-borne Disease Research and Training Center (VBDRTC), Hetauda, Nepal.

EHP is sponsored by the Office of Health and Nutrition in the Center for Population, Health and Nutrition, Bureau for Global Programs, Field Support and Research at the U.S. Agency for International Development

* Currently the priority vector-borne diseases are malaria, kala-azar and Japanese encephalitis.

** Strategic Objective 29 is increased use of effective responses to selected infectious diseases in Asia and the Near East.

WHO/SEARO has also initiated numerous meetings since 1995 to share experiences in disease prevention and management and to highlight issues related to the spread of these diseases across shared borders.¹⁸ Joint action

plans have been developed and resources mobilized in bi- and multi-lateral partnership through SAARC for cross-border collaboration on malaria, kala-azar, HIV/AIDS and TB control in selected border districts in BBIN.

Table 7. Border Districts Selected for the Joint Plans of Actions¹⁹

1. India – Jantia Hills, Meghalaya	Bangladesh – Sylhet
2. India – East Champaran and Lakhimpur Kheri	Nepal – Kailali, Bara and Rautahat
3. India – Darjeeling and Jalpaiguri	Bhutan – Samtse and Chukha

EHP actively participated in these inter-country cross-border meetings and further identified technical activities to follow-up. Now, process is underway for immediate implementation of these activities with the aim to achieve –

1. Inter-country agreement regarding surveillance and diagnosis standards for priority vector-borne diseases
2. Inter-country communications network for behavior change communication strategies, information dissemination, and data and information sharing

Malaria Drug Resistance in Bangladesh, Bhutan, India and Nepal

Treatment of malaria is becoming more complicated with the spread of drug resistance, often compelling one to acquire newer drugs that may be more expensive and toxic. In the last decade, chloroquine resistant *Plasmodium falciparum* has spread explosively in the Indian sub-continent, increasing the incidence of mortality, severe diseases and epidemics. This process has intensified due to the proximity of the South Asian countries to the Mekong region, the epicenter of malaria drug resistance. The problem has been compounded by the fact that adequate information is not available. Hence, EHP took on the task of reviewing malaria drug resistance status of Bangladesh, Bhutan, India and Nepal to determine the resistant trends of the malaria parasites, with focus on cross-border areas of the countries and on *P. falciparum* infections. This would facilitate the BBIN countries to review their policy guidelines on chemoprophylaxis and treatment, standardize methodologies in conducting *in vitro* and *in vivo* studies and to coordinate collaborative efforts to strengthen the monitoring of drug resistance.

Insecticide Resistance in Bangladesh, Bhutan, India and Nepal

Insecticide resistance has been a problem in all insects that serve as vectors of diseases. Since 1947, more than 50 mosquito species have developed resistance to insecticides.²⁰ Despite decades of international efforts, details of insecticide resistance have not been fully gathered. Since insecticide resistance affects

vector-borne disease control and its reemergence, information on it would help in control strategies. Bearing this in mind, EHP has started preparing an inventory of insecticides used in the BBIN countries against malaria, kala-azar and Japanese encephalitis vectors.

Community-based Surveillance and Case Management for Prevention and Control of Kala-azar

Collaboration activities at the local and community level towards prevention and control of kala-azar on both sides of the Nepal-India border have been identified. These activities will be focused in Dhanusha and Mahottari Districts of Nepal and Bihar State, India, (focusing particularly in Sitamarhi, Madhubani and Supoul Districts).

Other Cross-border Activities

As part of institutional capacity building, EHP is working with Nepal's Vector-borne Diseases Research and Training Center (VBDRTC) and at EHP's first inter-country workshop VBDRTC was appointed as a nodal center to coordinate inter-country cross-border issues on VBDs.

Nepal designated to hold a Secretariat for Malaria Drug Resistance Surveillance Network for the BBIN countries.

Working on adopting standardized surveillance methodologies among BBIN countries and agreement on data exchange system.

Together with MoH *in vitro* and *in vivo* malaria drug resistance studies are being carried out in

border districts. Furthermore, an inter-agency agreement has been signed with the U.S. Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok, to carry out in vitro malaria drug resistance study in Jhapa district. This will be extended to the regional level as part of the cross-border network.

Challenges

Diseases know no national boundaries - relatively small outbreaks can often grow into global epidemics. Therefore, it has become imperative to meet the health challenges of controlling and preventing these diseases by taking a global approach. Sporadic attempts have been made to coordinate international efforts at controlling diseases, but with not much success barring few exceptions like eradication of smallpox and the polio-plus drive.

A large number of the population that live in the border areas of Bangladesh, Bhutan, India and Nepal, are easy prey to emerging cross-border nature of vector-borne diseases. Poverty, mass movement of population, deterioration of health service delivery, growth of insecticides and drug resistance, lack of sustained political will, unavailability of easy access to health care, absence of standardized prevention and control strategies and weak integrated, collaborative inter-country efforts at all times make these people even more vulnerable to infections. The region can no longer carry the sociological and economical burden of these diseases.

The BBIN region faces the herculean task of bringing about greater awareness; improving public health infrastructure; building technical resources through training and laboratory support; further developing national capacity in surveillance and response to epidemics and outbreaks; monitoring drug resistance; and promoting networking of laboratories and institutions to exchange information on a regular basis.

A more intensive effort is needed to promote better health and reduce the burden of vector-borne diseases through effective partnership among the BBIN countries. There is a need to develop and implement evidence-based strategies built on experiences. Local initiatives have to be encouraged to carry out situation analysis, which can be translated into cross-border efforts and included in national policies. Successful strategies implemented by one country then could be adopted by another in whole or in part after adapting to local situation.

The greatest challenges facing the countries are to scale up national strategies to touch upon cross-border issues and to continue to be committed to collaborative efforts for sustainable prevention and control of vector-borne diseases. The BBIN countries have made progress in some measure in this regard. With EHP's initiation, Bangladesh, Bhutan, India and Nepal have come together and intensified inter-country cross-border collaboration in an effort to wipe out the scourge of vector-borne diseases that have been plaguing the people, the countries and the region!

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