Government of India

GUIDELINES
FOR SURVEILLANCE OF ACUTE ENCEPHALITIS SYNDROME
(WITH SPECIAL REFERENCE TO JAPANESE ENCEPHALITIS)

Directorate of National Vector Borne Diseases Control Programme

Directorate General of Health Services,
Ministry of Health and Family Welfare

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Preface

Strong surveillance system is an integral part and pre-requisite for any disease control programme especially for a disease like Japanese Encephalitis (JE), which has epidemic potential and high case fatality. JE surveillance in India is poor and actual disease burden is not fully known, therefore, intensified surveillance for JE is required. Surveillance is important to detect actual disease burden and early warning signals for predicting JE outbreak and to initiate timely effective control measures. This would be possible only if appropriate surveillance system is in place. Therefore, first time in India, a national level "Acute Encephalitis Syndrome (with Special Reference to Japanese Encephalitis) surveillance guidelines" have been developed by this Directorate for reporting Acute Encephalitis Syndrome cases (AES) /suspected JE cases and confirmed JE cases as per standard case definition. The Guidelines are amply supplemented with concise tables and appendices which shall serve as a practical guide book for all tiers of medical & para-medical staff in surveillance system.

For surveillance purposes (WHO's guidelines), JE is commonly reported under the broad heading of "acute encephalitis". This means that all cases of Acute Encephalitis Syndrome should be reported. Report for Laboratory confirmation of suspected cases will be maintained separately. The prevalence of confirmed JE and AES cases will form the basis of any future planning for prevention and control of this disease.

Surveillance would require collection of valid information on epidemiological aspects, case reporting, laboratory diagnosis, reservoir host and entomological parameters. In the guidelines, activities to carry out cilinico-epidemiological, serological, entomological and veterinary based surveillance are mentioned elaborately with concise tables and appendices. The surveillance is proposed to be carried out through sentinel sites. Three categories of sentinel sites/ health service providers (Sentinel Surveillance Sites with laboratory facilities, Sentinel Surveillance Sites without laboratory facilities; other Reporting Units) for the successful implementation of JE/AES surveillance activities have been identified.

I appreciate the hard work of Dr. Roop Kumari, Assistant Director and other officers of this organization for bringing out the Guidelines to strengthen AES and JE surveillance in India.

The Guidelines have been prepared in consultation with the experts from NICD, WHO, PATH, UNICEF and CRME, Madurai. Experts from National Polio Surveillance Project (NPSP) have contributed immensely by giving their valuable inputs in preparation, implementation and printing of these Guidelines.

It is fervently hoped that this document will guide the programme manager at all levels to strengthen the JE surveillance system.

(P.L. JOSHI)
Director,
NVBDCP

ABBREVIATIONS

AEFI	Adverse Event Following Immunization
AES	Acute Encephalitis Syndrome
AFP	Acute flaccid paralysis
CFR	Case-fatality Ratio (or rate)
CMO/CS	Chief Medical Officer/Civil Surgeon
CSF	Cerebrospinal Fluid
CRME	Centre for Research in Medical Entomology
DMO	District Malaria Officer
EPI	Expanded Program of Immunization
HI	Haemagglutination Inhibition
IDSP	Integrated Disease Surveillance Programme
IU	Informer Unit
JE	Japanese Encephalitis
JEF	Japanese Encephalitis forms
MO	Medical officer
MOH &FW	Ministry of Health and Family Welfare
NHMIS	National Health Management Information System
NICD	National Institute of Communicable Disease
NIMHANS	National Institute of Mental Health & Neuro Sciences
NIV	National Institute of Virology (NIV)
NPSP	National Polio Surveillance Project
NVBDCP	National Vector Borne Disease Control Programme
PATH	Program for Appropriate Technology in Health
PHC	Primary health center
RU	Reporting Sites
SMO	Surveillance Medical Officer
SSSs	Sentinel Surveillance Sites
UNICEF	United Nations Children's Fund
WHO	World Health Organization

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Preamble

Chapter-1

Japanese Encephalitis (JE) is caused by a virus which is transmitted through the bite of infected mosquitoes. The main reservoirs of the JE virus are pigs and water birds (Ardeidae) and, in its natural cycle, virus is maintained through certain mosquito species in these animals. Man is an accidental host and does not play a role in JE transmission.

JE outbreaks occur in human populations where there is close interaction between these animals and human beings. The vectors of JE breed in large water bodies such as paddy fields. The vector mosquitoes are outdoor resters and therefore vector control measures such as indoor residual spray has its limitation in effecting reduction in vector population. Vaccination against JE has been effective in prevention and control of JE in many countries where the coverage has been high and the programme was sustained. Since there is no specific treatment for this disease, early symptomatic management is important.

Analysis of data of various JE outbreaks in the country reveals that a vast majority of cases occur in children. However, in areas where JE had not been reported earlier, all age groups may be affected during an outbreak. Though both sexes are affected, males usually out number females. Inapparent infections out number the symptomatic JE cases; the ratio may range in between 250:1 to 1000:1. The disease shows a scattered distribution with not more than 1-2 cases being reported per village, on an average.

The management of critically ill children with JE and other viral encephalitis is directed at minimizing the risk of death and neurological complications. However, for prevention of the disease, various public health measures such as control of mosquitoes, protection from mosquito bites by using mosquito nets, protective clothing and keeping the pigs (the animal reservoir of JE) away from human dwellings are advocated, besides JE immunization.

Strong surveillance system is an integral part and a pre-requisite for any disease control programme especially in a disease like JE, which has epidemic potential and high case fatality. Though the ultimate objective of surveillance is prevention of occurrence of the disease, the immediate objective is to detect early warning signals for any potential JE outbreak and initiate timely effective control measures. This would be possible only if appropriate surveillance system is in place.

Where JE immunization is already ongoing, the primary purpose of surveillance is to determine if cases continue to occur in vaccinated children. Surveillance will also help in identifying the geographic areas in need of improved vaccination coverage as well as the areas with signs of onset of a new disease transmission, and to document the impact of control measures. In summary, JE surveillance is critical to characterize the epidemiology and burden of the disease, identify high risk areas for appropriate public health intervention and document the impact of control measures.

JE Surveillance

Chapter-2

Surveillance is defined as the ongoing and systematic collection, analysis, interpretation, and dissemination of data about cases of a disease and other factors influencing disease behaviour which is used as a basis for planning, implementing, and evaluating disease prevention and control activities including immunization activities.

JE Surveillance implies a continuous monitoring of all factors influencing transmission and effective control of JE, building up capacity for early recognition of impending outbreaks or epidemics. It is pertinent that the JE surveillance system collects the information on epidemiologic, clinical, laboratory and entomological parameters from the identified sites on a regular basis. This information needs to be statistically validated and be analyzed regularly. The goals, objectives and work modalities to achieve this are detailed below:

2.1 Goals

The goals of JE surveillance are to:

- Characterize the epidemiology and burden of JE
- Detect early warning signals for an impending outbreak, so as to decrease mortality and morbidity due to JE by initiating timely appropriate public health measures.

2.2 Objectives

The objectives of JE surveillance are to

- Detect early warning signals for an impending outbreak by using clinico-epidemiological, environmental and/or entomological parameters.
- strengthen laboratory services for sero diagnosis
- Assess the impact of vaccination as well as to guide future strategies

2.3 Strategies for JE Surveillance

JE surveillance should be conducted year round. Where feasible, surveillance for and reporting of JE should be performed within the context of integrated disease surveillance, supported by synergistic linkages with similar ongoing surveillance activities such as those for acute flaccid paralysis (AFP) or meningitis. In such situations, reporting of JE cases and deaths should be part of national health management information system (NHMIS) or integrated into communicable diseases reporting system. Currently, efforts are being made to integrate reporting of JE within the frame work of NHMIS developed under the Integrated Disease Surveillance Programme (IDSP).

JE surveillance should include:

- Epidemiological surveillance for Acute Encephalitis Syndrome (AES)
- Entomological surveillance
- Veterinary based surveillance

2.3.1 Epidemiological surveillance for Acute Encephalitis Syndrome

Infection with Japanese Encephalitis virus may be asymptomatic, or may cause febrile illness, meningitis, myelitis or encephalitis. Encephalitis is the most commonly recognized presentation of JE and is clinically indistinguishable from other causes of an acute encephalitis syndrome (AES). JE surveillance therefore, aims to identify patients with AES followed by serologically confirming JE viral infection using standardized laboratory techniques.

It may not be feasible or required to organize a nationwide surveillance for JE because of the various technical, operational and financial reasons. The best option under these circumstances is to consider sentinel surveillance, till a regular JE surveillance system becomes a reality.

Sentinel Surveillance may aim to include all hospitals in JE endemic areas or select the ones where most cases are usually seen. Such a system cannot be expected to provide information on AES from all JE endemic areas. However, sentinel surveillance system when used systematically over time will be able to provide information on the trend of the disease; such a system can also provide early warning signals for potential outbreaks of JE. Sentinel surveillance systems may, in fact, pick up most AES cases that may be occurring in that area as most of the AES cases report to hospitals/ health centres for treatment. Sentinel surveillance may utilize health facilities such as district and regional hospitals including teaching hospitals such as medical colleges.

2.3.2 Entomological surveillance

Entomological surveillance helps to monitor JE vector density continuously in JE endemic areas (trend data), suggest appropriate vector control measures, undertake entomological investigations during epidemics and evaluate the impact of control measures. The entomologist and insect collectors or/ Biologist/Entomologist attached with Filaria Control Unit may be assigned and made responsible for entomological surveillance in the district. They would identify index villages in the district for entomological surveillance.

2.3.3 Veterinary based surveillance

By identifying the prevalence & density of pigs, ducks, and ardeid birds and detecting viral activity in susceptible hosts, veterinary surveillance helps to track the rate of Haemagglutination Inhibition (HI) antibody carriers and the appearance of antibody from fresh infection as an index of the spread of JE virus in animal host. Veterinary-based surveillance is conducted with the help of animal husbandry department. Sera sample from these animals is randomly collected for serology to ascertain transmission of JE virus.

Epidemiological Surveillance

Chapter-3

Effective epidemiological surveillance of JE would require recording of all suspected cases of encephalitis so that the actual disease burden can be assessed area wise. Various activities pertaining to epidemiological surveillance i.e. collection, compilation, analysis and interpretation of data, follow-up action and feed back should be carried out in a systematic and organized manner. Epidemiological surveillance of JE would include components of laboratory based serological surveillance (described in Chapter 4) and clinical surveillance (detailed below).

To carry out clinical surveillance of JE it is crucial that all health institutions, which are attending to patients either at outpatient department or as indoor cases, be on the look out for any patients presenting with the signs and symptoms of encephalitis. All the reporting units (health institutions) in endemic areas both in public and private sector should further notify all these suspected JE cases based on standard case definitions. For reporting by all reporting units a line list of these cases should be prepared on the standardized reporting format and submitted to the higher authorities.

For surveillance purposes, JE is commonly reported under the heading of "acute encephalitis". In the WHO's guidelines for JE surveillance, syndromic surveillance for JE is recommended. This means that all cases of Acute Encephalitis Syndrome (AES) should be reported. Laboratory confirmation of suspected cases can be done where feasible. The following case definition should be used for reporting of suspected JE cases in endemic areas:

3.1 Case definition of Acute Encephalitis Syndrome (AES)

Clinically, a case of AES is defined as a person of any age, at any time of year with the acute onset of fever and a change in mental status (including symptoms such as confusion, disorientation, coma, or inability to talk[1]) AND/OR new onset of seizures (excluding simple febrile seizures[2]). Other early clinical findings may include an increase in irritability, somnolence or abnormal behavior greater than that seen with usual febrile illness.

3.2 Case classification

A case that meets the clinical case definition for AES i.e. suspected case should be classified in one of the following four ways (see Figure 1):

(i) **Laboratory-confirmed JE:** A suspected case that has been laboratory-confirmed as JE.

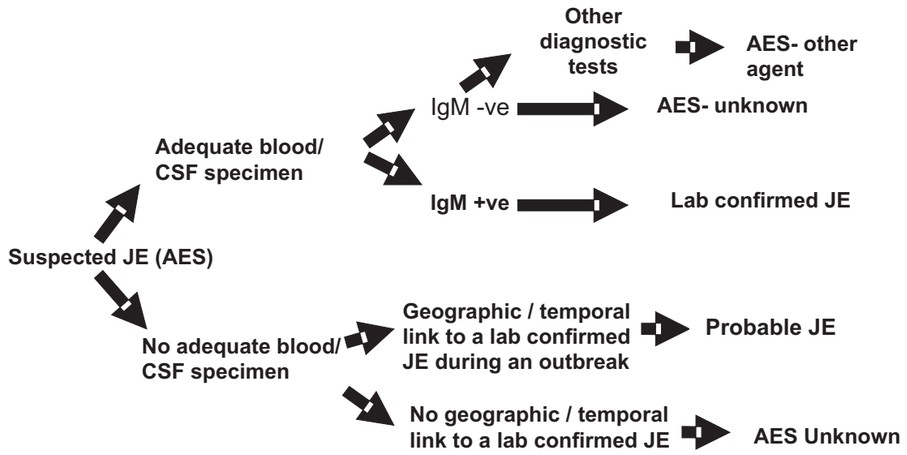
(ii) **Probable JE:** A suspected case that occurs in close geographic and temporal relationship to a laboratory-confirmed case of JE, in the context of an outbreak.

(iii) **"Acute encephalitis syndrome"** (due to other agent): A suspected case in which diagnostic testing is performed and an etiological agent other than JE virus is identified.

(iv) **"Acute encephalitis syndrome"** (due to unknown agent) A suspected case in which no diagnostic testing is performed or in which testing was performed but no etiological agent was identified or in which the test results were indeterminate.

[1] Other early clinical findings may include an increase in irritability, somnolence or abnormal behaviour greater than that seen with usual febrile illness.

[2] A simple febrile seizures is defined as a seizure that occurs in a child aged 6 months to less than 6 years old, whose only finding is fever and a single generalized convulsion lasting less than 15 minutes, and who recovers consciousness within 60 minutes of the seizure.



While the above classifications are useful for clearer definitions of AES cases, for practical purposes, the two key definitions to be used are "suspected JE cases" for those that meet the criteria for AES, and "confirmed JE cases" for those AES cases which have laboratory confirmation for JE.

3.3 JE and AES Surveillance

The purpose of JE and AES surveillance is to estimate disease burden and understand the disease pattern in terms of its influence on morbidity and mortality. The incidence of JE and AES will form the basis of any future planning for prevention and control of this disease. JE and AES surveillance would thus mean generation of authentic and valid information on epidemiological, clinical, laboratory and entomological parameters on regular basis. This surveillance will be carried out through sentinel sites and other health institutions. The first requirement of epidemiological surveillance for AES /JE is identification and notification of reporting units and informer units. These units will report all AES and JE cases based on standard case definition. The services of the following institutions and health service providers will be identified for the successful implementation of JE/AES surveillance activities:

- Sentinel Surveillance Sites with laboratories facilities
- Sentinel Surveillance Sites without laboratories facilities
- Other Informer Units

3.3.1 Sentinel Surveillance Sites (SSSL) with laboratories facilities

The key component of the AES surveillance system is the referral hospital with laboratory capacity to diagnose JE. These sites would

include government or private health facilities which are engaged in treating a large number of patients below 15 years. Most of them are usually larger facilities with both outpatient and inpatient departments and have facilities for laboratory diagnosis of JE. Examples are medical colleges, regional/district hospitals and private hospitals with laboratories facilities. These centres will function as tertiary care centres.

JE and AES surveillance at the local level will be institution based, initially through at least one sentinel surveillance site with laboratory facility per district. Fifty such sentinel surveillance sites have been identified where laboratories facilities will be strengthened in the first phase (List is given at Annexure-1). The number will be gradually increased to over 183 sites in XI five year plan (at least one SSSL in each district which has reported cases of JE in the last 5 years). Finally a comprehensive network of reporting sites including health facilities, reporting units and informers would be developed to report all cases of AES in the country.

Activities: Each SSSL would have a designated nodal officer for coordination of JE/AES surveillance activities. In SSSL, Medical Officers (MOs), pediatricians, and other physicians, nurses who see patients with AES should inform the designated Nodal Officer immediately upon presentation of the AES case. The case should be further subjected to laboratory investigations for JE; the nodal officer should immediately notify the District Malaria Officer (DMO) or the designated officer in charge of AES/ JE surveillance in the district. The SSSL will regularly generate and transmit information on encephalitis, confirmed JE cases, and the out come. These units will regularly generate and transmit information on encephalitis, confirmed JE cases, treatment of such cases and the out come. These units will also send regular information to district malaria officer. There should be case investigation and line listing of suspected cases of JE in order to track these cases back to their villages, to take appropriate control measures.

Records and Reports: The identified SSSL should maintain documentation of the patients being treated by various doctors of the unit and in various specialty departments & wards etc. For reporting of AES and confirmed JE cases and deaths from states to NVBDCP, JEF- 1 and JEF-1A form will be used. From districts to states, JEF-2 and JEF-2A forms will be used. For reporting from all the sentinel sites with laboratories (SSSL) JEF- 3, JEF- 4, JEF-5 forms will be used. These forms will be used as such for reporting on daily basis in outbreak situations, weekly basis during transmission season and on monthly basis in all the months.

Line list of AES and JE confirmed cases will be maintained and submitted to DMO/SPO in the form JEF-3 by nodal officer. They will report a case of AES immediately on identification, to the surveillance system using the form JEF-4. The information generated by SSSL is sent on a monthly basis in inter epidemic period, on weekly basis during transmission season and on daily basis during an outbreak to the district malaria officer. Even when there are no AES cases, nil case report should be sent in the forms JEF -3.

3.3.2 Sentinel Surveillance Sites without laboratory facilities (SSSs)

Some of the identified sentinel surveillance sites in government or private health facilities such as district hospitals, CHCs, PHCs etc. are engaged in treating a large number of patients below 15 years and do not have facilities for laboratory diagnosis of JE. Such sentinel surveillance sites will be linked to the nearest facilities or SSSL with capacity to perform sero-diagnosis of JE. These laboratories will send back the results to the SSS without laboratories. Such sentinel surveillance sites will be linked to the nearest SSSs with facilities for sero-diagnosis of JE or WHO designated or National laboratories. These

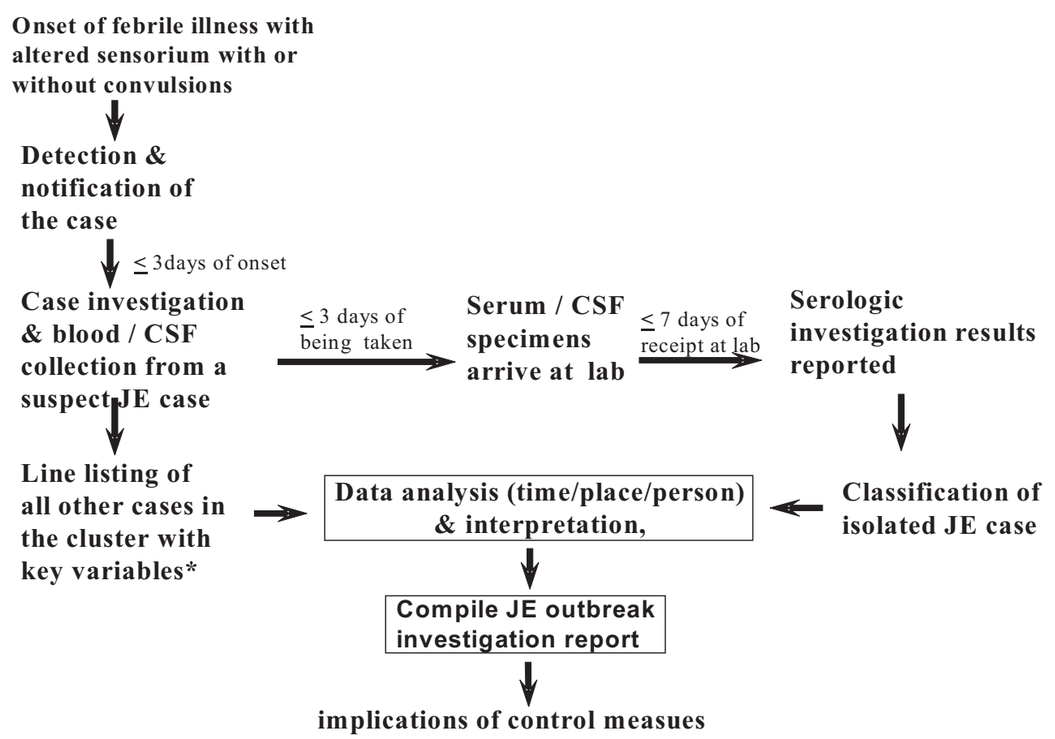
laboratories will send back the results to the SSS without laboratories. These SSSs without laboratories would be required to maintain records of the patients being treated by various doctors of the unit and in various specialty departments & wards etc. Line list of AES case and record of confirmation of JE would be maintained and submitted to DMO/ State Program Officer (SPO) in the form JEF-3. They will also report cases of AES immediately on identification, to the surveillance system using the form JEF 4. and also send daily, weekly and monthly reports (even when there are no AES cases), to the district malaria officer using forms JEF -3.

3.3.3 Informer Units (IU)

These are smaller health facilities or clinicians who are visited by patients below 15 years but in relatively smaller numbers than reporting units. These can be individual child specialists, private practitioners who are visited by AES cases. These units should inform the DMO/SMO whenever they come across an AES case as is being done for reporting of AFP cases. They usually do not maintain detailed documentation of the patients visiting them.

It may be pertinent to mention here that experience of AFP (Acute Flaccid paralysis) surveillance can be replicated by JE control programme. Under the AFP surveillance network throughout the country, as of early 2006, over 9700 reporting units and 16,300 informer units have been enrolled. The same network could additionally be used for AES surveillance as most cases of AES would be affecting children under 15 years of age.

The process of AES surveillance is described in the diagram below:



3.4 JE surveillance activities at the district level

The DMO or the identified health officer will study all reports received from all SSSL , SSSs without Laboratory, and informer units and also reconcile data with existing surveillance systems such as IDSP to identify if there are any outbreaks. In the office of DMO, compilation of all information/reports will be undertaken for interpretation and action. The DMO will be responsible for analysis of the data, keeping all records properly, maintaining the register for line listing of cases etc. This data will be utilized for planning and implementation of the control measures with the help of other district officers. The activities at district level by DMO are listed below:

3.4.1 Case Investigation

All cases that are notified should be verified and investigated by a specially trained District Malaria Officer, designated Surveillance Medical Officer or district level epidemiologist within 48 hours of notification. The necessary steps in the AES case investigation are:

- Verification of the case definition. Once a case of AES is reported by a physician, health unit or any other source, the DMO or any other designated official must personally see the case to ascertain if the case meets the AES case definition. If the case does not meet the case definition of AES, the DMO/SMO should discuss the findings with the reporting physician and record the case as not AES on the case investigation form.
- If the case is confirmed to be an AES case, a unique patient code number has to be assigned as described in section 3.7 (Guidelines for patient coding scheme for AES cases/ Suspected JE cases).
- Using the case investigation form JEF- 4 as a guide, obtain the history and conduct a physical examination of the affected child. Fill out the JEF-5 and assign the AES unique case identification number. Co ordinate the collection of specimens of serum or CSF and transporting them to the identified laboratory as mentioned in chapter 4.

3.4.2 Visits to sentinel surveillance sites

Regular visits should be made by DMO/ SPO or the officer in charge of AES surveillance at the district level to the sentinel surveillance sites and other reporting units for the specific purpose of supervision and facilitation of their activities. During a visit to a reporting unit the DMO or the officer in charge of surveillance should meet the head of the sentinel surveillance site and the nodal officer, visit all relevant departments and peruse their inpatient and outpatient registers to scan for any missed or unreported AES cases since the time of the last visit. This helps to verify the activity of the nodal officer, identify the training needs of the staff of the health facility or hospital. Active case searches followed by training sessions can greatly improve the reporting of AES cases by the health facilities. The visit should be documented by signing the registers/ records that are checked.

During visit to these units, the DMO / SPO or the officer in charge of surveillance should also ensure the availability of all blank reporting formats and logistics that are required to maintain quality AES surveillance.

3.4.3 Visits to AES informers

Regular visits should be made by DMO/SPO or the officer in charge of surveillance at the district level to the AES informers for monitoring the surveillance activities and to sensitize the staff. By meeting the informers in person, they can update informers on the importance of AES reporting.

3.4.4 Reporting by the District

DMO or on behalf of the DMO, the designated person at each district level would receive the AES/JE Report Forms/information from all the reporting units, collate them in the AES/JE District Report Forms (JEF-2 & JEF3) and compile and transmit this information to the State Programme Officer. The compiled report of all AES/JE cases reported and also updated figures on the earlier reported AES/JE cases will be sent to the state in the prescribed (JEF-2 & JEF 3). In an outbreak situation, daily report should be generated and transmitted in the JEF 2A form in addition to the details of the cases identified in the outbreak in the JEF 3 form. In outbreak situation action taken report should be sent along with daily report. Copy of this action taken report may be sent by Fax to NVBDCP during the outbreak. A weekly report should be sent in transmission period and monthly report in inter-epidemic period in the JEF 2 form. The details of the cases should be sent in the JEF-3 form.

Completeness and timeliness of reporting from the reporting units should be regularly monitored. To summarize, following surveillance activities need to be carried out at the district level:

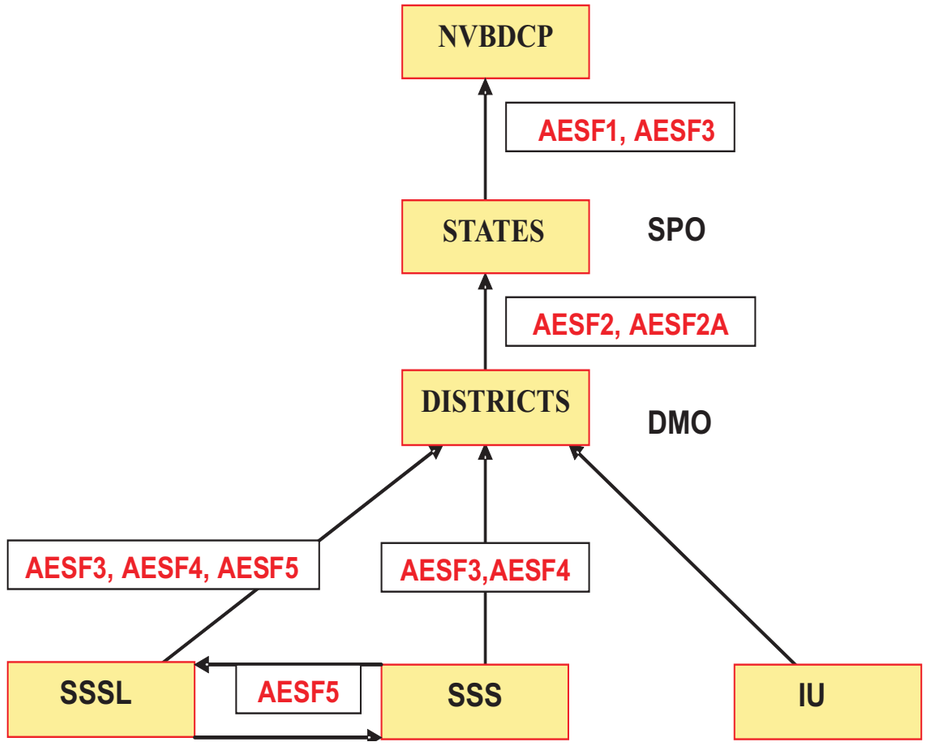
- Monitoring daily/weekly/monthly surveillance reports of AES/JE cases including “nil” case reports submitted by different reporting Units.
- Ensuring analysis of AES/JE cases and reconciling data with existing surveillance systems such as IDSP to identify if there are any outbreaks.
- Ensuring that all data from cases are properly collected, analyzed and interpreted for local action.
- Ensuring that surveillance reports and case investigation data are shared with other surveillance systems such as IDSP and forwarded to SPO, /NVBDCP (National Vector Borne Disease Control Programme) on Daily/ weekly or monthly basis as per requirement.
- Supervision and monitoring at all levels would be strengthened for ensuring effective surveillance.

3.5 Surveillance activities at the state level

The state level receives daily/weekly/monthly reports as per the disease status i.e daily report in outbreak situation, weekly report in transmission period and monthly report in inter-epidemic period from different districts. The districts reporting on time and defaulting should be distinctly highlighted. This information is then merged at the state level, collated and immediately transmitted through reporting format JEF-1 & JEF-3 by Fax or e-mail to the Director National Vector Borne Disease Control Programme, Government of India, New Delhi. During outbreaks, daily reports should be generated by the state and sent to the Director NVBDCP in form JEF-1A and details in form JEF-3. The state health authorities should also ensure a rapid action for containment.

In summary, flow chart for reporting AES cases and JE cases from different level of sentinel surveillance sites to NVBDCP, Delhi is given below:

INFORMATION FLOW DIAGRAM



AESF-1A & AESF-2A – during an outbreak

AESF1/1A	=	AES Cases & JE cases reporting Form from the States
AESF2/2A	=	AES Cases & JE cases reporting Form from the Districts
AESF3	=	Line listing Form
AESF4	=	Case Investigation Form
AESF5	=	Laboratory Report Form
SSSL	=	Sentinel Surveillance Sites with laboratory facilities
SSS	=	Sentinel Surveillance Sites without laboratory facilities
IU	=	Informer Unit

3.6 Surveillance activities at the national level

The national level receives daily/weekly/monthly reports as per the disease status i.e daily report in outbreak situation, weekly report in transmission period and monthly report in inter-epidemic period from various states. At the national level, the data from the states is collated and compiled to prepare the national report with epidemiological inferences. National data may be shared with international organization and other Institutes in due permission of concerned authorities. These reports will form the basis for planning JE containment activities and allocation of resources to the affected areas.

3.7 Guidelines for Patient Coding Scheme for AES Cases/Suspected JE Cases

The Directorate of NVBDCP, GOI which is the nodal agency for prevention and control of vector borne diseases has decided to introduce a patient coding scheme whereby the system will be able to track the patient up to the sub-centre/village level. Besides, the system would also rule out double counting of JE patients reported by various health institutions. The guidelines for the Patient Coding Scheme are as under:

- The patient coding scheme will have the country code cum Disease code, state, district, PHC and patient codes.
- The country code would be IND.
- Country code will be followed by the disease code for Acute Encephalitis Syndrome Cases (AES). All districts in the states will be coded in alphabetical order (from 01 to 99 for total no. of districts in the respective state), so that same code will be used for other diseases also. All states/UTs would be given two alphabetic numbers for all e.g. code for Uttar Pradesh would be 'UP'.
- The country code cum state, district,-------- Patients codes would be followed as stated below:
- For example, the code of Uttar Pradesh state is UP and if there are 70 districts, than the district code will be from IND-AES-UP-01 to IND-AES-UP-70. For Gorakhpur district, code would be IND-AES-UP-32.
- Treatment centres/ reporting Centers in the states for JE are PHCs, CHCs/District Hospitals, Medical Colleges, Private Hospitals etc.. Therefore after the district code, codes would be given to all PHCs followed by CHCs/District Hospitals, Medical Colleges, and Private Hospitals etc. in alphabetical order (01 to 99) by State Programme Officer of the respective states.
- A patient code will be a 3 digit numerical code given to each patient coming to a treatment centre as AES cases (AES001-999).

Periodicity of Reports

Daily report should be generated and transmitted in an outbreak situation, weekly report in transmission period and monthly report in inter-epidemic period. In outbreak situation action taken report should be sent along with daily report.

Note: The decision on the periodicity of the reports will be made at the state level by the state programme officer based on the local JE transmission pattern.

Syndrome Code	Country Code	STATES/UTS	State Code	District Code	Year of onset 01 to 99	PHC/Institution Code	Patient Code
AES	IND	A& N Islands	AN	Alphabetic code (3 letters) please se annexure-2	01 to 99	01 to 99	001 to 999
		Andhra Pradesh	AP		01 to 99	01 to 99	001 to 999
		Arunachal Pradesh	AC		01 to 99	01 to 99	001 to 999
		Assam	AS		01 to 99	01 to 99	001 to 999
		Bihar	BI		01 to 99	01 to 99	001 to 999
		Chandigarh	CH		01 to 99	01 to 99	001 to 999
		Chattisgarh	CG		01 to 99	01 to 99	001 to 999
		D&N Haveli	DN		01 to 99	01 to 99	001 to 999
		Daman & Diu	DD		01 to 99	01 to 99	001 to 999
		Delhi	DL		01 to 99	01 to 99	001 to 999
		Goa	GO		01 to 99	01 to 99	001 to 999
		Gujarat	GU		01 to 99	01 to 99	001 to 999
		Haryana	HA		01 to 99	01 to 99	001 to 999
		Himachal Pradesh	HP		01 to 99	01 to 99	001 to 999
		Jammu & Kashmir	JK		01 to 99	01 to 99	001 to 999
		Jharkhand	JH		01 to 99	01 to 99	001 to 999
		Karnataka	KA		01 to 99	01 to 99	001 to 999
		Kerala	KE		01 to 99	01 to 99	001 to 999
		Lakshadweep	LK		01 to 99	01 to 99	001 to 999
		Madhya Pradesh	MP		01 to 99	01 to 99	001 to 999
		Maharashtra	MH		01 to 99	01 to 99	001 to 999
		Manipur	MN		01 to 99	01 to 99	001 to 999
		Meghalaya	ME		01 to 99	01 to 99	001 to 999
		Mizoram	MZ		01 to 99	01 to 99	001 to 999
		Nagaland	NA		01 to 99	01 to 99	001 to 999
		Orissa	OR		01 to 99	01 to 99	001 to 999
		Pondicherry	PD		01 to 99	01 to 99	001 to 999
		Punjab	PB		01 to 99	01 to 99	001 to 999
		Rajasthan	RJ		01 to 99	01 to 99	001 to 999
		Sikkim	SI		01 to 99	01 to 99	001 to 999
		Tamil Nadu	TN		01 to 99	01 to 99	001 to 999
		Tripura	TR		01 to 99	01 to 99	001 to 999
		Uttar Pradesh	UP		01 to 99	01 to 99	001 to 999
		Uttaranchal	UA		01 to 99	01 to 99	001 to 999
		West Bengal	WB		01 to 99	01 to 99	001 to 999

- Details with example of Gorakhpur district are given at Table -1.
- As per the patient coding scheme, each AES/JE patient will have the eleven alphabets followed with seven digit numerical code (IND-AES-UP-XXX-01-001 to IND-AES-UP-XXX-99-999). No two patients will have the same code during a period of at least 10 years.
- The details pertaining to patient information as location of the patient, along with Treatment/reporting Centres, information as entered on the Treatment Card will be

reflected at the district level in the reports submitted by these centres. Copies of the reports pertaining to the concerned unit shall also be available at these centres.

- The patient will be having a copy of the treatment card on thick (durable) paper in order to enable identification for future reference.
- The remarks column in the Treatment Card can be filled to indicate if there is a change of treatment centre.
- The Directorate of NVBDCP may be consulted in case of any further clarification.
- According to the above scheme, each state will have a unique code number which will be depicted in the JE treatment centre register, JE Treatment Card and District Master Register for JE cases. This would facilitate monitoring of treatment compliance.

JE Laboratory Network

Chapter-4

Laboratory based serological surveillance

Sometimes, it may be difficult to differentiate Japanese Encephalitis from those caused by other viruses, bacteria etc. as clinical signs of JE are indistinguishable from other causes of AES. Under such circumstances laboratory confirmation is essential for accurate diagnosis of JE. Confirmation of a suspected or probable case of JE would require the support of a well equipped laboratory to test blood and cerebrospinal fluid (CSF) for the same. However, such a laboratory is essential for undertaking serological surveillance in any community, which would provide us with the earliest clue for prediction of JE virus activity in a community. Besides this sero- surveillance can also be used for knowing the status of JE antibodies in case of vaccinated populations.

For strengthening of JE sero-surveillance in the country following activities will be carried out:

- Laboratory confirmation of JE cases
- Collection, Storage and Transportation of samples to serology laboratories
- Establish a Net work of JE testing laboratories
- Establish Reporting system and ensure use of uniform formats
- Establish internal quality assurance in the laboratory

4.1 Laboratory confirmation of JE cases

Clinical signs of JE are indistinguishable from other causes of AES. Epidemiological data can provide supporting information for the diagnosis; however laboratory confirmation is essential for accurate diagnosis of JE. The fever and AES surveillance will capture any suspected JE cases which can be confirmed by laboratory tests as per the following markers:

- Presence of IgM antibody in serum and/or CSF
- Four fold difference in IgG antibody titre in paired sera
- Virus isolation from brain tissue
- Antigen detection by immunofluoroscence
- Nuclic acid detection by PCR

Laboratory confirmation of suspected JE cases would be carried out in the identified sentinel laboratories. At these laboratories the preferred test for JE diagnosis is the IgM Capture ELISA (enzyme linked immunosorbent assay). Initial processing of samples should be in district sentinel laboratories. Samples for subsequent virological testing should then be sent to designated national laboratories.

Internal quality control of JE tests would be assured in the laboratory. These laboratories may also do other investigations or send the specimens on to national levels as necessary. JE laboratories will also be included under the External Quality Assurance for laboratory services under NVBDCP.

4. 2 Specimen collection and transportation

Blood (serum) and Cerebrospinal fluid (CSF) are the specimens to be collected for JE diagnosis. Blood samples should be collected from suspected JE cases within 4 days after the onset of illness for isolation of virus and at least 5 days after the onset of illness for detection of IgM antibodies. A second, corvolescent samples should be collected at least 10-14 days after the first sample for serology.

Patient information should be recorded as below on a laboratory request and report form

(AESF-5) that must accompany the specimen when it is referred to the laboratory:

i. Name, age and sex of the patient.

ii. Full Mailing Address.

iii. Number of cases with similar illness in the locality/village/town.

iv. Name and contact address of treating doctor.

v. Brief clinical features with a special note on any asymmetry of clinical signs and symptoms.

vi. Three dates are very important:

   1. Date of last JE vaccination;
   2. Date of onset of first symptom
   3. Date of collection of sample.

vii. Label the vial with the patient's name, date of collection and specimen type. The specimens should be labeled with the number and this must be identical to the number given in the (JEF- 6).

viii. In the case of an outbreak, a laboratory request and report form in the form of a line list may be prepared.

Following methods would be adopted for collection and transportation of Blood (serum) and CSF samples:

4.2.1. Blood/Serum

4.2.1.1 Equipment for collection of serum the following equipment, and blood collection kit would be required

- 5 ml vacutainer tube (non-heparinized) with 23 g needle / 5 ml syringe with needle
- 5ml blood collection tubes if syringe and needle is used for blood collection
- Disposable gloves and face mask (one set each)
- Tourniquet
- Sterilizing swabs
- Sterile serum storage vials
- Specimen labels, marker pen
- Band aid
- Zip lock plastic bags
- Lab request form
- Cold box (vaccine carrier) with ice packs
- First aid kit (Along with address of nearest referral facility in case of blood collecting complications).

4.2.1.2 Collection procedure

- Collect 5 ml blood by venepuncture in a sterile tube labeled with patient identification and collection date.
- The blood should be kept at room temperature until there is complete retraction of the clot from the serum
- Blood can be stored at $+4^{o}C$ to $+8^{o}C$ for up to 24 hrs before the serum is separated
- Do not freeze whole blood.
- There are 2 options available to ensure that the proper specimen reaches the lab

Option 1

Transport whole clotted blood specimen to laboratory in ice, if it can reach the laboratory within 24 hours.

Option 2

- This should be centrifuged at 1000 rpm for 10 minutes to separate the serum.
- If centrifuge is not available, carefully remove the serum using a pipette, avoid extracting red cells.
- Transfer the serum aseptically to a sterile labeled vial.
- Store the serum at $+4^{o}C$ to $+8^{o}C$ until transport to the laboratory

4.2.1.2.3 Transportation of blood/serum specimens

- Specimens should be transported to the laboratory as soon as possible. Do not wait to collect additional specimens before transporting.
- Place specimens in Zip lock or plastic bags and pack with absorbent material (cotton/tissue paper).
- Use a Thermos flask with ice or a vaccine carrier.
- If using ice packs (should be frozen) and vaccine carrier, place frozen icepacks along the sides and place the samples in the center.
- Place lab request form in plastic bag and tape to inner side of the Styrofoam box / vaccine carrier
- Arrange a transporting date.
- When the arrangements have been finalized, inform the lab of the time and manner of transportation.
- Serum should be shipped on wet ice within 48 hours or stored at $+4^{o}C$ to $+8^{o}C$ for a maximum period of 7 days.
- In case a delay is anticipated, sera must be frozen at -20°C and should be transported to the specified laboratory on frozen ice packs. Repeated freezing and thawing can have detrimental effects on the stability of IgM antibodies

4.3. Cerebrospinal fluid (CSF)

CSF specimen would be collected in a sterile screw capped bottles under all aseptic precautions by a trained person. The containers should be properly labeled and transported at the earliest to the designated laboratory. All attempts would be made to collect CSF sample for confirmation of diagnosis.

4.3.1. Collection procedure

CSF is the fluid that bathes, cushions, and protects the brain and spinal cord. It flows through the skull and spine in the subarachnoid space, which is the area inside the arachnoid membrane. To obtain a specimen of cerebrospinal fluid the procedure is carried out by expert medical officer. Lumbar puncture (spinal tap) is the most common means of collecting a specimen of CSF.

- The patient is positioned on his side with his knees curled up to his abdomen and with chin tucked in to his chest. (Occasionally this procedure is performed with the person sitting and bent forward).
- The skin is scrubbed, and a local anesthetic is injected over the lower spine. The spinal needle is inserted, usually between the 3rd and 4th lumbar vertebrae.

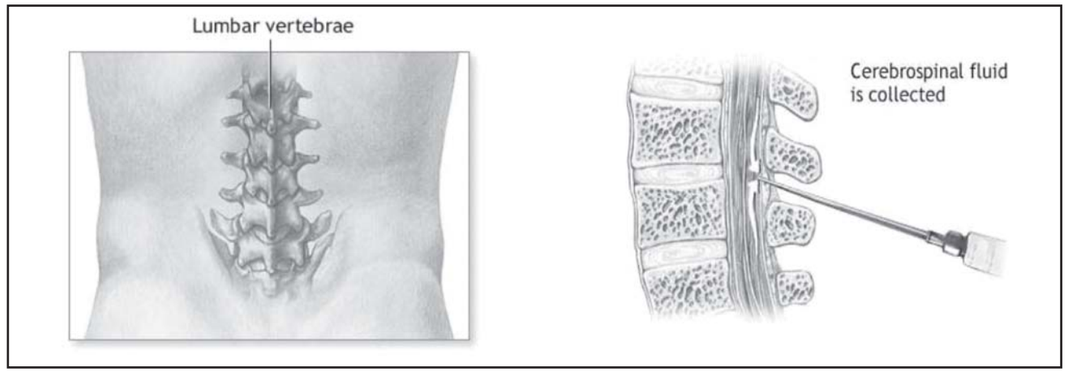


Figure- Collection of CSF

- Once the needle is properly positioned in the sub-arachnoid space, pressures can be measured and fluid can be collected for testing.
- After the sample is collected, the needle is removed, the area is cleaned, and a bandage is applied.
- The patient is asked to remain flat, or nearly flat, for 6 to 8 hours after the procedure.
- Overall, discomfort is minimal to moderate. The entire procedure usually takes about 30 minutes, but it may take longer. The actual pressure measurements and fluid collection only takes a few minutes.

Examination of CSF is an essential step in the diagnosis of any patient with evidence of meningeal irritation or affected cerebrum. Approximate 2-3 ml of CSF is collected and part of it is used for physical and cytological, biochemical, and microscopic examination and the remaining CSF is to be stored aseptically for serology, viral culture, bacteriological or fungal examination. The following important precautions need to be taken for CSF collection and transportation:

- CSF is a precious specimen, handle it carefully and economically. It may not be possible to get a repeat specimen.
- Collect CSF in a screw capped sterile container and not in an injection vial with cotton plug.
- Do not delay transport and laboratory investigations.
- Perform physical inspection immediately after collection and indicate findings on laboratory requisition form.
- Store at +4°C, if delay in processing is inevitable.

4.3.2. Storage and transport of CSF sample

Place the specimens at +4°C as soon as possible after collection. Dispatch these at the earliest possible opportunity on wet ice in a large thermus or an ice-box to the designated laboratory. Considering the emergency, preference should be given to hand carry the sample to the designated laboratory. Samples for PCR should be transported on dry ice. A designated person (or persons) would be responsible for storage, packing and transport of samples according to national or international guidelines.

4.3.3. Criteria for rejection of CSF/ Serum samples

- leakage of sample
- haemolyzed sample
- inadequate quantity
- improper cold chain maintenance during transportation
- improperly labeled sample
- samples collected in improper containers
- turbid serum sample (contaminated)

4.4. Networking of JE testing Laboratories

Many viruses (herpes, rabies, entero-viruses, mumps, measles, chicken pox etc.), bacterial, fungal and protozoal infections (P.falciparum) may present with features of encephalitis. It may not be possible, many a times; to differentiate the disease on clinical grounds under such circumstances only laboratory investigations can give etiological diagnosis. Samples from suspected viral encephalitis should be subjected to laboratory investigations, especially during the starting of an outbreak to ensure early confirmation of JE cases. For effective serological surveillance, strengthening of laboratory for serodiagnosis is required. Laboratory based surveillance should be carried out in the identified institutions for delimitation of JE prone and high-risk areas. Sero-diagnosis will

be carried out in those institutes having IgM Capture ELISA test facility.

4.4.1. Identification and notification of Laboratories for sero -surveillance

Some laboratories are already testing for JE or involved in virus isolation. These would be listed as national/referral laboratories. In addition district/regional level sentinel laboratories are proposed to be designated as laboratories for sentinel sero- surveillance which would be increased in time bound and phased manner. These will be designated first level laboratories for JE testing. At these laboratories the preferred test for JE diagnosis is the IgM-capture ELISA (enzyme linked immunosorbent assay). These laboratories may also do other investigations or send the specimens on to national levels as necessary.

All laboratories would be classified in the following categories:

i) **District Sentinel Surveillance Laboratories**

The laboratory attached with hospitals or medical college will be a designated JE Sentinel Surveillance laboratory. Laboratory confirmation of suspected JE cases would be carried out in these identified sentinel laboratories. Directorate of NVBDCP envisages strengthening these laboratories so that necessary equipment and testing kits are made available in a phased manner. Govt. of India would provide Mac ELISA test kits as well as ELISA Reader in places where such equipment is not available. Adequate training will be imparted to medical and paramedical staff working in these laboratories. In the first phase, 50 sentinel surveillance laboratories have been identified. Subsequently, SSL at district level will be strengthened in all endemic districts in a phased manner.

ii) **Regional Sentinel surveillance laboratories/WHO designated laboratories**

During the first phase it is proposed to strengthen regional SSL centres with good laboratory facilities and trained staff. All near by Districts will send the samples for diagnosis in to these centres. Reports should be sent back to respective districts by regional SSL.

The WHO will also provide technical support and funds to the country in establishing a JE laboratory network on the lines of the Polio and Measles network in a phased manner. It is therefore proposed that the following laboratories are nominated for JE testing and surveillance for the first phase of the network.

Tamilnadu	King Institute of Preventive Medicine, Chennai and /or Madurai medical College, Madurai
Karnataka	Bellary Medical College and / **OR** National Institute of Virology, Bangalore Medical College.
Uttar Pradesh	B.R.D. Medical College, Gorakhpur.
Assam	Assam Medical College, Dibrugarh **OR** R.M.R.C. Dibrugarh.
Andhra Pradesh	Kurnool Medical College, Andhra Pradesh.
West Bengal	Burdwan Medical College, Burdwan.

iii) National laboratories/ Referral laboratories

National laboratories such as NICD, NIV, Pune, NIMHANS, Bangalore, etc. already exist in the country for diagnosis of JE cases and to investigate the viral strain of AES cases. Samples from any district sentinel laboratories may be sent to these laboratories for detail analysis.

4.6 Reporting

All test results would be conveyed back to respective Sentinel Surveillance/Reporting Units Sites and to DMO in the form (JEF-5) for planning and implementation of appropriate control measures. All compiled reports will be sent to SPO.

4.7 Quality assurance

All the laboratories are to be accredited by WHO. This accreditation requires 100% proficiency score in test panels and a yearly on-site review

by trained WHO virologists. The program monitors the turn around time between specimen receipt in the laboratories and report for all laboratories in the network.

4.8 Sero-Surveillance in vaccinated Children

Any case of post vaccinated effects like fever seizures etc. should be investigated for the virus strains to match the same with the vaccination strain or otherwise. For children vaccinated with Japanese Encephalitis vaccine within six months of illness onset, testing a single serum sample for JE IgM may not be diagnostic because it may give a false positive result. In such cases, a diagnosis can only be confirmed by demonstrating JE IgM in the CSF, JE virus isolation, a positive nucleic acid amplification test, immuno histochemistry, IFA, or a four-fold or greater rise in antibody titre in acute and convalescent phase serum samples.

Entomological Surveillance

Chapter-5

JE is a disease principally of rural agricultural areas, particularly in rice cultivation areas, where vector mosquitoes proliferate in close association with pigs, wading birds and ducks, the principal amplifying hosts. Vector mosquito is able to transmit the JE virus to a new host usually the pig after infected bite of a host with an incubation period of 14 days.

5.1 Vector Mosquitoes of Japanese Encephalitis

In India, JE virus has been isolated from 17 mosquito species in wild caught specimens from different parts of the country. Maximum isolations have been recorded from Culex vishnui group consisting of Cx.tritaeniorhynchus, Cx.vishnui and Cx.pseudovishnui. Female mosquitoes get infected after feeding on a vertebrate host harbouring JE virus and after 9-12 days of extrinsic incubation period, they can transmit the virus to other hosts.

Culex vishnui subgroup of mosquitoes are very common, widespread and breed in water with luxuriant vegetation, mainly in paddy fields and their abundance may be related to their breeding in rice fields, shallow ditches, pools, fish ponds, etc. Preference for breeding places varies with location. Paddy fields are the favourable breeding places during rainy season and irrigation channels bordering the paddy fields support breeding during non-monsoon season. Rain water collections in low lying areas with aquatic vegetation/ submerged grasses support the breeding during post monsoon months. However permanent water collection in ponds, ditches etc. with aquatic vegetation such as water hyacinth, elephant grass, etc. provide favourable breeding places during all months. In view of the breeding habitats of the vector mosquitoes, JE is usually associated with rural areas with paddy cultivation.

Cx.tritaeniorhynchus, the principal vector of JE has been reported to be an outdoor rester (exophilic) but may rest indoor during some part of the year. Vector of JE are zoophilic and feed outdoor as well as indoor. They prefer to feed on cattle and also feed on pig. Cattle such as cows may reduce risk by diverting vector mosquitoes (zooprophylaxis).

For planning vector control measures, the bionomics of vector mosquitoes in an area needs to be studied.

5.2 Objectives of Entomological surveillance

1. To identify the JE vector mosquitoes in an area
2. To monitor JE vector abundance in JE endemic areas
3. To detect JE virus in vector mosquitoes
4. To suggest appropriate vector control measures

5.3 Procedure

Entomologist and insect collectors or/ Biologist/National Filaria Control Officers in the districts will be responsible for entomological surveillance in JE endemic areas. An entomological team of National Institute of Malaria Research (NIMR) may also conduct these studies. Refresher training of these functionaries would be organized by the Dte. of NVBDCP on receiving request from states. They will identify index villages in the district for entomological surveillance.

5.4 Choice of index villages

- At least 3 villages in which JE has occurred in the recent past (past five years)
- At least 2 villages which remained unaffected

till date would be monitored in each affected block

- Sampling would be carried out on fortnightly basis
- Surveillance would be carried out round the year to know the JE vector density, their resting behaviour, feeding behaviour and detection/ isolation of JE virus from vector mosquitoes.

Following entomological investigations are to be carried out:

5.5 Larval surveys

Larval density & Mapping of breeding sites: Larval survey should be carried out by the entomological team periodically. All potential breeding sites will be surveyed and will be reported on the standard proforma. All permanent breeding sites of JE vectors would be identified (mapped) and provided to District officers for implementation of control measures.

Larvae collected in the field would be reared in laboratory for emergence of adult mosquitoes for identification of vector species. For this purpose standardized reporting format JEF- 6 form for breeding survey will be used by all the entomological/ reporting units.

5.6 Adult surveys

Indoor / Outdoor resting collection and the Dusk collection should be carried out from fixed as well as random sites in indoor sites such as human dwelling/cattle sheds/mixed dwelling and outdoor situations such as bushes, plantations, standing crops, etc. by hand catch method using suction tubes. Per Man Hour Density (PMHD) will be monitored and reported in standard prescribed format JEF- 7. This collection would be carried out in the index villages only.

Cx.tritaeniorhynchurs predominantly rests outdoors on agricultural crops and wild vegetation, depending on local situations, where they can also be monitored by BPD Hop Cage method; formerly known as sweep cage method (NICD). The density of mosquito may be estimated as average number of mosquitoes collected per 10 Hop Cages. The larger the area covered by hopping, the better representation of the mosquito density.

$$\text{Mosquito density (Per 10 HC)} = \frac{\text{Total number of mosquitoes collected} \times 10}{\text{Total numbers of hops made on vegetation}}$$

Hourly collection during night using different baits would be done in selected entomological unit with trained teams in JE endemic areas particularly where pig population would be less or negligible. This study will be used to find out other susceptible animal reservoirs in areas other than pigs. Viral isolation in those animals should be also done. Hourly collection report will be monitored and reported in standard prescribed format JEF- 9.

5.7 Blood meal analysis

After identification of field collected vector mosquitoes, stomach blood would be collected in filter paper and sent to the Dte. of NVBDCP for blood meal analysis by ELISA method to know the source of blood.

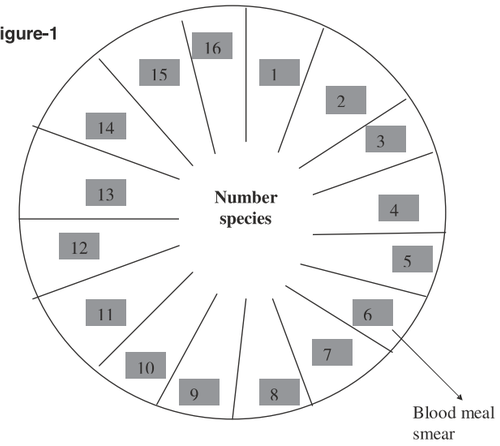
5.7.1 Guidelines for collection and transportation of samples:

For preparing filter-papers for blood meal squashes refer to see figure 1 below.

- Fold the filter-paper in half, then fold again and fold twice more.
- Unfold paper, which will now be marked by folds into 16 parts.
- Draw pencil lines along the folds from the edge of the filter-paper towards the centre, but leave the central 5 cm blank.
- On the inner edge of the filter-paper, number the divisions from 1 to 16.
- When you use the filter-paper, write a number in the centre of each paper and

record the species of mosquito from which the blood was taken, where and when.

Figure-1



5.7.1 Making the blood meal squashes

Blood from a freshly fed mosquito is best for detection of blood meal source. Older blood meals are not suitable.

- One filter-paper must be used for only one species of mosquito that has been obtained from the same type of resting site, for instance inside houses, inside animal sheds and preferably outdoor natural resting sites. This reduces the chance of error in conducting the test as a circle of paper is punched out from each sector.
- Label the filter-paper with a number in the centre and enter the name of the mosquito species, the place of collection, the date and the time.
- Kill or anaesthetize the freshly-fed mosquitoes.
- Place a female mosquito on the filter-paper approximately 1 cm from the edge and inside the area and level as number 1.
- Squash the abdomen using a blunt needle or the corner of a slide or a glass rod.
- Make sure that the squashed abdomen remains inside the area labeled 1.
- Place a second female mosquito in the area labeled 2 and squashes it.
- Each female must be squashed with the corner of a slide or a glass rod or other side of a lead pencil which do not have exposed lead. If you use a slide; use each corner in turn and after four squashes, discard the slide; you have to make sure that blood from one specimen is not transferred to another (i.e., contamination) from the rod or slide.
- Continue in this way until all 16 areas of the filter-paper have been used.
- Write the details that are asked for on the recording form and make two copies of it.
- Allow blood-meal squashes to dry, making sure that the papers are protected from ants and humidity.
- Store filter-[papers by placing them on top of each other with a piece of plain paper between each set of papers on which there are squashes.
- Place filter-papers in a desiccators or a refrigerator.
- When you have made all the squashes that you require, pack the filter-papers into a self-sealing plastic envelope. If you do not have self-sealing envelopes, pack the filter paper (s) in a plastic bag and seal the end with a hot iron/candel.
- Send the blood meals to the laboratory in which the identifications are to be made, including one copy of the record forms.
- Keep one copy of the record forms at your laboratory.

5.7.3 Recording information

Record the following information for each filter-paper of blood meals:

- Name of the collector;
- Estimated ratio of people to pigs, cattle and other animals;
- Locality;
- The resting site from which the mosquitoes were obtained;
- Date and time on which the collections was made.

5.8 Susceptibility of JE vector mosquitoes and larvae

Susceptibility status of JE vector mosquitoes to insecticides particularly Malathion in JE endemic areas should be carried out by entomological teams in the state/ICMR/ any other institute. Map should be prepared in all JE endemic states about the status resistance in vector mosquitoes to insecticides. Format JEF-9 will be used for reporting susceptibility/resistance status of vector mosquitoes.

5.9 Method for Collection and transportation of mosquitoes for isolation of JE virus

For entomological studies the virus isolation would be attempted from vector mosquitoes, which would be collected in a screw-capped clean test tube and sent to the laboratory at NIV/CRME. Particularly, in epidemic situations it becomes necessary to collect vector mosquitoes for isolation of JE virus.

In an epidemic situation, it is desirable to collect mosquitoes from the affected areas-both indoor and outdoor, so that they may be processed for virus isolation. This may give an indication of the species acting as vector of the area. Mosquitoes can be collected by standard method such as aspirator, baited traps, biting collections and light traps

The mosquitoes should be held alive in 'Barraud Cages' wrapped with moistened lint or cloth. If the collection locality is not far from the laboratory or transportation can be done within a day or two, they may be transported alive in Barraud cages. For such transportation, it is necessary to provide raisins soaked in water or a cotton pledget soaked in 10 percent glucose solution inside the Barraud cage.

If the collection locality is far from the laboratory and immediate transportation is not possible, mosquitoes may be identified, pooled species wise and stored in liquid nitrogen, refrigerators or on dry ice for subsequent transportation to the laboratory. If facilities for liquid nitrogen or dry ice storage are not available in the field, transport medium may be used to store the mosquito pools. It is, however, necessary that such pools are constantly kept in the refrigerator or transported on wet ice. Since the Centre for Research in Medical Entomology (CRME), ICMR, Madurai, and Tamil Nadu has developed a technique whereby the JE antigen can be detected in even 28 days old desiccated mosquitoes and NICD has also detected JE virus antigen even after 20 months of mosquito collection from field. It would be possible to get the JE antigen detected from the mosquitoes regularly dispatched to CRME, Madurai by post. However, the care should have to be taken not to allow mosquitoes attacked by fungus or affected by dilapidation before enveloping for dispatch.

5.10 Laboratory Support

The following virological investigations should be carried out in labs:

1. Screening/isolation of JE virus from suspected JE vector mosquitoes.
2. Vector incrimination would be done in collaboration with NIV Pune, CRME Madurai and NICD, Delhi.

Veterinary Based Surveillance

Chapter-5

Like most other arboviral infections, Japanese Encephalitis is basically a disease of animals. Pigs and birds, particularly those belonging to Family Ardeidae (e.g. cattle egrets, pond herons, etc.) are the natural hosts. The virus is generally maintained in the enzootic form and appears as focal outbreaks under specific ecological conditions. Infection in human beings is caused as a result of spill-over of infection from zoonotic cycle.

At low vector density level the virus circulates in ardied birds -mosquito ardied bird cycle. However, at the commencement of monsoon season or increased availability of surface area for mosquito breeding e.g. paddy cultivation etc., the vector population builds up rapidly, the virus from wild birds through vector mosquito species spreads to peri domestic and domestic birds and then to mammals like cattle and pigs, etc. and eventually spills over to man.

6.1 Natural Reservoirs of JE virus

Birds: Some species of birds like pond herons, cattle egrets, poultry birds, ducks and sparrows, etc. appear to be involved in natural transmission of JE virus. Migratory birds may be involved in the transfer of virus from one region to another.

Cattle: Cattle do not circulate virus in their blood but develop antibodies against them; hence they do not act as natural host for the virus. It is believed that prevalence of an enormously large population of cattle in India as compared to pigs may act as deterrent to the spread of JE infection, as the vector mosquito species have got more preference for cattle blood as compared to that of human beings.

Pigs: Infected pigs do not manifest many overt symptoms of the disease but allow multiplication and circulation of the virus in their blood. They are capable of infecting a large number of vector mosquito species, which in turn may transmit the virus to man after the completion of extrinsic incubation period of 9-12 days. The pigs are thus considered to be "amplifier hosts" for the virus.

6.2 Animal surveillance

The purpose of animal surveillance is to track the rate of HI antibody carriers and the appearance of antibody from fresh infection as an index of JE viral activity and its spread in animal hosts.

6.2.1 Objectives

The objectives of Veterinary based surveillance are:

- Prevalence of Pigs / Ducks, Ardeid Birds in an area
- To detect viral activity in susceptible hosts

6.2.2 Procedure

Veterinary-based surveillance can be conducted with the help of Animal Husbandry Department. Assessment of pig density in relation to human habitation should be carried out. Density of other susceptible host population should also be carried out periodically. Sera sample from these animals should be randomly collected for serology to ascertain transmission of JE virus.

As the pigs are amplifying host for JE virus, monitoring of antibody titre in pigs would be helpful in determining viral activity. Generally, 5-8 months old piglets should be selected and blood samples should be collected. The antibody titre in the serum samples should be estimated. Detection of IgM antibody would indicate recent infection. The area where HI antibody carrier pigs are high and IgM antibody is detected the area can be considered at risk of JE virus infection.

Sera sample from pigs to be randomly collected for serology in collaboration with veterinary department to ascertain transmission of JE virus

in pigs. The process of collection of pig sera would be on regular basis for generating regular data for early warning signals.

6.3 Laboratory analysis of Sera samples

Animal sera sample collection should be done with the help of Veterinary Department and screening for antibody carriers could be done by microbiology unit of Veterinary Research Institutes having such facilities. Study of different strains of virus could be done with the help of NICD, Delhi, National Institute of Virology, Pune and CRME, Madurai.

6.4 Differential diagnosis

Disease outbreaks in pigs is characterized by abortions, foetal mummification or stillbirths, and encephalitis in pigs up to 6 months of age, or disease outbreaks in horses characterised by fever, jaundice or nervous signs of depression and in coordination or hyper-excitability should be considered as possible JE infections.

As a part of the emergency response, any clinical disease in pigs and horses that may be JE should be investigated to establish the extent of infection. Isolation of virus should be attempted from suitable cases. Serology should be conducted on sick horses, with sera-sampling two weeks later to confirm antibody conversion to JE. Similar serological monitoring should be conducted in piggeries suspected of being infected .If it was desired to define free zones, the surveillance requirements to establish and maintain the zone will have to be developed at the time. Pigs would be the most sensitive sentinel animals, though, because of operational difficulties, the existing arbovirus surveillance programs (that do not use pigs) would need to be used.

6.5 Veterinary Research Institutes

List of following Institutive are given for screening for antibody carriers and other virology studies:

1. National Institute of Virology (NIV), Pune.

2. NICD (National Institute of Communicable Diseases), Delhi.

3. Centre for Research in Medical Entomology (CRME), Madurai.

4. VBRI (Veterinary Biological Research Institute), Shanthinagar, Hyderabad, Andhra Pradesh.

5. Kyasanoor Forest Disease Laboratory, Shimoga, Karnataka.

6. Institute of Vector control and Zoonosis Hosur, Tamil Nadu.

7. Indian Veterinary Research Institute (IVRI), Izatnagar, Bareilly, U. P. 243 122. His Fax no. 0581-2303284 and email- dirivri@ivri.up.nic.in

8. Diagnostic Research Laboratories, RWITC. Ltd. (Approved By Govt. Of India), 6 Arjun Marg, Pune 411 001, Maharashtra

9. School of Tropical Medicine, Virology Unit, Calcutta

Early warning signals, JE outbreak investigations and management

Chapter-5

Monitoring the early warning signals for predicting an out break of JE is the key activity which needs to be established and undertaken at different level with utmost attention. The clues for an impending outbreak can be picked up from following:

- Prediction of high rainfall by the meteorological department, an unusual increase in vector breeding sites and sudden increase in the adult vector density.
- Relative increase in pig population and water frequenting birds should alert the local officers. They should share such information with the District Nodal Officer of JE Surveillance (DMO).
- Virus detected in the suspected animal hosts and in mosquitoes can also act as an indicator for warning a forthcoming outbreak.
- Other associated parameters and the surveillance data can be correlated to above to identify early warning signals.
- Epidemiological data for the last ten years would indicate the trend of the diseases in the specific area. Micro analysis of such data at the district level would help the district health officer to predict areas which are at risk of having epidemic outbreak of JE.

To obtain the earliest inkling of an impending outbreak it is essential that all the components of surveillance i.e. collection, compilation, analysis and interpretation of data, follow-up action and feed back must be carried out in a systematic and organized manner. Supervision and monitoring at all levels is mandatory for ensuring effective surveillance.

The state programme officer would compile district-wise surveillance data generated through epidemiological, entomological, laboratory and veterinary surveillance, predict the suspected outbreak and warn the districts for implementation of proper measures for prevention of outbreak. Outbreak investigations should be initiated if there is a sudden increase in cases or if cases reported are different from historical information, in terms of season, geographic area, age group, or case fatality. All compiled reports should be sent to Dte. of NVBDCP on regular basis.

7.1. Early warning Signals

Directorate of NVBDCP monitors daily/ weekly or monthly incidence of JE as per the needs. During epidemics, daily monitoring is carried out while weekly reports are insisted upon during the transmission season. During the inter-epidemic period a monthly report is expected from the states. This surveillance data is further analyzed by the Dte. of NVBDCP and interpreted to detect any warning signals (WS) for JE outbreak. Based on epidemiological trends advance warnings are given to the states. Some of the early warning signals for JE outbreak are:

- Reporting of a suspect case or increase in suspect cases with clustering in time and space which do not fit into the expected known endemicity or seasonality of JE in a given area.
- Fluctuations in ecological conditions conducive for vector breeding and enhanced adult density of JE vectors
- Presence of amplifying host in good number
- Detection of viral activity in vector
- Detection of viral activity in zoonotic reservoirs(s)

It is emphasized that comprehensive analysis of

all available information is made to estimate the risk of an outbreak.

RISK FACTORS FOR JE OUTBREAK IN AN AREA

- Increase in susceptible population
- High density of Culex mosquitoes
- Presence of amplifying hosts such as pigs, water birds etc.
- Paddy cultivation

7.2 Epidemic/ outbreak investigation

JE is a disease of public health importance because of its epidemic potential and high case fatality rate. JE, in patients who survive, complications may lead to life long sequelae. The first major outbreak of JE occurred in Bankura and Burdwan districts, West Bengal, in 1973 and since then it has spread to many states/UTs of the country. Though JE is primarily a disease of rural agricultural areas, where vector mosquitoes proliferate in close association with pigs and other animal reservoirs, epidemics have also been reported in peri-urban areas where similar conditions may exist. For investigation of an outbreak, the first principle is to have in place a system to receive early warning signals and confirm diagnosis. In areas of low JE endemicity every single suspected JE case needs to be investigated. However in areas where JE is endemic the term outbreak can be applied to an unusual increase in suspected JE cases compared to the normal transmission or increase beyond the normal range due to seasonal variations. This normal range will be different from place to place. Following steps should be taken for epidemic outbreak investigation:

7.2.1 Epidemic Outbreak Investigation

- Define an outbreak.
- Assessment of the number of suspected cases in the area and confirmation of an outbreak. In case JE diagnosis is confirmed, incidence rates may be worked out.
- Delineation of the area involved in outbreak
- Investigation of reported cases in the Case Investigation Form (JE F-4).
- Line list of cases including age and gender distribution of suspected cases, date(s) of onset of fever and other symptoms in a chronological order and severity of illness of the cases, including deaths. (JEF 3).
- Laboratory confirmation of suspected cases
- Assessment for presence of reservoir host such as pigs, cattle, poultry in the near vicinity of suspected cases.
- Vector surveillance should be initiated immediately, which should include collection of larvae and adult mosquitoes, identification of vector species, density and for incrimination of the vector mosquitoes.
- History of JE outbreak in the past must be noted.
- Analysis and report on the distribution and risk factors associated with the outbreak.
- After an outbreak is over, detailed report of the outbreak must be prepared on the Form JE F-10 and submitted to Directorate of NVBDCP.

7.3 Anticipatory preparation for managing an outbreak of JE:

- Anticipatory preparations should be made for timely availability of medicines, equipment and accessories as well as sufficient number of trained medical, nursing and paramedical personnel.
- For clinical management of JE cases states should identify the facilities like CHCs, District Hospitals and Medical colleges. These institutions should ensure the availability of the necessary drugs, IV fluids & equipment before the onset of JE transmission season.

- It is essential for investigation of an outbreak that rapid response teams are constituted at state and district level for investigation and containment of an outbreak. These teams should have experts in medicine, epidemiology, entomology and microbiology.
- Peripheral institutions have to be prepared to manage any outbreak. For this provision should be made for Technical Malathion, fogging machines, health education materials, preliminary laboratory investigations, transportation of cases to referral centers before the transmission season.
- The staff should be oriented towards detection of cases and trained to take immediate remedial measures to report cases in prescribed format and also follow up for laboratory confirmation. The data should be collected and analyzed to understand the cause of the outbreak.

7.4. Outbreak containment

After receiving the warning signals and investigation of a suspected outbreak, the containment measures should automatically be rolled out. The rapid response team should be mobilized and it should start immediate containment action. To minimize the mortality and reduce CFR prompt and appropriate clinical management of suspected JE cases is essential. Cases occurring in periphery, needing specialized care, should be referred to the referral centre without any delay. Some of the measures detailed below will be found useful for managing JE outbreak:

- Daily monitoring of the outbreak, cases and deaths. besides early referral of cases to higher treatment centers.
- Daily report to state/ National health authorities
- The local health authorities particularly the PHC medical officer and district health officials must be aware of the disease profile in their area. As the overt incidence of JE in a village in a given season does not exceed more than 2 cases, the local health personnel and the community at large must be alerted about reporting occurrence of any fever case with altered sensorium.
- Sensitize community and staff regarding JE and about its prevention and control.
- For early reporting involve key members of the community
- Control measures should be implemented immediately. Vector control measures especially fogging with Malathion technical should be carried out immediately in the affected village, use of bed nets; full sleeve clothes etc. during evening hours should be promoted to prevent mosquito bites.
- Continue community education for personal prophylaxis like use of impregnated mosquito nets, keeping piggeries away from human habitations etc.

Annexure

JE Reporting Formats

PROFORMA FOR MONTHLY REPORT ON ACUTE ENCEPHALITIS SYNDROME CASES/

JAPANESE ENCEPHALITIS * FROM STATES

AESF 1

State _____ District_____
Period included in the report: From _____ to _____
Date of Report:

Sl. No	Name of the District	Disease	No. of affected PHCs	No. of Cases reported – Age wise										No. of Deaths reported – Age wise										Cumulative total				No. of Samples collected	No. found+ ve for J E		Remarks **
				0-1 ?		1-5		6-15		> 15 yrs.		Total		0-1 ?		1-5		6-15		> 15 yrs		Total		Cases		Deaths					
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	V	N	V	N		V	N	
		AES																													
		JE																													
		AES																													
		JE																													
		AES																													
		JE																													

C: Cases D: Death M: Male F: Female V: Vaccinated N: Not Vaccinated

** Mention causes of encephalitis or AES unknown.

(Name & Signature)
Designation

Send this report to NVBDCP, New Delhi by Fax No.011-23968329, e-mail:namp@ndc.vsnl.net.in

PROFORMA FOR DAILY/WEEKLY REPORT ON ACUTE ENCEPHALITIS SYNDROME CASES/

JAPANESE ENCEPHALITIS * FROM STATES

AESF 1A

State _____Year _____Month _____Weekly Report (from---------to---------)/ Daily Report (date--------)

Sl. No	Name of the District	Disease	During the week/day				Progressive Total (From 1st January to----------)				Remarks
			Cases	Deaths	No. of samples collected	No. found + ve for JE	Cases	Deaths	No. of samples collected	No. found + ve for JE	
1.		AES									
		JE									
2.		AES									
		JE									

*=Daily report during epidemic/outbreak and weekly report in transmission season

(Name & Signature)

Designation

During outbreaks, send this report daily to NVBDCP, New Delhi Fax No.011 -23968329, e-mail:namp@ndc.vsnl.net.in

PROFORMA FOR MONTHLY REPORT ON ACUTE ENCEPHALITIS SYNDROME CASES/

JAPANESE ENCEPHALITIS * FROM DISTRICTS

AESF 2

State _____ District_____
Period included in the report: From _____ to _____
Date of Report:

Sl. No	Name of the SSSL or SSS	Disease	No. of affected PHCs	No. of Cases reported – Age wise										No. of Deaths reported – Age wise										Cumulative total				No. of Samples collected	No. found+ ve for J E		Remarks **
				0-1 ?		1-5		6-15		> 15 yrs.		Total		0-1 ?		1-5		6-15		> 15 yrs		Total		Cases		Deaths					
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	V	N	V	N		V	N	
		AES																													
		JE																													
		AES																													
		JE																													
		AES																													
		JE																													

C: Cases D: Death M: Male F: Female V: Vaccinated N: Not Vaccinated

** Mention causes of encephalitis or AES unknown.

(Name & Signature)
Designation

Send this report to State Programme Officer (SPO), _____ by Fax Number _____ or e mail id

PROFORMA FOR DAILY/WEEKLY REPORT ON ACUTE ENCEPHALITIS SYNDROME CASES/ JAPANESE ENCEPHALITIS * FROM DISTRICTS

AESF 2 A

State _____ District _____ Year _____Weekly Report (from---------to---------)/ Daily Report (date--------)

Sl. No	Name of the Sentinel Surveillance Sites	Disease	During the week/day				Progressive Total (From 1st January to----------)				Remarks
			Cases	Deaths	No. of Samples collected	No. found + ve for JE	Cases	Deaths	No. of Samples collected	No. found + ve for JE	
1.		AES									
		JE									
2.		AES									
		JE									

*=Daily report during epidemic/outbreak and weekly report in transmission season

(Name & Signature)

Designation

During outbreaks, send this report daily to State Programme Officer (SPO), _____ by Fax Number _____ or e mail id

Linelist of AES/ JE Cases

Monthly/ Weekly/ Daily Report (Encircle the appropriate*)

AESF 3

This report is sent from _____ (Specify – Name of SSS / District/ State)

Period Included in this report from _____ to _____

Total Number of Cases in this period _____ (Write "Nil" if there are no cases)

Date of Report:

Case ID Number	Name & address	District Name	Block Name	Religion	Sex	Age	No. of Doses	Date of last JE vacci-nation	Date Of Admi-ssion	Date of onset of symptoms	Date of onset fever	Change in mental status (Y/N)	Seizure (Y/N)	Type of sample	Date of sample collection	Lab Result	Outcome	Remark
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(15)	(16)
AES-																		
AES-																		
AES-																		
AES-																		
AES-																		
AES-																		
AES-																		
AES-																		

Person sending the report:_____ Designation_____ Signature _____

(1) Religion: H=Hindu, M=Muslim, O=Others
(2) Sex of child: M=Male, F=Female
(3) Age
(4) No. of vaccination doses & date of last JE vaccination
(5) Date of Admission
(6) Date of onset of symptoms
(7) Date of onset of fever
(8) Change in mental status
(9) Seizures yes=1,no=2,unknown=3
(10) Specified type of samples collected i.e. blood or CSF& date of collection
(11) Lab Result: 1=Positive, 2=Negative, 3=Not tested, 4=Unknown
(12) Status at Discharge: Normal/Disable/Died on/Any other
(13) Final Classification: 1=Lab Confirmed JE 2= Probable JE 3= AES Unknown, 4=AES other agentDate of death or discharge

* Daily report during epidemic/outbreak, Weekly report in transmission season and Monthly report every month

ACUTE ENCEPHALITIS SYNDROME/ SUSPECTED JE CASE INVESTIGATION FORM

EPID Number: AES - _____ -_____ - _____ - _____ **AESF-4**

Reporting information

Date Case Reported: _____ /_____ / _____ Notified by: _____
Date Case Investigated: _____ / _____ / _____ Investigated by:_____

Patient information

Patient's Name: _____ Sex: _____
Date of birth: _____/ _____ / _____ Age: years_____ months_____
Father's Name:_____ Religion: Muslim / Hindu / Other
Address: Landmark:
_____ _____
Village / Mohalla: _____ Block /Urban area: _____
District: _____ State: Setting: Urban / Rural
_____

Travel history over past two weeks from onset of first symptoms

Date from: Date to: Address Block District and State			

Immunization history

JE immunization: Yes / No / Partial / Unknown Date of last JE immunization: _____/ _____/_____

Signs and Symptoms

Date of onset of first symptoms: _____/_____/_____ Headache: Yes / No / Unknown
Change in mental status: Yes / No / Unknown Paralysis: Yes / No / Unknown
Fever: Yes / No / Unknown Unconsciousness: Yes / No / Unknown
Seizure: Yes / No / Unknown Neck rigidity: Yes / No / Unknown
Any other, specify: _____

Sample collection, tracking and results

Specimen	Date Collection	Date Sent	Date Result	Condition*	Laboratory Result (circle)
CSF					Positive Negative Not tested Unknown
Serum 1					Positive Negative Not tested Unknown
Serum 2					Positive Negative Not tested Unknown

Diagnosis and final classification

Final classification: Laboratory confirmed JE / Probable JE / AES unknown / AES other agent
Clinical diagnosis:_____

Discharge status

Status at discharge: Alive / Dead / Unknown Date of discharge: _____/ _____/_____
If alive, status of recovery: Recovered completely / Recovered with disability
If died, date of death: _____/ _____/_____

* condition is good if adequate if specimen is transported in reverse cold chain

(Name & Signature)
Designation

ACUTE ENCEPHALITIS SYNDROME/ SUSPECTED JE LABORATORY REQUEST AND REPORT FORM AESF 5

Epid number:AES - _____ -_____ - _____ - _____	Date / /	
Patient name:	M	F
Age:		
Name of parent or guardian:		
State: District:		
Town/Village: Name of health facility:		

Number of doses of Japanese Encephalitis Vaccine: Date of last dose / /
Date of onset of illness: / /
Name & address of treating Institution:
Clinical features:

SPECIMEN TYPE	SPECIMEN ID	DATE OF COLLECTION	DATE OF SHIPMENT
(1)		/ /	/ /
(2)		/ /	/ /
(3)		/ /	/ /

Name of person to whom laboratory results should be sent:
Address:

Telephone number: Fax number: Email

For use by the receiving laboratory:

Name of laboratory:
Name of person receiving the specimen:
Specimen condition*:

SPECIMEN TYPE	DATE RECEIVED IN LAB	DATE RESULT	TEST TYPE	TEST RESULT	Date result to program/ sender	Remark
	/ /	/ /			/ /	
	/ /	/ /			/ /	
	/ /	/ /			/ /	

*** Sample is good if:**

1. There is no leakage
2. Of adequate quantity
3. Brought in cold chain
4. Documentation is complete

FORMAT FOR MOSQUITO BREEDING SURVEY REPORTS AESF 6

1) State----------Zone----------Dist.----------PHC---------Locality------

2) Month ----------Year----------

DETAILS OF MOSQUITO BREEDING SITES	NO. CHECKED	NO. FOUND+ VE			DENSITY / DIP	NAME OF SPECIES IDENTIFIED*
1		Anopheles	Culex	Aedes		
2						
3						
4						
5						
6						
7						
8						

***For identification of JE vectors: Larvae of mosquitoes may be reared in the Laboratories for adult emergence, as adult is easy to identify.**

1) Remarks:----------

Signature of the investigator

Designation

FORMAT FOR MONITORING OF JAPANESE ENCEPHALITIS VECTORS DENSITY AESF 7

A.1) State_____ Zone_____ District _____PHC _____Village_____

2) Month of collection_____

3) Name of the insecticide sprayed---------- Date of last spray ---------

4) Spray coverage- Population Room House CS

In % ---------- ---------- ----------

B. JE Vector Density (Per man hour density)

1. Time of collection (Morning his collection) 6 a.m. – 8 a.m.
2. Total time spent---------- No. of structure ------ No. of persons ----------

NAME OF THE SPECIES	INDOOR				OUTDOOR
	HD	CS	MD	PMHD	PMHD

HD = Human dwelling CS = Cattle sheds MD = Mixed dwelling

PMHD = Per man hour density = No. of mosquito caught

No. of person x Time in hours

C. **ABDOMINAL CONDITION**

NAME OF THE SPECIES	UF	FF	SG	G	TOTAL

UF = Unfed FF = Full fed SG = Semi Gravid G = Gravid

Remarks if any ----------

Signature of Investigator
Name & Designation

FORMAT FOR MONITORING OF JAPANESE ENCEPHALITIS VECTOR MOSQUITOES DENSITY BY WHOLE NIGHT VECTOR LANDING COLLECTION

AESF 8

State ---------- Zone---------- District----------PHCs-

1. Date of the study----------

2. No. of Baits----------

3.

	HUMAN / BAIT						ANIMAL/ BAIT					
Night hours Collection	**Vectors Collected**						**Vectors Collected**					
	INDOOR			**OUTDOOR**			**INDOOR**			**OUTDOOR**		
18-19	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
19-20												
20-21												
21-22												
22-23												
-												
05-06												
Bait **Night** **Bait**												

Name of the species
1)=
2) =
3) =

5 Weather condition - (Tick Marks)

Wind	Rain	Fog	Cloudy

Signature of the investigator

Designation

FORMAT FOR MONITORING OF INSECTICIDE SUSCEPTIBILITY STATUS OF JAPANESE ENCEPHALITIS VECTOR MOSQUITOES
(ADULT/ LARVAL STAGE)

AESF 9

State---------- Zone----------District---------- PHC----------

1) Date of test----------

2) Species tested----------

3) Insecticide tested----------Name of insecticide----------
-----Concentration----------

4) Test sample----- source of collection --------Physiological stage UF/ FF/ SG

5) Test Results

	REPLICATE-I		REPLICATE- II		REPLICATE- -III	
Test group	**Test**	**Control**	**Test**	**Control**	**Test**	**Control**
No. exposed						
No. dead						
% Mortality						
Most corrected						

UF = Unfed FF = Full fed SG = Semi Gravid G = Gravid

6) Temp:

7) Humidity:

Signature of the investigator

Designation

OUTBREAK INVESTIGATION REPORT

AESF 10

General information

State : .....

District: .....

PHC/Town: .....

Village/ Ward : .....

Population : .....

Background information

Person reporting the outbreak: .....

Date of report .....

Date when investigations started .....

Person(s) investigating the outbreak .....

Details of investigation

Describe how cases were found (may include a) house to house search in the affected area; (b) visiting blocks adjacent to the affected area; (c) conducting record reviews at local hospitals; (d) requesting health workers to report similar cases in their areas etc.):

Descriptive epidemiology

Cases by time, place and person (attach summary tables and relevant graphs and maps)
Age specific attack rates and mortality rates

High risk age groups and geographical areas
Vaccination status of cases, unaffected population

Prevalence and density of JE vectors

Prevalence of reservoirs specially pigs

Description of control measures

Description of measures for follow-up visits

Brief description of problem encountered

Factors which contributed to the outbreak

Conclusions and recommendations

Date

(Name and designation)

Annexure-1

List of Sentinel Sites

Sl. No.	Name of the States	No. of Sites	Name of Sentinel sites/ Institutes
1.	Andhra Pradesh	**5**	1. Medical Collage, Kurnool 2.VBRI Medical Collage, Hyderabad 3. Govt. Hospital, Anantpur 4. MGM Hospital, Warangal 5. Medical Collage, Mahboobnagar
2.	Assam	**5**	1. Assam Medical College, Dibrugarh 2. Sibsagar Civil Hospital 3. Jorhat Civil Hospital 4. Lakhimpur Civil Hospital 5. RMRC, Dibrugarh/Medical College, Guwahati
3.	Goa	**1**	1..Goa Medical College, Goa
4.	Haryana	**4**	1. District Hospital, Kaithal 2. District Hospital, Karnal 3. District Hospital, Kurukshetra 4. District Hospital, Ambala
5.	Chandigarh	**1**	1. Chandigarh, PGI
5.	Karnataka	**3**	1. SNR Hospital, Kolar 2. VIMS, Bellary 3. Chigateri General Hospital, Davanager
6.	Maharashtra	**5**	1. District Hospital, Bhandara 2. District Hospital, Gondia 3. Indira Gandhi Medical College, Nagpur 4. District Hospital, Wardha 5. District Hospital, Gadchiroli
7.	Manipur	**1**	1. J.N. Hospital Poompat, Impahl
8.	Tamil Nadu	**5**	1. Christian Medical college, Vellore 2. Centre for Research in Medical Entomology (CRME), Madurai. 3. District Hospital,Thanjavur 4. Govt. Hospital, Kallakurchi 5. District Hospital,Cuddalore
9.	West Bengal	**2**	1.School of Tropical Medicine, Calcutta 2.Burdwan Medical College, Burdwan
10.	Bihar	**2**	1. Patna Medical college & Hospital (PMCH) 2. Sri Krishana Medical College & Hospital (SKMCH) Muzaffarpur
11.	Kerala	**1**	1. District Hospital, Kottayam
12.	Uttar Pradesh	**15**	1. District Hospitals, Sidharthnagar 2. District Hospitals, Maharajganj 3. District Hospitals, Kheri 4. District Hospitals, Basti 5. District Hospitals, S. Kabir Nagar 6. District Hospitals, Saharanpur 7. District Hospitals, Gorakhpur 8. District Hospitals, Bahraich 9. District Hospitals, Kushinagar 10. District Hospitals, Gonda 11. District Hospitals, Balrampur 12. District Hospitals, Sultanpur 13. District Hospitals, Deoria 14. KG Medical College, Lucknow. 15. District Hospitals, Raibareli
	Total	**50**	

DISTRICT CODES

Sl. No.	STATE	DISTRICT	CODE
1	A&N ISLANDS	ANDAMAN	ADN
2	A&N ISLANDS	NICOBAR	NCB
3	ANDHRA PRADESH	ADILABAD	ADB
4	ANDHRA PRADESH	ANANTPUR	APR
5	ANDHRA PRADESH	CHITTOOR	CHT
6	ANDHRA PRADESH	CUDDAPAH	CDP
7	ANDHRA PRADESH	EAST GODAVARI	EGV
8	ANDHRA PRADESH	GUNTUR	GTR
9	ANDHRA PRADESH	HYDERABAD	HYD
10	ANDHRA PRADESH	KARIMNAGAR	KMR
11	ANDHRA PRADESH	KHAMMAM	KMM
12	ANDHRA PRADESH	KRISHNA	KRN
13	ANDHRA PRADESH	KURNOOL	KRL
14	ANDHRA PRADESH	MAHBUBNAGAR	MBR
15	ANDHRA PRADESH	MEDAK	MDK
16	ANDHRA PRADESH	NALGONDA	NGD
17	ANDHRA PRADESH	NELLORE	NLR
18	ANDHRA PRADESH	NIZAMABAD	NZD
19	ANDHRA PRADESH	PRAKASAM	PKM
20	ANDHRA PRADESH	RANGAREDDY	RGY
21	ANDHRA PRADESH	SRIKAKULAM	SKM
22	ANDHRA PRADESH	VISAKHAPATNAM	VSM
23	ANDHRA PRADESH	VIZIANAGARAM	VZM
24	ANDHRA PRADESH	WARANGAL	WRL
25	ANDHRA PRADESH	WEST GODAVARI	WGV
26	ARUNACHAL PR.	ANJAW	ANJ
27	ARUNACHAL PR.	CHANGLONG	CHA
28	ARUNACHAL PR.	DIBANG VALLEY	DIV
29	ARUNACHAL PR.	EAST KAMENG	EKA
30	ARUNACHAL PR.	EAST SIANG	ESI
31	ARUNACHAL PR.	KURUNG KUMEY	KMY
32	ARUNACHAL PR.	LOHIT	LOH
33	ARUNACHAL PR.	LOWER DIBANG VALLEY	LDV
34	ARUNACHAL PR.	LOWER SUBANSIRI	LSU
35	ARUNACHAL PR.	PAPUMPARE	PMP
36	ARUNACHAL PR.	TIRAP	TRP
37	ARUNACHAL PR.	TOWANG	TAW
38	ARUNACHAL PR.	UPPER SIANG	USI
39	ARUNACHAL PR.	UPPER SUBANSIRI	USU
40	ARUNACHAL PR.	WEST KAMENG	WKA
41	ARUNACHAL PR.	WEST SIANG	WSI
42	ASSAM	BARPETA	BPT
43	ASSAM	BONGAIGAON	BNG
44	ASSAM	CACHAR	CHR
45	ASSAM	DARRANG	DRG
46	ASSAM	DHEMAJI	DMJ
47	ASSAM	DHUBRI	DBB

Sl. No.	STATE	DISTRICT	CODE
48	ASSAM	DIBRUGARH	DBR
49	ASSAM	GOALPARA	GLP
50	ASSAM	GOLAGHAT	GLT
51	ASSAM	HAILAKANDI	HLK
52	ASSAM	JORHAT	JHT
53	ASSAM	KAMRUP	KMP
54	ASSAM	KARBI ANGLONG	KAG
55	ASSAM	KARIMGANJ	KXJ
56	ASSAM	KOKRAJHAR	KJR
57	ASSAM	LAKHIMPUR	LKR
58	ASSAM	MARIGOAN	MRG
59	ASSAM	N. CACHAR HILLS	NCH
60	ASSAM	NAGAON	NGN
61	ASSAM	NALBARI	NLB
62	ASSAM	SIBSAGAR	SBR
63	ASSAM	SONITPUR	SPR
64	ASSAM	TINSUKHIA	TSK
65	BIHAR	ARARIA	ARR
66	BIHAR	ARWAL	ARW
67	BIHAR	AURANGAABAD	AGB
68	BIHAR	BANKA	BNK
69	BIHAR	BEGUSARAI	BGS
70	BIHAR	BHAGALPUR	BGP
71	BIHAR	BHOJPUR	BJR
72	BIHAR	BUXAR	BXR
73	BIHAR	CHAMPARAN EAST	CPE
74	BIHAR	CHAMPARAN WEST	CPW
75	BIHAR	DARBHANGA	DBG
76	BIHAR	GAYA	GYA
77	BIHAR	GOPALGANJ	GPG
78	BIHAR	JAMUI	JMI
79	BIHAR	JEHANABAD	JBD
80	BIHAR	KAMUR	KMU
81	BIHAR	KATIHAR	KTH
82	BIHAR	KHAGARIA	KHA
83	BIHAR	KISHANGANJ	KIS
84	BIHAR	LAKHISARAI	LKS
85	BIHAR	MADHEPURA	MDP
86	BIHAR	MADHUBANI	MDB
87	BIHAR	MUNGER	MUN
88	BIHAR	MUZAFFARPUR	MZF
89	BIHAR	NALANDA	NLD
90	BIHAR	NAWADA	NWD
91	BIHAR	PATNA	PTN
92	BIHAR	PURNIA	PRN
93	BIHAR	ROHTAS	RTS
94	BIHAR	SAHARSA	SAH

DISTRICT CODES

Sl. No.	STATE	DISTRICT	CODE
95	BIHAR	SAMASTIPUR	SAM
96	BIHAR	SARAN	SAR
97	BIHAR	SHEIKHPURA	SKP
98	BIHAR	SHEOHAR	SHR
99	BIHAR	SITAMARHI	SIT
100	BIHAR	SIWAN	SWN
101	BIHAR	SUPAUL	SPL
102	BIHAR	VAISHALI	VSL
103	CHANDIGARH	CHANDIGARH	CHD
104	CHHATTISGARH	BASTER	BTR
105	CHHATTISGARH	BILASPUR	BIL
106	CHHATTISGARH	DANTEWADA	DTW
107	CHHATTISGARH	DHAMTARI	DTR
108	CHHATTISGARH	DURG	DUR
109	CHHATTISGARH	JANJGIR CHAMPA	JGC
110	CHHATTISGARH	JASHPUR	JHP
111	CHHATTISGARH	KANKER	KNK
112	CHHATTISGARH	KAWARDHA	KWD
113	CHHATTISGARH	KORBA	KRB
114	CHHATTISGARH	KORIYA	KRY
115	CHHATTISGARH	MAHASAMUND	MMD
116	CHHATTISGARH	RAIGARH	RGH
117	CHHATTISGARH	RAIPUR	RPR
118	CHHATTISGARH	RAJNANDGAON	RNG
119	CHHATTISGARH	SARGUJA	SRG
120	D&N HAVELI	D&N HAVELI	DNV
121	DAMAN & DIU	DAMAN	DMN
122	DAMAN & DIU	DIU	DIU
123	DELHI	DELHI	DLH
124	GOA	NORTH GOA	GON
125	GOA	SOUTH GOA	GOS
126	GUJARAT	AHMEDABAD	AMD
127	GUJARAT	AHMEDABAD CORPN.	AMC
128	GUJARAT	AMRELI	AML
129	GUJARAT	ANAND	AND
130	GUJARAT	BANASKANTHA	BAN
131	GUJARAT	BHARUCH	BRH
132	GUJARAT	BHAVNAGAR	BVN
133	GUJARAT	BHAVNAGAR CORPN.	BVC
134	GUJARAT	DAHOD	DHD
135	GUJARAT	DANGS	DNG
136	GUJARAT	GANDHINAGAR	GNR
137	GUJARAT	JAMNAGAR	JMD
138	GUJARAT	JAMNAGAR CORPN.	JMC
139	GUJARAT	JUNAGADH	JUN
140	GUJARAT	KHEDA	KDA
141	GUJARAT	KUTCH	KTC

Sl. No.	STATE	DISTRICT	CODE
142	GUJARAT	MEHSANA	MSN
143	GUJARAT	NARMADA	NMD
144	GUJARAT	NAVSARI	NAV
145	GUJARAT	PANCHMAHALS	PML
146	GUJARAT	PATAN	PAT
147	GUJARAT	PORBANDAR	POR
148	GUJARAT	RAJKOT	RJT
149	GUJARAT	RAJKOT CORPN.	RJC
150	GUJARAT	SABARKANTHA	SBK
151	GUJARAT	SURAT	SRT
152	GUJARAT	SURAT CORPN.	SRC
153	GUJARAT	SURENDRANAGAR	SRN
154	GUJARAT	VADODARA	VDD
155	GUJARAT	VADODARA CORPN.	VDC
156	GUJARAT	VALSAD	VLD
157	HARYANA	AMBALA	AMB
158	HARYANA	BHIWANI	BWN
159	HARYANA	FARIDABAD	FBD
160	HARYANA	FATEHABAD	FTB
161	HARYANA	GURGAON	GUR
162	HARYANA	HISAR	HSR
163	HARYANA	JHAJJAR	JJR
164	HARYANA	JIND	JND
165	HARYANA	KAITHAL	KTL
166	HARYANA	KARNAL	KNL
167	HARYANA	KURUKSHETRA	KKR
168	HARYANA	MAHINDERGARH	MHN
169	HARYANA	MEWAT	MWT
170	HARYANA	PANCHKULA	PKL
171	HARYANA	PANIPAT	PNP
172	HARYANA	REWARI	RWR
173	HARYANA	ROHTAK	RTK
174	HARYANA	SIRSA	SRS
175	HARYANA	SONEPAT	SNP
176	HARYANA	YAMUNANAGAR	YNR
177	HIMACHAL PRADESH	BILAASPUR	BLP
178	HIMACHAL PRADESH	CHAMBA	CHB
179	HIMACHAL PRADESH	HAMIIRPUR	HMR
180	HIMACHAL PRADESH	KANGRA	KGR
181	HIMACHAL PRADESH	KINNAUR	KNR
182	HIMACHAL PRADESH	KULLU	KLU
183	HIMACHAL PRADESH	LAHUL & SPITI	LSP
184	HIMACHAL PRADESH	MANDI	MND
185	HIMACHAL PRADESH	SHIMLA	SML

DISTRICT CODES

Sl. No.	STATE	DISTRICT	CODE
186	HIMACHAL PRADESH	SIRMUR	SMR
187	HIMACHAL PRADESH	SOLAN	SLN
188	HIMACHAL PRADESH	UNA	UNA
189	JAMMU & KASHMIR	ANANTNAG	ATN
190	JAMMU & KASHMIR	BADGAM	BGM
191	JAMMU & KASHMIR	BARAMULA	BLA
192	JAMMU & KASHMIR	DODA	DOD
193	JAMMU & KASHMIR	JAMMU	JAM
194	JAMMU & KASHMIR	KARGIL	KAR
195	JAMMU & KASHMIR	KATHUA	KUA
196	JAMMU & KASHMIR	KUPWARA	KUP
197	JAMMU & KASHMIR	LEH	LEH
198	JAMMU & KASHMIR	PULWAMA	PUL
199	JAMMU & KASHMIR	PUNCH	PCH
200	JAMMU & KASHMIR	RAJAURI	RAJ
201	JAMMU & KASHMIR	SRINAGAR	SGR
202	JAMMU & KASHMIR	UDHAMPUR	UDM
203	JHARKHAND	BOKARO	BOK
204	JHARKHAND	CHATRA	CTR
205	JHARKHAND	DEOGHAR	DGH
206	JHARKHAND	DHANBAD	DBD
207	JHARKHAND	DUMKA	DMK
208	JHARKHAND	GARHWA	GRH
209	JHARKHAND	GIRIDIH	GRD
210	JHARKHAND	GODDA	GDA
211	JHARKHAND	GUMLA	GML
212	JHARKHAND	HAZARIBAGH	HZB
213	JHARKHAND	JAMTARA	JMT
214	JHARKHAND	KODERMA	KDR
215	JHARKHAND	LATEHAR	LTH
216	JHARKHAND	LOHARDAGA	LHD
217	JHARKHAND	PAKUR	PKR
218	JHARKHAND	PALAMU	PLM
219	JHARKHAND	RANCHI	RNC
220	JHARKHAND	SAHIBGANJ	SBG
221	JHARKHAND	SARAIKELLA	SRK
222	JHARKHAND	SIMDEGA	SMD
223	JHARKHAND	SINGHBHUM EAST	SBE
224	JHARKHAND	SINGHBHUM WEST	SBW
225	KARNATAKA	BAGALKOT	BLK
226	KARNATAKA	BANGALORE (U)	BLU
227	KARNATAKA	BANGALORE(R)	BLR
228	KARNATAKA	BELGAUM	BEL
229	KARNATAKA	BELLARY	BLY
230	KARNATAKA	BIDAR	BDR
231	KARNATAKA	BIJAPUR	BIJ

Sl. No.	STATE	DISTRICT	CODE
232	KARNATAKA	CHAMARAJNAGAR	CRN
233	KARNATAKA	CHIKMAGLUR	CHK
234	KARNATAKA	CHITRADURGA	CDG
235	KARNATAKA	DAKSHIN KANNAD	DKN
236	KARNATAKA	DAVANAGERE	DVG
237	KARNATAKA	DHARWAD	DHA
238	KARNATAKA	GADAG	GDG
239	KARNATAKA	GULBARGA	GBG
240	KARNATAKA	HASSAN	HAS
241	KARNATAKA	HAVERI	HVR
242	KARNATAKA	KODAGU(COORG)	KOD
243	KARNATAKA	KOLAR	KOL
244	KARNATAKA	KOPPAL	KPP
245	KARNATAKA	MANDYA	MAN
246	KARNATAKA	MYSORE	MYS
247	KARNATAKA	RAICHUR	RCR
248	KARNATAKA	SHIMOGA	SHI
249	KARNATAKA	TUMKUR	TUM
250	KARNATAKA	UDUPI	UDU
251	KARNATAKA	UTTAR KANNAD	UKN
252	KERALA	ALAPPUZHA	APZ
253	KERALA	ERNAKULAM	ENK
254	KERALA	IDUKKI	IDK
255	KERALA	KANNUR	KNU
256	KERALA	KASARAGOD	KSG
257	KERALA	KOLLAM	KLM
258	KERALA	KOTTAYAM	KOT
259	KERALA	KOZHIKODE	KZK
260	KERALA	MALAPPURAM	MPM
261	KERALA	PALAKKAD	PLK
262	KERALA	PATHANAMTHITTA	PTM
263	KERALA	THIRUVANANTHAPURAM	TRM
264	KERALA	THRISSUR	THR
265	KERALA	WAYANAD	WYD
266	LAKSHADWEEP	LAKSHADWEEP	LKD
267	MADHYA PRADESH	ANUPPUR	ANP
268	MADHYA PRADESH	ASHOKNAGAR	AKN
269	MADHYA PRADESH	BALAGHAT	BLG
270	MADHYA PRADESH	BARWANI	BRW
271	MADHYA PRADESH	BETUL	BTL
272	MADHYA PRADESH	BHIND	BHD
273	MADHYA PRADESH	BHOPAL	BPL
274	MADHYA PRADESH	BURHANPUR	BHP
275	MADHYA PRADESH	CHHATARPUR	CTP
276	MADHYA PRADESH	CHHINDWARA	CDW
277	MADHYA PRADESH	DAMOH	DMH
278	MADHYA PRADESH	DATIA	DTA

DISTRICT CODES

Sl. No.	STATE	DISTRICT	CODE
279	MADHYA PRADESH	DEWAS	DWS
280	MADHYA PRADESH	DHAR	DHR
281	MADHYA PRADESH	DINDORI	DDR
282	MADHYA PRADESH	GUNA	GUN
283	MADHYA PRADESH	GWALIOR	GLR
284	MADHYA PRADESH	HARDA	HAR
285	MADHYA PRADESH	HOSANGABAD	HSB
286	MADHYA PRADESH	INDORE	IDR
287	MADHYA PRADESH	JABALPUR	JBP
288	MADHYA PRADESH	JHABUA	JBA
289	MADHYA PRADESH	KATNI	KTN
290	MADHYA PRADESH	KHANDWA	KND
291	MADHYA PRADESH	KHARGONE	KRG
292	MADHYA PRADESH	MANDLA	MDL
293	MADHYA PRADESH	MANDSAUR	MDS
294	MADHYA PRADESH	MORENA	MRN
295	MADHYA PRADESH	NARSINGPUR	NSP
296	MADHYA PRADESH	NEEMUCH	NMC
297	MADHYA PRADESH	PANNA	PAN
298	MADHYA PRADESH	RAISEN	RSN
299	MADHYA PRADESH	RAJGARH	RJG
300	MADHYA PRADESH	RATLAM	RTM
301	MADHYA PRADESH	REWA	RWA
302	MADHYA PRADESH	SAGAR	SAG
303	MADHYA PRADESH	SATANA	STN
304	MADHYA PRADESH	SEHORE	SEH
305	MADHYA PRADESH	SEONI	SNI
306	MADHYA PRADESH	SHADOL	SDL
307	MADHYA PRADESH	SHAJAPUR	SJP
308	MADHYA PRADESH	SHEOPUR	SOP
309	MADHYA PRADESH	SHIVPURI	SVP
310	MADHYA PRADESH	SIDHI	SDH
311	MADHYA PRADESH	TIKAMGARH	TKM
312	MADHYA PRADESH	UJJAIN	UJN
313	MADHYA PRADESH	UMARIYA	UMR
314	MADHYA PRADESH	VIDISHA	VDS
315	MAHARASHTRA	AHMEDNAGAR	ANG
316	MAHARASHTRA	AKOLA	AKL
317	MAHARASHTRA	AMRAVATI	AMT
318	MAHARASHTRA	AURANGABAD	ABD
319	MAHARASHTRA	BEED	BED
320	MAHARASHTRA	BHANDARA	BND
321	MAHARASHTRA	BULDHANA	BLD
322	MAHARASHTRA	CHANDRAPUR	CPR
323	MAHARASHTRA	DHULE	DHL
324	MAHARASHTRA	GADCHIROLI	GDL
325	MAHARASHTRA	GONDIA	GNA

Sl. No.	STATE	DISTRICT	CODE
326	MAHARASHTRA	GR. MUMBAI	BMC
327	MAHARASHTRA	HINGOLI	HIN
328	MAHARASHTRA	JALGAON	JLG
329	MAHARASHTRA	JALNA	JLN
330	MAHARASHTRA	KOLHAPUR	KLP
331	MAHARASHTRA	LATUR	LTR
332	MAHARASHTRA	NAGPUR	NGP
333	MAHARASHTRA	NANDED	NDD
334	MAHARASHTRA	NANDURBAR	NDB
335	MAHARASHTRA	NASIK	NSK
336	MAHARASHTRA	OSMANABAD	OBD
337	MAHARASHTRA	PARBHANI	PBN
338	MAHARASHTRA	PUNE	PNA
339	MAHARASHTRA	RAIGAD	RGD
340	MAHARASHTRA	RATNAGIRI	RTG
341	MAHARASHTRA	SANGLI	SNG
342	MAHARASHTRA	SATARA	STR
343	MAHARASHTRA	SINDHUDURGA	SDG
344	MAHARASHTRA	SOLAPUR	SLR
345	MAHARASHTRA	THANE	THN
346	MAHARASHTRA	WARDHA	WDH
347	MAHARASHTRA	WASIM	WSM
348	MAHARASHTRA	YUVATMAL	YTL
349	MANIPUR	BISHNUPUR	BPR
350	MANIPUR	CHANDEL	CDL
351	MANIPUR	CHURACHANDPUR	CCP
352	MANIPUR	EAST IMPHAL	EIM
353	MANIPUR	IMPHAL	IMP
354	MANIPUR	SENAPATI	SPT
355	MANIPUR	TAMENGLONG	TAM
356	MANIPUR	THOUBAL	TBL
357	MANIPUR	UKHRUL	UKL
358	MEGHALAYA	EAST GARO HILLS	EGH
359	MEGHALAYA	EAST KHASI HILL	EKH
360	MEGHALAYA	JAINTIA HILLS	JNH
361	MEGHALAYA	RI-BHOI	RIB
362	MEGHALAYA	SOUTH GARO HILLS	SGH
363	MEGHALAYA	WEST GARO HILLS	WGH
364	MEGHALAYA	WEST KHASI HILL	WKH
365	MIZORAM	AIZAWAL EAST	AZE
366	MIZORAM	AIZAWAL WEST	AZW
367	MIZORAM	CHAMPHAI	CHP
368	MIZORAM	KOLASIB	KLS
369	MIZORAM	LAWNGTLAI	LWN
370	MIZORAM	LUNGLEI	LLI
371	MIZORAM	MAMIT	MMT
372	MIZORAM	SAIHA	SIH

DISTRICT CODES

Sl. No.	STATE	DISTRICT	CODE
373	MIZORAM	SERCHHIP	SRP
374	NAGALAND	DIMAPUR	DPR
375	NAGALAND	KIPHIRE	KPR
376	NAGALAND	KOHIMA	KMA
377	NAGALAND	LONGLENG	LNG
378	NAGALAND	MOKOKCHUNG	MKK
379	NAGALAND	MON	MON
380	NAGALAND	PEREN	PER
381	NAGALAND	PHEK	PHK
382	NAGALAND	TUENSANG	TSG
383	NAGALAND	WOKHA	WOK
384	NAGALAND	ZUNHEBOTO	ZTO
385	ORISSA	ANGUL	AGL
386	ORISSA	BALASORE	BSR
387	ORISSA	BARGARH	BGH
388	ORISSA	BHADRAK	BRK
389	ORISSA	BOLANGIR	BOL
390	ORISSA	BOUDH	BOU
391	ORISSA	CUTTACK	CTK
392	ORISSA	DEOGARH	DGR
393	ORISSA	DHENKANAL	DNK
394	ORISSA	GAJAPATI	GJP
395	ORISSA	GANJAM	GJM
396	ORISSA	JAGATSINGHPUR	JSP
397	ORISSA	JAJPUR	JJP
398	ORISSA	JHARSUGUDA	JSG
399	ORISSA	KALAHANDI	KLH
400	ORISSA	KENDRAPARA	KDP
401	ORISSA	KEONJHAR	KNJ
402	ORISSA	KHURDA	KRD
403	ORISSA	KORAPUT	KRP
404	ORISSA	MALAKANGIRI	MKG
405	ORISSA	MAYURBHANJ	MYB
406	ORISSA	NAWARANGPUR	NRP
407	ORISSA	NAYAGARH	NYG
408	ORISSA	NUAPADA	NUP
409	ORISSA	PHULBANI	PLB
410	ORISSA	PURI	PUR
411	ORISSA	RAYAGARA	RYG
412	ORISSA	SAMBALPUR	SBP
413	ORISSA	SONEPUR	SNR
414	ORISSA	SUNDERGARH	SUN
415	PONDICHERRY	KARAIKAL	KKL
416	PONDICHERRY	MAHE	MAE
417	PONDICHERRY	PONDICHERRY	PNY
418	PONDICHERRY	YANAM	YNM
419	PUNJAB	AMRITSAR	ASR
420	PUNJAB	BHATINDA	BTD
421	PUNJAB	FARIDKOT	FRK
422	PUNJAB	FATEHGARH-SAHIB	FGS
423	PUNJAB	FEROZEPUR	FZP
424	PUNJAB	GURDASPUR	GDP
425	PUNJAB	HOSHIARPUR	HSP
426	PUNJAB	JALANDHAR	JLD
427	PUNJAB	KAPURTHALA	KPT
428	PUNJAB	LUDHIANA	LDN
429	PUNJAB	MANSA	MNS
430	PUNJAB	MOGA	MGA
431	PUNJAB	MUKTSAR	MKS
432	PUNJAB	NAWASHER	NSR
433	PUNJAB	PATIALA	PTL
434	PUNJAB	ROOPNAGAR	RPN
435	PUNJAB	SANGRUR	SAN
436	RAJASTHAN	AJMER	AJM
437	RAJASTHAN	ALWAR	ALW
438	RAJASTHAN	BANSWARA	BSW
439	RAJASTHAN	BARAN	BRN
440	RAJASTHAN	BARMER	BRM
441	RAJASTHAN	BHARATPUR	BTP
442	RAJASTHAN	BHILWARA	BLW
443	RAJASTHAN	BIKANER	BKN
444	RAJASTHAN	BUNDI	BDI
445	RAJASTHAN	CHITTAURGARH	CTG
446	RAJASTHAN	CHURU	CRU
447	RAJASTHAN	DAUSA	DSA
448	RAJASTHAN	DHAULPUR	DLP
449	RAJASTHAN	DUNGARPUR	DGP
450	RAJASTHAN	GANGANAGAR	GGN
451	RAJASTHAN	HANUMANGARH	HAN
452	RAJASTHAN	JAIPUR	JPR
453	RAJASTHAN	JAISALMER	JSM
454	RAJASTHAN	JALOR	JLR
455	RAJASTHAN	JHALAWAR	JLW
456	RAJASTHAN	JHUNJHUNU	JJN
457	RAJASTHAN	JODHPUR	JDP
458	RAJASTHAN	KARAULI	KRA
459	RAJASTHAN	KOTA	KTA
460	RAJASTHAN	NAGAUR	NGR
461	RAJASTHAN	PALI	PLI
462	RAJASTHAN	RAJSAMAND	RSM
463	RAJASTHAN	SAWAI MADHOPUR	SAW
464	RAJASTHAN	SIKAR	SKR
465	RAJASTHAN	SIROHI	SRH
466	RAJASTHAN	TONK	TNK

DISTRICT CODES

Sl. No.	STATE	DISTRICT	CODE
467	RAJASTHAN	UDAIPUR	UDP
468	SIKKIM	EAST DISTRICT	EST
469	SIKKIM	NORTH DISTRICT	NTH
470	SIKKIM	SOUTH DISTRICT	STH
471	SIKKIM	WEST DISTRICT	WST
472	TAMIL NADU	CHENNAI	CNI
473	TAMIL NADU	COIMBATORE	CBE
474	TAMIL NADU	CUDDALORE	CUD
475	TAMIL NADU	DHARMAPURI	DPI
476	TAMIL NADU	DINDIGUL	DGL
477	TAMIL NADU	ERODE	ERD
478	TAMIL NADU	KANCHEEPURAM	KPM
479	TAMIL NADU	KANYAKUMARI	KKM
480	TAMIL NADU	KARUR	KRR
481	TAMIL NADU	KRISHNAGIRI	KGI
482	TAMIL NADU	MADURAI	MDU
483	TAMIL NADU	NAGAPATTINAM	NAG
484	TAMIL NADU	NAMAKKAL	NAM
485	TAMIL NADU	NILGIRIS	NIL
486	TAMIL NADU	PERAMBALUR	PBR
487	TAMIL NADU	PUDUKOTTAI	PDK
488	TAMIL NADU	RAMANATHAPURAM	RAM
489	TAMIL NADU	SALEM	SLM
490	TAMIL NADU	SIVAGANGA	SVG
491	TAMIL NADU	THANJAVUR	TNJ
492	TAMIL NADU	THENI	TNI
493	TAMIL NADU	THIRUVALLUR	TLR
494	TAMIL NADU	THIRUVANNAMALAI	TVM
495	TAMIL NADU	THIRUVARUR	TVR
496	TAMIL NADU	TIRUCHIRAPALLI	TRY
497	TAMIL NADU	TIRUNELVELI	TNV
498	TAMIL NADU	TUTICORIN	TTC
499	TAMIL NADU	VELLORE	VLR
500	TAMIL NADU	VILLUPURAM	VPM
501	TAMIL NADU	VIRUDHUNAGER	VRD
502	TRIPURA	DHALAI	DLI
503	TRIPURA	TRIPURA NORTH	TRN
504	TRIPURA	TRIPURA SOUTH	TRS
505	TRIPURA	TRIPURA WEST	TRW
506	UTTAR PRADESH	AGRA	AGR
507	UTTAR PRADESH	ALIGARH	ALG
508	UTTAR PRADESH	ALLAHABAD	AHB
509	UTTAR PRADESH	AMBEDKAR NAGAR	ABN
510	UTTAR PRADESH	AURAIYA	AUR
511	UTTAR PRADESH	AZAMGARH	AZG
512	UTTAR PRADESH	BADAUN	BAD
513	UTTAR PRADESH	BADOHI	BDH
514	UTTAR PRADESH	BAGHPAT	BGT
515	UTTAR PRADESH	BAHRAICH	BRC
516	UTTAR PRADESH	BALLIA	BAL
517	UTTAR PRADESH	BALRAMPUR	BRP
518	UTTAR PRADESH	BANDA	BNA
519	UTTAR PRADESH	BARABANKI	BBK
520	UTTAR PRADESH	BAREILLY	BRL
521	UTTAR PRADESH	BASTI	BST
522	UTTAR PRADESH	BIJNOR	BJN
523	UTTAR PRADESH	BULANDSHAHAR	BLS
524	UTTAR PRADESH	CHANDAULI	CND
525	UTTAR PRADESH	CHITRAKOOT	CKT
526	UTTAR PRADESH	DEORIA	DOR
527	UTTAR PRADESH	ETAH	ETA
528	UTTAR PRADESH	ETAWAH	ETW
529	UTTAR PRADESH	FAIZABAD	FAI
530	UTTAR PRADESH	FARRUKHABAD	FKB
531	UTTAR PRADESH	FATEHPUR	FTP
532	UTTAR PRADESH	FEROZABAD	FER
533	UTTAR PRADESH	GAUTAM BUDH NAGAR	GBN
534	UTTAR PRADESH	GHAZIABAD	GZA
535	UTTAR PRADESH	GHAZIPUR	GZP
536	UTTAR PRADESH	GONDA	GND
537	UTTAR PRADESH	GORAKHPUR	GRP
538	UTTAR PRADESH	HAMIRPUR	HMP
539	UTTAR PRADESH	HARDOI	HDO
540	UTTAR PRADESH	HATHRAS	HTR
541	UTTAR PRADESH	JALAUN	JAL
542	UTTAR PRADESH	JAUNPUR	JNP
543	UTTAR PRADESH	JHANSI	JNS
544	UTTAR PRADESH	JYOTIBA PHULE NAGAR	JPN
545	UTTAR PRADESH	KANNAUJ	KNA
546	UTTAR PRADESH	KANPUR(DEHAT)	KPD
547	UTTAR PRADESH	KANPUR(NAGAR)	KPN
548	UTTAR PRADESH	KAUSHAMBI	KSM
549	UTTAR PRADESH	KHERI	KRI
550	UTTAR PRADESH	KUSHINAGAR	KSN
551	UTTAR PRADESH	LALITPUR	LLP
552	UTTAR PRADESH	LUCKNOW	LNO
553	UTTAR PRADESH	MAHARAJGANJ	MHG
554	UTTAR PRADESH	MAHOBA	MHB
555	UTTAR PRADESH	MAINPURI	MAI
556	UTTAR PRADESH	MATHURA	MTR
557	UTTAR PRADESH	MAU	MAU
558	UTTAR PRADESH	MEERUT	MRT
559	UTTAR PRADESH	MIRZAPUR	MZP
560	UTTAR PRADESH	MORADABAD	MRD

Annexure-2

DISTRICT CODES

Sl. No.	STATE	DISTRICT	CODE
561	UTTAR PRADESH	MUZAFFARNAGAR	MZN
562	UTTAR PRADESH	PILIBHIT	PIL
563	UTTAR PRADESH	PRATAPGARH	PTG
564	UTTAR PRADESH	RAEBARELI	RBL
565	UTTAR PRADESH	RAMPUR	RMP
566	UTTAR PRADESH	SANT KABIR NAGAR	SKN
567	UTTAR PRADESH	SHAHARANPUR	SHP
568	UTTAR PRADESH	SHAHJAHANPUR	SHA
569	UTTAR PRADESH	SIDDHARTHNAGAR	SDN
570	UTTAR PRADESH	SITAPUR	STP
571	UTTAR PRADESH	SONBHADRA	SBD
572	UTTAR PRADESH	SRAWASTI	SRW
573	UTTAR PRADESH	SULTANPUR	SUL
574	UTTAR PRADESH	UNNAO	UNN
575	UTTAR PRADESH	VARANASI	VRN
576	UTTARANCHAL	ALMORA	AMR
577	UTTARANCHAL	BAGESHWAR	BGW
578	UTTARANCHAL	CHAMOLI	CML
579	UTTARANCHAL	CHAMPAWAT	CPT
580	UTTARANCHAL	DEHARADUN	DDN
581	UTTARANCHAL	GARHWAL	GRL
582	UTTARANCHAL	HARDWAR	HRD
583	UTTARANCHAL	NAINITAL	NNT
584	UTTARANCHAL	PITHORAGARH	PRG
585	UTTARANCHAL	RUDRAPRAYAG	RPG
586	UTTARANCHAL	TEHRI GARHWAL	TGL
587	UTTARANCHAL	UDHAMSINGH NAGAR	UDS
588	UTTARANCHAL	UTTAR KASHI	UKS
589	WEST BENGAL	24-PARGANAS NORTH	NPG
590	WEST BENGAL	24-PARGANAS SOUTH	SPG
591	WEST BENGAL	BANKURA	BKR
592	WEST BENGAL	BARDHAMAN	BDN
593	WEST BENGAL	BIRBHUM	BBM
594	WEST BENGAL	CALCUTTA	CAL
595	WEST BENGAL	DAKSHIN DINAJPUR	DDJ
596	WEST BENGAL	DARJILING	DJL
597	WEST BENGAL	HOWRA	HRA
598	WEST BENGAL	HUGLI	HGL
599	WEST BENGAL	JALPAIGURI	JPG
600	WEST BENGAL	KOCH BIHAR	KBR
601	WEST BENGAL	MALDAH	MLD
602	WEST BENGAL	MEDINIPUR	MNP
603	WEST BENGAL	MURSHIDABAD	MBD
604	WEST BENGAL	NADIA	NDA
605	WEST BENGAL	PURULIA	PRL
606	WEST BENGAL	TAMLUK	TML
607	WEST BENGAL	UTTAR DINAJPUR	UDJ

Table-1

Example of the patient coding scheme for AES Cases of one District -Gorakhpur in Uttar Pradesh

Country Code	Disease Code	STATE	States Code	Name of Districts	year of onset	Districts Code	Gorakhpur District-Code 32 PHCs/CHCs/MC	PHCs/CHCs/Medical Colleges etc.	PHCs/CHCs/MC Code	Patients Code
IND	JE	Uttar	UP	Agra		1			1	IND-AES-UP-32-01-001
		Pradesh		Aligarh		2		Belghat	2	
				Allahabad		3		Bhatth	3	
				Ambedkar nagar		4		Brahmpur	4	
				Auraiya		5	PHCs	Charganva	5	
				Azamgarh		6		Derava	6	
				Badaun		7		Gagha	7	
				Badohi		8		Jangal koria	8	
				Baghpat		9		Khajni	9	
				Bahraich		10		Kodiram	10	
				Ballia		11		Sardarnagar	11	
				Balrampur		12		Bansgavn	12	
				Banda		13		Bahralganj	13	
				Barabanki		14		Chourichoura	14	
				Bareilly		15	CHCs	Goala	15	
				Basti		16		Harnai	16	
				Bijnor		17		Pali	17	
				Bulandshahar		18		Pipraich	18	
				Chandauli		19		Kampion	19	
				Chitrakoot		20		Sahanjava	20	
				Deoria		21	MC	District Hospital Gpur	21	IND-AES-UP-32-21-001
				Etah		22	Pvt.	BRD Med.College	22	
				Etawah		23	Hospital	Pvt.Hospital-1	23	
				Faizabad		24		Pvt.Hospital-2	24	
				Farrukhabad		25		Pvt.Hospital-3	25	
				Fatehpur		26			26	
				Ferozabad		27			27	
				Gautam Budh Nagar		28			28	
				Gahaziabda		29			29	
				Ghazipur		30			30	
				Gonda		31			31	
				Gorakhpur		**32**			32	
				Hamirpur		33			33	
				Hardoi		34			34	
				Hathras		35			35	
				Jalaun		36			36	
				Jaunpur		37			37	

				Jhansi		38			38	
				Jyotiba Phule Nagar		39			39	
				Kannauj		40			40	
				Kanpur(Dehat		41			41	
				Dkanpur(Nagar)		42			42	
				Kaushambi		43			43	
				Kheri		44			44	
				Kushinagar		45			45	
				Lalitpur		46			46	
				Lucknow		47			47	
				Maharajganj		48			48	
				Mahoba		49			49	
				Mainpuri		50			50	
				Mathura		51			51	
				Mau		52			52	
				Meerut		53			53	
				Mirzapur		54			54	
				Moradabad		55			55	
				Muzaffarnagar		56			56	
				Pilibhit		57			57	
				Pratapgarh		58			58	
				Raebareli		59			59	
				Rampur		60			60	
				Sant Kabir Nagar		61			61	
				Shaharanpur		62			62	
				Shahjahanpur		63			63	
				Siddharthnagar		64			64	
				Sitapur		65			65	
				Sonbhadra		66			66	
				Srawasti		67			67	
				Sultanpur		68			68	
				Unnao		69			69	
				Varanasi		70			70	

MC=Medical College

* Note that the PHCs/CHCs/Medical College etc in district Gorakhpur should be arranged in alphabetical order,