FIELD PROJECT REPORTS

By

Dr. Balraj Singh

(MAE-FETP Scholar)

submitted in partial fulfillment of the requirements for the degree of
Master of Applied Epidemiology (MAE)

of

Sree Chitra Tirunal Institute for Medical Sciences and Technology
Thiruvananthapuram, Kerala 695 011

This work has been done as part of the two year Field Epidemiology Training Programme (FETP) conducted at

National Institute of Epidemiology
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CERTIFICATION

This is to certify that all the field projects submitted in this Bound Volume are original works carried out by **Dr. Balraj Singh** during the two field postings of six months each under guidance of faculty of national Institute of Epidemiology (ICMR), Chennai and the local supervisor specially nominated for this purpose. This is in partial fulfillment of the requirements for the degree of Master of Applied Epidemiology and has not been submitted earlier by him in part or whole for any other (publication or degree) purpose.

Date: 3/1/17

Chennai

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Date 31st January 2009

Chennai **Dr. Balraj Singh.**

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SECTION 1

FIRST FIELD POSTING

1. HEALTH SITUATION ANALYSIS

1. Health situation analysis, Himachal Pradesh, India, 2006.

1.1 Introduction

1.1.1 Background

I was working as a Medical Officer at Zonal Hospital, Mandi, District Mandi, Himachal Pradesh prior to joining MAE course at NIE Chennai. I completed postgraduate degree in public health (M.D. Community Medicine) in May 2005 and was posted to Zonal Hospital Mandi in June 2005. Most of the times I worked in the department of surgery and hardly got any opportunity to utilize my skills in the field of public health.

After completing the first contact session at NIE, Chennai from January to April 2006, I reported back for my duty to State Programme Officer, Integrated Disease Surveillance Project, in the office of the Director of Health Services, Government of Himachal Pradesh, Shimla for my field assignments. I will complete my assignments working in this office during the next two years.

The key elements to be presented in this health situation analysis include: -

- General presentation of the location: natural geography, climatic conditions, administrative setup, economic resources, cultural, ethnic and linguistic characteristics.
- Demographic and socioeconomic profile.
- Health facilities: health institutions, health manpower and laboratory facilities.
- Organization of the health system.
- Major public health priorities and
- Indicators towards the millennium development goals.

1.1.2 Himachal Pradesh: Overview of the state

Himachal Pradesh is a predominantly hill state located in the northern part of the country. It covers an area of 55,673 Sq.Kms with a population of 60,77,900 (Census 2001). It comprises 1.69% of area and 0.59% of population of the country. The altitude of various areas ranges from 450 meters to 6,500 meters above mean sea level and, therefore, the climatic conditions also vary from subtropical conditions (altitude <950 meters) to dry temperate conditions (altitude>2500 meters).[1]

Agriculture is the main occupation of the people, contributing 22.5% towards the state gross domestic product. Majority community in the state is Hindu (95.6%). Muslims (1.9%), Sikhs (1.2%), Buddhists (1.2%) & others comprise the remaining 4.4%. Most people speak Hindi language although there are more than a hundred dialects spoken in the state. Most communities still believe in supernatural theory of disease causation and cure.[1]

Administratively the state is divided into three zones and 12 districts. Two of the districts - Lahaul & Spiti and Kinnaur are completely tribal. Half of the district of Chamba is also tribal.

1.2 Objectives

- Critically analyze the health situation in the state based on various indices (please see methods below) and other observations related to health status and health services.
- Formulate recommendations based on the conclusions derived from this analysis.
- Identify potential topics for my MAE-FETP course assignments based on the health situation in the state.

[1] Source: Government of Himachal Pradesh, Statistical Outline of Himachal Pradesh, 2002

1.3 Methods

1.3.1 Data sources

We collected the data on various indicators/facilities from the following sources/documents:

- Directorate of Health Services, Government of Himachal Pradesh.
- Registrar General of India, Census , 2001.
- National Family Health Survey-2 (NFHS-2).
- World Bank - Millennium Development Goals for India.
- National Health Profile, India, 2007 - Document by Central Bureau of Health Intelligence (CBHI), Directorate General of Health Services, Ministry of Health & Family Welfare, Government of India.

1.3.2 Indicators

We reviewed the following quantitative and qualitative indicators related to health status and health services in the state:

1.3.2.1 Demographic indicators

- Population structure – by age, sex, residence (rural/urban) and caste.
- Other demographic characteristics – sex ratio, growth rate & population density
- Vital Rates – birth rate, crude death rate, life expectancy at birth.

1.3.2.2 Socioeconomic indicators – literacy rate and per capita income.

1.3.2.3 Health facilities: Health institutions and health manpower

1.3.2.4 Laboratory facilities – available at different levels of health facilities.

1.3.2.5 Public health problems and priorities in the state.

1.3.2.6 Health status indicators including indicators towards Millennium Development Goals.

1.4 Results

1.4.1 Population

The population structure is typical of a high fertility population. Thirty one percent of the population is below15 years of age whereas nine percent is 60 years of age and above. The population structure of the state as per the 2001 census is shown in table 1.1. Kangra is the largest district by population and Lahaul and Spiti the largest by area. District wise population structure and selected demographic characteristics are given in table 1.2.

1.4.2 Selected demographic/socioeconomic indicators and vital rates

Being a hill state, Himachal Pradesh is thinly populated. Most people (>90%) live in rural areas and this proportion is one of the highest in the country. The state has a higher literacy rate and per capita income compared with the national average. Selected vital rates are also better than the national average (table 1.2).

1.4.3 Health facilities

1.4.3.1 Organization of Health Infrastructure

The state has a three tier health care infrastructure comprising primary, secondary and tertiary care level health facilities.

Primary level: Primary health care institutions include health sub-centers and primary health centers. There are 2068 sub-centers and 440 primary health centers in the state.

Secondary level: Secondary level health care institutions include Community Health Centers, District and sub-district level hospitals. The state owns 66 community health centers and 50 hospitals as secondary level health institutions.

Tertiary level: These include the two medical college hospitals at Shimla (Indira Gandhi Medical College and Hospital, Shimla) and Dharamshala (Dr. Rajender Prasad Government Medical College & Hospital, Tanda at Dharmshala, District Kangra).

Tertiary care institutions come under the department of Medical Education, Ministry of Health & Family Welfare whereas primary and secondary health care facilities come under the department of Health & Family Welfare, Ministry of Health.

Going by the population covered by various levels of health institutions, the state fulfills government of India norms for each level of health facilities (table 1.4)

Other details of various primary and secondary health care institutions are shown in table 1.4 and the organizational structure in Fig 1.

1.4.3.2 Health manpower situation

The highest shortage of health functionaries is amongst trained dais/midwives (45%), followed by male and female health workers (35.9 and 19.0% respectively). Other details about key health functionaries in the state department of Health & Family Welfare of are shown in table 1.5.

1.4.3.3 Laboratory resources

Various laboratory facilities existing at the three levels of health institutions are shown in table 1.6. However, with the strengthening of laboratory network under the Integrated Disease Surveillance Project (IDSP) that was launched in the state in March 2005, is yet to be undertaken

1.4.4 Major Public Health Problems and public health priorities

1.4.4.1 Burden of disease (BOD)

The Burden of Disease estimates study was undertaken in the state of Himachal Pradesh in the year 2001-02[2]. The first estimate of Burden of Disease (BOD) was made on the basis of secondary data available on mortality and morbidity. The morbidity data for the state has been compiled from the morbidity report of the state for the year 1999. The source of mortality data is the annual statistical report prepared by Government of Himachal Pradesh for the year 2000.The total population of the state has been taken from primary censes abstract for 2001.The age and sex composition of the state is based on the average of the annual SRS report of the past five years (1993-1998). The summary of estimation for BOD for year 2001 is given below:

1. The total "Disability Adjusted Life Year " (DALYs) lost in Himachal Pradesh were 2305295; 1288461 (55.8%) were lost in males and 1016834 (44.1 %) in females.
2. The total DALYs lost per 1000 population in Himachal Pradesh were 379, which was slightly higher than India (344 per 1000 population).

[2] Department of Health & Family Welfare Himachal Pradesh. 'Himachal Burden of Disease – A Study' 2001

3. Among the children (0-4 years), diarrhoeal diseases, low birth weight and lower respiratory infections are still the leading causes of disease burden.
4. Among the reproductive age group (15-45 years), road accidents, other unintentional injuries, iron deficiency anemia, tuberculosis, chronic obstructed pulmonary diseases and upper respiratory infection are the leading causes of diseases burden.
5. Among the elderly (more than 60 years), the main causes of disease burden are chronic obstructed pulmonary disease, ischaemic heart disease, tuberculosis, asthma, other infectious diseases and other unintentional injuries.
6. The overall leading causes of disease burden in both sexes are chronic obstructed pulmonary disease, asthma, iron deficiency anemia, dental caries, other unintentional injuries and diarrhoeal diseases.
7. The ratio of Years of Life Lost due to premature mortality (YLL) and Years of Life Lived with Disability (YLD) is higher among males as compared to females in different age groups. It means that burden of disease is more contributed by the premature mortality compared to disability.
8. The leading causes of premature mortality (YLL) in males and females are road accidents, diarrhoeal and other infectious diseases, ischaemic heart disease, self-inflicted and other unintentional injuries, tuberculosis and chronic obstructed pulmonary disease.
9. The leading causes of disability (YLD) in both sexes are chronic obstructed pulmonary disease, ischaemic heart disease, diarrhoeal diseases, and other unintentional injuries.

1.4.4.2 Public health priorities

Key public health priorities in the state are mentioned in table 1.7.

1.4.4.3 Indicators towards Millenium development goals

In terms of indicators towards millennium development goals, it can be seen from the table 1.8 that all the indicators in the state of Himachal Pradesh are better than the national average except for the births attended by the skilled health personnel. It could be because of the difficult terrain of the state and therefore difficult in reaching the health institutions to avail of the services at the time of onset of labour.

1.5 Conclusions

1.5.1 Strengths of the system

1. The main strength of the health system is the existence of a well knit three health care system providing services to even the most far-flung rural, backward and tribal areas. The population served by various health institutions is as per the norms laid down by the government of India. The infrastructure is being further strengthened under the National Rural Health Mission (NRHM) and Integrated Disease Surveillance Projects (IDSP) in the state.
2. The state has two tertiary care hospitals and reference laboratories in two medical colleges and one WHO accredited microbiological laboratory namely Central Research Institute, Kasauli, District Solan). The people of the state do

not have to normally go out of the state to seek health services that are available at the cheapest price in the state.

3. Decennial growth rate in the state during the decade 1991-2001 has been +17.54 as against the country's growth rate of +21.34. This is one of the remarkable achievements of the state health & family welfare programme. The population of the state stands at 60,77,900 (Census 2001) against an estimate of 63,64,000 on that date.

4. Socio-economic status of the people of the state is better than the national average. Per capita income is Rs. 24,903/- and literacy rate is 76.5% against the national average of Rs. 20,989/- and 64.9% respectively.

5. Further strengths of the system are reflected in the following achievements by the Department of Health & Family Welfare in the state:

    - The state has succeeded in eliminating leprosy in the state. The current prevalence of leprosy is 0.6 per 10,000 population in the state.
    - Revised National Tuberculosis Programme (RNTCP) is being successfully implemented in the state with new case detection rate of 80% and a cure rate of 88-89%.
    - Immunization coverage under the Universal Immunization Programme is >97%.
    - Most vital parameters in the state are better than the national average.

1.5.2 Constraints of the system

1. The topography of the state is such that it is one of the major obstacles in the health care delivery to the people of the state. More than 90% of the population lives in rural areas that are poorly accessible
2. Health Management and information system are not yet well developed. The data remains inadequate not only for the disease surveillance systems but also for the vital events in the state. Although there is a separate statistical cell in the Directorate of Health & Family Welfare, it remains handicapped because of lack of proper feedback from the peripheral institutions. xwith
3. There is shortage and irrational distribution of health manpower in the state in absence of a concrete policy of postings. There are institutions where we have surplus manpower whereas others remain understaffed or unstaffed.
4. The state also lacks not only a separate public health cadre but also the sufficient manpower trained in public health activities. Untrained personnel are manning many of the key posts, which can be better handled by public health professionals.

1.6 Recommendations

1. Rationalise the distribution of health manpower so that distribution is proportionate to serve all sections of the community
2. Separate publich health cadre needs to be created in the state health department. At least, public health specialists should be given the programme managerial posts to improve programme performance.
3. Strengthen the health management information system by training the staff in data handling and management.

1.7 Potential topics for various MAE-FETP field assignments

For the assignments to be a fruitful outcome not only for me as merely an academic exercise, but to be of practical use for making true recommendation for the benefit of the state, I intend to do my assignments for the state level activities than the district level activities for secondary data analysis and surveillance evaluation. Although this will, obviously, be more challenging, expensive and difficult task, I am sure I will be able to accomplish it as per the timeline and schedule given to me. However, as the evaluation of a programme cannot be undertaken at the state level single handedly, because of the time and resource constraints, it will be done only at the level of a district.

I am proposing various options for the field assignments (table 1.9) and will undertake whatever is further assigned to me by the worthy faculty and my mentor Dr. (Mrs.) Vidya Ramachandran, from National Institute of Epidemiology, Chennai, India.

Table 1.1: Population structure by age, sex, caste and economic status, Himachal Pradesh, India, 2001.

Population group	Population size	Proportion of the total (%)
Population 0-4 years of age	5,60,187	9.2
Population 5-14 years of age	13,24,203	21.8
Population 15-29 years of age	17,27,160	28.4
Population 30-44 years of age	11,74,406	19.3
Population 44-59 years of age	7,29,664	12.0
Population 60 + years of age	5,47,564	9.0
Age not stated	14,716	0.2
Male population	30,87,940	50.8
Female population	29,89,960	49.2
Population above poverty level	46,79,983	77.0
Population below poverty level	13,97,917	23.0
Schedule caste	15,02,170	24.7
Schedule tribe	2,44,587	4.0
Others	43,31,143	71.3
Total population size	**60,77,900**	**100**

Source: Census 2001, Registrar General of India.

Table 1.2: District wise population and selected demographic characteristics of the districts and state of Himachal Pradesh, India, 2001.

District	Population	Area (Sq km.)	Population Density/sq. km.	Sex-Ratio	Literacy Rate	Sex Ratio at birth
Kangra	1339030	5739	233	1025	80.1	803
Mandi	901344	3950	228	1013	75.2	894
Shimla	722502	5131	141	896	79.1	897
Solan	500557	1936	258	852	76.6	881
Chamba	460887	6528	71	959	62.9	917
Sirmaur	458593	2825	162	901	70.4	926
Una	448273	1540	291	997	80.4	833
Hamirpur	412700	1118	369	1099	82.5	818
Kullu	381571	5503	69	927	72.9	953
Bilaspur	340885	1167	292	990	77.8	847
Kinnaur	78334	6401	12	857	75.2	913
L&Spiti	33224	13835	2	802	73.1	933
HP	**6077900**	**55673**	**109**	**968**	**76.5**	**866**

Source: Census of India, 2001.

Table 1.3: Selected demographic/socioeconomic indicators & vital rates, Himachal Pradesh and India.

Indicator		H.P.	India
Demographic indicators			
Proportion of rural population (%)*		90.2	72.2
Sex ratio (Females/1000 males)*		968	933
Population density (per sq. km)*		109	325
Socioeconomic indicators			
Literacy Rate (%)*		76.5	64.9
Per Capita Income per annum in Rupees (2003-2004)†		24,903	20,989
Vital rates			
Birth rate (2004)‡		19.2	24.1
Crude death rate (2004)‡		6.8	7.5
Decennial growth rate (1991-2001)*		+17.5	+21.5
Total Fertility Rate (2003)§		2.1	3.0
Life expectancy at birth in years (1998-2002)‡	Males	65.7	61.6
	Females	66.3	63.3

Sources:

* *Census 2001, Registrar General of India.*

† *National Accounts Statistics, Central Statistical Organization.*

‡ *Sample Registration System Bulletin; Registrar General of India, April 2006.*

§ *Statistical Report, Registrar General of India, 2003.*

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† *National Accounts Statistics, Central Statistical Organization.*

‡ *Sample Registration System Bulletin; Registrar General of India, April 2006.*

§ *Statistical Report, Registrar General of India, 2003.*

Table 1.4: Health institutions in the state, population served and average radial distance covered, Himachal Pradesh, India, 2007-08.

Health institutions	No. of institutions	Population covered per institution	Average radial distance covered per institution (km)	Government of India norms for hilly areas
Sub-centers	2,068	2,838	2.93	One/3000 population
Primary health centers	440	13,367	6.35	One/20,000 population
Community health centers	66	88,911	16.38	One/1,00,000 population
Hospitals	50	-	- -	
Civil dispensaries	22	-	- -	

Source: Directorate of Health Services, Government of Himachal Pradesh, 2006.

Figure 1: Organizational structure of the health system in Himachal Pradesh

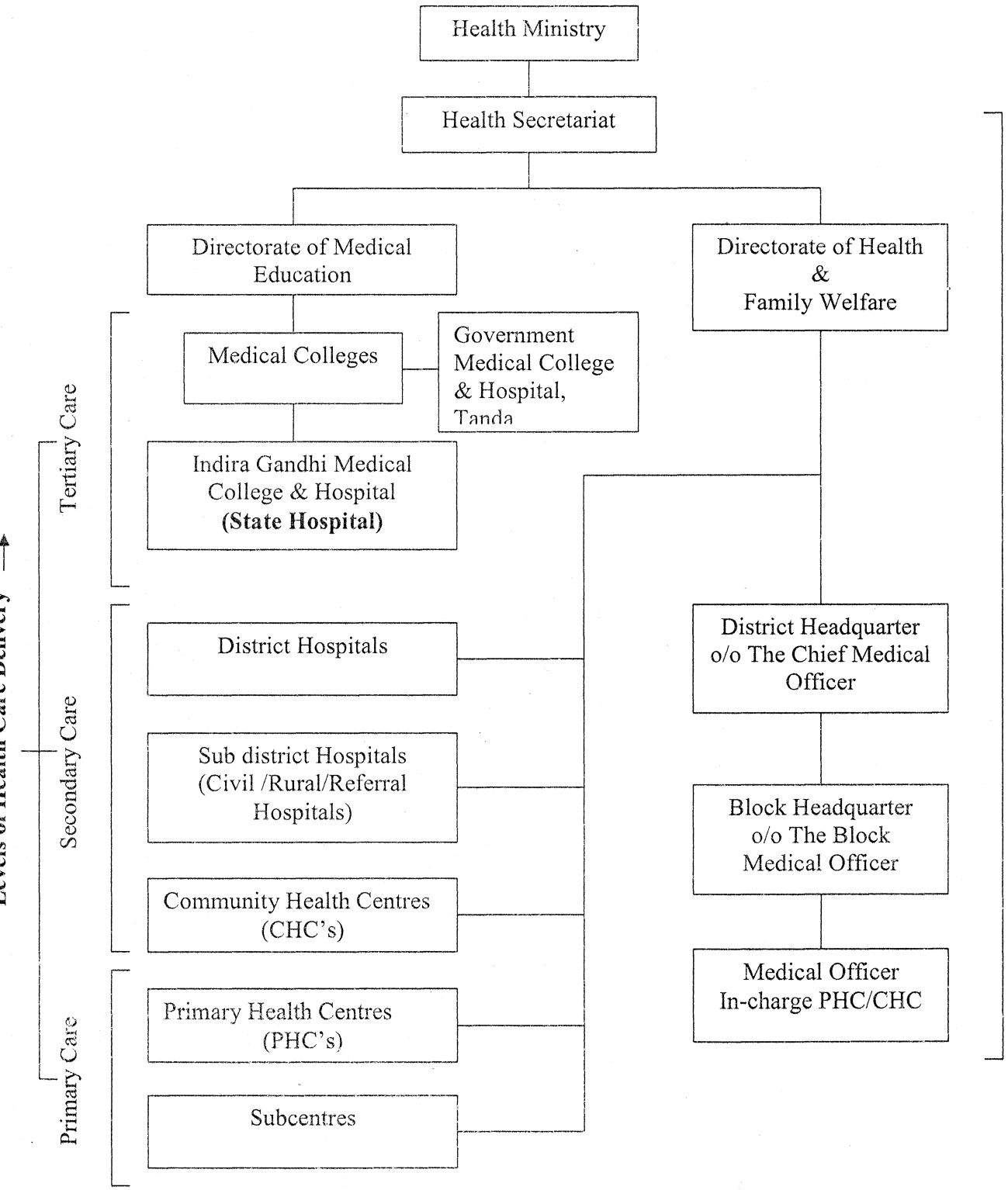

Table 1.5: Category wise health manpower situation, Himachal Pradesh, India (as on 31.3.2005)

Category of Employees	No. of posts sanctioned	No. in Position	Vacant	
			No.	%
Medical officers	1558	1370	188	12.1
Pharmacists	934	789	145	15.5
Staff Nurses	1540	1179	361	23.4
Health Supervisors (M)	413	365	48	11.6
Health Workers (F)	2210	1790	420	19.0
Health Workers (M)	2005	1286	719	35.9
Trained Dais/Midwives	467	257	210	45.0
Lab Technicians	694	571	123	17.7

Source: Directorate of Health Services, Himachal Pradesh.

Table 1.6: Existing laboratory facilities at various levels of institutions, Himachal Pradesh, India, 2006.

Level of Institution	Facilities available
Primary level (PHC level)	• Urine – RE • Hemoglobin estimation (Sahli's method) • Malaria microscopy (At malaria microscopy centers) • Sputum microscopy for AFB (At T.B. microscopy centers only)
Secondary level (CHC/Hospitals)	• **Urine/Stool:** Routine exam. • **Hematological investigations** ▪ Hemoglobin (Sahli's Method) ▪ TLC, DLC, ESR ▪ BT & CT. • **Biochemical investigations** ▪ Blood glucose estimation ▪ Blood urea ; Serum creatinine ▪ Serum uric acid ▪ Liver function tests ▪ Serum lipid profile ▪ RH factor • **Serology** ▪ Widal test ▪ HIV testing ▪ HBSAg ▪ HCV ▪ STS/VDRL • **Microscopy** ▪ Malaria ▪ Sputum for AFB
Tertiary level (Medical college hospitals)	• All facilities available at secondary levels • Bacterial culture & sensitivity testing • Serological tests for HBV, HCV, HIV, Syphilis • CD4 Cell Count • Mycological Culture *(without sensitivity testing)* • **Biochemical investigations** ▪ Thyroid Function Tests ▪ Enzyme assays. • **Histopathological examination of tissue specimens**

Table 1.7: Key public health priorities in Himachal Pradesh, India, 2006.

Public health priority	Key elements	Ongoing prevention and control programmes
Tuberculosis	• ARTI (Average Annual Risk of Tuberculosis Infection is 1.9%. • Amongst new outdoor cases 2-3% are having chest symptoms and out of these 10-15% test smear positive for tubercle bacilli.	• Revised National Tuberculosis Control Programme (RNTCP) and • Directly Observed Treatment – Short Course (DOTS) being implemented throughout the State.
Iron Deficiency Anemia	• Prevalence ranges from 50-80% in different age groups and geographic areas. • Prevalence higher in females of all age groups	• National Programme for Prevention of Nutritional Anaemia as a component of RCH Programme
Acute Respiratory Infections (ARI)	• Leading cause of childhood morbidity & mortality	• Acute Respiratory Disease Control Programme as part of RCH Programme
Diarrhoeal Diseases	• One of the leading causes of child morbidity & mortality	• Diarrhoeal Diseases Control Programme as a component of RCH Programme

Table 1.8: Indicators of progress for the health related millennium development goals, Himachal Pradesh, India, 2006.

Goal	Indicator	Value of the indicator	
		In H.P. (Year)	In India (Year)
	Prevalence (%) of underweight children < 5 years of age[1]	43.6 (NFHS-2)	47.0 (NFHS-2)
	Proportion (%) of population below minimum level of dietary energy consumption	23.0 (2005)	24.0(1999)
	Percentage of children 6-59 month of age who received one dose of vitamin A in the past six months[2]	35.1 (NFHS-2)	17.1 (NFHS-2)
	Proportion (%) of infants under six months who are exclusively breastfed[3]	17.5 (NFHS-2)	55.2 (NFHS-2)
Goal 4	Under-five mortality rate per 1000 live births	42.4 (NFHS-2)	94.9 (NFHS-2)
	Infant mortality rate per 1000 live births[4]	51.0(2004)	58.0 (2004)
	Measles immunization among children under one (percent coverage)	89.1 (NFHS-2)	51.0 (NFHS-2)
Goal 5	Maternal mortality ratio	Not available	420 (1990) 407 (2001)
	Proportion (%)of births attended by skilled health personnel	40.2 (NFHS-2)	42.3 (NFHS-2)
	Contraceptive prevalence rate [5] (percent)	67.7 (NFHS-2)	48.2 (NFHS-2)
	Percentage of women receiving antenatal care [6]	86.8(NFHS-2)	65.4(NFHS-2)
Goal 6 (HIV)	HIV prevalence among 15-24 years old pregnant women [7]	0.13% (NACO 2005)	0.88% (NACO 2005)
	Condom use rate of the contraceptive prevalence rate	7.4% (NFHS-2)	6.5% (NFHS-2)
	Number of children orphaned by HIV/AIDS	Not available	Not available
	Percentage of people using a condom during most recent higher risk sexual encounter	Not available	Not available
	Percentage of STI clients who are diagnosed and treated according to guidelines	Not available	89.0 (DGHS 2003)
	Percentage of HIV-positive women receiving anti-retroviral treatment during pregnancy to prevent mother to child transmission of HIV	Not available	84.5% (2003)

Abbreviations used for data sources: NFHS 2 (National Family Health Survey 2; 1998-99); DHS (Directorate of Health Services, Himachal Pradesh); DGHS (Director General of Health Services, Govt. of India); NACO (National AIDS Control Organization, India); WHO (World Health Organization).

[1] Figures given in cells are for children 6-35 months (figures for children up to 59 months not available)
[2] Figures given in cells are for children 12-35 months (figures for children up to 59 months not available as the programme is being implemented up to 35 months of age in the country as well as the state of Himachal Pradesh)
[3] Figures for infants 0-3 months.
[4] Source: Statistical Report, Registrar General of India April 2006.
[5] May be replaced by the effective couple protection rate.
[6] Information may be available to describe the proportion of women with at least one visit.
[7] Replace by prevalence among women attending antenatal clinic if not available.

Table 1.8(contd.): Indicators of progress for the health related millennium development goals, Himachal Pradesh, India, 2006.

Goal	Indicator	Value of the indicator	
		In H.P. (Year)	In India (Year)
Goal 6 (Malaria)[8]	Malaria death rate [9,10]	0 (2005)	0.003% (2000)
	Proportion (%) of people with uncomplicated malaria getting correct treatment at the health facility and community levels, according to the national guidelines, within 24 hours of the onset of symptoms	Not available	Not available
	Percentage of pregnant women who have taken chemo prophylaxis or drug treatment for malaria	Not available	Not available
	The proportion (%) of households having at least one insecticide treated bed nets	0	Not available
Goal 6 (TB)	Prevalence and death rate associated with tuberculosis per 1,00,000	Not available	Prev: 426 (2002) Deaths: 40.4(2002)
	Proportion (%) of tuberculosis cases detected and cured under DOTS	80.0/88.0 (DHS 2005)	66.0/86.0 (DGHS 2005)
	Percentage of estimated new smear-positive tuberculosis cases registered under the DOTS approach	78.6 (DHS 2005)	62.5 (DGHS 2005)
Goal 7	Proportion (%) of population with sustainable access to an improved water source[11], urban and rural	Rural: 87.5(2001)[12] Urban: 97.0(2001)	Rural: 79.0(2000) Urban: 95.0(2000) (WHO 2002)
	Proportion (%) of urban population with access to improved sanitation [13]	Not available	61.0(2000) (WHO 2002)
Goal 8	Proportion (%) of population with access to affordable essential drugs on a sustainable basis [14]	Not available	80.0(1997) (WHO 2002)

[8] Indicators adapted as per WHO recommendations (Dr Alan Schapira, WHO, personal communication).
[9] If available for children under five, specify.
[10] Source: National Anti Malaria Programme/ Now Directorate of NVBDCP/GOI, 2005.
[11] Improved drinking water sources include: Household connection, public standpipe, borehole, protected dug well, protected spring and rainwater collection. Unimproved drinking water sources include: Unprotected well, unprotected spring, rivers or ponds, vendor-provided water, bottled water (because of lack of quantity) and tanker truck water (WHO/UNICEF).
[12] Source: Statistical Abstract India 2003, Ministry of Statistics and Programme Implementation, Govt. of India & Past Issues.
[13] Improved sanitation facilities include: Connection to a public sewer, connection to a septic system, pour-flush latrine, simple pit latrine and ventilated improved pit latrine. Unimproved sanitation facilities include: Public or shared latrine, open pit latrine and bucket latrine (WHO/UNICEF).
[14] Two indicators possible: What percentage of the population has regular access to essential medicines (i.e. minimum of 20 most essential medicines available and affordable at public and private facilities within a one-hour walking distance) and what percentage of the population is within one-hour walking distance to: public health facilities, private health facilities, Public or private retail drug outlet (Dr Sophie Logez, WHO, personal communication).

Table 1.9: Potential topics for the various field MAE-FETP assignments.

Assignment	Potential topic
Surveillance system description and evaluation	• Interim Assessment of Integrated Disease Surveillance Project (IDSP) in the state of Himachal Pradesh.
Secondary data analysis	• HIV/AIDS Sentinel Surveillance data of the **state** for the last five years.
Programme evaluation	• Blood Safety Programme in District Kangra, Himachal Pradesh.
Dissertation	• Metabolic syndrome among hypertensive patients.

2. SECONDARY DATA ANALYSIS

Abstract

Title: Trends of increasing HIV prevalence amongst high risk populations between 2000-2007 indicate an imminent transition from low to concentrated epidemic in the state of Himachal Pradesh, India.

Background: States with HIV prevalence of >5% in high risk groups but < 1% among antenatal cases are classified as having concentrated HIV epidemics. Himachal Pradesh is one of the lowest prevalence states in India with an adult HIV prevalence of 0.03% against a national average of 0.36% in the year 2006. Annual rounds of HIV sentinel surveillance (HSS) are the principal source of information on trends of HIV infection in low and high risk populations in the state.

Methods: We analyzed HSS data for all the five STD (sexually transmitted diseases) clinic sites for the years 2000 to 2007 and for all three FSW (female sex workers) sites for the years 2003-2007 to look for trends of HIV prevalence over time. To compare the trends, we followed guidelines of the National AIDS Control Organization and calculated median prevalence (%) where the no. of sites was >3 and mean prevalence (%) where the no. of sites was three or less.

Results: Median prevalence of HIV infection among STD clinic attendees in the state increased from 0.0% in 2000 to 0.4% in 2007 whereas the mean prevalence amongst FSW's increased from 0.00% in 2003 to 0.87% in 2007. All three FSW sites have targeted intervention (TI) projects being run by non-governmental organizations (NGO's).

Conclusions: HIV prevalence is on the increase among FSW's and STD clinic attendees. The epidemic may soon transform into a concentrated epidemic if urgent steps are not taken. TI projects amongst FSW's have not succeeded in controlling the spread of HIV infection. Reasons for unsuccessful TI's amongst FSW's must be investigated. At the same time prevention efforts need to be scaled up.

Key words
HIV/AIDS, Sentinel, Surveillance, High risk. Population groups, Prevalence, Trends.

Words: 270 (excluding title, sub-titles and key words)

2. Trends of HIV/AIDS epidemic in Himachal Pradesh, India, 1998-2007.

2.1. Introduction

Globally, HIV/AIDS is one of the top ten causes of mortality[1]. As of December 2007, an estimated 33.2 million (Range: 30.6 to 36.1 million) people worldwide were living with HIV. Of these 30.8 million (Range: 28.2 to 33.6 million) are adults and half of the latter (15.4 million; Range: 13.9 – 16.6 million) are women. Remaining 2.1 million [1.9 – 2.4 million] are children below 15 years of age. During the year 2007, an estimated 2.5 million (Range: 1.8 – 4.1 million) people were newly infected with HIV and 2.1 million (Range: 1.9 – 2.4 million) died due to AIDS.[2]

In Asian continent, an estimated 4.9 million [3.7 million-6.7 million] people were living with HIV, including the 440,000 [210 000-1.0 million] people newly infected in the year 2007. Approximately 300,000 [250,000-470,000] people died from AIDS-related illnesses in 2007. Prevalence is highest in WHO South-East Asia region, with wide variation in epidemic trends between different countries. India alone accounts for an estimated 2.47 million (2.0-3.1 million) people living with HIV/AIDS (PLHA) of which 39.3% are females 3.8% are children[2,3]. Adult HIV prevalence in the country in 2006 is estimated to be 0.36% (Range: 0.27-0.47). Prevalence is higher (0.43%) amongst males as compared to females (0.29%). Eleven states in the country have adult HIV prevalence higher than the national average. Of the six high prevalence states (Manipur, Nagaland, Andhra Pradesh, Karnataka, Maharashtra and Tamilnadu) in the country adult HIV prevalence is greater than 1% in three states - namely Manipur (1.67%), Nagaland (1.26%) and Andhra Pradesh (1.05%)[3].

Himachal Pradesh is one of the two lowest prevalence states (along with Assam) with an adult HIV prevalence of 0.03% in the year 2006[3]. As on 31st December 2007, 2653 cases of HIV infection and 506 cases of AIDS were reported to be living with infection[4].

2.1.1. Background of the area

The state has a population of 6,077,900 (Census, 2001; Annexure-2.1) that constitutes 0.6% of country's population with a population density of 109 persons/sq km. Administratively, the State is divided into 12 districts, of which two are completely tribal (districts of Kinnaur and Lahaul and Spiti), spread in 36% of the area of the state. The proportion of rural population is 90.2%, one of the highest in the country. The sex ratio is 968 females/1000 males - 1024 females/1000 males in rural areas and 912 females/1000 males in urban areas.

The state is on the global tourist map as one of the favoured tourist destinations. This promotes chances of commercial sexual activity. The state is also one of the largest apple growing belts in the country. As a consequence lot of truckers move in and out of the state to transport the apple crop especially during the apple season of July to October. At the same time apple orchardists visit metropolitan cities of the country (like New Delhi, Calcutta, Mumbai) to sell their apple produce at higher prices. This makes them vulnerable to visit 'red light areas' in these metros. In addition, state's bordering areas with other states (Punjab, Haryana and Uttarakhand) are having industrial units (due to government policy of giving 'tax holidays' to these units) with majority of the labourers being migrant population from other states of the country. All these factors increase the vulnerability of the population to indulge in high-risk behaviours and acquire STD's/HIV infection.

2.1.2. The prevailing surveillance system

Although the first case of HIV infection was detected in Himachal Pradesh in the year 1992, National AIDS Control Program (NACP) was launched in the state in 1987 with operationalization of sero-surveillance center in the department of Microbiology, IG Medical College, Shimla. HIV sentinel surveillance was started in the state in 1994 at one center - the State STD clinic, DDU District Hospital, Shimla. Regular and systematic HIV sentinel surveillance started in the year 1998. Since then an annual round of sentinel surveillance is being conducted regularly amongst low risk (Antenatal Clinic attendees) and high risk (e.g. STD clinics attendees) populations.

2.2. Objectives

We analyzed the secondary data of HIV Sentinel Surveillance (HSS) of the state of Himachal Pradesh to:-

1. Analyze the number and distribution of sentinel surveillance sites for various population groups in the state since the year 1998.
2. Analyze the trends in the prevalence of HIV infection over time in various geographical areas in different population subgroups (low and high risk).
3. To formulate recommendations based on the results of the abovementioned analysis.

2.3. Methods

2.3.1. Setting

Annual rounds of HIV Sentinel Surveillance (HSS) are being conducted in the state since the year 1998 as part of the National AIDS Control Programme (NACP) through Himachal Pradesh State AIDS Control Society (HPSACS) under the guidelines of the National AIDS Control Organization (NACO), New Delhi. The sentinel sites include sites for low risk populations i.e. antenatal clinics (ANC's) as well as high risk populations viz. STD (Sexually Transmitted Diseases) clinic attendees, FSW's (Female Sex Workers), MSM's (Men having sex with men) , truckers and migrant population.

2.3.2. Data sources

We collected sentinel surveillance data from HPSACS for the years 1998-2007.

2.3.3. Data analysis

We analyzed the data using MS Excel for windows. We followed NACO guidelines (Annexure-2.2) for analysis of sentinel surveillance data. These guidelines include:

1. Calculate median prevalence for the states where no. of sentinel sites is more than three.
2. For calculation of median, do not include the sites where the sample surveyed is less than 75% of the desired sample size (desired sample size is 250 consecutive new patients for high risk population and 400 new consecutive cases for low risk populations).

2.3.4. Quality assurance

We carried out data consistency checks by triangulating the data of districts, the state and NACO.

2.4. Results

2.4.1. Expansion of HIV Sentinel Surveillance In Himachal Pradesh

Regular and systematic HIV sentinel surveillance started in the year 1998 with the establishment of three sentinel sites for STD clinic attendees (at Shimla, Nahan and Bilaspur) and two antenatal clinics (ANC's) at Hamirpur and Kangra . Figure 2.1 shows the expansion of sentinel surveillance since the year 1998 and figure 2.2 shows the distribution of sites in the year 2007.

During the year 2000, four more sites were added, two each for STD clinic attendees (at Chamba and Kullu) and ANC clinic attendess (at Solan and Reckongpeo), so that the total no. of sites reached nine (five STD clinic sites and four ANC sites). Also the ANC site at Kangra was moved to Dharamshala, the district headquarter of district Kangra.
In the year 2001, three more ANC sites were created at Mandi, Una and Keylong (district Lahaul & Spiti). This was the first time when every district in the state had at least one sentinel site.

During 2003, a new sentinel site was created for surveillance among Female Sex Workers (FSW's) of Shimla city. This site for FSW's was the first one outside the government sector and was run by a non-governmental organization (NGO). In addition, 15 rural ANC (ANC-R) sentinel sites were identified in districts that already had an ANC site.

These sites were located at Community Health Centers (CHC) or First Referral Units (FRU) of the same district (Annexure-2.3).

In the year 2004 surveillance activities at rural sub sites were withdrawn. Number of sites was 13 during the surveillance rounds of the years 2004-05.

During the year 2006, seven more sites were added. These included -two more sites for FSW's (at Manali in Kullu district and Paonta in Sirmour district), one site for MSM (at Damtal in Kangra district), one STD clinic site at Barmana in Bilaspur district, and three ANC-Rural sites (at Nadaun in Hamirpur district, Rampur in Shimla district and Kaza/Udaipur in Lahaul & Spiti District). With this expansion five of the 20 sites were run by NGO's/Private partners.

In 2007, one STD site at Barmana (District Bilaspur) was withdrawn and replaced by a site for truckers at the same location and another site for migrant population was created for industrial area of Parwanoo in Solan district. The MSM site at Kangra was shifted to Paonta (District Sirmaur). So, during the year 2007, HSS was conducted at 21 sites (five STD clinics, seven ANC's, three ANC-R, three FSW sites, one MSM site, one site for truckers and one site for migrant population).

2.4.2. Trends of HIV infection among ANC attendees

The trends of both mean and median prevalence are on the decline in all the sites although mean prevalence in the state never touched zero since the start of HSS in the year 1998 (figure 2.3). During the year 2007, Una ANC site was the only one reporting sero-positivity. Lahaul & Spiti is the only district in the state that never reported a case but at the same time never completed the desired sample size of 400.

2.4.3. Trends of HIV infection – rural-ANC attendees

Amongst the ANC-rural sub-sites created in the year 2003 in seven districts with main ANC sites, three districts namely Kangra, Solan and Mandi reported HIV prevalence ranging from 0.25-0.50. All these sites were later withdrawn. In the year 2006, none of the three rural ANC sites reported seropositivity. But in 2007, Hamirpur and Shimla subsites reported a prevalence of 0.50 and 0.25 respectively (table 2.1).

2.4.4. Trends of HIV prevalence amongst STD clinic attendees

Overall the trends of HIV prevalence are on the increase in the state (figure 2.4 [a] and table 2.1). However the patterns vary in different districts – whereas district Shimla and district Sirmaur show downward trends, two districts of Bilaspur and Chamba and are showing rising trends. Kullu district did not complete the desired sample size during three of the eight rounds and, therefore, the trends were not analyzed.

2.4.5. Trends of HIV prevalence amongst Female Sex Workers

The trend analysis amongst FSW's also shows a rising trend (figure 2.4) in the state with Shimla showing consistent increase from 0.00% in 2003 to two percent in the year 2007 (table 2.1). The other two sites have also shown seropositivity –Sirmour 0.8% in 2006 and Kullu, 0.53% in 2007 (table 2.1).

2.4.6. Trends among other high risk population groups

The site for MSM was started at Damtal in Kangra district in the year 2006. The prevalence was found to be 0.44 percent. The very next year, the site was shifted to Paonta in district Sirmaur. This site showed zero prevalence amongst MSM. Due to short duration of starting of this site and shifting after one year only, it is difficult to analyze the trends.

The sites for truckers and migrant population were started only during the 2007 round of HSS. Whereas the prevalence among truckers was 0.40% no case was reported amongst migrant population (table 2.1).

2.5. Discussion

Sentinel sites were rapidly expanded from five in 1998 to 21 in the year 2007 to ensure that in addition to antenatal and STD clinics and most population groups that are at a higher risk of exposure to HIV (FSW's, MSM, Truckers and Migrant populations)are included in the surveillance.. The trends of HIV infection are rising amongst high risk populations of FSW's and STD clinic attendees, while these are on the decline amongst antenatal cases.

By the year 2001, all the 12 districts had at least one sentinel site. However, looking at the location of all these twelve sites, all were located at district headquarters which are urban areas. In a state where >90% of population lives in rural areas, the sites seemingly don't represent the majority population of state. Another issue is the ratio of high risk: low risk population groups. The ratio is in contrast to NACO-guidelines. According to NACO guidelines, in low prevalence states (like Himachal Pradesh) the recommended ratio of high risk : low risk population sites is 3:1 (Ratio in 2001 in H.P= 5:7). Even at the end of the year 2007 the ratio stands at 2:1(14 sites for high risk groups and seven for ANCs). Thirdly, larger districts like Kangra and Mandi with higher population (Annexure-2.1) have only one site each whereas smaller districts like Sirmour ,Bilaspur and Kullu have more than on sites (figure 2.2). Fourthly, the location of sites has been changed on more than one occasion. For example, MSM site was moved from Damtal (District Kangra) to Paonta (District Sirmour); ANC site at Kangra (District Kangra) was

moved to Dharamshala (District Kangra); Rural ANC sites (three of which reported seropositivity) created in 2003 were withdrawn in 2004 and not included in Rural ANC sites in 2006 when such sites were recreated. As the main objective of HSS is to monitor the trends, change of location of the sites does not permit the trend analysis. Further, there is no site for patients of TB and Injecting Drug Users. Also there is no participation of the private sector in HSS.

Mean/median prevalence of HIV infection amongst ANC attendees in the state never crossed one percent. The three sites that had prevalence of ≥1% include - Solan and Kinnaur (in the year 2000) and Hamirpur (in 2003.) The trend is on the decline in all the ANC sites but all these sites are urban and represents <10% of the population of the state. Of the three rural sites created in 2006, two are showing seropositivity which reiterates the idea of the importance of HSS in rural areas.

Prevalence among STD clinic attendees never crossed five percent at any of the sites in the state. The only STD site in the state that crossed 2% mark was Bilaspur in the year 2004 and 2006. The trend, however, is on the increase (figure 2.4[a]) although the trends vary from site to site. Shimla and Sirmour are showing downward trends whereas Bilaspur and Chamba are showing upward trends. Kullu site did not complete the desired sample size on three occasions since the start of this site in the year 2000. Therefore, it is difficult to say with certainty whether the trend is on the increase.

Trends of HIV infection amongst female workers are also on the increase (figure 2.4[b]). Of particular concern is the Shimla site which was started in 2003 and has shown consistently rising trends over the years and the prevalence reached two percent in 2007. The other two sites have also shown sero-positivity in the first two years of starting HSS.

Sites for other risk groups viz. MSM, truckers and migrant populations have been started in the years 2006/2007 and therefore, it is not possible to analyze the trends. However, seropositivity has been detected amongst MSM in 2006 and truckers in 2007 (table 2.1).

Although the state continues to be a low-epidemic state, the rising trends amongst high risk population groups, especially the FSW's and STD clinic attendees, are an alarming sign and a warning against complacency. The programme managers cannot relax assuming the state to be out of danger having the lowest prevalence in the country. The factors that are known to influence the HIV epidemic in India are the size, behaviours, and disease burdens of high-risk groups, their interaction with bridge populations and general population sexual networks. The interplay of these forces has resulted in substantial epidemics in several pockets of many Indian states[5]. HIV spreads mainly as a result of unprotected sex between sex workers and their clients, and their respective other sex partners[6]. Although prevention efforts are often complicated by the varied nature of commercial sex[7], especially at tourist destination like the state of Himachal Pradesh, targeted intervention programmes focusing on sex workers have shown some success leading to decline in HIV prevalence among sex workers, especially in Tamil Nadu and other southern states[6]. Understanding of the current epidemic scenario , thus, constitutes the major input to HIV prevention programming.

2.5.1. Limitations of the study

But the study has some of its limitations. Firstly, like all secondary data analysis, reliability and validity of the data remains questionable. Since, HIV sentinel surveillance is guided, co-ordinated and monitored by a nodal agency (NACO), which in turn receives technical inputs for quality assurance from international agencies like UNAIDS and

WHO, it will be unwise to doubt the quality of surveillance and the data generated by it. Secondly, we were provided with only aggregated data (prevalence percent by type and location of the HSS sites) by the HPSACS without any information on age, sex, occupation, education, migrant status etc. of the participants in the sentinel surveillance. This limited our capacity to analyze these variables. However, as one of our main objectives was to look at the trends over time in various geographic areas in different population groups, it has been accomplished. Thirdly, we did not have the denominators (no. of samples tested) for various type of sites. In that case it could have been possible for us to test the trends by chi-square test for trend which is a more robust test than the graphic version.

2.5.2. Conclusions

However, keeping in mind these limitations, we conclude that :-

1. The distribution of sentinel sites is not in line with NACO guidelines. Most sentinel sites are located in urban areas and the ratio of sites for high risk: low risk populations is imbalanced. There is no involvement of private sector. Larger districts of Kangra and Mandi have only one site each whereas smaller districts have more sites.
2. The state continues to be in low epidemicity but the trends of HIV infection are on the increase amongst FSW's and STD clinic attendees.
3. Districts of Bilaspur, Chamba, Una, Shimla and Hamirpur are currently reporting HIV seropositivity in one or the other population group.
4. Targeted intervention project amongst FSW's, in particular at Shimla, has not succeeded in controlling the spread of HIV infection.

2.5.3. Recommendations

Based on these conclusions, we recommend:-

1. Create more sites for high risk population to strike the recommended balance preferably in rural areas. Kangra and Mandi districts have ample scope for creation of new sites. Sites can be identified for IDU's and TB patients.

   However, it will not be wise to shift the existing sites to strike the urban/rural balance.

2. Involve private partners in HSS.
3. Prioritize prevention efforts in districts of Shimla, Bilaspur, Chamba, Hamirpur and Una.
4. Strengthen targeted intervention projects among high risk populations.
5. Investigate the reasons for unsuccessful targeted interventions amongst FSW's at least.

2.6. References

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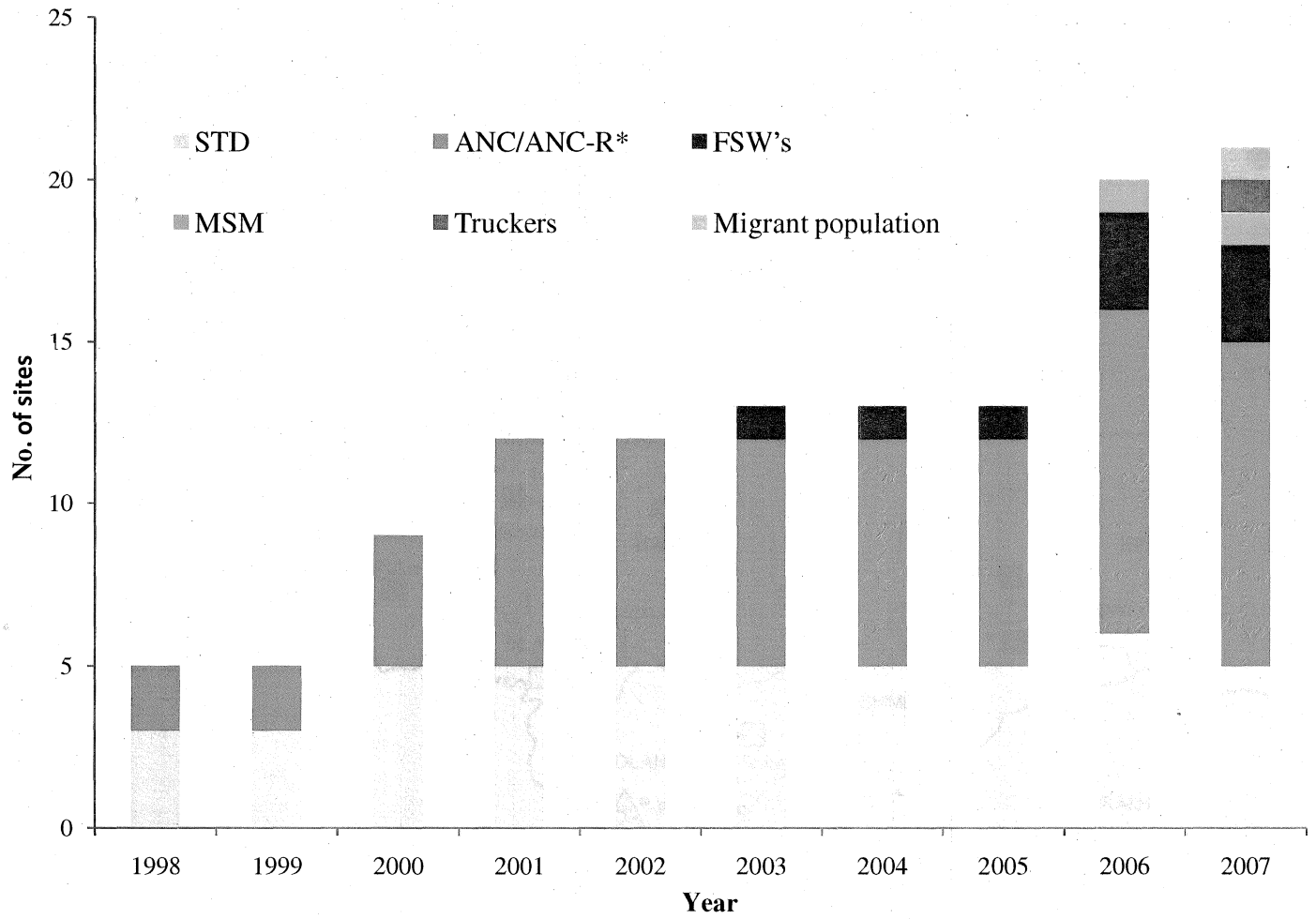
Tables and Figures

Figure 2.1: Expansion of HIV sentinel surveillance sites, Himachal Pradesh, India, 1998- 2007.



*Fifteen 'one time' ANC-Rural sites created in 2003 not shown in the figure; only three regular ANC-R sites started in 2006 have been included.
Abbreviations: STD=Sexually transmitted diseases; ANC=Antenatal clinics; ANC-R= Antenatal clinics- Rural; FSW= Female Sex Workers; MSM= Men having Sex with Men.

Figure 2.2: Location of various HIV sentinel surveillance sites, Himachal Pradesh, India, 2007 (n=21).

Abbreviations: STD=Sexually transmitted diseases; ANC=Antenatal clinics; FSW= Female Sex Workers; MSM= Men having Sex with Men.

Table 2.1: Prevalence of HIV infection by district and type of sentinel sites, Himachal Pradesh, India, 1998-2007.

District		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Antenatal clinics (ANC)											
1. Hamirpur		0.24	0.49	0.73	0.25	0.75	1.00	0.50	0.75	0.00	0.00
2. Kangra		0.49	0.00	0.24	0.00	0.00	0.77	0.00	0.25	0.25	0.00
3. Kinnaur		-	-	1.05*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Solan		-	-	1.23	0.00	0.00	0.00	0.00	0.00	0.25	0.00
5. Mandi		-	-	-	0.50	0.00	0.00	0.25	0.00	0.00	0.00
6. Una		-	-	-	0.75	0.00	0.00	0.75	0.25	0.00	0.25
7. Lahaul & Spiti		-	-	-	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*
Himachal Pradesh	**Mean**	**0.37**	**0.25**	**0.73**	**0.25**	**0.13**	**0.29**	**0.25**	**0.22**	**0.06**	**0.04**
	Median	-	-	**0.89**	**0.13**	**0.00**	**0.00**	**0.13**	**0.13**	**0.00**	**0.00**
Antenatal clinics -Rural(ANC-R)*											
1. Hamirpur		-	-	-	-	-	0.00	-	-	0.00	0.50
2. Kangra		-	-	-	-	-	0.25	-	-	-	-
3. Kinnaur		-	-	-	-	-	0.00	-	-	-	-
4. Solan		-	-	-	-	-	0.50	-	-	-	-
5. Mandi							0.26	-	-	-	-
6. Una		-	-	-	-	-	0.00	-	-	-	-
7. Lahaul & Spiti		-	-	-	-	-	0.00	-	-	0.00	0.00
8. Shimla		-	-	-	-	-	-	-	-	0.00	0.25
STD Clinics											
1. Shimla		0.39	0.39	0.00	0.52	0.00	0.83	0.00	0.00	0.00	0.00
2. Nahan (Sirmour)		0.40	0.80	0.79	0.00	0.80	0.40	1.20	0.40	0.81	0.00
3. Bilaspur		0.00	0.00	0.00	0.80	0.80	0.40	2.40	0.00	2.88	0.40
4. Chamba		-	-	1.18	0.00	0.00	0.00	0.00	0.40	0.40	0.40
5. Kullu		-	-	0.00	**0.00***	0.40	1.38	0.00	0.57*	0.00	0.40
Himachal Pradesh	**Mean**	**0.26**	**0.40**	**0.39**	**0.33**	**0.40**	**0.58**	**0.75**	**0.26**	**0.84**	**0.17**
	Median	-	-	**0.00**	**0.26**	**0.40**	**0.40**	**0.00**	**0.40**	**0.40**	**0.40**

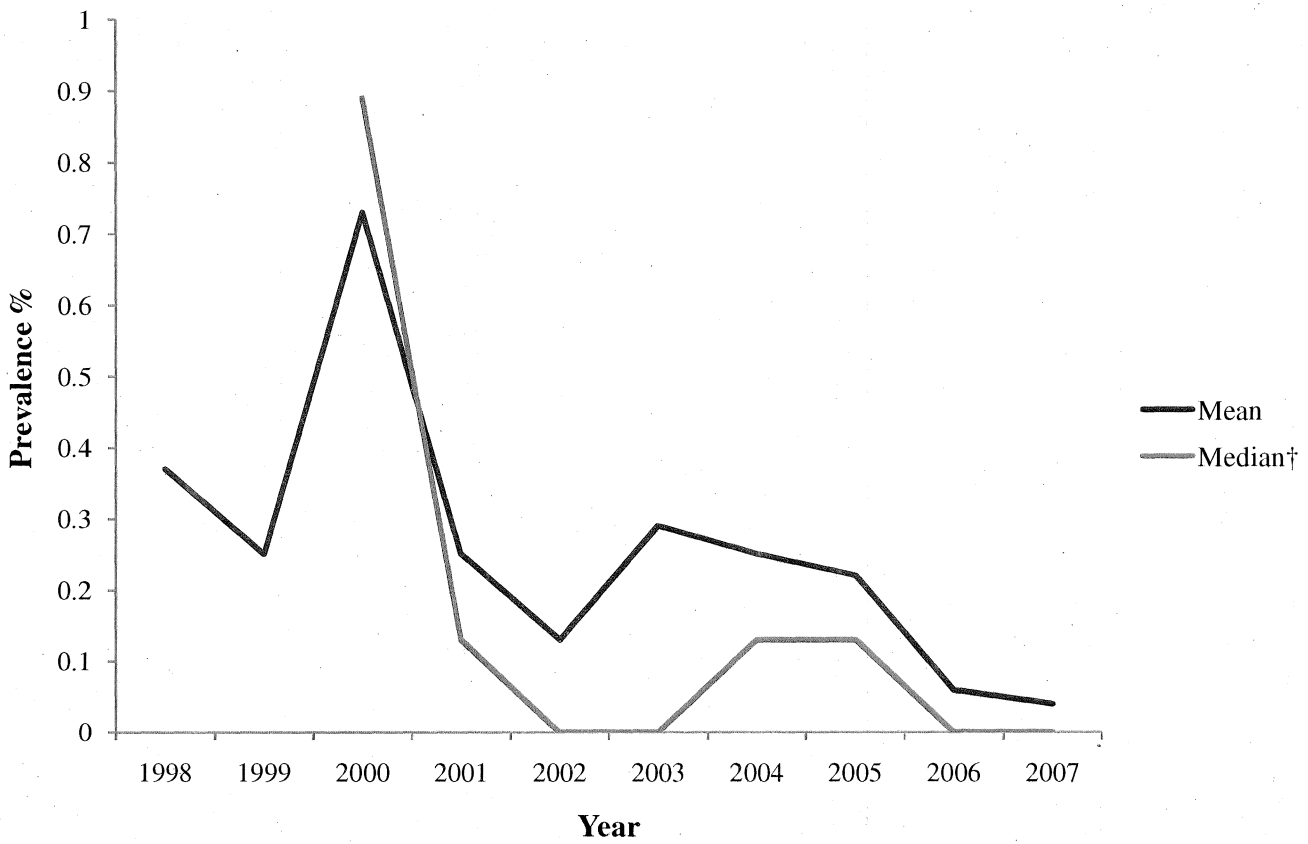
* Desired sample size of at least 75% not achieved.

Table 2.1(contd.): Prevalence of HIV infection by district and type of sentinel sites, Himachal Pradesh, India, 1998-2007.

District	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
FSW Sites										
Shimla	-	-	-	-	-	0.00	0.80	0.00	1.20	2.00
Manali (Kullu)	-	-	-	-	-	-	-	-	0.00	0.53
Paonta (Sirmour)	-	-	-	-	-	-	-	-	0.80	0.00
Himachal Pradesh						**0.00**	**0.80**	**0.00**	**0.66**	**0.87**
MSM Site										
Kangra (2006)/Sirmour (2007)	-	-	-	-	-	-	-	-	0.44	0.00
Truckers site										
Bilaspur-	-	-	-	-	-	-	-	-	-	0.40
Migrant population site										
Solan	-	-	-	-	-	-	-	-	-	0.00

*Desired sample size of at least 75% not achieved.

Figure 2.3: Trends of HIV infection amongst antenatal clinic (ANC) attendees*, Himachal Pradesh, India, 1998-2007.



*ANC-Rural sites not included

†Median prevalence could not be calculated for the years 1998-99 as the no. of ANC sites was only two.

Figure 2.4: Trends of HIV prevalence among high risk populations(STD Clinic attendees and FSW's), Himachal Pradesh, India.

Figure: 2.4 (a)
Trends of HIV prevalence among STD clinic attendees*, 2000-2007†

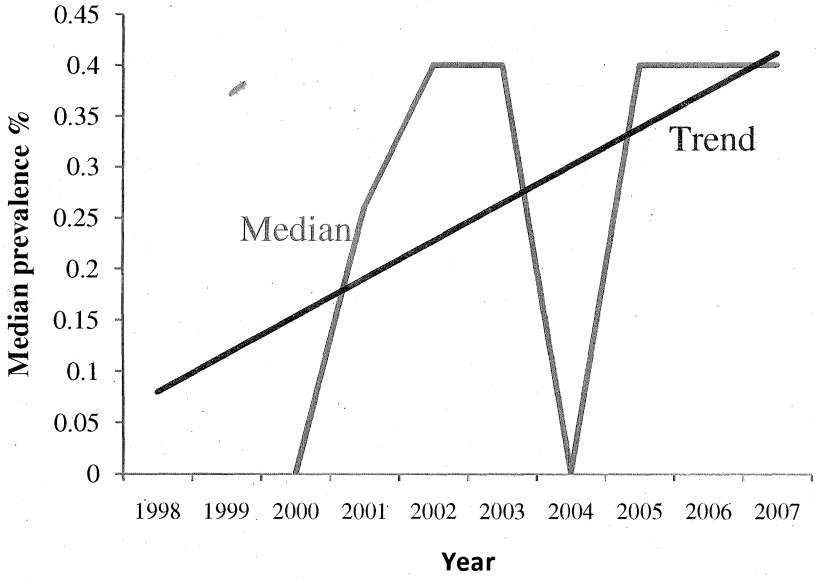
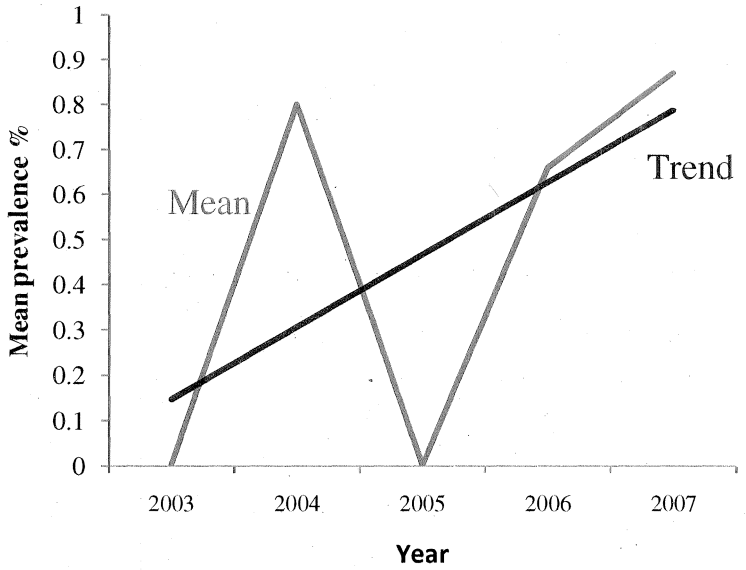


Figure: 2.4 (b)
Trends of HIV prevalence among Female Sex Workers , 2003-2007



*STD clinic Kullu had a sample size <75% during the years 2001, 2005 and 2007. Therefore data for this site not included in calculation of median as per NACO guidelines .
†Figures for median prevalence available for the years 1998-99 as the no. of sites during this period was three only. As per NACO guidelines, median is to be calculated when no. of

Annexure-2.1

Some demographic characteristics of the districts and state of Himachal Pradesh, India, 2001

District	Area (Sq km.)	Population	Population Density/sq. km.	Sex-Ratio	Literacy Rate	Sex Ratio at birth
Kangra	5739	1339030	233	1025	80.1	803
Mandi	3950	901344	228	1013	75.2	894
Shimla	5131	722502	141	896	79.1	897
Solan	1936	500557	258	852	76.6	881
Chamba	6528	460887	71	959	62.9	917
Sirmaur	2825	458593	162	901	70.4	926
Una	1540	448273	291	997	80.4	833
Hamirpur	1118	412700	369	1099	82.5	818
Kullu	5503	381571	69	927	72.9	953
Bilaspur	1167	340885	292	990	77.8	847
Kinnaur	6401	78334	12	857	75.2	913
L&Spiti	13835	33224	2	802	73.1	933
HP	**55673**	**6077900**	**109**	**968**	**76.5**	**866**

Source: Census of India, 2001.

Annexure-2.2

HIV Sentinel Surveillance - NACO guidelines

HIV sentinel surveillance is a cross-sectional study that can generate information on prevalence of HIV at regular intervals among selected groups in the population known as 'Sentinel groups'. In other words, with HIV sentinel surveillance, trends in HIV infection are monitored over time, by group and by place. HIV sentinel surveillance can be either community-based or clinic/health facility-based; the latter is much more convenient and hence is always preferred.

Following procedures are used for planning and implementation of HIV sentinel surveillance and for analysis of the data so obtained:

Planning

Selection of the sentinel population and sites

The first step towards the development of HIV sentinel surveillance is the selection of Sentinel population. The population is divided by transmission pattern into high and low risk groups.

Groups with high-risk behaviour include:

1. Those having sexual intercourse with multiple partners; for example patients with sexually transmitted diseases.
2. Female sex workers (FSW's)

3. Men who have sex with men (MSM)

4. Injecting drug users (IDU's)

An example of population groups with low risk is pregnant women. ***However, it should be kept in mind that initiating surveillance in low risk groups might be relatively unproductive unless a critical level of HIV prevalence among those with high-risk behaviour has been reached. Hence, testing of pregnant women may not be very useful in low prevalence states and should, as a general rule, not be carried out if HIV prevalence in high-risk groups is below 2%.***

Pregnant ladies at any antenatal clinic are considered to represent general population. Truly speaking, HIV infected women are expected to be less fertile and therefore HIV estimates from antenatal clinics are likely to be underestimates. The data collected from various sentinel surveillance groups is essentially based on opportunities available for blood collection in an unlinked and anonymous manner. From ANCs blood is routinely collected for VDRL and haemoglobin estimations. Blood samples from these ladies are used for sentinel surveillance without linking identity of these individuals. This, perhaps, is the only group, which provides important information with respect to HIV prevalence in general community in the country.

It is important to emphasize that data from donated blood screening should also be analyzed to get an indication of HIV prevalence in the low risk population. Although not a sentinel population per se, such data provides valuable information to monitor blood

transfusion safety. The results should, however, be disaggregated, where possible, by voluntary and remunerative donations.

Criteria for establishment of Sentinel Sites

As far as possible, easily defined and consistently accessible groups should be selected as sentinel population. For this reason, the sites should be chosen where blood is already being drawn for some other purpose and a part of it could conveniently be separated and tested for HIV in an unlinked anonymous manner. From the programme point of view, it is preferable to select sites in such a manner that all important transmission categories in the country are covered e.g., sexual transmission, injecting drug use and transmission in low risk groups of population.

Furthermore, sites should be accessible, convenient, have sufficient numbers of patients, and

have staff willing to participate in the surveillance activity. Therefore, the sites, which meet these criteria, include STD clinics, drug treatment centres, and antenatal clinics.

1. **Selection of STD/high risk group sites**
    - No clustering: one in each region of State (in low prevalent states)
    - Annual attendance of attendees should be 500+
    - One in each bigger city
2. **Selection of ANC sites**
    - One in each region of State (in low prevalent states)
    - Should not hit red light areas
    - Urban rural mix

3. **Ratio of high risk and low risk mix**

- High prevalent states-1:2
- Medium prevalence states - 2:1
- Low prevalence states – 3:1

Sampling

Consecutive blood samples are collected till the predetermined sample size is reached over twelve-week period. Only new patients are included for collection of blood samples.

Inclusion criteria for sampling in each risk group are defined in individual request forms for each risk group.

Sample size

The minimum sample size required for surveillance purpose is determined for each sentinel site based on some assumptions. However, such data at center level is unlikely to be available. Following sample sizes are considered appropriate for sentinel surveillance:

- High risk groups - 250 over twelve-week period.
- Antenatal clinic attendees - 400 over twelve-week period.

As the prevalence of HIV among antenatal clinic attendees is likely to be lower and change more slowly than in STD clinic attendees, a comparatively large sample size is required, i.e. 400 or more over twelve-week period. This sample size gives a greater precision, and thereby smaller changes in the prevalence rates can be detected.

However, from operational point of view the Sentinel sites will collect samples on a consecutive

basis for 12 week's and this sample size consideration will be for testing laboratories, and not for the Sentinel sites. Once the testing laboratory receives the samples as per pre-designed sample size, they need to communicate to the site, to stop collection of samples. In case of STD sites, the samples will be collected consecutively from two sources i.e. Skin &STDclinic and OBG clinic, in the same hospital. The collection of samples in these clinics must be based strictly on the inclusion criteria & sampling procedure. It is suggested that testing facility should consider 150 samples from STD clinics & 100 samples from O&G clinic and the same are pooled to make a sample size of 250. It must be emphasized that in order to do so, different codes should be given to STD and O&G clinics and different tally sheets to be filled by testing laboratory accordingly.

Frequency of Survey

As described above, Sentinel surveillance should be carried out using the sample sizes given above and repeated **once a year** to look at HIV infection trends. Experience suggests that it is better from the programmatic viewpoint to carry out surveillance in more sites and repeat them

once a year instead of fewer sites every six months. However, every possible attempt should be made to obtain good quality data. In consecutive surveys, the methodology and laboratory procedures must be similar to those used previously so that data from the various surveys couldbe compared to each other. If possible, in each laboratory the same technician should be made specifically responsible for running tests in order to avoid human error.

Testing methodology

Unlinked anonymous testing method is used, as it minimizes participation bias. In this type of testing, a part of blood sample originally collected for other purposes is used for testing for HIV. For example, at an STD clinic, when blood sample is collected for VDRL, a part of it can be separated out and sent to the laboratory after removing all personal identifiers, viz. name, address etc, so that the HIV test results cannot be linked with the individual.

HIV testing strategy

For screening purposes two consecutive tests showing HIV positivity are considered adequate. For confirmation a third test is necessary. For the purpose of sentinel surveillance only two tests are performed. Second test is performed only if the first test is positive. These two tests are of two different kinds for HIV antibodies.

Implementation

Every year, annual round of HIV Sentinel surveillance is conducted in designated sentinel sites for twelve weeks from 1st August to 31st October (in 2006 it will be from 1st September to 30th November).

Data collection

While every effort is made to unlink the HIV test result with the individual concerned, the data collection from each serum sample includes the following information:

- General location of the sentinel site (not the name of the clinic)
- Population group

- Month and year of serum collection
- Age group
- HIV laboratory test result

For additional information, the formats are revised and made available to the states, well in advance. Sufficient quantity of these forms is made available to all the sites and testing laboratories for use during the round. Adequate training is ensured to all the staff, with emphasis on changes in the formats.

Only a unique code number links the data collection form and the laboratory result.

Storage and transport of blood samples

The specimen tube for HIV testing should contain a minimum of 0.5 ml of serum. These tubes are properly labeled and stored in the freezer compartment of the refrigerator and sent to the HIV testing laboratory in batches of not less than 50 samples. If only a few samples are sent and tested, there will be a possibility of linking of that positive laboratory result to an individual.

HIV testing

All sera collected at one sentinel site are tested in the same testing laboratory at the same time using testing strategy outlined under HIV testing strategy. As described earlier, care is taken not to test a "few" samples at a time because this may lead to potentially identifying individuals who might have tested positive. The intention is to make the tracing of the HIV testing results to the individual impossible.

External Quality assurance programme

All the samples detected HIV sero-positive by using Rapid HIV test kits are retested by using two ELISA test kits with different antigens or principles, in order to standardize the Rapid HIV test kit results. The results are communicated to the respective testing laboratories immediately by the identified reference laboratories.

Of the samples tested during each round, 5% negative samples are sent to reference laboratories for confirmation of the results. Reference laboratories intimate a digit to the testing laboratory for sentinel surveillance for this purpose. The results for samples received are communicated to respective laboratories in 15 days time.

Data Analysis

Data collected at HIV sentinel site and for each sentinel group of that site are sent in the prescribed format as per the reporting schedule. The data are analyzed and compared separately to make meaningful interpretation. Primary data are the number of sera examined for a particular group at a particular site and the proportion positive for HIV.

Interpretation and use of data

The HIV sentinel surveillance data are interpreted to assess trend of HIV prevalence in different groups and areas. This helps in determining which population groups need priority attention with respect to interventions and what differences exist between sentinel sites. Also, surveillance data can be used to estimate how many people may be currently infected and how many are expected to develop AIDS in the future. The results of sentinel surveillance are disseminated not only to those responsible for formulating policy but also to health care providers at the sentinel sites.

Annexure-2.3

One time Rural Antenatal (ANC-R) Clinic Sites, Himachal, Pradesh, India, 2003.

District	Location of main ANC site	Location of the subsites (ANC-R)
Hamirpur	Hamirpur	Barsar
		Sujanpur
Kangra	Dharamshala	Palampur
		Jawalmukhi
Solan	Solan	Arki
		Nalagarh
Kinnaur	Reckongpeo	Nichar
		Sangla
		Pooh
Una	Una	Haroli
		Daulatpur
Mandi	Mandi	Karsog
		Janagar
Lahaul & Spiti	Keylong	Udaipur
		Kaza
Total	**7**	**15**

Source: Himachal Pradesh, State AIDS Control Society.

3. OUTBREAK INVESTIGATION

Abstract*

Title: Hepatitis A outbreak due to contamination of drinking water supply, Shimla city, Himachal Pradesh, India, 2006-07.

Background: India is one of the high endemic countries for hepatitis A virus (HAV) infections. On 22nd January 2007, 48 cases of acute jaundice were reported from Shimla city by the local newspaper. We investigated the outbreak to identify the causative agent and possible source of outbreak to suggest control measures and prevent future outbreaks.

Methods: We defined a case as any person who developed acute jaundice since 1st December 2006 and was a resident of Shimla city. We conducted hospital and house to house search for cases, prepared line listings of cases, performed descriptive epidemiology, and identified possible exposures. An interview schedule consisting of semi-structured questions on identification particulars, symptoms of illness and exposure to water and food sources was used to collect data. Data analysis included calculation of attack rates, risk ratios and 95% confidence intervals to test the statistical significance of the findings. We tested sera of case patients to confirm diagnosis. We also conducted environmental investigations to identify the source of outbreak.

Results: We identified 401 cases of acute hepatitis (attack rate 2.6/1000 population) with a mean age of 16 years and 220 (54.9%) males. No death was reported. Case histories did not reveal consumption of any common food item. Of the 117 blood samples tested, 84 tested positive for IgM antibodies to HAV. All samples were negative for hepatitis E. Majority (86%) of the cases were clustered in southern parts of the city supplied with drinking water from Kasumpti tank. Consumption of drinking water from Kasumpti tank

was associated with a risk of hepatitis A (Risk Ratio 8.4; 95% CI: 1.9-30.7). Water samples from Kasumpti tank demonstrated fecal contamination. Environmental survey detected a leakage in the incoming pipeline to this tank. This leakage site was used for open defecation by the migrant laborers.

Conclusions: An outbreak of HAV was confirmed that was probably caused by faecal contamination of water through a broken pipe. Prompt repair of pipelines, disinfection of water supply and health education on personal hygiene helped controlling the outbreak. Regular monitoring and surveillance of drinking water quality were recommended to prevent future outbreaks.

Key words: Hepatitis A, outbreak, Risk Ratio, monitoring, surveillance.

Word count: 345 (excluding title, subtitles and key words).

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* Oral presentation done at 4th Bi-Regional TEPHINET CONFERENCE, Taipei, Taiwan, 2007.

3. Hepatitis A outbreak due to contamination of drinking water supplies, Shimla city, Himachal Pradesh, India, 2006-07.

3.1. Introduction

Hepatitis A is caused by infection with hepatitis A virus (HAV), an RNA virus of the picornavirus family [1]. The virus is present worldwide and has a single serotype throughout the world.[2]

Transmission of HAV is typically by faeco-oral route[3,4,5,6]. In persons who develop clinically apparent hepatitis A, secretion of virus in stool at high titres begins one to three weeks prior to onset of illness, and may continue for several weeks at lower titres after jaundice occurs[7]. As HAV is abundantly excreted in faeces, and can survive in the environment for prolonged periods of time, it is typically acquired by ingestion of faeces-contaminated food or water. Direct person-to-person spread is common under poor hygienic conditions[8]. Occasionally, HAV is also acquired through sexual contact (anal-oral) and blood exposure (injecting drug use and blood transfusions)[0].

Average incubation period of the disease is 30 days (range: 15-50 days)[2]. Infection with HAV results in asymptomatic infection or an acute disease that is usually self-limiting and seldom causes a chronic infection.

People who have never contracted HAV and who are not vaccinated against hepatitis A, are at risk of infection. The risk of infection is inversely proportional to levels of sanitation and personal hygiene[5]. In areas where HAV is highly endemic, most HAV infections occur during early childhood[3]. In developing countries with poor environmental hygienic conditions, nearly all children are infected with HAV before the

age of 9. As sanitation conditions improve, transmission shifts to older age groups and the incidence of symptomatic disease increases[1]. Infection confers lifelong immunity[1]. Although serious hepatitis and death is rare (0.2% of icteric cases), it is a significant cause of morbidity and socioeconomic losses with annual incidence of 1.4 million cases globally, costing US$ 1.5 to US$ 3 billion every year[3,4].

Shimla is Capital city of Himachal Pradesh with an estimated population of 156,811 (based on Census 2001 and growth rates for the intervening years) as on 1st of January, 2007[9]. It is divided administratively into 25 municipal wards. It derives its water supply from two major catchment areas: namely Ashwini Khud and Gumma water works. In addition, some peripheral areas of the city derive water from small rivulets located in these areas. Two agencies are responsible for treatment and disinfection of drinking water. These include department of irrigation & public health (IPH) and Municipal Corporation, Shimla. The water treated by these agencies is distributed to different parts of the city allocated to these agencies for supply of drinking water.

On 22nd January, 2007 a cluster of 48 cases of jaundice was reported by local print media from Kasumpti-Vikasnagar areas of Shimla city. State health authorities (Director of Health Services, Government of Himachal Pradesh) requested us to investigate the outbreak on 7th February, 2007 .We investigated the outbreak to :(1) identify the causative agent (2) identify the possible source of outbreak (3) institute control measures and (4) suggest measures for prevention of future outbreaks.

3.2. Methods

We followed CDC (Center for Disease Control) Atlanta, guidelines and investigated the outbreak in a step-by-step manner as under:-

1. We determined the existence of an outbreak by comparing the incidence of jaundice cases during the investigation period with the background rate.
2. We confirmed the diagnosis by serological tests (presence of IgM antibodies to HAV/HEV).
3. We defined a case of hepatitis 'as a case of acute jaundice occurring since 1st of December 2006 in a resident of Shimla city'.
4. We actively searched for cases by house-to-house visits. Ten teams comprising three members each were formed by the director of health services of Himachal Pradesh for the purpose. The team members included health workers and health supervisors of the state health department.
5. We prepared a line list of cases by collecting data on:
    i. Demographic characteristics – age and sex
    ii. Place of residence
    iii. Date of onset of symptoms
    iv. Symptoms of illness – yellow discolouration of conjunctiva, dark yellow coloured urine, fever, anorexia and pain abdomen
    v. Exposures to common water and food sources
    vi. Results of liver function tests performed, if any.
6. We generated hypotheses using descriptive findings based on the data elements of the line list. We calculated attack rates by age and sex, plotted an epidemic curve

by date of onset and carried out spatial analysis to examine the distribution of cases within various wards of the city.

7. We tested hypotheses based upon an analytical study : We conducted a retrospective cohort study to compare the attack rates in two areas namely Kasumpti and Chamyana (ward no. 21 & ward no. 19 respectively – figure 1) getting water supply from two different sources. We calculated a sample size of 896 (448+448) assuming an α-error of 0.05, a power of 80% and attack rate of 1.9% (19 per 1000) amongst the unexposed to detect a relative risk of three based on a null hypothesis of no difference in attack rates of the two areas. We calculated relative risk, attributable fraction and population attributable fractions along with 95% confidence intervals of these measures of associations.
8. We also conducted environmental investigations and collected water samples from various sites to look for faecal contamination. These water samples were tested in IDSP (Integrated Disease Surveillance Project) Water testing Laboratory located in Deen Dayal Upadhyay Hospital, Shimla. In addition we procured the maps of water supply lines to various parts of Shimla city from the departments of IPH (Irrigation and Public Health) and Municipal Corporation Shimla.
9. We drew conclusions based on the results of descriptive findings, analytic study and environmental investigations.
10. We compared the conclusions with established facts by reviewing the literature.
11. We communicated the findings and conclusions to the state health department (Director of Health Services)
12. We made recommendations to the local health department that included: -

i. Immediate/short term measures to control the outbreak

ii. Mid-term and long term measures to prevent future outbreaks.

3.3. Results

The existence of an outbreak was confirmed - no. of cases reported ranged from 1-5 per day since second week of January against a background rate 1-3 cases per month. There was no change in surveillance nor was any gross population movement reported during the period.

We identified 401 cases of acute hepatitis (attack rate 2.6/1000 population) by the time of concluding the preliminary report (As the cases were continuing at the time of writing the preliminary report, later routine surveillance data recorded the cases and the final count was 1,165 cases with an attack rate of 7.4 cases/1000 population). Forty eight of the 401 cases, who underwent biochemical investigations on their own, reported deranged liver function tests (raised serum bilirubin and ALT levels). No death was reported. Case histories did not reveal consumption of any common food item.

Of the 117 serum samples tested for the presence of HAV/HEV IgM antibodies, 84 tested positive of IgM antibodies to HAV. Of the 84 positive results, 75 (out of 100)tested positive by the tests conducted by National Institute of Virology (NIV), Pune and nine of the 17 samples tested positive by National Insitute of Communicable Diseases (NICD), Delhi. None of the samples tested positive for IgM antibodies to HEV.

3.3.1.Descriptive epidemiological findings

Person distribution

Mean age of the cases was 16 years (range: 2-75 years) and 220 (54.9%) were males. The attack rates were highest in the age group 5-14 followed by the age group 15-24 with no significant differences by gender (Table 3.1).

Place distribution

Majority (86%) of the cases were located in southern parts of the city. Kasumpti area (ward no. 21) was worst affected with an attack rate of 19.1 per thousand population (Figure 1).

Time

Epidemic curve showing distribution of cases of hepatitis A by date of onset is given in figure 2. The distribution is by week (Monday to Sunday) starting on the dates shown in the figure 2. The cases started rising rapidly around the second week of January and reached a peak during the week 12^{th} – 18^{th} of February, 2007.

Hypothesis generated

Steep rise of epidemic curve suggested a common source outbreak. As there was no history of consumption of common food at some common supper/feast, the outbreak was most probably waterborne. Place distribution of hepatitis cases showed that most cases were clustered in the southern part of the city. The southern part of the city is supplied by water from Ashwani rivulet whereas the northern part is supplied water by Gumma water works. So we suspected the water supply from Ashwani rivulet was most likely to be contaminated.

Analytic study

Based on the hypothesis generated by descriptive findings, we conducted a retrospective cohort study in two adjoining areas of the city namely, Kasumpti Ward which gets its water supply from Ashwani rivulet and Chamyana village which gets its water supply from Gumma water works. We surveyed 150 randomly selected houses (by simple random technique) in each of these areas to have the desired sample size of at least 448 in each of these areas. The attack rates of hepatitis A , relative risk, attributable fraction and population attributable fractions along with 95% confidence intervals of the measures of these associations are shown in table 3.2.

Environmental investigations

Nineteen (37%) of the 51 water samples taken from affected areas tested positive for faecal contamination. These included two water samples taken from Kasumpti main reservoir. On examination of the maps of water supply pipelines, we observed that water from Ashwani rivulet is pumped in two stages before supply to the dependent populations – the first stage pump at the water treatment site at Ashwani rivulet and the second stage pump at village Kawalag (Figure 3) where first stage reservoir is located. Water supply to village Kawalag is from the reservoir located in this village. No hepatitis case was reported from village Kawalag. To confirm, whether there were any cases in village Kawalag, we surveyed the whole village and found no case of hepatitis. Since the main water reservoir is located at Kasumpti, we suspected the contamination occurred between village Kawalag and Kasumpti. Then we surveyed the pipeline between village Kawalag and Kasumpti and found a large leakage in the main rising pipeline (Figure 3). The leakage site was used for open defaecation and cleaning by labourers involved in construction work near the leakage site.

Conclusions

- Outbreak was confirmed to be due to HAV infection.
- Contamination of drinking water supplies through a broken pipe was most probably responsible for the outbreak.
- Drinking water quality was not monitored and water was inadequately treated.
- Surveillance system failed to detect the outbreak.

Recommendations

We communicated the conclusions of investigations to the state and district health authorities with the following short-term, intermediate and long-term recommendations

Short term/immediate

- Repair the leakage site.
- Disinfect water sources .
- Educate the masses about importance of personal hygiene especially washing of hands with soap and water.
- Reassure those affected about the benign nature of the disease.

Intermediate/long term

- Monitor the drinking water quality on regular(daily) basis
- Strengthen surveillance system – ensure regular reporting through IDSP reporting channels.
- Consider vaccination for those who can afford.

Discussion

This outbreak was confirmed to be due to HAV infection. Contamination of drinking water supplies through a broken pipe was most probably responsible for the outbreak. Prompt

investigation of the outbreak lead to identification of the cause and source of outbreak with consequent institution of effective prevention and control measures.

The fact that the outbreak could not be detected by the surveillance system, points towards a poorly organized surveillance system, particularly the urban surveillance, in the state. In spite of implementation of IDSP in the state in the year 2005, the system has not become operational at least in the urban areas. At the same time, the water quality monitoring was also not being done otherwise, the faecal contamination could have been detected much earlier and the outbreak contained much in advance.

India is one of the high endemic countries for hepatitis A virus infection. Most infections occur during childhood when they are asymptomatic and go unnoticed[0]. As a consequence, outbreaks of hepatitis A are uncommon[0] . Most hepatitis outbreaks reported in India have been due to Hepatitis E virus infections[10]. The current outbreak of hepatitis A points to the fact that many adults were non-immune and got infection and symptoms of hepatitis A. This means that the state is moving towards decreasing endemicity for hepatitis A probably due to improved sanitary conditions. Similar observations have been made in a recent outbreak of hepatitis A in Kottayam district of Kerala in India[10] . A sero-survey in Pune, India also demonstrated high prevalence of susceptibility among adults[10]. This has potential epidemiological implications in the prevention and control of hepatitis A especially with reference to the need for hepatitis A immunization. If endemicity has really decreased, there is a need for immunizing children against hepatitis A, at least those who can afford to purchase the vaccine. However, the need for a well organized surveillance system along with water quality monitoring cannot be overemphasized in the early detection of such outbreaks and long term control of the disease.

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Table 3.1: Attack rates of Hepatitis A by age and sex, Shimla City, Himachal Pradesh, India, 2006-07

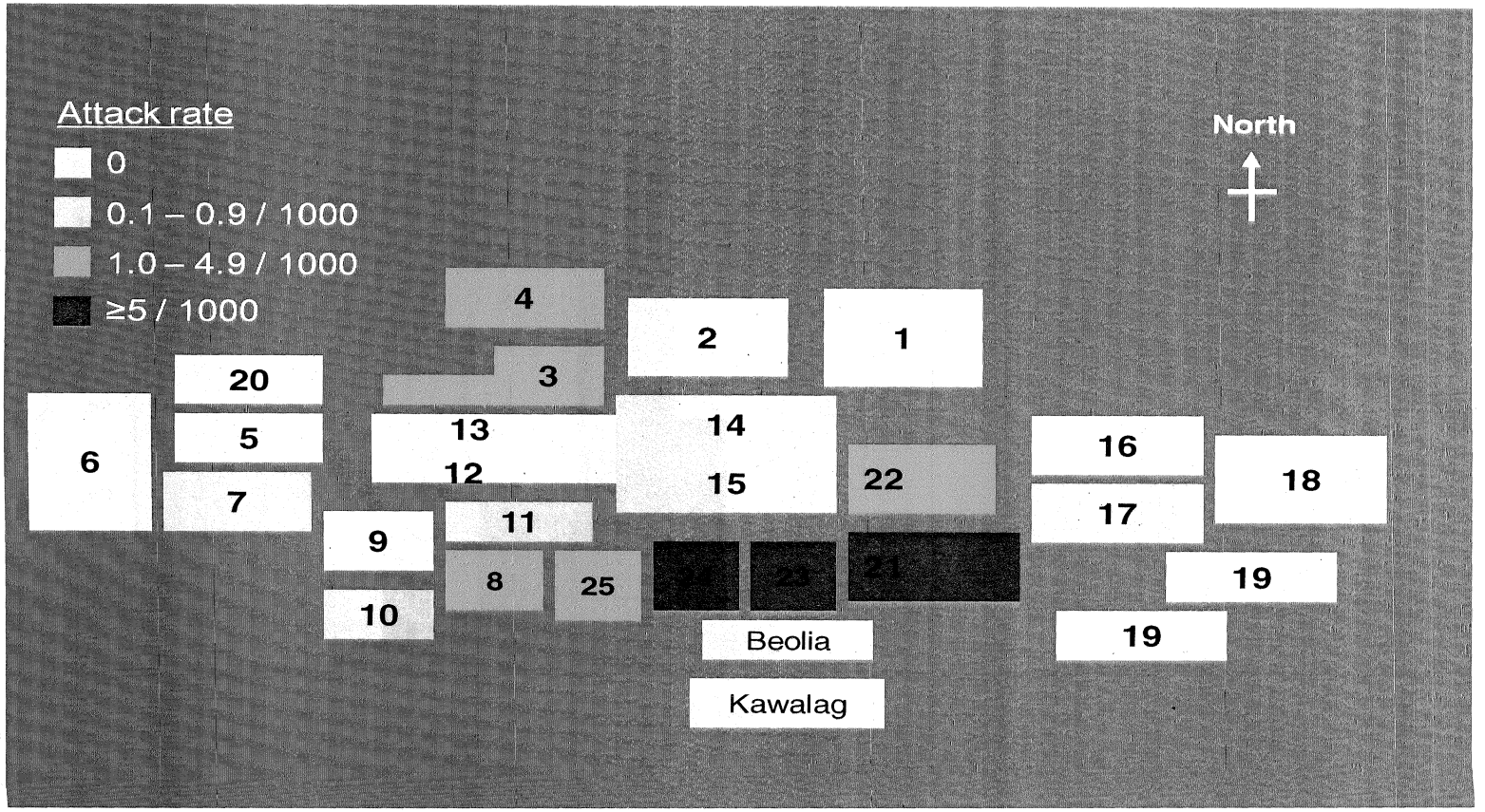
	Number of cases	Population	Attack rate per 1000 population
Age group (years)			
<5	19	9,720	2.0
5-14	164	28,628	5.7
15-24	169	35,192	4.8
25-34	27	29,300	0.9
35-44	14	25,186	0.6
≥45	8	28,786	0.3
Sex			
Males	220	89,305	2.5
Females	181	67,506	2.7
Total	401	156,811	2.6

Table 3.2: Attack rates of hepatitis A in two areas supplied by two different sources of water supply, Shimla City, Himachal Pradesh, India, 2006-07.

Area	Source of water supply	Population surveyed	No. attacked	Attack rate (%)	RR* (95% CI)†
Chamyana (Ward no. 19)	Gumma water works	579	2	0.3	Reference
Kasumpti (Ward no. 21)	Ashwini rivulet	480	14	2.9	8.4 (1.9-37.0)
AF‡ (95% CI)= 88.2% (48.1-97.3%); **PAF§ (95% CI)**= 77.1% (42.1-85.1%)					

*RR- Relative risk; †CI – Confidence interval; ‡AF- Attributable fraction; §PAF- Population attributable fraction

Figure 3.1: Attack rates of Hepatitis A by area* of residence, Shimla City, Himachal Pradesh, India, 2006-07



*Areas shown by numbers are wards of the city. The area names corresponding to the wards are: 1. Bharari; 2. Ruldu Bhatta; 3. Kaithu; 4. Annadale; 5. Summerhill; 6. Jutogh; 7. Boileauganj; 8. Tutti Kandi; 9. Nabha; 10. Phagli; 11.Krishna Nagar;12. Ganj; 13. Lower Bazar; 14. Jahku; 15. Benmore; 16. Sanjauli; 17. Engine Ghar; 18. Dhalli; 19. Chamyana; 20. Sangti; 21. Kasumpti; 22. Chhota Shimla; 23. New Shimla; 24. Khalini; 25. Kanlog.

Figure 3.2: Hepatitis A cases by week of onset, Shimla City, Himachal Pradesh, India, 2006-07 (n=401)

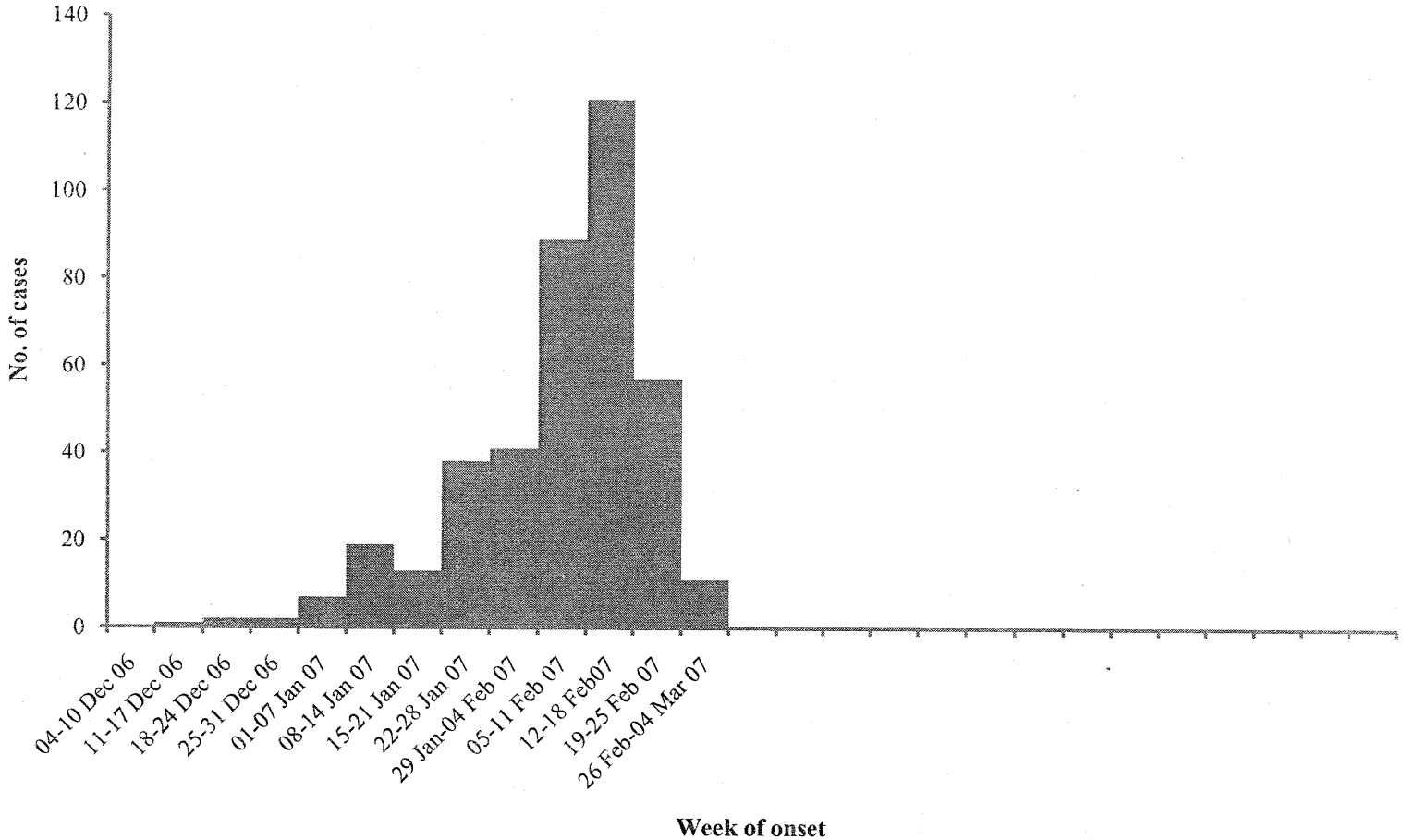
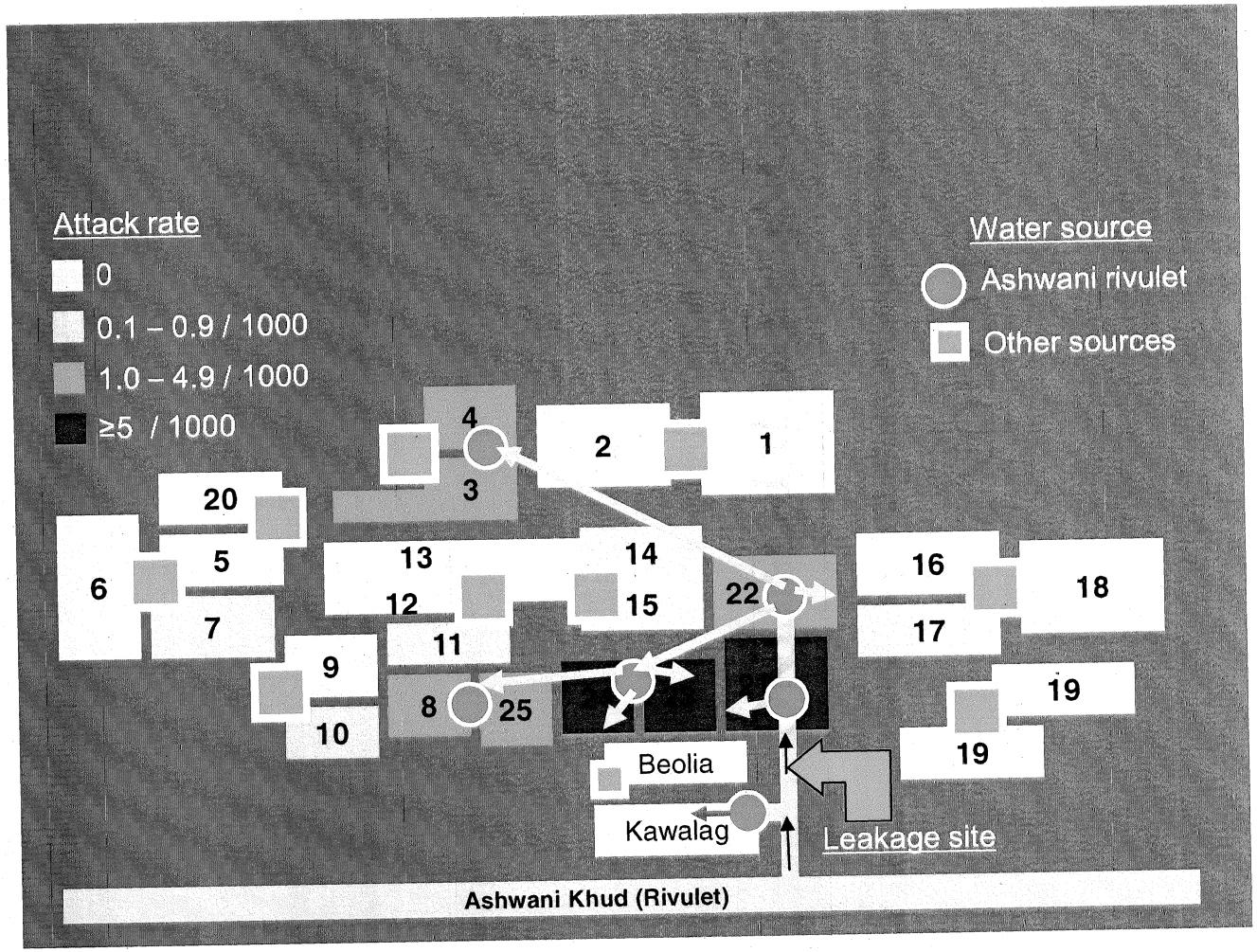


Figure 3.3: Sources of water supply and attack rates of Hepatitis A by area of residence, Shimla City, Himachal Pradesh, India, 2006-07



*Areas shown are the same as in figure 1

SECTION 2

SECOND FIELD POSTING

4. PROGRAMME EVALUATION

Abstract

Title: Injudicious clinical use of blood exposes one third of the recipients to unwarranted risks of transfusions: a study from Kangra District, Himachal Pradesh, India, 2008.

Background: Blood transfusion is associated with the risk of serious transfusion transmissible infections (TTI's) like HIV, Hepatitis B, Hepatitis C, syphilis and malaria. Ensuring adequate and safe blood is key challenge for national blood programmes. We evaluated blood safety programme in Kangra district of Himachal Pradesh, India to identify its strengths and constraints.

Methods: We reviewed national guidelines on standards for blood transfusion services. We prepared a logic matrix and identified three key indicators :(1) Proportion of all blood units donated by voluntary non-remunerated donors (2) Proportion of donated blood units screened for five TTI's and (3) Proportion of recipients transfused single units of blood. We interviewed medical officers, abstracted information from records and observed blood collection procedures.

Results: There is no component separation facility and only whole blood is used for transfusion. During 2007, 3603 units of blood were collected from all types of donors. Of these, 52.9% were donated by voluntary donors. Records of voluntary blood donors were not being maintained and donor counseling services were not available. Hundred percent blood units were screened for all five TTI's. More than one third (34.4%) of the recipients were transfused single unit of blood. This amounted to 18.9% of all blood units transfused as single units.

Conclusions: Voluntary blood donation is far short of the target of 80%. All units of donated blood are being screened for TTI's. National guidelines on rational clinical use of blood are not being followed. This is unnecessarily exposing recipients to the risks of blood transfusion. We recommend that efforts be made to recruit and retain more voluntary donors, maintain their records and train prescribers about the rational clinical use of blood.

Key words: Blood safety, Voluntary blood donation, transfusion transmissible infections, rational, clinical use, logic matrix, key indicators.

Words: 273 (excluding title, subtitles and key words).

4. Evaluation of blood safety programme, district Kangra, Himachal Pradesh, India, 2008.

4.1. Introduction

The need for a safe and adequate blood supply is universal. The transfusion of blood/blood products is frequently central to the management of haemorrhagic conditions, haematologic disorders, leukemia and to support advanced medical and surgical procedures.

However, the safety of blood and blood products remains a continuing cause for concern, particularly in developing countries as the transfusion of a unit of blood infected with any of the transfusion transmissible infections (TTI's) like HIV, hepatitis B virus (HBV), hepatitis C virus (HCV), syphilis, or malaria carries a high risk of transmission of infection to the recipient. Whatever the transfusion requirements of its patient population, every country has the same need to ensure: (1) *adequate* supplies of blood and blood products and their accessibility to all patients requiring transfusion (2) *Safety* of blood and blood products against the risk of TTI's and (3) *Safe and appropriate clinical use* of blood and blood products.

Recognition of the high risk of transmission of HIV through unsafe blood transfusions led to the introduction of blood safety interventions in the mid-1980s, with a particular focus on the testing of donated blood for HIV. WHO Blood Transfusion Safety unit developed an integrated strategy [1] for the safety of blood transfusion and recommended its use by national blood programmes. The essential elements of this strategy include (1) The establishment of a well-organized, nationally coordinated blood transfusion service (BTS) (2) The implementation of a quality system in the BTS covering all aspects of its

activities (3) Collection of blood only from voluntary non-remunerated blood donors from low risk populations (4)Testing of all donated blood for TTI's , blood group serology & compatibility and (5) Appropriate clinical use of blood to avoid unnecessary transfusions and to promote use of blood components in place of whole blood.

National AIDS Control Organization (NACO) of India, adopted the WHO Blood Transfusion Strategy in toto and formulated its own National Blood Policy in April 2002 and an Action Plan in 2003 to implement this policy.

We evaluated blood safety programme in Kangra district of Himachal Pradesh, India, to identify its strengths and constraints and to make recommendations based on these observations.

4.2. Methods

4.2.1. Study area

Himachal Pradesh is a small hilly state with a population of 6,077,900(Census of India, 2001) and is administratively divided into 12 districts. Population wise Kangra is the largest district with a population of 1,339,030 that makes 22.0% of the population of the state. Except for the district of Lahaul & Spiti, each district level hospital is equipped with a blood transfusion facility/blood bank. In addition two districts of the state have sub-district level blood banks – District Kangra with one sub-district level blood bank at Palampur and district Shimla with two sub-district level blood banks at Rampur and Rohru. The state has only one blood component separation facility at Indira Gandhi Medical College and Hospital Shimla. Apart from these blood transfusion facilities, one blood bank has been started at Kamla Nehru Hospital, the obstetrical and gynaecological

wing of Indira Gandhi Medical College and Hospital Shimla. There is no blood transfusion facility in the private or non-government sector (Annexure-4.1).

4.2.2. Sampling frame and sample size

We prepared a district wise list of all blood banks in the state and purposively selected district Kangra due to two reasons –(1) it is the largest district of the state and (2) has one sub-district level blood bank at Palampur.

4.2.3. Strategy

We approached Director of Health Services (DHS) of Himachal Pradesh and State Programme Officer (Blood Safety), Himachal Pradesh State AIDS Control Society. We discussed our protocol, evaluation plan/design and objectives of the programme evaluation with them. After the discussions, it was agreed by the DHS of the state that we can proceed with the evaluation after further discussions with all the Medical Officers-in-charge of the respective district/sub-district blood banks. We were permitted to attend the meeting of all the Medical Officers-in-charge blood banks held during the same month. At this meeting we elaborately discussed the whole evaluation protocol.

After discussions, it was agreed upon that selection of district Kangra will be most appropriate to give a representative picture of district level blood safety programme.

4.2.4. Programme description

4.2.4.1. Documents by World Health Organization

We reviewed the following documents on blood safety measures to identify the main elements/arms of the programme:

1. Blood Transfusion Safety – Information for National Health Authorities[2].

2. Blood Safety: Aide-Memoire for National Blood Programmes[1].
3. Developing a National Policy and Guidelines on the clinical use of blood - Recommendations[3].

4.2.4.2. Documents by National AIDS Control Organization (NACO), India

1. Standards for Blood Banks & Blood Transfusion services[4].
2. National Blood Policy: April 2002[5].
3. An Action Plan for Blood Safety[6].
4. Guidelines for Appropriate Use of Blood[7].
5. Blood safety – A note[8].

4.2.5. Preparation of logic model and logic matrix

Based on the national (NACO) and international (WHO) guidelines we identified three main elements (arms) of the programme namely (1) Voluntary non- remunerated (unpaid) blood donation (2) Compulsory Screening of blood units for Transfusion Transmissible Infections (HIV, hepatitis B & C, malaria, syphilis) and (3) Rational clinical use of blood. We then identified inputs, processes, output and outcomes for each of the three elements and prepared a logic model and logic matrix accordingly (Annexure-4.2).

4.2.6. Formulation of indicators

4.2.6.1. Quantitative indicators

Having identified the three key elements of the programme, we identified the following critical indicators following the seven point checklist for indicators (Annexure-4.3).

1. Proportion (%) of all blood units donated by voluntary non-remunerated blood donors.

2. Proportion (%) blood units screened for each of the TTI's.
3. Proportion (%) of recipients transfused single unit of blood.

4.2.6.2.Qualitative indicators

In addition to three key quantitative indicators mentioned above, we identified some qualitative indicators using logic model and logic matrix for each element of the programme (Annexure-4.2).

4.2.7. Identification of data needed for the calculation of indicators

We identified data needs for calculation of each of the programme indicators as per the logic matrix (Annexure-4.2).

4.2.8. Choice of data collection methods

For each data element needed, we identified how the information can best be collected as per the logic matrix.

4.2.9. Design of the protocol

The evaluation study design combined the following elements:

- Interview with the medical officers-in-charge of the two blood banks.
- Abstraction of records of the selected blood banks
- Structured observations during the blood collection procedures from the donors.

4.2.10. Data collection instruments

We developed a data collection instrument based on WHO Global Database on Blood Safety (GDBS) 2004 which combined the elements of interview with medical officers-in-charge of the selected blood banks, review of blood bank records and observations pertaining to cold chain equipment of the blood banks (Annexure-4.4).

In addition we prepared a structured checklist of observations to be made during collection of blood from all categories of blood donors (Annexure-4.5).

4.3. Results

No component separation facility is available in the district and only whole blood is used for transfusion. During 2007, 3603 units of blood were collected from all types of donors.

4.3.1. Quantitative indicators

4.3.1.1.Voluntary blood donation

The proportion of voluntary blood donation was 52.9% in the district, 63.6% in district hospital Dharamshala and 18.9% in referral hospital Palampur. In the district, 94.0% of all donors and 89.9% of voluntary donors were males (Table 4.1). Of all the blood units collected from voluntary blood donors 40.6% of units were collected at voluntary blood donation camps. Of the total blood donations, the units collected at voluntary blood donation camps comprised 21.5% of the total blood units collected during the year 2007.

4.3.1.2.Screening for TTI's

All (100%) blood units collected were screened for all the five TTI,s i.e. HIV, HBV, HCV, syphilis and malaria.

4.3.1.3.Rational clinical use of blood

In ZH Dharamshala, 32.7% of the patients and in RH Palampur, 39.5% of the patients given transfusion received single units of blood. In the district as a whole more than one third of the blood recipients received single units of transfusion. This percentage translated in to 17.4%, 24.6% and 18.9% of all the blood units issued by ZH Dharamshala, RH Palampur and district Kangra respectively.

4.3.2. Qualitative indicators

4.3.2.1.Nationally co-ordinated blood transfusion service

Both blood banks are licensed since the year of their inception. They are being regulated by the National Blood Transfusion Council through State Blood Transfusion Council, under the chairmanship of Secretary Health to the government of Himachal Pradesh and Director of Health Services, Himachal Pradesh as the member secretary and State Program Officer (Blood safety) as the member. The license is renewed annually on the recommendations of the State Blood Transfusion Council.

4.3.2.2.Voluntary blood donor programme

There is no blood donor programme officer either at the state or the district level. No blood donor unit has been established in the district. Comprehensive lists of non-remunerated voluntary donors are not being maintained either manually or by computerized systems. Most voluntary donations are organized by voluntary and non-governmental or organizations. No counselors are available for counseling of voluntary or other donors at the donation sites. Sixty six percent of the donors observed during the blood donation camps were new donors and remaining the repeat donors. Donors do not undergo complete physical examination at the time of blood donation as no blood haemoglobin estimation is not being done in the settings of blood donation camps. Both blood banks had IEC material and Standard Operating Procedures available for blood collection procedures. Single use disposable equipment was used for all observed blood donations. No shortage of blood collection bags or other supportive material was reported by the medical officers in-charge of either of the blood banks.

4.3.2.3.Testing of donated blood for TTI's, Blood grouping & Rh Compatiblity

All (100%) donated blood units are being screened for five of the TTI's made compulsory under the national blood safety programme. Screening for HIV and HBV and syphilis is being done manually by rapid test procedures and for malaria by JSB staining. Testing for ABO blood grouping and cross matching is being done exclusively by manual methods. However, there is no quality control check on the quality of these tests. SOP's for testing of blood were available in both the blood banks of the district.

4.3.2.4.Rational clinical use of blood

There is no hospital blood transfusion committees at either of the two hospital blood banks surveyed. No optimum surgical blood ordering procedures are in place. NACO guidelines for rational clinical use of blood are available only in the blood banks and not being circulated among the clinicians and prescribers of the blood.

Although a blood component separation unit is located at Shimla, no components are being requisitioned by either of the blood banks in the district.

4.3.2.5.External quality assurance

No external quality assurance checks are being made in spite of provisions for such checks under the national blood safety programme and guidelines by NACO.

4.4. Limitations of the study

The clinicians, prescribers of blood were not interviewed to obtain information about their knowledge of rational clinical use of blood. Most information is abstracted from the blood bank records and interview with medical officers in-charge of the blood banks. Also the blood donors were not interviewed

4.5.Conclusions

1. Voluntary blood donation is much below the target of 80% laid down by NACO. Most voluntary donors are new donors as observed during the voluntary blood donation ca and not regular ones. There are no professional donors in the state.
2. Screening for all TTI's is being done for 100% of the donated blood units. However, there is no external quality assurance of the screening procedures.
3. NACO guidelines on appropriate clinical use of blood are not being followed. Most recipients received single units of blood for transfusions.

4.5.1. Recommendations

1. Recruit more voluntary blood donors by conducting IEC activities and involving non-governmental, voluntary and community based organizations.
2. Retain the recruited voluntary blood donors and maintain records, preferably computerized.
3. Ensure external quality assurance of the screening procedures for TTI's.
4. Train medical officers about the rational clinical use of blood.

5. Appoint district blood donor recruitment officer and blood donor counselors if feasible.
6. Form hospital blood transfusion committees to ensure appropriate clinical use of blood.

4.5. References

[1] Blood Safety: Aide-Memoire for National Blood Programmes. World Health Organization, Blood Transfusion Safety, Department of Blood Safety and Clinical Technology, Geneva, Switzerland. 2002;1-2. www.who.int/bct/02.03.

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Table 4.1: Blood units collected during the year 2007, by gender and type of donor, District Kangra, Himachal Pradesh, India, 2007.

	Type of donors	No. (%) of donors during the year					
		Males		Females		Total	
		No.	%	No.	%	No.	%
Zonal Hospital Dharamshala	Voluntary non-remunerated	1594	61.7	150	95.5	1744	63.6
	Replacement/family	991	38.3	7	4.5	998	36.4
	Professional/paid	0	0.0	0	0.0	0	0.0
	Autologous	0	0.0	0	0.0	0	0.0
	TOTAL	**2585**	**100.0**	**157**	**100.0**	**2742**	**100.0**
Referral Hospital Palampur	Voluntary non-remunerated	121	15.1	42	72.4	163	18.9
	Replacement/family	682	84.9	16	27.6	698	81.1
	Professional/paid	0	0.0	0	0.0	0	0.0
	Autologous donors	0	0.0	0	0.0	0	0.0
	TOTAL	**803**	**100.0**	**58**	**100.0**	**861**	**100.0**
Whole district	Voluntary non-remunerated	1715	50.6	192	89.3	1907	52.9
	Replacement/family	1673	49.4	23	10.7	1696	47.1
	Professional/paid	0	0.0	0	0.0	0	0.0
	Autologous donors	0	0.0	0	0.0	0	0.0
	TOTAL	**3388**	**100.0**	**215**	**100.0**	**3603**	**100.0**

Table 4.2: Blood units collected at blood donation camps during the year 2007, District Kangra, Himachal Pradesh, India, 2007.

Location of the blood bank	Blood units collected during the blood donation camps in 2007			
	No. of camps	No. of units collected	% of all voluntary donations	% of all donations
Zonal Hospital Dharamshala	21	641	36.8	23.4
Referral Hospital Palampur	10	133	81.6	15.5
TOTAL	**31**	**774**	**40.6**	**21.5**

Table 4.3: Proportion (%) of patients and proportion of blood units issued for single unit transfusion during the year 2007, District Kangra, Himachal Pradesh, India, 2007.

Hospital	No. of patients issued single unit of blood	No. of patients issued two units of blood	No. of patients issued >2 units of blood	Total no. of patients receiving blood transfusion	Total No. of blood units issued	Proportion of patients transfused single units of blood	Proportion of all units transfused as single units
Zonal Hospital Dharamshala	183	280	0	463	743	39.5%	24.6%
Referral Hospital Palampur	476	649	320	1455	2742	32.7%	17.4%
TOTAL	659	929	320	1918	3485	34.4%	18.9%

List of blood transfusion facilities in Himachal Pradesh, India, 2007. (n=16)

TYPE OF FACILITY	LOCATION	DISTRICT
Blood component separation unit	1. Indira Gandhi Medical College, Shimla	Shimla
Blood Banks of District Hospitals[*] and Medical colleges[†]	1. Kamla Nehru Hospital, Indira Gandhi Medical College, Shimla Shimla	Shimla
	2. Deen Dayal Upadhayay, Zonal Hospital, Shimla	Shimla
	3. Regional Hospital, Solan	Solan
	4. Regional Hospital, Sirmaur	Sirmaur
	5. Dr. R.P.Government Medical College-cum-Zonal Hospital, Kangra	Kangra
	6. Regional Hospital, Kullu	Kullu
	7. Regional Hospital, Kinnaur	Kinnaur
	8. Regional Hospital,Bilaspur	Bilaspur
	9. Regional Hospital, Una	Una
	10. Zonal Hospital, Mandi	Mandi
	11. Regional Hospital, Hamirpur	Hamirpur
	12. Regional Hospital, Chamba	Chamba
Sub-district level Blood Banks	1. Referral Hospital, Rampur	Shimla
	2. Referral Hospital, Rohru	Shimla
	3. Referral Hospital, Palampur	Kangra

[*]Eleven blood banks co-located in respective district hospitals. One district (Lahaul & Spiti) does not have any blood bank.

[†] One blood bank in Kamla Nehru Hospital, Indira Gandhi Medical College, Shimla and another blood bank common for both Dr. Rajendra Prasad Government Medical College, Tanda (District Kangra) and Zonal Hospital, Dharamsala (District Kangra).

Table 1: Logic model-evaluation of blood safety programme, district Kangra, Himachal Pradesh, India, 2007.

Element	Inputs	Processes	Output	Outcome

Voluntary non-remunerated blood donation	• Government commitment and support
	  ▪ Legislation/regulation
	• Blood donor unit (for donor education, motivation. Recruitment and retention)
	• Human resource
	  ▪ Programme Officer, Blood donor Programme
	  ▪ Blood donor recruitment Officer
	• Low risk donor populations
	• Standard operating procedures including checklist for deferral criteria for blood donation
	• IEC materials to educate voluntary non-remunerated donors and masses
		• Implementation of legislation and policy
		• Identification of donor populations at low risk for TTI's
		• Maintenance of register of non-remunerated blood donors
		• Donor notification and referral for counseling
		• Educate, motivate recruit & retain voluntary non-remunerated blood donors
		• Generate awareness among the masses
		• Voluntary blood donation camps
		• Training of staff in blood donor unit
		• Safe blood collection procedures, including donor selection
		• Monitoring of TTI's in the donor populations
			• Elimination of paid blood donor systems
			• Minimization of family/replacement blood donations.
				Safe blood for transfusion – low risk of TTI's

Screening for TTI's (HIV, hepatitis B & C, malaria, syphilis)	• Legislation /regulation to ensure Licensed Blood Banks
	• Technical officer (qualified haematologist/microbiologist with specialized training in blood transfusion)
	• Trained laboratory technicians
	• Laboratory infrastructure
	  ▪ Sufficient quantity of test kits for various screening procedures
	  ▪ Cold chain equipment
	• Screening strategies and protocols for testing, selection and evaluation of appropriate screening assays to be used for each site
		• Mandatory screening of all donated blood for TTI's (HIV, hepatitis B & C, malaria, syphilis)
		• Blood grouping and compatibility testing
		• Procurement, supply, central storage and distribution of reagents and materials ***to ensure continuity in testing at all sites***
			• Screened and compatible blood deemed safe for transfusion	Safe blood for transfusion – low risk of TTI's

Table 1 (contd.): Logic model-evaluation of blood safety programme, district Kangra, Himachal Pradesh, India, 2007.

Element	Inputs	Processes	Output	Outcome
Rational clinical use of blood	• Policy and guidelines for the rational clinical use of blood • Training in rational use of blood for all clinicians and for BTS staff. • Blood component separation unit wherever feasible	• Transfusion of blood only when unavoidable • Prescription and use of blood components whenever whole blood transfusion can be avoided • Prevention, early diagnosis and treatment of conditions that could result in the need for transfusion • Monitoring and evaluation of clinical use of blood.	• Effective clinical use of blood and blood products in accordance with national guidelines	• Safe blood for transfusion – low risk of blood borne infections

Table 1: From the logic framework to study design for a programme evaluation: Voluntary non- remunerated blood donation

Levels of logic model	Programme elements	Indicators	Data needed for the indicator	Source of data	Evaluation design
Inputs	• Government commitment and support ▪ Legislation/regulation	▪ Legislation in force or not	▪ Yes/No	▪ Health directorate	Interview with State Programme Officer HIV/AIDS/Blood donor programme
	• Blood donor unit (for donor education, motivation, recruitment and retention)	▪ Blood donor unit established or not	▪ Existing/Functioning – Yes/No	▪ Health directorate	
	• Human resource ▪ Programme Officer, National Blood donor Programme ▪ Blood donor recruitment Officer	▪ Programme officer (Blood donor programme) appointed or not	▪ Appointed - Yes/No	▪ Health directorate	
		▪ Blood donor recruitment officer appointed or not	▪ Appointed – Yes/No	▪ Health directorate	
	• Low risk donor populations	▪ Identified/not identified	▪ Yes/No ▪ If yes, No. identified	▪ Records of blood donor unit	Review of records of blood donor unit
	• Standard operating procedures including checklist for deferral criteria for blood donation	▪ Standard operating procedures available or not	▪ Available/not available	▪ Records of blood bank/donor unit	Review of records of BB/ donor unit
	• IEC materials to educate voluntary non-remunerated donors and masses	▪ Proportion of blood donor units having IEC material	▪ No. of units having IEC material	▪ Blood donor units	Observation
			▪ Total No. of donor units	▪ Health directorate	Review of records of health directorate

Table 2(contd.): From the logic framework to study design for a programme evaluation: Voluntary non- remunerated blood donation

Levels of logic model	Programme elements	Indicators	Data needed for the indicator	Source of data	Evaluation design
Processes	• Implementation of legislation and policy	▪ Proportion of blood bank staff aware about the legislation on banning of professional donors	▪ No. aware	▪ BB staff	Survey of BB staff
			▪ No. surveyed	▪ BB staff	
	• Identification of donor populations at low risk for TTI's	▪ Proportion of blood units donated by voluntary donors	▪ No. of units donated by voluntary donors	▪ BB records	Review of BB records
			▪ Total units donated	▪ BB records	
	• Maintenance of register of non-remunerated blood donors	▪ Register of voluntary blood donors maintained	▪ Yes/No	▪ Blood donor unit	
	• Donor notification and referral for counseling	▪ Donor notification and referral system	▪ In place/not in place	▪ Blood donor unit	Review of records of blood donor unit
	• Educate, motivate, recruit & retain voluntary non-remunerated blood donors	▪ No. of donors recruited	▪ Register of voluntary blood donors	▪ Blood donor unit	
	• Generate awareness among the masses	-	-	-	-
	• Voluntary blood donation camps	▪ Proportion of blood samples collected through blood donation camps	▪ No. of units collected in camps	▪ BB records	Review of BB records
			▪ Total units collected	▪ BB records	
	• Training of staff in blood donor unit	▪ Proportion of blood donor unit staff trained in donor notification, counselling, and recruitment.	▪ No. trained	Training records; programme officer	Review of training records; interview with programme officer
			▪ Total staff	▪ Training records; programme officer	
	• Safe blood collection procedures, including donor selection	▪ Proportion of units collected using single use disposable equipment (needle, tubes and bags).	▪ No. of units collected using single use disposable equipment	▪ BB procedures	Observation of blood collection procedures in blood banks/voluntary donation camps.
			▪ Total no. of units collected		
	• Monitoring of TTI's in the donor populations	▪ Proportion of donors monitored for TTI's after recruitment.	▪ No. of donors screened for TTI's	▪ BTS officials	Interview; review of records of the monitoring activities
			▪ Total no. of donors recruited		

Table 2(contd.): From the logic framework to study design for a programme evaluation: Voluntary non- remunerated blood donation

Levels of logic model	Programme elements	Indicators	Data needed for the indicator	Source of data	Evaluation design
Output	• Elimination of paid blood donor systems	▪ Proportion of blood units collected through voluntary non-remunerated blood donations	▪ No. of blood units collected through voluntary non-remunerated blood donations	▪ Blood bank records	Review of blood bank records
	• Minimization of family/replacement blood donations.		▪ Total no. of blood units collected	▪ Blood bank records	

Table 2: From the logic framework to study design for a programme evaluation: Screening of blood for TTI's

Levels of logic model	Programme elements	Indicators	Data needed for the indicator	Source of data	Evaluation design
Inputs	• Legislation /regulation to: ▪ Ensure screening for HIV, HBV, HCV, malaria and syphilis ▪ Licensing of blood banks	▪ Legislation existing or not	▪ Yes/No	▪ Health directorate	Review of records
		▪ Proportion of blood banks licensed	▪ No. of BB licensed		
			▪ Total no. of blood banks		
	• Technical officer (qualified haematologist/microbiologist with specialized training in blood transfusion)	▪ Proportion of technical officers qualified haematologists /microbiologists/ with specialized training in blood transfusion	▪ No. qualified/trained	▪ Health directorate	
			▪ Total no. of technical officers		
	• Trained laboratory technicians	▪ Proportion of laboratory technician trained in screening for: ▪ (1) HIV (2) HBV (3) HCV (4) MP (5) VDRL/RPR.	▪ No. of technicians trained for each infection	▪ Training records; interview with lab technicians	Review of training records; Survey of technicians
			▪ Total no. of technicians	▪ BB records	
	• Laboratory infrastructure ▪ test kits for various ▪ Cold chain equipment	▪ Frequency the test kits have gone out of stock during the last one year (separate data for each test kit)	▪ No. of times the test kits have gone out of stock during the last one year (separate data for each test kit)	▪ BB in charge	Interview with BB incharge
		▪ Sufficient availability of refrigerators	▪ Refrigerators available	▪ BB in charge	Interview with BB incharge; observation of the equipment
			▪ Refrigerators required	▪ BB in charge	
	• Screening strategies and protocols for testing, selection and evaluation of appropriate screening assays to be used for each blood transfusion site	▪ Availability of screening protocols	▪ Yes/No ▪ If yes, are these protocols appropriate?	▪ BB records	Review of BB records

Table 3 (contd.): From the logic framework to study design for a programme evaluation: Screening of blood for TTI's

Levels of logic model	Programme elements	Indicators	Data needed for the indicator	Source of data	Evaluation design
Processes	• Mandatory screening of all donated blood for TTI's (HIV, hepatitis B & C, malaria, syphilis)	• Proportion of blood units screened for (1) HIV (2) HBV (3) HCV (4) Malaria (5) VDRL	▪ No. of units screened for each infection	▪ BB records	Review of records
	• Blood grouping and compatibility testing	▪ Proportion of blood units tested for blood groups and compatibility	▪ Total no. of units collected by the BB	▪ BB records	
	• Procurement, supply, central storage and distribution of reagents and materials ***to ensure continuity in testing at all sites***	▪ No. of times the equipment has gone out of stock/out of order during the last one year	▪ Same as for indicator	▪ BB records	Review of records
			▪ Same as for indicator		
Output	• Screened and compatible blood deemed safe for transfusion	• Proportion of blood units screened for all the five TTI's	▪ No. of units screened for all the five TTI's	▪ BB records	Review of records
			▪ Total no. of units collected by the BB		
		▪ Proportion of blood units tested for blood groups and compatibility	▪ No. of units tested for blood group & compatibility	▪ BB records	
			▪ Total no. of units	BB records	

Table 3: From the logic framework to study design for a programme evaluation: Rational clinical use of blood.

Levels of logic model	Programme elements	Indicators	Data needed for the indicator	Source of data	Evaluation design
Input	• Policy and guidelines for the rational clinical use of blood	▪ Policy and guidelines available or not	▪ Yes/No	▪ Programme officer	Interview with programme officer; see the document if available
	• Training in rational use of blood for all clinicians and for BTS staff.	▪ Proportion of clinicians at the blood bank site trained and aware of the guidelines for rational use of blood	▪ No. of clinicians trained	▪ Clinicians	Survey of clinicians and BB staff; review of training records
			▪ Total no. of clinicians at site	▪ Hospital records	
		▪ Proportion of BB staff trained	▪ No. trained	▪ BB in charge	Interview and scrutiny of records
			▪ Total no.	▪ BB in charge	
	• Blood component separation unit wherever feasible	▪ Component separation unit existing.	▪ Yes/No	▪ BB in charge	Interview with BB in charge
Process	• Transfusion of blood only when unavoidable	▪ Proportion of blood transfusions that could be avoided	▪ No. of avoidable transfusions in last one week	▪ BB records	Review of records of blood bank and patients.
			▪ Total no. of transfusions given in the last one week	▪ BB records	
	• Component separation	▪ Proportion of blood units used for component separation	▪ Total no of units used for component separation in one year	▪ BB in charge	Review of blood bank records
			▪ Total no of units collected in that year	▪ BB records	
	• Prevention, early diagnosis and treatment of conditions that could result in the need for transfusion	▪ Proportion of antenatal women given complete course of iron and folic tablets.	▪ No. of antenatal women given complete course of iron and folic acid in the year preceding evaluation.	▪ Directorate of health services	Review of records of health directorate.
			▪ Total no of antenatal women in that year	▪ Directorate of health services	
	• Monitoring and evaluation of clinical use of blood.	▪ Monitoring checklist/SOP's and monitoring and evaluating agency/authority	▪ Available – Yes/No	▪ BB in charge	Interviews with BB in charge; review of SOP's
Output	• Effective clinical use of blood and blood components in accordance with national guidelines	▪ Proportion of blood component transfusions	▪ No. of blood component transfusions	▪ BB records	Review of BB records
			▪ Total no. of transfusions	▪ BB records	

THE SEVEN POINT CHECKLIST FOR INDICATORS

Field Epidemiology Training Programme (FETP) – Draft 2 – 19 October 2006

Ensure the quality of your indicators through running them through this short checklist:

1. **The indicator focuses on a point that is key to ensure long-term impact.**
   - ✓ It covers a point that is essential in the chain between the input and outcome
2. **The indicator is measurable using reasonably feasible methods.**
   - ✓ Data can be collected for the indicator.
     - Some outcome indicators (e.g. incidence of infection) can not be obtained in practice in the context of a simple programme evaluation.
3. **The indicator is standard.**
   - ✓ The indicator is identical or compatible with established indicators that are recommended in national or international guidelines.
     - Immunization coverage indicators are calculated using standardized methods allowing international comparisons.
4. **The indicator can be measured in a specific, reproducible way.**
   - ✓ The indicator is based upon data that can be collected in a reproducible, objective way. Make reference to a time reference if needed (For example: Proportion of health workers supervised in the last 12 months). Words to be avoided and replaced by explicit descriptions include:
     - "Adequate"
     - "Appropriate"
     - "Correct"
     - "Proper"
     - "As per guidelines"
   - ✓ Examples:
     - "Proportion of population who knows they should seek attention for a cough longer than three weeks" is better than "Proportion of the population having correct knowledge on tuberculosis".

- "Proportion of surveillance officers who attended three day induction course on Integrated Disease Surveillance Programme" is better than "Proportion of medical officers trained".

5. **The indicator is quantified.**
   - ✓ The indicator is based upon quantitative rather than upon qualitative data.
6. **The indicator is expressed as a rate, ratio or proportion.**
   - ✓ The indicator uses some sort of denominator to allow comparison as per the Count, Divide and Compare (CDC) principle.
7. **The indicator is critical.**
   - ✓ The indicator is not redundant and reflects well other points that cannot be all covered by a dedicated indicator.
     - "Proportion of blood units screened for HIV" and "Proportion of blood units screened for HCV" may be sufficient and will give you an idea of what may happen for HBV, syphilis and malaria.

Annexure-4.4

Data collection instrument.

(For Blood Banks/Blood Transfusion Facilities)

PART-I
Administrative information

1) Name of the blood bank _____

2) Address of the blood bank _____

City _____ District _____

3) Name of the officer in-charge _____

4) Tele no. _____ Fax no. _____

5) Email _____

6) Date: _____

7) Data for the period: **1.1.2007 – 31.12.2007**

8) Year of starting the blood bank ☐

9) Year of licensing of the blood bank ☐

10) Floor area of the blood bank (sq feet) ☐

11) Total number of blood units collected during the year 2007. ☐

12) In 2007, what were the number and percentage of blood units discarded due to the following causes?

Cause	Number	Percentage
Faulty blood collection		
Positive for Transfusion Transmissible Infection (TTI)		
Date expiry		
Processing failure		
Storage/transportation problems		
Other causes (please specify)		

13) Does your organization require training or technical support? 1.☐ Yes

(Please specify below) 2.☐ No

_____

_____

_____

14) What major problems are you facing in the following areas?

a) Inability to meet the demand for blood.

b) Un-necessary demand for blood units.

c) Irrational use of whole blood in place of blood components

d) Shortage of Voluntary non-remunerated donors

e) Counseling services for donors

f) Shortage/Irregular supply of testing kits for screening for transfusion transmissible infections

g) Blood collection equipment viz. blood collection bags, needles etc.

h) Cold chain equipment – storage/transportation of blood including power failures

i) Staff shortages

j) Inadequate trainings.

(Remarks of blood bank in-charge: major problems first)

1._____

2._____

3._____

4._____

5._____

6._____

PART-II
(BLOOD DONORS)

15) Is blood donor recruitment officer appointed in your district? 1. ☐ Yes
2. ☐ No

16) Is there blood donor unit established in your district? 1. ☐ Yes
2. ☐ No

17) Do you have trained donor recruitment staff? 1. ☐ Yes
2. ☐ No

18) Is special budget provided for blood donor recruitment programme? 1. ☐ Yes
2. ☐ No

19) Have you identified low risk (voluntary non-remunerated) blood donor populations? 1. ☐ Yes
2. ☐ No

20) If yes, are you maintaining a database of these donors? 1. ☐ Yes[1]
2. ☐ No

21) If yes, is the database computerized or manual? 1. ☐ Computerized
2. ☐ Manual

22) If yes, how many donors are registered in your district?* ☐

23) Are these donors monitored for TTI's? 1. ☐ Yes
2. ☐ No

24) Is IEC material available for donor education, motivation, recruitment, retention and deferral? 1. ☐ Yes
2. ☐ No

25) Are local work instructions (SOP's) in use?[1,2] 1. ☐ Yes
2. ☐ No

26) Number of blood units collected during the year 2007: ☐

---

[1] Tick mark /fill after confirming the availability of the document and referring to it.
[2] SOP's regarding criteria for voluntary non-remunerated blood donation.

Type of donors	No. of donors during the year 2007			Remarks (if any)
	Males	Females	Total	
Voluntary non-remunerated donors				
Family/Replacement donors				
Paid/professional donors				
Autologous donors				
Total				

27) What is the average volume of a whole blood unit? ml.

28) No. of blood units supplied during the year by the blood bank

29) Number of voluntary blood donation camps held during the year

30) Number of blood units collected in blood donation camps during the year

31) Are donor counseling services provided at donation sites? 1. ☐ Yes 2. ☐ No

32) If yes, the number of donors counseled.

33) Do you have a system of post-donation counseling of blood donors who test positive for transfusion transmissible infections? 1. ☐ Yes 2. ☐ No

34) Do you have a system to obtain feedback and complaints from donors? 1. ☐ Yes 2. ☐ No

35) Are pre-donation deferral criteria used? 1. ☐ Yes 2. ☐ No

36) If yes, the criteria used:

i. _____

ii. _____

iii. _____

iv. _____

v. _____

vi. _____

vii. _____

viii. _____

ix. _____

x. _____

37) In 2007, what was the percentage of donors deferred after being assessed unsuitable to donate blood? [ ] %

38) Proportion of donors undergoing Hb estimation before donation [ ] %

PART-III
(SCREENING FOR TRANSFUSION TRANSMISSIBLE INFECTIONS)

39) Is national strategy on blood screening being followed? 1. ☐ Yes
2. ☐ No

40) Are the screening protocols for screening of blood for transfusion available in your blood bank? 1. ☐ Yes[3]
2. ☐ No

41) Has blood ever been issued without testing due to non-availability of test kits/reagents? 1. ☐ Yes
2. ☐ No

42) In 2007,what proportion (%) of units were screened for:

i. HIV _____(%)
ii. HBV _____(%)
iii. HCV _____(%)
iv. Syphilis _____(%)
v. Malaria _____(%)

43) What proportion (%) of HIV tests were performed by:
i. ELISA _____(%)
ii. Rapid/Simple_____(%)

44) Method routinely used to test for:
(i) HBV _____
(ii) HCV _____
(iii)Syphilis _____
(iv)Malaria _____

45) What is the proportion of units discarded after testing positive for TTI's_____(%)

46) During 2007 what was the prevalence of TTI's among:

Type of donors	**HIV (%)**	**HBV (%)**	**HCV (%)**	**Syphilis (%)**	**Malaria (%)**
Voluntary					
Replacement					
Professional					
Autologous					
Total					

[3] Verify the availability of protocols

47) From which tests are prevalence data obtained?

1. ☐ Screening
2. ☐ Confirmatory

48) Do you store frozen samples of donor plasma for look-back testing?

1. ☐ Yes
2. ☐ No

49) Do you maintain the records of patients frequently requiring blood/blood products?

1. ☐ Yes
2. ☐ No

50) How often the screening kits/reagents for the following tests have gone out of stock during the year 2007?

a) HIV .....
b) HBV.....
c) HCV.....
d) Syphilis.....
e) Malaria.....
f) Blood grouping reagents.....

PART IV
(BLOOD GROUP SEROLOGY AND COMPATIBILITY TESTING)

51) Are there guidelines for compatibility testing? 1. ☐ Yes 2. ☐ No

52) What proportion of donations are tested for blood group and by which methodology?

	Tests performed		**If yes, percentage tested**
i.	Red cell ABO grouping	1. ☐ Yes 2. ☐ No	%
ii.	Serum ('reverse') ABO grouping	1. ☐ Yes 2. ☐ No	%
iii.	RhD antigen testing	1. ☐ Yes 2. ☐ No	%
iv.	Antibody testing	1. ☐ Yes 2. ☐ No	%
v.	Cross-matching with recipient blood	1. ☐ Yes 2. ☐ No	%
vi.	Are the tests routinely performed by manual methods?	1. ☐ Yes 2. ☐ No	%

53) Do you have facility for electronic cross-matching of the blood? 1. ☐ Yes 2. ☐ No

54) What was the percentage of blood units issued without compatibility testing during the year 2007? %

55) Does the blood bank participate in external quality assurance? 1. ☐ Yes 2. ☐ No

PART V
(RATIONAL CLINICAL USE OF BLOOD)

56) Are there national guidelines available in the district for rational clinical use of blood?(e.g. NACO guidelines). 1. ☐ Yes[1] 2. ☐ No

57) Do you have a functioning hospital transfusion committee for monitoring/evaluating clinical use of blood? 1. ☐ Yes 2. ☐ No

58) If yes, how frequently the service is being monitored and evaluated? ____ /Yr

59) In 2007, what proportion (%) of blood was transfused as whole blood? ____ %

60) Are crystalloids available in your location as alternatives to blood products? 1. ☐ Yes 2. ☐ No

61) Are colloids available in your location as alternatives to blood products? 1. ☐ Yes 2. ☐ No

62) Does your hospital follow a *maximum surgical blood ordering schedule (MSBOS)*[4] 1. ☐ Yes 2. ☐ No

63) Are post-transfusion **reactions** monitored? 1. ☐ Yes 2. ☐ No

64) Are post-transfusion **infections** monitored? 1. ☐ Yes 2. ☐ No

65) How many patients were issued single unit of blood during 2007? ____

[4] A guide to expected normal blood usage for elective surgical procedures which lists the number of units of blood to be routinely cross-matched or grouped, screened and held for each procedure preoperatively.

PART VI
(COLD CHAIN EQUIPMENT)

66) Are national guidelines/ work instructions (SOP's) on the **storage** of blood/blood products available/ in use?
1. ☐ Yes
2. ☐ No

67) Are national guidelines/ work instructions (SOP's) on the **transportation** of blood/blood products available/ in use?
1. ☐ Yes
2. ☐ No

68) Are blood and blood products stored in temperature monitored storage equipment?
1. ☐ Yes
2. ☐ No

69) Are reagents stored in temperature monitored cold chain equipment?
1. ☐ Yes
2. ☐ No

70) What is the equipment available in the blood bank for cold chain maintenance?

(Tick all that apply)

a. Blood bank refrigerator with temperature monitoring system and alarm ☐
b. Plasma freezer ☐
c. Platelet agitator/incubator ☐
d. Refrigerated centrifuge ☐
e. Domestic refrigerator ☐
f. Ice-lined refrigerator (ILR) ☐
g. Blood transport boxes ☐
h. Standby generator ☐
i.

71) Is domestic refrigerator being used for storage of blood/blood products?
1. ☐ Yes
2. ☐ No

72) Do you think that your storage capacity is adequate?
1. ☐ Yes

2. ☐ No

73) How frequently the cold chain equipment has gone out of order (defected) during the last three months (no. of times)? ☐

74) How frequently you have encountered power failures of more than six hour duration during the last three months (no. of times)? ☐

5. SURVEILLANCE EVALUATION

Abstract*

Title: Training needs hamper progress of Integrated Disease Surveillance Project (IDSP) in Himachal Pradesh, India, during 2006.

Background: Integrated disease surveillance project was started in India and Himachal Pradesh in the year 2005 to improve the information available to the health care providers on a set of high-priority diseases and risk factors. We undertook an interim assessment to identify strengths and constraints of the program and recommend measures to overcome the constraints identified.

Methods: We assessed the inputs, processes and outputs of the program across the 12 districts in Himachal Pradesh. We interviewed health personnel involved in disease surveillance, reviewed the documents and records pertaining to implementation plan/guidelines, training records and reports generated by various reporting units. We calculated the proportion of districts reporting the surveillance data, proportion of staff of various categories trained in surveillance activities, number of districts with regular surveillance officers and proportion of laboratories strengthened.

Results: Data management staff in all the districts and state headquarters was as per the project norms. Training of the all state and district level rapid response teams had been completed. All the 12 districts were sending the weekly reports but timely reports were received from 50% of districts. During the year 2006, officer in charge of the state surveillance unit was changed four times with an average working span of three months. A training consultant is yet to be appointed. At sub-district level 57% percent of the medical

officers, 36% of health workers and three percent of the laboratory staff were trained against the target planned. None of the two proposed state level laboratories were supported from the allotted funds. Only 41.6% of the district public health laboratories and 3.6% of the sub-district laboratories were strengthened from the allotted funds.

Conclusions: Since its commencement in March 2005, IDSP appears to be moving in the right direction with respect to regularity of reporting. It is recommended that training of all peripheral level staff be completed, training consultant appointed and dedicated trained state level surveillance officer appointed to improve quality of reporting.

Key words: Surveillance, project, interim assessment

Word count: 323 (excluding title, subtitles and key words).

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* Presented as poster presentation at 4th TEPHINET, Bi-Regional Conference, Taipei, Taiwan, 2007.

5. An interim assessment of Integrated Disease Surveillance Project (IDSP), Himachal Pradesh, India, 2006.

5.1. Introduction

Surveillance is the backbone of public health programmes and provides information so that effective action can be taken in controlling and preventing diseases of public health importance. However, like in most developing countries, health information system in most parts of India lacks the capacity to provide timely information on health events requiring prompt action. Integrated disease surveillance programme aims to overcome this gap and improve the information available to the health care providers on a set of high-priority diseases and risk factors, with a view to improving the on-the-ground responses to such diseases and risk factors.

Prior to the launch of IDSP, some important drawbacks/gaps identified in the health surveillance system in India included: lack of integration of private sector in surveillance activity, poor laboratory capacity, lack of surveillance infrastructure in the urban regions, slow and inefficient sharing of surveillance information at the district level, limited capacity to undertake analysis and response at the district level and non inclusion of non-communicable diseases (NCD) and their risk factors in surveillance programme.

IDSP was, therefore, launched in India and Himachal Pradesh in the year 2005 with the main objectives of (1) Establishing a decentralized district-based system of surveillance for communicable and non-communicable diseases with the District Surveillance Unit (DSU) as the focal point of all surveillance related activities (2) Integrating existing surveillance activities i.e. integration of: communicable and non-communicable diseases,

rural and urban sectors, private and public sectors including medical colleges. (3) Improving laboratory diagnostic capacity at all levels (4) Improving communication through improved use of computers and information technology for surveillance (5) Developing human resource by providing training and incremental staff and (6) Developing infrastructure to facilitate sharing of surveillance information at the district and state levels.

We undertook an interim assessment of the integrated disease surveillance project in the state of Himachal Pradesh to (1) describe the surveillance system (2) Analyze some attributes of the surveillance system (3) assess the accomplishment of component wise objectives of IDSP from a programmatic perspective (4) identify its strengths and weaknesses/gaps (5) identify underlying factors contributing to these gaps and (6) recommend appropriate measures to narrow down the gaps identified.

5.2. Methods

5.2.1. Methods for description of the surveillance system

5.2.1.1. Review of documents

5.2.1.1.1. Documents on IDSP by government of India

We reviewed the following documents on IDSP prepared by the Government of India, Directorate General of Health Services, Ministry of Health & Family Welfare, New Delhi:

1. National Project Implementation Plan (PIP), 2004.

2. Operational Manual for District Surveillance Units.

3. Operational Manual for Medical Officers.

4. Operational Manual for Health Workers.

5. Manual of laboratory techniques for District Public Health Laboratories.

6. Reporting formats – Form 'S' for syndromic surveillance, Form 'P' for presumptive surveillance, Form'L' for laboratory surveillnac and Form 'W' for water quality surveillance (Annexure-5.1).

7. Data collection, aggregation, transmission and analysis protocols.

5.2.1.1.2. Documents on IDSP by government of Himachal Pradesh

1. State Project Implementation Plan.
2. Training records of all categories of personnel involved in surveillance

5.2.2. Methods for analysis of the surveillance system

5.2.2.1.Simplicity : We reviewed the reporting formats : Form 'S' for syndromic surveillance, Form 'P' for presumptive surveillance, Form'L' for laboratory surveillnac and Form 'W' for water quality surveillance (Annexure-5.1).

5.2.2.2.Flexibility – IDSP Guidelines for inclusion of state/area specific diseases

5.2.2.3.Acceptability – interview with district surveillance officers

5.2.2.4.Sensitivity – not analyzed

5.2.2.5.Positive value positive- not analyzed

5.2.2.6.Representativeness – review of weekly reports of the districts

5.2.2.7. Timeliness- review of weekly reports of the districts

5.2.2.8. Cost-review of documents pertaining to budgetary allocation for various activities under IDSP

2.9. Usefulness- interview with state and district surveillance officers about the number of outbreaks detected by the surveillance data.

.3. Methods for assessment of achievement of component wise objectives

.3.1. Review of documents

reviewed the records of the State Surveillance unit pertaining to

1. Project Implementation Plan (PIP)
2. Installation of information technology (IT) infrastructure viz. computers with internet connectivity and telephones.
3. Recruitment of incremental staff
4. Training of State and District Surveillance Teams, medical officers, laboratory technicians and health workers

.3.2. Visits to district surveillance unit

visited five of the twelve district surveillance units to observe the status of plementation activities.

.4. Indicators calculated

.4.1. Indicators for inputs and processes

.4.1.1 Decentralization

- Proportion of districts where district surveillance units (DSU's) have been established

5.2.4.1.2 Integration

- Number of medical colleges involved in surveillance under IDSP
- Proportion of districts where private practitioners have been involved in IDSP activities and number of private practitioners involved.
- Proportion of districts where non-communicable disease (NCD) risk factor surveys were conducted.
- Proportion of districts integrating with police department for procuring data on road traffic accidents.

5.2.4.1.3 Human resource development

5.2.4.1.3.1 State surveillance unit

- Mean duration for which State Surveillance Officers have held office
- Training status of State Surveillance Officer (s).
- Training consultant appointed or not
- Whether state level rapid response team identified and trained or not
- Proportion of sanctioned incremental staff appointed

5.2.4.1.3.2 District surveillance units

- Proportion of districts with full time District Surveillance Officers (DSO's)
- Proportion of District Surveillance Officers imparted (trainers') training in IDSP.
- Proportion of districts where district level rapid response teams have been trained
- Proportion of different categories of incremental staff appointed at the district level.
- Proportion of medical officers, laboratory technicians and health workers trained

5.2.4.1.4 Strengthening of information technology

- Proportion of district surveillance units provided with computers
- Proportion of district surveillance units provided with IDSP software for data compilation, transmission and analysis.
- Proportion of district surveillance units provided with internet connections
- Proportion of district surveillance units provided with telephone facility

5.2.4.1.5 Strengthening of laboratory capacity

- Whether State level public health laboratory (L3) established and made functional
- Proportion of districts with fully functional district public health laboratories (L2) have been established.
- Proportion of peripheral level (L1) laboratories provided with additional equipment as planned under IDSP
- Proportion of laboratory technicians trained out of planned number required to be trained.
- Proportion of Water Testing Laboratories set up as planned under the IDSP

5.2.4.2 Indicators for output

- Proportion of districts reporting weekly
- Proportion of districts reporting on time

5.3. Results

5.3.1. Description of the surveillance system

5.3.1.1 Population under surveillance

The whole state of Himachal Pradesh is under surveillance. Except for HIV, HBV, HCV and water quality, which are under sentinel surveillance, whole of the population of the state is under surveillance for remaining communicable and non-communicable diseases/non-communicable disease risk factors.

5.3.1.2 Disease conditions under surveillance

Conditions under various types of surveillance activities under the IDSP include the following:

5.3.1.2.1 Regular Surveillance

Vector Borne Disease	: 1. Malaria
Water Borne Disease	: 2. Acute Diarrhoeal Disease (Cholera)
	: 3. Typhoid
Respiratory Diseases	: 4. Tuberculosis
Vaccine Preventable Diseases	: 5. Measles
Diseases under eradication	: 6. Polio
Other Conditions	: 7. Road Traffic Accidents (Linkup with police computers)
Other International commitments	: 8. Plague, Yellow fever
Unusual clinical syndromes (Causing death/hospitalization)	: 9. Meningoencephalitis / Respiratory Distress, Hemorrhagic fevers, other undiagnosed conditions.

5.3.1.2.2 Sentinel Surveillance

Sexually transmitted diseases/Blood borne	: 10. HIV/HBV, HCV
Other Conditions	: 11. Water Quality
	: 12. Outdoor Air Quality (Large Urban centers)

5.3.1.2.3 Regular periodic surveys

NCD Risk Factors	: 13. Anthropometry, Physical Activity, Blood Pressure, Tobacco, Nutritional status.
5.3.1.2.4 State specific diseases	: 14. Scrub typhus, Leishmaniasis, plague

5.3.1.3 Syndromes under surveillance

The following clinical syndromes will be under surveillance in IDSP. (paramedical health staff undertakes disease surveillance based on broad categories of presentation).:

1. Fever

- Less than seven days duration without any localizing signs (suspected malaria)
- With rash (suspected measles)
- With altered sensorium (suspected Japanese encephalitis or suspected malaria)
- With convulsions (suspected Japanese encephalitis)
- Bleeding from skin or mucus membrane(suspected dengue)
- Fever more than seven days with or without localizing signs (suspected typhoid)

2. Cough more than 3 weeks duration

3. Acute Flaccid Paralysis

4. Watery Diarrhea

5. Jaundice

6. Unusual Events causing death or hospitalization

5.3.1.4. Case definitions of diseases under surveillance

Case definitions used under IDSP are the same as used in WHO recommended surveillance standards[1].Case definitions of various diseases/conditions under surveillance are annexed to this document (Annexure-5.2).

5.3.1.5. Type of surveillance system

IDSP combines the elements of active surveillance (e.g. malaria), passive surveillance and stimulated passive surveillance (e.g. polio).

5.3.1.6. Reporting units

The reporting units for surveillance data include 2068 health sub-centres (one each for a population of 3000), 440 primary health care centres (one each for a population of 20000), 67 community health centers (one each for a population of 80000-120000), 50 district/sub-district level hospitals and two medical colleges of the state apart from private practitioners and health institutions of Indigenous system of medical (ISM) care.

5.3.1.7. Data structure and flow of information

Surveillance activities are carried at three levels of diagnosis – syndromic diagnosis (suspected case based on symptoms), presumptive diagnosis (probable diagnosis by a medical officer) and confirmatory diagnosis (confirmed by laboratory criteria).

At peripheral levels health workers carry out syndrome surveillance based on the syndromes under surveillance. The data is aggregated and reported on form 'S' at weekly intervals to the medical officer in-charge of the primary/community health center of the area. Individual record is maintained in the 'S' register on which the workers maintain daily record before aggregating it at the end of the week.

Medical officers at all levels collect data on daily basis on 'P" register. Again data is aggregated at the end of week and transmitted directly to the district surveillance unit of the area.

District units compile the data of the whole district on the IDSP software for the purpose. The aggregated data is then transmitted to the state surveillance units every week via internet.

Similarly, state surveillance unit transmits the aggregated data of the state to the central surveillance unit at National Institute of Communicable Diseases, Delhi, which is the nodal agency at the country level.

Further details of the information flow are given in Figure 5.1.

5.3.1.8. Indicators to be calculated by IDSP Managers

Data analysis was not being done at the district and state levels. Theoretically, the following indicators need to be calculated under the operational guidelines[2] of the project:

5.3.1.8.1 Morbidity and mortality indicators

Some of the measures that are to be used for analysis are

Cases – the number of new cases of a disease/ syndrome under surveillance that have been detected in the specified period

Deaths – the number of deaths that have occurred in the specified period in the community or in the institution

Incidence Rate – the number of new cases that have occurred in a 1000 population over a fixed period of time.

Case Fatality Ratio – the number of deaths from a particular disease that have occurred per 100 cases of that particular disease.

5.3.1.8.2 Performance indicators

Weekly indicators

These indicators are supposed to be reviewed every week when the data is collated and reports generated. There are two main indicators:

- Timeliness of reports
- Completeness of reports

These two indicators apply for all the levels e.g. the PHC MO can monitor whether all sub-centers have reported (completeness) and on time (timeliness). The same is to be done at the CHC/District/State/National level.

Monthly / Quarterly indicators

These indicators allow for mid term review and correction of the Programme performance, so that the surveillance system remains alert and vigilant. The following indicators are to be calculated:

- Completeness of report for the period XXX:

$$\frac{\text{No: of reporting units sending complete reports during the specified period}}{\text{Total no. of reporting units}}$$

- Timeliness of report for the period XXX:

$$\frac{\text{No: of reporting units that have been on time during the specified period}}{\text{Total no. of reporting units}}$$

- Percentage of outbreaks that have been detected:

$$\frac{\text{No: of outbreaks detected by the surveillance system}}{\text{Total no. of outbreaks during that period}}$$

Annual indicators

These indicators include.

- Completeness of report for the year
- Timeliness of report for the year

- Percentage of outbreaks that have been detected
- Percentage of newsletters published.

5.3.1.9. Feedback

Regular monthly review meetings of surveillance officers are not held. During the year 2006 only one meeting of district surveillance officers was organized at the state surveillance unit. However, regular monthly meetings are held at the district and block headquarters to discuss the issues pertaining to implementation of IDSP.

Routine correspondence with districts is mainly regarding non-submission of reports on time.

5.3.1.10. Non-Communicable Disease (NCD) Risk Factor Surveillance

The prevalence of risk factors is supposed be measured by periodic sample surveys in states conducted once in 5 years. Twenty percent of districts are to be surveyed each year, so that the whole population is covered in 5 years. The survey would be conducted every year in randomly selected districts in a five-year cycle. Thus, the same district will be covered once again after five years and the changing trends observed (thus having a repeat coverage of the same cross-section of the population only once in five years).

5.3.2. Analysis of the surveillance system

Simplicity

The reporting formats are simple, short and easy to understand and report (Annexure-5.1). All the reporting formats are brief comprising one page each. Each peripheral reporting unit (i.e. sub-center, primary health center, community health center, and sub-

district level hospital and laboratory) has to report on a single page reporting format. However, in far-flung remote areas, with little communication network, it is difficult to transmit data on weekly basis.

Acceptability

The system is acceptable to all being simple. However, the parallel systems of surveillance under various national health programmes are yet continuing and the participants feel additional workload of reporting under IDSP.

Flexibility

The system is flexible enough to accommodate surveillance of diseases other than those included in the routine surveillance system. The state specific diseases like scrub typhus and leishmaniasis have been included in the surveillance. Any other unusual syndrome or disease not endemic in the area can also be included.

Sensitivity

Sensitivity of the surveillance could not be ascertained due to resource and logistic constraints. The system is multi-disease and the assessment comprised the whole of state. Large scale survey to ascertain the sensitivity of the system for any one disease could also not have been possible for the same reasons.

Positive predictive value

Case definitions of various syndromes and diseases have been adapted from WHO Recommended Surveillance Standards and are deemed to be highly sensitive and specific. However, as the laboratory capacity has not yet been enhanced as planned under

IDSP, laboratory confirmation of most diseases except malaria and tuberculosis is not yet being done at the district and sub-district levels.

Timeliness

All the twelve districts in the state were sending weekly reports. However, only six of the 12 districts (50%) were sending the weekly reports on time in the one month period prior to writing of this report. Timeliness of the reporting of sub-district level units was not ascertained.

Representativeness

The data generated by the system is not representative because of (1) incomplete or non-reporting from most sub-district level hospitals due to lack of training of health workers (only 57% of medical officers and 36% health workers were trained) (2) Non-participation of Medical Colleges (2) Non-involvement of private practitioners.

Usefulness

None of the district surveillance officers admitted having detected and outbreak based on the analysis of surveillance data. All the outbreaks were reported by local people or media.

Costs

In general, the costs of operating the system is quite cheap as the reporting system is simple to operate at the grass root level. However, at the district and state level, additional data management staff (data entry operators and data managers) had to be recruited for handling data. Additional costs are being incurred to develop information technology and laboratory infrastructure. These expenses are being borne from the

project funds provided by the central government. Additional expenses are being incurred due to increase in frequency of surveillance data transmission (weekly as compared to monthly reporting earlier). When the project ends after, five years, the sustainability of the system will impose additional burden on the state exchequer.

5.3.3. Indicators of achievements of project components

Decentralization

District Surveillance units have been established in all the 12 districts of the state. All the districts have been issued the allocated funds for IDSP activities.

Integration

- None of the two medical colleges have been involved in the IDSP activities except for training of two microbiologist of each medical college.
- None of the districts have involved private practitioners in the IDSP.
- No survey has been done for non-communicable disease (NCD) risk factors in any of the districts since the inception of IDSP in the state in March, 2005.
- Also there is no co-ordination with the police department to procure data on road traffic accidents and injuries.

Human resource development

State surveillance unit

- Mean duration served by a State Surveillance Officer (SSO) during the year 2006 was four months (range 3-6 months). Three surveillance officers were appointed

during the year 2006 and only one of them was a public health specialist (DPH). Other two SSO's were not even trained in IDSP activities.

- Training consultant has not been appointed since the beginning of the project in the state.
- Three member state level rapid response team comprising one epidemiologist, one physician and one microbiologist has been trained
- Status of incremental staff sanctioned and appointed is shown in table 5.1.

District surveillance units

- None of the districts had a full time District Surveillance Officer (DSO)
- Only five of the 12 DSO's (41.7%) had training in IDSP at the timing of writing this report
- Three member rapid response team comprising one epidemiologist, one physician/paediatrician and one microbiologist/pathologist has been trained in all the districts.
- Different categories of incremental staff appointed at the district level is shown in table 5.1.
- Proportion of medical officers, laboratory technicians and health workers trained is as shown in table 5.2.

Strengthening of information technology

- All twelve district surveillance units and the state surveillance units have been provided with one computer each along with the latest IDSP software and internet connectivity.

- One telephone has also been provided to each district and state surveillance officers out of IDSP funds.

Strengthening of laboratory capacity

- State level public health laboratory has not been set up so far. No funds or equipment has been issued to the medical college for the purpose.

- Public health laboratories have been set up in only two of the 12 districts (District Solan and Kinnaur). These laboratories are also not fully functional as the laboratory technicians have not been trained to conduct the additional tests made available under the IDSP.

- No sub-district level laboratory has been upgraded.
- Training of laboratory technicians/assistants is yet to start.
- Only on Water Testing Laboratories has been set up (at Deen Dayal Upadhayay Zonal Hospital Shimla) against a planned number of three.

5.3.4. Output indicators

Results of out put indicators have been included in analysis of surveillance above.

5.4. Discussion, conclusions and recommendations

Integrated disease surveillance project is a very well conceived surveillance project having adopted many features of the best surveillance systems in the world like MMWR (Morbidity and Mortality Weekly Report) of the United States of America. Whereas a lot of work has been done to improve the communication and other infrastructure, yet, the project is moving at a very slow pace in Himachal Pradesh due mainly to (1) Programme management problems consequent to non-availability of full-time, trained programme managers at the state and district levels (2) Inadequate number of trained health staff involved in disease surveillance (3) Poor laboratory capacity (4) Lack of integration with medical colleges. These issues and the pertinent practicable recommendations will be discussed one by one.

The appointment of state and district level progrmme is done based on the service seniority of the officers in the hierarchy. As a result the officer who qualifies on this count is only appointed for the post of state or district surveillance officer. Most of these officers are either on the verge of superannuation/retirement or next promotion. As a result they stay for short periods on the post of surveillance officers and the next incumbent joins at their place. This vicious cycle goes on and as a result the programme suffers. The junior officers who are likely to stay longer can not be appointed as surveillance officers due to seniority protocols. The most practicable solution lies in appointment of trained medical officers/epidemiologists as full time assistants/ to these

programme officers so that all surveillance activities can go on when a new incumbent joins. Epidemiologists in training at National Institute of Epidemiology, Chennai from the state can best be utilized for the purpose at the state/district surveillance units.

Training of health personnel also suffers because of the non-availability of the programme managers. By the time the programme managers learns about the training activities to be conducted he moves out of the office. Appointment of training consultant can address this issue promptly without imposing additional costs to the state as budgetary provision already exists under the project guidelines.

Public health laboratories at the district and state level could not be established due to misconception in the minds of surveillance officers that these laboratories have separate existence apart from the existing laboratories at the district hospitals. All districts have expressed concerns about the availability of space/accommodation to set up the laboratories and non-availability of staff to man these additional laboratories. Therefore, existing laboratories at the district hospitals should be upgraded with supplies of additional equipment and reagents under the IDSP. The laboratory technicians need to be imparted training to perform additional tests.

Involvement of the two medical colleges of the state in IDSP activities need not be emphasized. If medical colleges are involved, the services of specialists in public health can be utilized for training of the health personnel. Medical colleges also conduct the largest number of confirmatory tests on biological specimen and may thus contribute significantly in laboratory surveillance of communicable diseases. As per the project guidelines, the departments of microbiology of medical college are to impart training to

laboratory technicians/assistants of the state. Without their involvement the laboratory capacity of the state can not be enhanced. Medical colleges also to a substantial proportion of the urban population at their respective locations. The resources from medical colleges can also be utilized in conducting non-communicable disease risk factor surveys.

The implementation of these recommendations will not lead to any extra-costs to the state. But if implemented promptly the programme can take off in the desired direction and at a fast pace so that surveillance data becomes useful for making public health decisions.

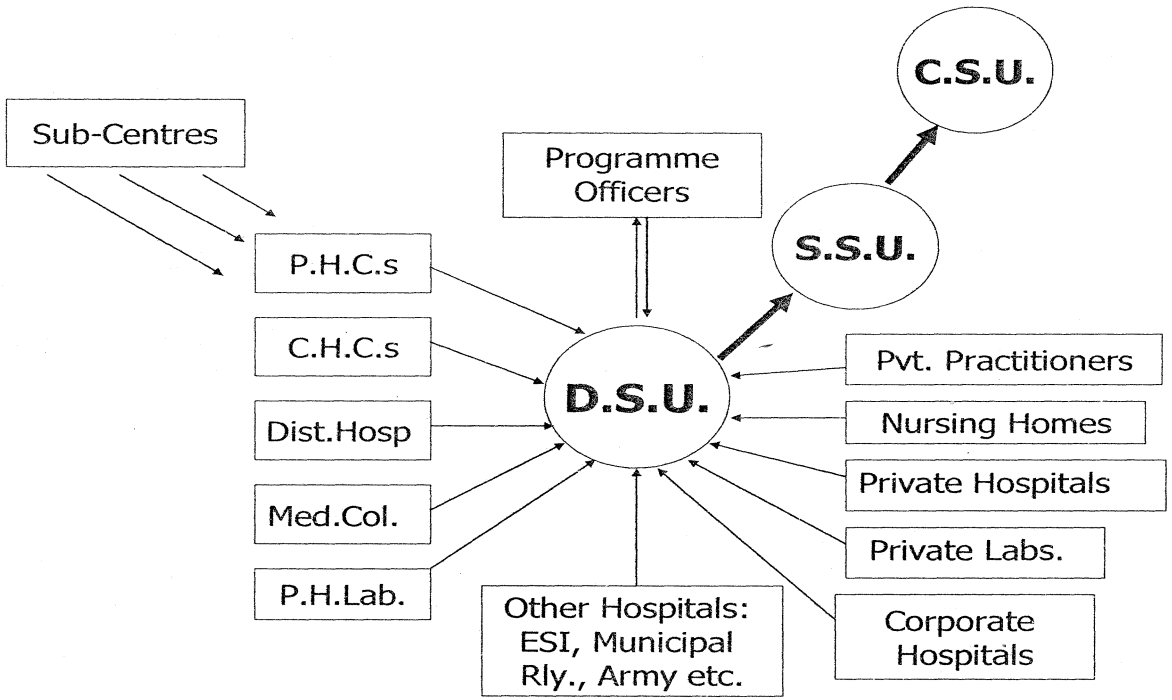
References:

[1] WHO Recommended Surveillance Standards. World Health Organization, Department of Communicable Disease Surveillance and Response, 1999.

[2] Operational Manual for District Surveillance Units, Government of India, Directorate General of Health Services, Ministry of Health and Family Welfare, Nirman Bhawan, New Delhi, India, 2005. p 130-131.

Figure 5.1.

Information flow chart, Integrated Disease Surveillance Project, Himachal Pradesh, India, 2006.



Note: Abbreviations and acronyms used: (1) PHC – Primary Health Center (2) CHC – Community Health Center (3) District Surveillance Unit (4) SSU- State Surveillance unit (5) CSU- Central Surveillance unit (6) Dist. Hosp – District Hospital (7) Med. Col. – Medical College (8) P.H. Lab.- Public Health Laboratory (9) ESI – Employees State Insurance dispensaries/hospitals (10) Rly. – Railway hospitals/dispensaries (11) Pvt. Practitioners – Private Practitioners

Table 5.1: Appointment of incremental staff, Integrated Disease Surveillance Project, Himachal Pradesh, India, 2006

Name of the Post	State Surveillance Unit			District Surveillance Units		
	Sanctioned	Appointed	Deficient	Sanctioned	Appointed	Deficient
Training Consultant	1	0	1	Nil	NA	NA
Financial Consultant	1	1	Nil	Nil	NA	NA
Data Manager	1	1	Nil	Nil	NA	NA
Accountant	Nil	NA	NA	1 per district	12	Nil
Data Entry Operators	2	2	Nil	2 per district	24	Nil
Helper	1	1	Nil	Nil	NA	NA
Office Assistants	1	Nil	1	1 per district	Nil	12

Table 5.2: Trainings status of various categories of health personnel under Integrated Disease Surveillance Project (IDSP), Himachal Pradesh, India, 2006.

Category of personnel	No. proposed to be trained*	Training needs/No. actually required to be trained†	No. trained	Proportion of the proposed number trained	Proportion of the actual requirement trained
Medical officers	367	894	209	57%	33%
Health Workers	2371	3100	854	36%	27.5%
Laboratory Technicians	48	66	0	0%	0%
Laboratory Assistants	65	67	0	0%	0%
Accountants	12	12	12	100%	100%
Data Manager	1	1	1	100%	100%
Data Entry Operators	26	26	26	100%	100%

*According to the state Project implementation Plan

†Minimum number based on the no. of reporting units.

Annexure-5.1
Reporting formats

Form 'S'
Reporting format for syndromic surveillance under IDSP

Name of the reporting unit:
Week from:_____ to _____

District Name	Fever					Cough with or without fever		Loose Watery Stools <2 Weeks			Jaundice cases of less than 4 weeks	Acute Flacid Paralysis cases in less than 15 years of age	Unusual Symptoms Leading to Death or Hospitalization that do not fit into other columns	Outcome (In case of death, please use this column)
	Fever less than 7 days				Fever more than 7 days	<3 weeks	>3 weeks	With some / much dehydration	With no dehydration	With blood in stool				
	Only Fever	With Rash	With Bleeding	With daze or semi/ un-consciousness										
Total														

Form 'P'
Reporting format of presumptive surveillance under IDSP

Name of the reporting unit:
Reporting week : from:_____ to _____

District Name	Fever				Loose Watery Stools < 2 Weeks	Jaundice < 4 weeks	Acute Flacid Paralysis < 15 yrs age	Unusual Syndromes leading to death/hosp-italizaion	Outcome (in case of death, use this column)
	Measles	Dengue	Japanese Encepha-litis	Typhoid	Cholera	Hepatitis A/E	Polio		
Total									

Form 'L'
Reporting format of laboratory surveillance under IDSP

Name of the reporting unit:
Reporting week : from:_____ to _____

District Name	Malaria		Typhoid	Tuberculosis	Cholera		Hepatitis					Measles	Dengue	Polio	Plague	Leptospirosis	HIV		Anthrax	Other (Specify)
	P. falciparum.	*P. vivax.*			Culture	Typing Cholera toxin test	A	B	C	E							Rapid Test	ELISA		
Total																				

Weekly reporting summary- Integrated Disease Surveillance Project

State:_____

Reporting week: from_____**to** _____

Sr. No.	District	Total RUs	Reported RUs	Reporting %
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
	Total Report			

Water Quality Reporting Format for Level 1 and Level 2 Laboratories

Name of the reporting unit:
Reporting week : from:_____ to _____

WATER QUALITY TESTING				
Purpose	**Investigation**	**Source of water sample**	**Number of samples tested**	**Result**
Fecal Contamination	Rapid H_2S test	1		
		2		
		3		
		4		
		5		
		6		
Chlorination level of drinking water source	Orthotoludine Test (using Chloroscope)	1		
		2		
		3		
		4		
		5		
		6		

Water Quality Reporting Format for Level 3 (State Level) Laboratories

Name of the reporting unit:
Reporting week : from:_____ to _____

WATER QUALITY TESTING				
Purpose	**Investigation**	**Source of water sample**	**Number of samples tested**	**Result**
Detection of coliform bacteria	Most probable number (MPN)	1		
		2		
		3		
		4		
		5		
		6		

Annexure-5.2

Case definitions

1. Malaria

Clinical case description

Any case of fever.

Fever may be accompanied by

- Headache, backache, chills, rigors, sweating, myalgia, nausea and vomiting
- Splenomegaly and anemia
- Generalized convulsions, coma, shock, spontaneous bleeding, pulmonary edema,
- renal failure and death (untreated falciparum infection)

Laboratory criteria for diagnosis

Demonstration of malaria parasites in blood films OR Positive Rapid Diagnostic Test for Malaria.

Case classification

Suspect case: Any case of fever (in an endemic area)

Probable case: A case that meets the clinical case definition

Confirmed case: A suspect case with malaria parasites in blood films

Confirmed complicated/severe malaria: A confirmed case with symptoms/signs of complicated/severe malaria (prostration, impaired consciousness, respiratory distress (acidotic breathing), multiple convulsions, circulatory collapse, pulmonary oedema (radiological), abnormal bleeding, jaundice, haemoglobinuria, severe anaemia, etc).

Confirmed malaria death: Death of a confirmed case.

Outbreak triggers

The states may set their own trigger levels based on the prevalence of malaria in the region. The following is a general guideline.

Trigger-1

- Even single case of smear + ve malaria in an area where malaria was not present for minimum three months.
- Smear Positivity Rate (SPR) rise more than double over last three months.
- Single death from malaria (clinical /microscopically proven).
- Single ***Plasmodium falciparum*** (PF) case of indigenous origin in a PF free region

Trigger-2:

- Two fold rise in malaria in the region over the last 3 months
- More than 5 cases of PF of indigenous origin

2. Cholera

Clinical case description:

In an area where the disease is not known to be present:

Severe dehydration or death from acute watery diarrhoea in a patient aged 5 years or more. Severe dehydration implies lethargy, altered consciousness, decreased urine.

In an area where Cholera is endemic:

Acute watery diarrhoea, with or without vomiting in a patient aged 5 years or more.

In an area where there is a cholera epidemic:

Acute watery diarrhoea, with or without vomiting, in any patient.

Laboratory criteria for diagnosis:

Isolation of Vibrio cholera O1 or O139 from stools in any patient with diarrhoea.

Case classification

Suspect case: A case that meets the clinical case definition.

Probable case: A suspect case diagnosed as Cholera by a medical officer.

Confirmed case: A suspected case that is laboratory-confirmed.

Outbreak triggers

Trigger-1

- A single case of Cholera /epidemiologically linked cases of Diarrhea
- A case of severe dehydration/death due to diarrhea in a patient of > 5 yr of age.
- Clustering of cases in a particular village/ urban ward where more than 10 houses have at least one case of loose stools irrespective of age per 1000 population.

Trigger-2;
More than 20 cases of diarrhea in a village / geographical area of 1000 population

3. Typhoid

Clinical case description

Any Patient with fever for more than one week and with any 2 of the following.

- Toxic look
- Coated tongue
- Relative bradycardia
- Splenomegaly

Laboratory criteria for diagnosis:

- Isolation of organisms from clinical specimen such as blood, stool or other clinical specimen.
- Serology – Typhi Dot Test + ve / Widal test

Case classification

Probable case: Any case of fever diagnosed as typhoid by MO that is compatible with:

- Clinical case description.
- Tyhpi Dot / Widal Test +ve (More than 1 week)
- Exposure to confirmed case
- Clinical presentation with complications eg. GI Bleeding, Perforation, etc

Confirmed Case: A suspected /probable case that is laboratory confirmed by

- Isolation of Salmonella typhi / paratyphi from blood or other clinical specimens
- Four fold rise in the agglutination titre in paired sera taken ten days apart

Outbreak triggers

Trigger -1

- More than 30 cases in a week from the entire PHC area OR
- 5 or more cases per week from 1 sub centre of 30,000 population OR
- More than 2 cases from a single village/urban ward/1000 population
- Clustering of cases of fever

Trigger-2

More than 60 cases from a PHC or more than 10 cases from a sub-center.

4.Tuberculosis

Clinical case description

Pulmonary tuberculosis

Any person with

- Cough of more than 3 weeks duration and with at least 2 of 3 initial sputum smear examinations (direct smear microscopy) positive for AFB. Often associated with
- Fever
- Weight loss
- X-ray may show infiltration/ fibrocavitary changes

Laboratory criteria for diagnosis:

- Sputum positive for AFB in 2 out of 3 sputum smear examination
- Sputum positive for AFB in at least 1 out of 3 smear examination with X-ray evidence of TB
- Sputum culture grows Acid Fast Bacilli

Case classification

Suspect case: Any patient having cough more than 3 weeks duration.

Probable case: Patient with symptoms suggestive of pulmonary TB (cough of 3 weeks with or without fever) diagnosed by MO as TB with or without radiological signs consistent with pulmonary TB.

Confirmed case: A case that meets the clinical case definition and that is positive for laboratory criteria.

Outbreak triggers

Trigger Levels: Not Applicable

5. Measles

Clinical case description:

Any person with

- Fever and

- Maculo popular rash lasting for more than 3 days
- Cough or coryza or conjunctivitis

Laboratory criteria for diagnosis:

- At least a four fold increase in the anti body titre or
- Isolation of measles virus or
- Presence of measles specific IgM anti bodies

Case classification

Suspect case: Any case with fever & rash

Probable case: Any suspect case who is diagnosed as measles by MO on basis of clinical case description

Confirmed case: A case that meets the clinical case definition and that is laboratory confirmed or linked epidemiological to a lab confirmed case

Outbreak triggers

Trigger Level-1

- A single case of measles in a tribal area
- More than 2 cases of fever with rash in a village / geographical area of 1000 population

Trigger Level-2

- More than 4 cases of fever with rash in a geographical area of 1000 population
- Similar illness in more than 1 village reported in the same week

6. Polio

Clinical case description:

A case of AFP is defined as any child aged <15 years who has acute onset of flaccid paralysis for which no obvious cause (such as serve trauma or electrolyte imbalance)

is found, or paralytic illness in a person of any age in which polio is suspected.

Cases of AFP without isolation of wild poliovirus may be classified as "polio compatible" if:

- Stool specimens were inadequate

  AND

- Residual weakness was present 60 days after onset of paralysis or 60-day follow-up was not done (due to death or absence)

  AND

- Expert review" concludes that these cases could not be discarded as "non-polio" based on available data.

Laboratory criteria for diagnosis:

Wild poliovirus isolated from any stool specimen

Case classification

Suspect case: Syndromic case of AFP – Fever with abrupt onset of paralysis of leg or arm

Probable case: Epidemiologically linked case

Confirmed case: A suspected case that is laboratory-confirmed.

Outbreak triggers

Even a single case of AFP reported will trigger the outbreak investigation

7. Plague

Clinical description

Disease characterized by rapid onset of fever, chills, headache, severe malaise, prostration with

- *Bubonic form:* extreme painful swelling of lymph nodes at axilla, groin and

neck (buboes).

- *Pneumonic form:* cough with blood-stained sputum, chest pain, difficult breathing
- *Septicemia form:* toxic changes in the patient.

Laboratory criteria for diagnosis:

- Giemsa smear should be positive
- Direct fluorescent antibody testing of smears (for anti-F1 antibody)
- PCR test
- Four fold increase in antibody titres against F1 antigen (by PHA tests)
- Isolation of the bacteria by culture and phage lysis

Case classification

Probable case: A case consistent with clinical case description with H/0 rat fall. OR

- *Y. pestis* F1 antigen detected in clinical materials by direct fluorescent antibody testing or by some other standardized antigen detection method, OR
- Isolate from a clinical specimen demonstrates biochemical reactions consistent withY.pestis or PCR positivity, OR
- A single serum specimen is found positive for diagnostic levels of antibodies to *Y. pestis* F1 antigen, not explainable on the basis of prior infection or immunization
- Epidemiological link with a confirmed case.

Confirmed case: a suspected or probable case that is lab-confirmed

- Isolate identified as *Y. pestis* by phage lysis or cultures; or
- A significant (4-fold) change in antibody titre to the F1 antigen in paired serum specimens.

Outbreak triggers

Trigger-1: Rat fall

Trigger -2: Even one probable case of plague in the community

8. Dengue Fever (DF)

Clinical case definition:

An acute febrile illness of 2-7 days duration with 2 or more of the following:

- headache
- Arthralgia
- Retro-orbital pain
- Rash
- Myalgia
- Haemorrhagic manifestations
- Leucopoenia

Laboratory criteria for diagnosis:

Any one or more of the following:

- Isolation of the dengue virus from serum, plasma, leukocytes, or autopsy samples
- Demonstration of a fourfold or greater change in reciprocal IgG or IgM antibody titres to one or more dengue virus antigens in paired serum samples (depending on the diagnostic kit used).
- Demonstration of dengue virus antigen in autopsy tissue by immunohistochemistry or immunofluorescence or in serum samples by EIA.
- Detection of viral genomic sequences in autopsy tissue, serum or CSF samples by polymerise chain reaction (PCR)

Case classification

Suspected

A case compatible with the clinical description.

Probable

A case compatible with the clinical description with one or more of thefollowing:

- Supportive serology (reciprocal haemagglutination-inhibition antibody titre, comparable IgG EIA titre or positive IgM antibody test in late acute or convalescent-phase serum specimen).

Epidemiologically linked with a confirmed case of dengue fever (occurrence at same location and time as other confirmed cases of dengue fever).

- High vector density.

Confirmed

- Isolation of the dengue virus from serum, plasma, leukocytes, or autopsy samples.
- Demonstration of a fourfold or greater change in reciprocal IgG or IgM antibody titres to one or more dengue virus antigens in paired serum samples (depending on the diagnostic kit used).
- Demonstration of dengue virus antigen in autopsy tissue by immunohistochemistry or immunofluorescence or in serum samples by EIA.
- Detection of viral genomic sequences in autopsy tissue, serum or CSF samples by polymerase chain reaction (PCR)A case compatible with the clinical description and confirmed by positive IgM ELISA rapid Test in the laboratory.

Outbreak triggers

Trigger -1:

- Clustering of two similar cases of probable dengue fever
- A single case of suspected Dengue heamorragic fever or shock syndrome

Trigger-2

- More than 4 cases of Dengue Fever in a village / Geographical area of 1000 population

9. Japanese encephalitis (JE)

Clinical case description

Febrile illness of variable severity associated with neurological symptoms ranging from headache to meningitis or encephalitis. Symptoms can include: Headache, fever, meningeal signs, stupor, disorientation, coma, tremors, paresis (generalized), hypertonia, and loss of coordination. (The encephalitis cannot be distinguished clinically from other central nervous system infections).

Laboratory criteria for diagnosis

Presumptive

Detection of an acute phase anti-viral antibody response through one of the following:

- Elevated and stable serum antibody titres of JE virus through ELISA, haemagglutination or virus neutralization assay, or
- Ig M antibody to the virus in serum (Appears after 1 week of disease)

Confirmatory

- Detection of the JE virus, antigen or genome in tissue, blood or other body fluid by immuno-chemistry or immuno-fluorescence or PCR, or

- JE virus-specific IgM in the CSF, or
- Fourfold or greater rise in JE virus-specific antibody in paired sera (acute and convalescent phases) through IgM /IgG, ELISA, haemagglutination inhibition test or virus neutralization test

CASE CLASSIFICATION

Suspect case of JE: Any case with fever of acute onset and altered consciousness/ convulsions and change in behaviour

Probable JE:

- Any suspected cases diagnosed as JE by the MO (or)
- Any suspect case with presumptive lab results
- An epidemiologically linked case of fever with proven JE case

Confirmed JE: A suspect or probable case confirmed by laboratory tests

Outbreak triggers

Trigger -1: Clustering of two or more similar case from a locality in one week.

Trigger-2: More than 4 cases from a PHC (30,000 population) in one week

10. Acute viral hepatitis

Clinical case description

Acute illness typically including the following:

- Acute jaundice (Yellow sclera/skin)
- Dark urine
- Anorexia, malaise
- Extreme fatigue

- Right upper quadrant tenderness

Biological signs include:

- Increased urine urobilonogen
- >2.5 times the upper limit of serum alanine aminotransferase1.

Laboratory Criteria for Diagnosis:

Hepatitis A: IgM anti HAV positive

Hepatitis B: Positive for HbsAg or IgM anti-HBc2

Hepatitis C: Positive for anti-HCV

Hepatitis D: Positive for HbsAg or IgM anti-HBc Plus anti-HDV

Hepatitis E: Positive for anti-HEV

Case Classification for IDSP

Suspect case: As per clinical case definition

Probable case: Not applicable

Confirmed case: A suspect case that is laboratory confirmed. For Hepatitis A, a case compatible with the clinical description and with epidemiological link with a lab confirmed case of Hepatitis A.

11. HIV

Clinical case description

There is no clinical description; the diagnosis is based on lab criteria

Laboratory criteria for diagnosis:

- HIV positive serology (ELISA)
- Confirmation should be by a second ELISA.

6. Scientific study critique

General information

Title of the paper: **Cassia occidentalis poisoning as the probable cause of hepatomyeloencephalopathy in children in western Uttar Pradesh.**

Authors: **V.M Vashishtha, Amod Kumar, T.Jacob Johan & N.C.Nayak.**

References: **Thirty one references**

Reviewer: **Dr. Balraj Singh**

General narrative comments:

Outbreaks of childhood encephalopathy syndrome with high case fatality were becoming a recurrent feature in the districts of western Utter Pradesh. As these outbreaks were a seasonal feature, epidemiology could help in identifying the statistically most significant cause of the illness & could suggest specific interventions for the control of the toxic weed and prevention of future high case fatality outbreaks. The systematic steps of outbreak investigation are not provided and the problem in terms of time, place and person characteristics not mentioned.

6. JOURNAL CRITIQUE

Area	*Checklist items*	*Grading from 1 (strongly disagree) to 5 (strongly agree)*					*Explanations*
		1	*2*	*3*	*4*	*5*	
Overall assessment of the paper	The background provides a description of the public issue at the global and local levels and logically introduces the need to answer a specific research question.				√		The background doesn't provide a description of the issue at the global or national level, but does reflect it as a regional problem. As the problem is restricted to regional level global description is not warranted, but the background logically introduces the need to answer a specific research question.
	The methods section provides sufficient information on the methods used, including the type of study, the sampling strategy, the case definitions, the data collection and the data analysis.				√		All are well described except that it has no reference of sampling of neighbourhood controls and no time, place and person characteristics mentioned.
	The results reports sound scientific results that meet the study's objective and the research question. They are presented with sufficient details and adequate statistical information (e.g., Confidence Intervals).					√	They meet the study's objective and research question & all are adequately explained except the limitations of the study.
	The discussion summarizes and interprets the results, discusses the findings in view of what is already known, frames what the results of the study can support, defines the limitation of the work and suggests next steps in terms of (1) intervention and (2) research.				√		All are sufficiently dealt with except that next steps in terms of research are lacking.

Area	*Checklist items*	*Grading from 1 (strongly disagree) to 5 (strongly agree)*					*Explanations*
		1	*2*	*3*	*4*	*5*	
Methods	The study design is adequate to meet the objective.					√	More cases & clustering favoured case control study
	The study population is well defined and relevant to the research question				√		Study population is well defined but is not relevant to the research question as it may not be representative of western U.P and Uttranchal.
	Definitions are specified, sound and based upon standardized criteria when available.				√		Time, place & person criterion is not fulfilled.
	Sampling methods are statistically sound and adapted.				√		For cases it is adequate where as for controls it is not mentioned.
	The sample size was estimated beforehand appropriately.					√	All the cases were included and 1:3 controls were selected in 1:3 proportions of cases.
	The study is exempt from bias.	√					Sex match of control is lacking.
	The data that were collected are well described and relevant.					√	It is epidemiologically adequate.
	The data was collected was of sufficient quality.					√	59 variables are included.
	The analysis is thought beforehand and appropriate.	√					The paper doesn't mention anything on this aspect of epidemiological study.
	The indicators generated are appropriate and well calculated.					√	Epi info 6 software is used.
	The statistical tests used are appropriate and well computed.					√	Epi info 6 software is used.
	Appropriate attention has been given to human subject protection issues.	√					Human subject protection issues have not been discussed and there is no mention of ethical committee clearance.

Area	*Checklist items*	*Grading from 1 (strongly disagree) to 5 (strongly agree)*					*Explanations*
		1	*2*	*3*	*4*	*5*	
Writing	The content is well distributed by chapters and sections.					√	It follows the style of scientif writing.
	The language is simple and clear. The word count is < 3000.					√	2992 words including 2 table (less than 3000 words)
	The writing is sequential, going from one point to the next.					√	It is sequential and logical.
	The active voice is used throughout.			√			Occasional passive voice is u
	The vocabulary is precise, consistent and standardized.					√	The vocabulary is precise, consistent and standardized.
Tables and figures	There are no more than five tables and or figures. All are needed.					√	The tables were needed.
	The choice of graph or table to display information is judicious.					√	Tables for time, place and pe distribution could have been included.
	The tables are clear, exact and the totals add up.					√	They do describe data.
	The graphs are effective, appropriate and understandable.	√				√	The graphs are not required.