Issue - 11 Vol. 1

Disease Alert
प्रकोप चेतावनी

A monthly Surveillance Report from Integrated Disease Surveillance Programme
National Health Mission

November 2016

Inside

Malaria Outbreak, Pal sub-centre, District Pratapgarh, Rajasthan September - October 2016

Background

Malaria, a vector-borne disease transmitted through the bites of Anopheles mosquitoes, is endemic in many parts of the world. According to the latest WHO data, worldwide, an estimated 4,38,000 people died of malaria in 2015. Almost all malaria deaths are caused by Plasmodium falciparum. In India Plasmodium vivax have wide geographic distribution but most cases are of P. falciparum. Other species found in India are Plasmodium malariae and Plasmodium ovale. As per National Vector Borne Disease Control (NVBDCP), total malaria cases for India in 2014 were 1.10 million with 561 deaths. On 22 September 2016, Chief Medical and Health Officer (CMHO) Pratapgarh district, Rajasthan, reported outbreak of malaria at 8 villages of sub-centre Pal under PHC Gyaspur (Figure 1). These villages are located in Sita Mata wildlife sanctuary area which is a protected forest area covering about 423 square kilometres (sq kms). The CSU-IDSP and a team from National Centre for Disease Control (NCDC), including two Epidemic Intelligence Service (EIS) officers Dr Prasoon Sheoran and Dr C. S Moghe, and entomologists joined the district team's outbreak investigation on 2 November 2016 to determine risk factors and to recommend preventive measures.

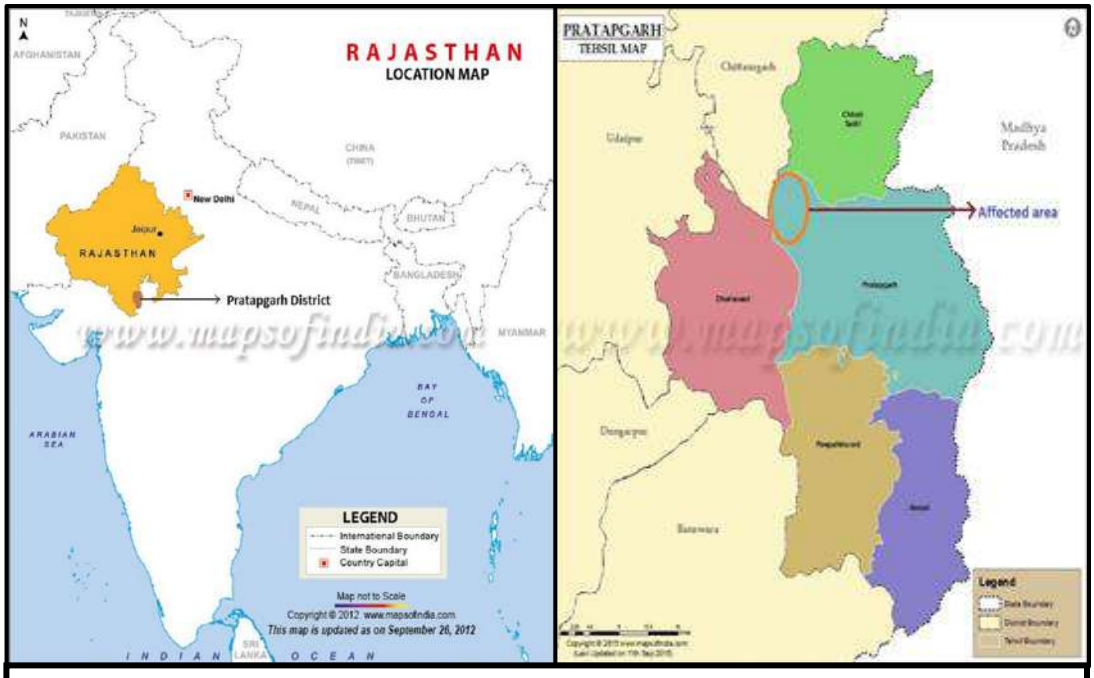


Fig. 1: Location of affected area in Pratapgarh District of Rajasthan.

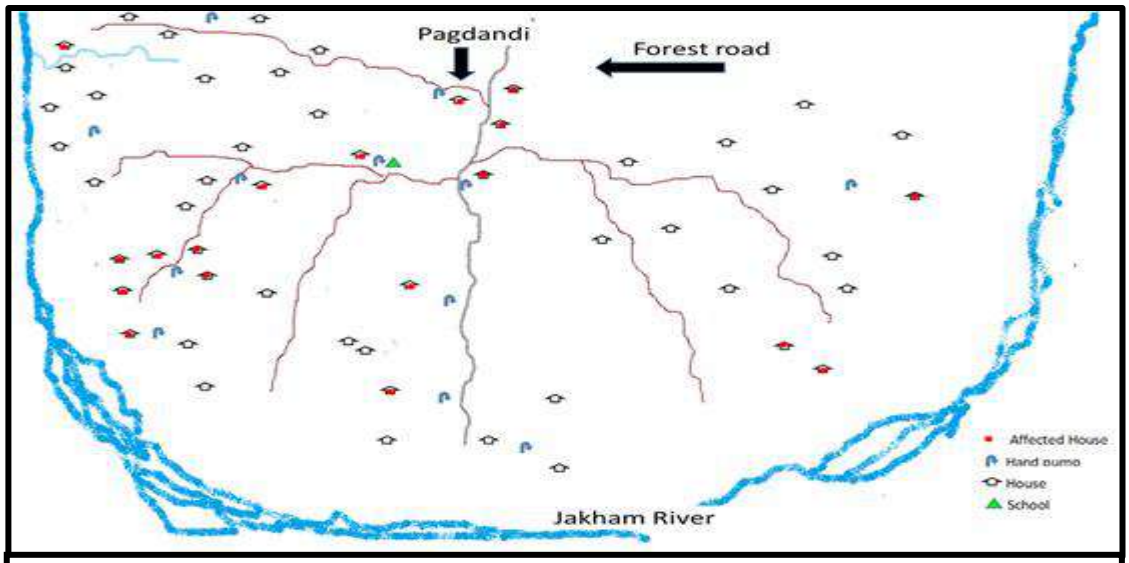


Fig. 2 Spot map of Balaliya village, Pratapgarg District, Rajasthan.

Objectives

a. To study the epidemiological characteristics of the outbreak.
b. To determine potential risk factors associated with the outbreak
c. To propose recommendations for prevention and control of the outbreak

Methods

a. Case finding

Case definition

Suspect: A suspect case of malaria was defined as acute febrile illness in resident of villages under Pal sub-centre of Rural Pratapgarh block between 1 September and 31 October 2016**.**
Confirm: Smear positive suspected case

Surveillance: Case search using enhanced passive surveillance at Pal sub-centre. OPD registers and malaria registers (NVBDCP) were used to prepare the line list of cases

b. Lab Investigations:

Blood slides were prepared for all suspected cases by the health workers at the health camps conducted at villages under Pal sub-centre area. Blood slides were examined by the lab technician for presence of malarial parasite at the Gyaspur PHC.

c. Environmental Methods:

The team collected weather data from the district Collector office for the rainfall and temperature.

d. **Entomological investigation**:

The team conducted an entomological survey from 19-30 September 2016 by collecting adult mosquitoes and larvae from 3 out of 4 most affected villages (Balaliya, Richdi, Mandkala and Pal) during outbreak. Total 12 sites in these villages were examined as per convenient sampling. The team also conducted a survey on 4 November 2016 in the villages of Pal sub centre to find potential sites for mosquito larvae breeding.

e. **Outbreak confirmation**

The team interviewed the CMHO, District Surveillance Officer, and District Epidemiologist of District Pratapgarh, ANM and health workers of Pal sub-centre. Data collected for malaria cases as per active and passive surveillance from National Vector Borne Disease Control Program (NVBDCP) to compare reporting of malaria cases in 2013-2016. The team used MS-Excel software for data entry and analysis.

f. Health facilities and intervention

The team assessed number of health facilities and staff in the area and health interventions by the district health authorities in the form of health camps, residual spraying, etc.

Investigation findings

a. Descriptive epidemiology:

The team identified 523 suspect cases and out these 198 were confirmed. Cases began reporting to Pal sub-centre on 1 September with maximum cases reported on 22 September 2016. Cases declined after 22 September (Figure 3). Median age of confirmed malaria cases was 12 years (3 months-75 years). Male constitute 55% (109) of smear positive cases. Most affected village under Pal sub-centre was Balaliya with API of 89, followed by Pal (44) and Madkala (41) (Table 1).

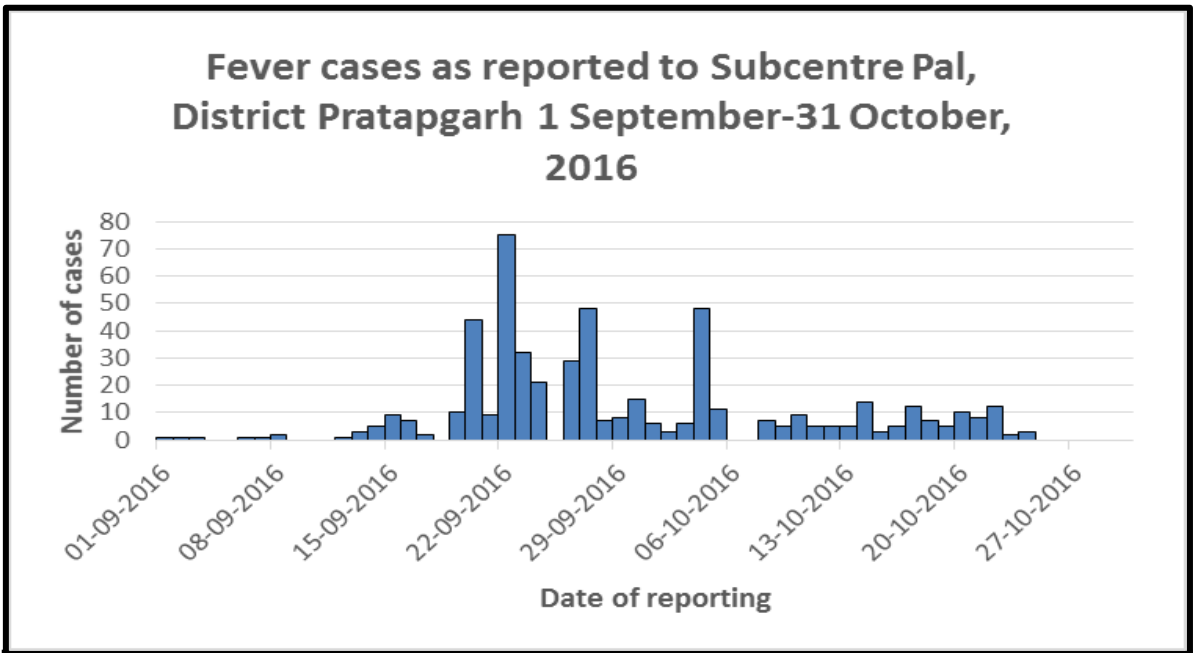


Fig. 3 Number of suspected malaria cases (Fever) reporting to sub-centre Pal (N=539).

Table 1: Attack rate and API in villages served by sub-centre Pal.

S.No.	Village	Number of cases	Population	Attack rate*	API*
1	Balaliya	47	529	8.9	89
2	Pal	57	1283	4.4	44
3	Mad kala	55	1348	4.1	41
4	Richhadi Pal	16	578	2.8	28
5	Patia Pal	9	495	1.8	18
6	Rana	1	922	0.1	1
7	Khalel	5	484	1	10
8	Talay Pal	8	790	1	10
	Total	198	6429	3	30
	*As per data till 31 October 2016.				

b. Laboratory investigation

For the outbreak slide positivity rate (SPR) was 38% (198/523). Slides were P. falciparum positive in 89% (177/198), P. vivax in 7% (13/198) and mixed infection positive in 4% (8/198) slides.

c. Environmental investigation

Outbreak occurred in sparsely populated area of 100 sq kms within Sita mata wild life sanctuary during September-October 2016. Affected area has thick vegetation in hilly terrain. River Jakham flows within the sanctuary with many tributaries draining the surrounding area. Till October 2016, 1256 mm rainfall was recorded this year. Average rainfall for August month since last 8 years is 403 mm and this year it was 615 mm (Figure 4). Average temperature recorded during August 2016 was 25.50 Celsius.

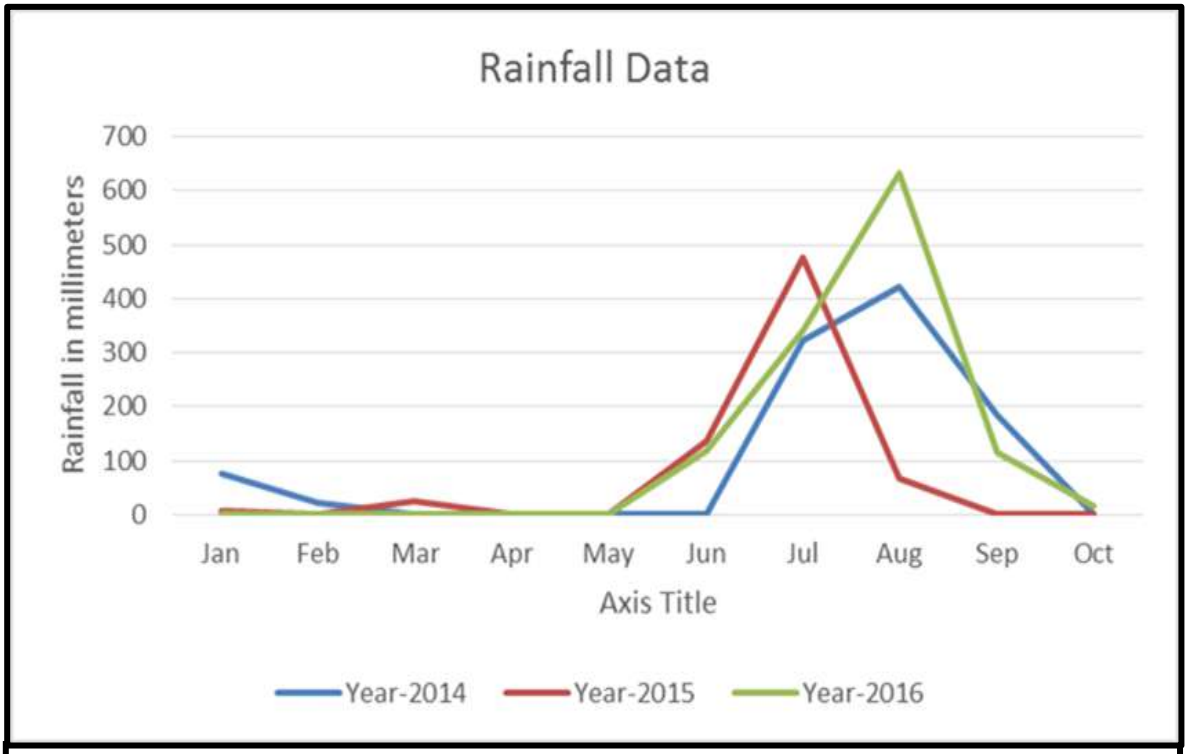


Fig. 4 Rainfall comparison in District Pratapgarh for years 2014, 2015 and 2016.

d. Entomology investigation

Anopheles larvae were found in all 12 sites (Table 2) by the district entomology team. Maximum larvae density of 26.2 was recorded at hand pump near Pal sub-centre. There were 150 hand pumps in the Pal area with no proper drainage plan and was a potential mosquito larval breeding site (Pic. 1). Besides this there were many natural (Pic. 2) mosquito larvae breeding sites in the area due to topography and heavy rainfall in the area.

Table 2: Entomology survey by district IDSP team

S. No	Area/site visited	Month (2016)	Adult An. culicifacies density (PMH)	Anopheles larval density Anopheles/dip (LAR)
1	Pal village	September	13	---
2	Richadi village	September	3.5	---
3	Balaliya village	September	14.5	---
4	Pal school	September	---	9.6

5	Pal sub-centre hand pump	September	---	26.2
6	Richadi sarpanch house	September	---	7
7	Richadi village hand pump 1	September	---	8.2
8	Richadi village hand pump 2	September	---	21
9	Cattle foot mark as on Richadi Balaliya road	September	---	24.8

Pic 1: A hand pump in Pal area with open drainage as on 4 November, 13:07

Pic 2: A natural water body in Pal area as on 4 November, 15:32

e. NVBDCP parameters

Data from NVBDCP was also used to confirm the outbreak. All parameters for 2016 for Pal sub centre were high. For 2016 total blood slide collected (BSC) were 890, annual blood examination rate (ABER) 37.15, slide positivity rate (SPR) as 22.2 % and annual parasite index (API) of 82.64 (Table 3).

Table 3: Comparison of NVBDCP data for years 2013-2016				
NVBDCP Parameters (Year)	BSC	ABER	SPR	API
2013	520	21.7	0.5%	1.25
2014	612	25.5	0.4%	1.25
2015	209	8.7	0.4%	0.4
2016*	890	37.15	22.2%	82.64
*Data till 31 October 2016				

f. Health facilities and interventions

There are 3 sub-centres in the Sita mata forest area serving about 8500 population. HR position at all three sub-centre were vacant for about six months before the start of outbreak. After start of outbreak one ANM was posted at one of the three sub-centre (Pal) on temporary basis (deputation) by the district authorities. Following the start of the outbreak a team from district camped in the area, conducted house to house survey and provided medicine to confirmed malaria cases till the outbreak was controlled. There was no residual spray by the district authorities in last 3 years as the API was reported to be <2.

Conclusion

Increase in acute febrile illness, reported from 8 villages of Pal sub centre from 14 September onwards was due to Malaria outbreak. Plasmodium falciparum was predominant agent and was detected in 177 (89%) of slide positive malaria cases. Vector for Plasmodium falciparum was Anopheles and species was predominantly An. culicifacies. Pal sub-centre is located in Sita mata wildlife sanctuary and health interventions are not adequate due to its geography, absence of road networks and human resource issues in sub centres. In 2016, rainfall in excess of 65% than the previous year occurred. This together with no residual spray in the village in last three years lead to increased mosquito breeding in the area. There is active migration of person going out for labour work in Gujarat cities which might have led to introduction of agent in the vector-human cycle in to area and heavy breeding of mosquitoes help in spread of the plasmodium. The outbreak was controlled due to active health interventions by the district authorities from 19-30 September 2016.

Recommendations

Short term recommendations

a) Use of Pyrethrum Spray for indoor in the villages during pre and post monsoon by the health department.
b) Use Gambusia fish as a biological control for larvae control in permanent water bodies with the help of fishery department.
c) Use Malaria larvicidal oil (MLO) & Temiphos at all potential larvae breeding sites around hand pumps pre and post monsoon by the Health Department.
d) Supply mosquito nets to residents in the affected area in adequate numbers with proper instructions.
e) Do IEC activities for residents for using full sleeves clothes during the outbreak and regular change of water in cattle
f) Do presumptive and radical treatment of cases as per NVBDCP guidelines.

Long term recommendations

a) Call a meeting with the village panchayat during the pre- monsoon period and drainage water should be prevented from accumulating near hand pumps in 8 villages of Pal sub-centre during rainy season. Train local health practitioner to treat suspected malaria cases as per standard protocol.
b) Promote use of bed nets during sleep at night, through IEC and behavioural changes

Surveillance data of Enteric Fever, Acute Diarrhoeal Disease, Viral Hepatitis A & E, Dengue Leptospirosis and Chikungunya During November 2014-2016*

* Data extracted from IDSP Portal (www.idsp.nic.in) as on 02 March, 2017.

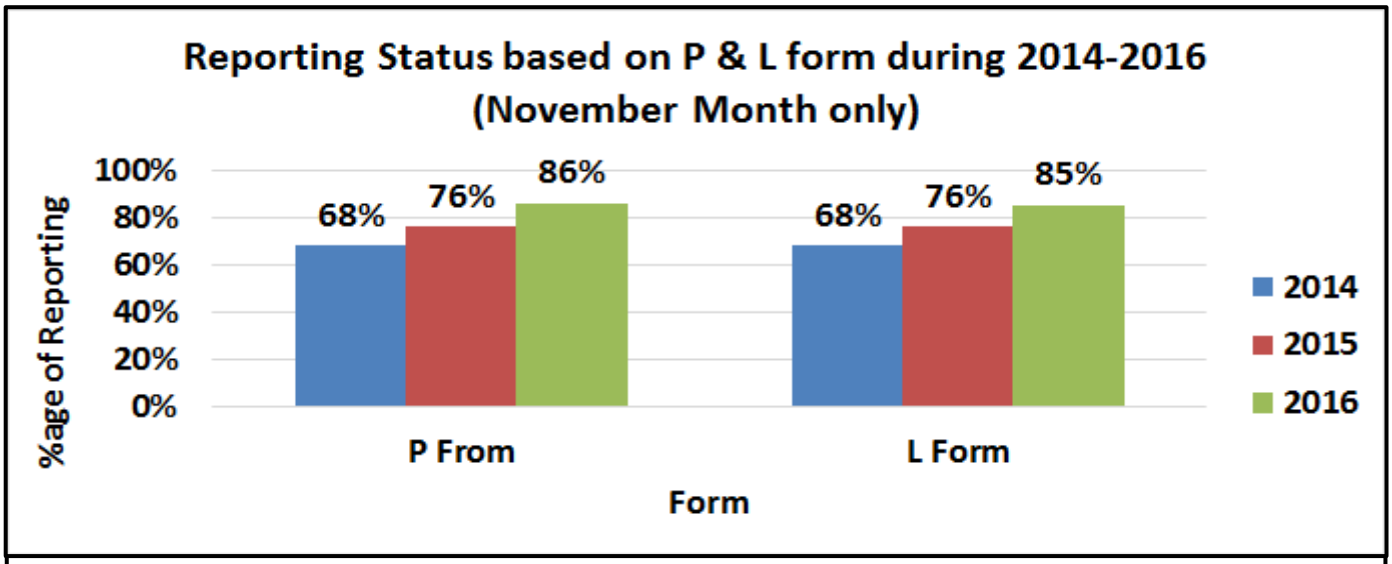


Fig. 5: Reporting Status based on P & L form during November 2014-2016

As shown in fig 5, in November 2014, 2015 and 2016, the 'P' form reporting percentage (i.e. % RU reporting out of total in P form) was 68 %, 76% and 86% respectively across India, for all disease conditions reported under IDSP in P form. Similarly, L form reporting percentage was 68%, 76% and 85% respectively across India for all disease conditions, during the same month for all disease conditions reported under IDSP in L form. The completeness of reporting has significantly increased over the years in both P and L form, thereby improving the quality of surveillance data.

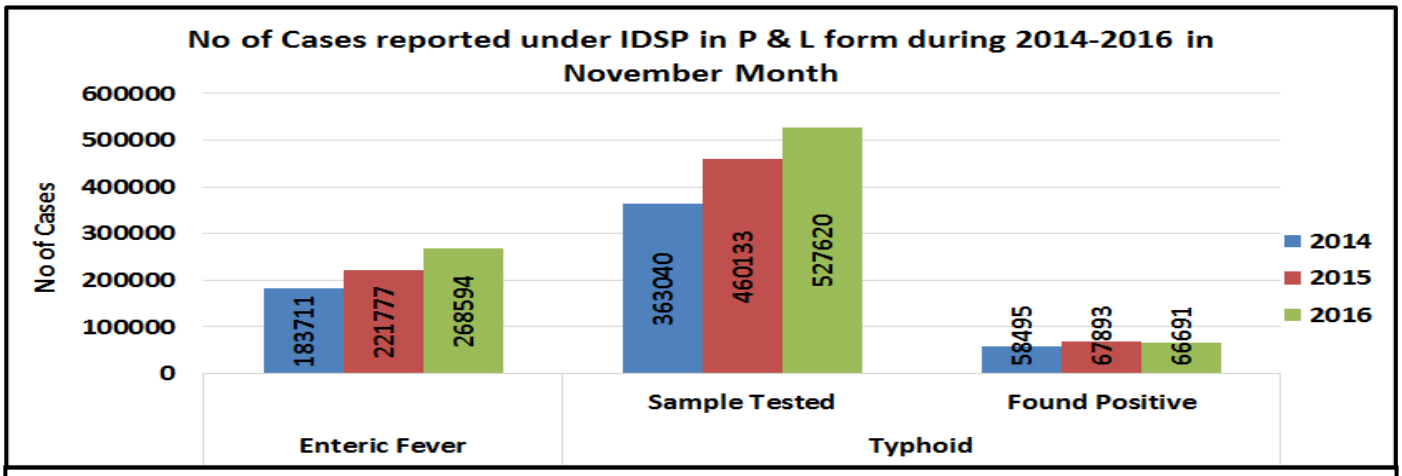


Fig. 6: No. of Enteric Fever Cases reported under P & L form during November 2014-2016

As shown in fig 6, number of presumptive enteric fever cases, as reported by States/UTs in 'P' form was 183711 in November 2014; 221777 in November 2015 and 268594 in November 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in November 2014; 363040 samples were tested for Enteric fever, out of which 58495 were found positive. In November 2015; out of 460133 samples, 67893 were found to be positive and in November 2016, out of 527620 samples, 66691 were found to be positive.

Sample positivity has been 16.1%, 14.8% and 12.8% in November month of 2014, 2015 & 2016 respectively.

Limitation: The test by which above mentioned samples were tested could not be ascertained, as currently there is no such provision in L form.

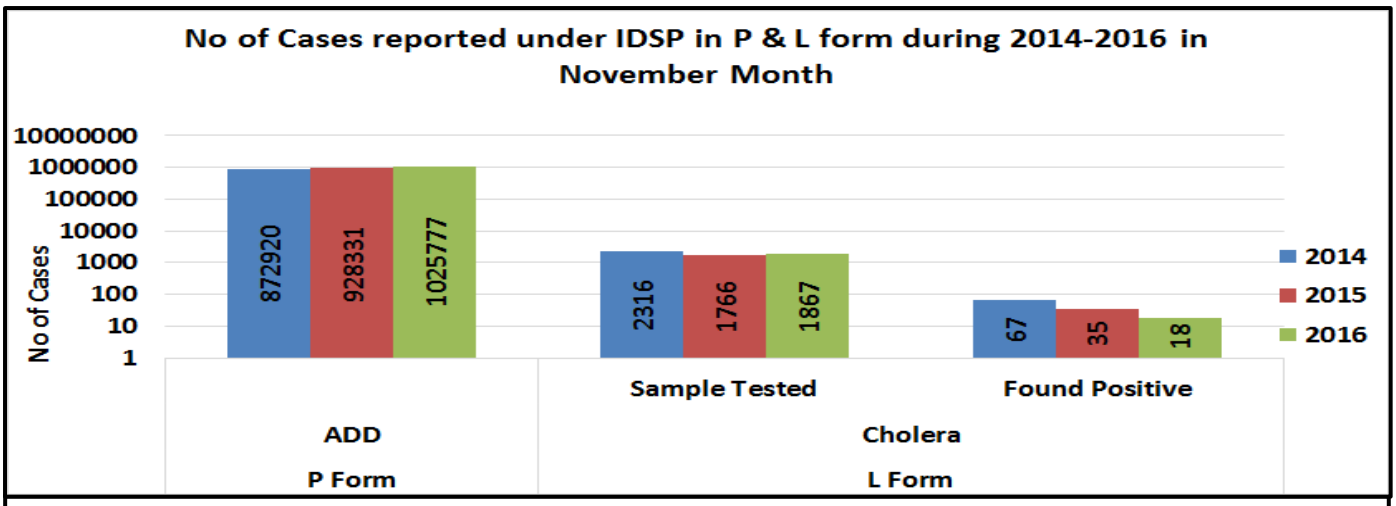


Fig. 7: No. of ADD Cases reported under IDSP in P form & Lab confirmed Cholera cases in L form during November 2014-2016

As shown in fig 7, number of Acute Diarrhoeal Disease cases, as reported by States/UTs in 'P' form was 872920 in November 2014; 928331 in November 2015 and 1025777 in November 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in November 2014, 2316 samples were tested for Cholera out of which 67 tested positive; in November 2015, out of 1766 samples, 35 tested positive for Cholera and in November 2016, out of 1867 samples, 18 tested positive.

Sample positivity of samples tested for Cholera has been 2.9%, 2.0% and 1.0% in November month of 2014, 2015 & 2016 respectively.

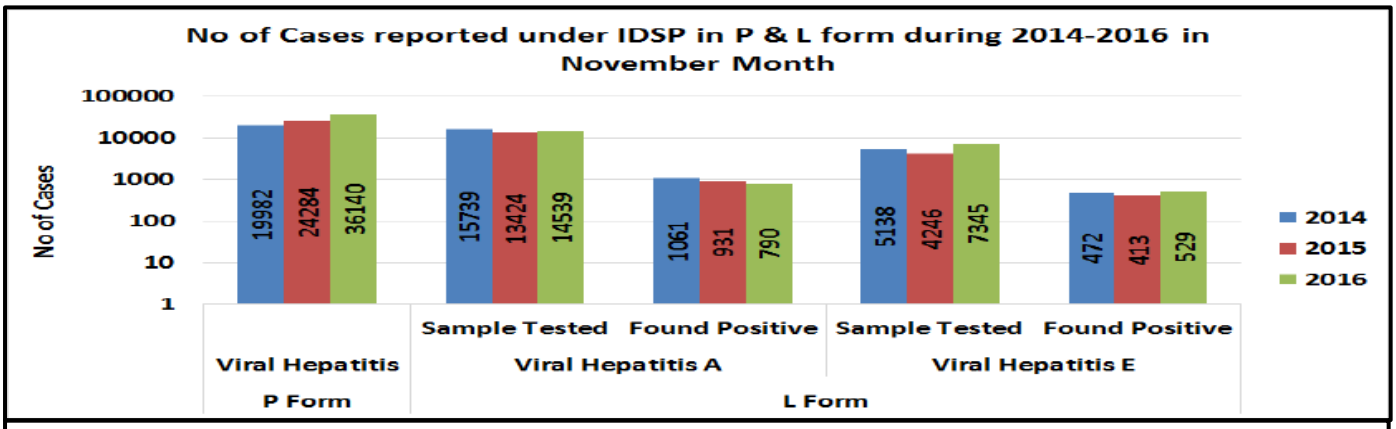


Fig. 8: No of Viral Hepatitis Cases reported under IDSP in P form & Viral Hepatitis A & E cases reported under L form during November 2014-2016

As shown in fig 8, the number of presumptive Viral Hepatitis cases was 19982 in November 2014, 24284 in November 2015 and 36140 in November 2016. These presumptive cases were diagnosed on the basis of case definitions provided under IDSP.

As reported in L form for Viral Hepatitis A, in November 2014; 15739 samples were tested out of which 1061 were found positive. In November 2015; out of 13424 samples, 931 were found to be positive and in November 2016, out of 14539 samples, 790 were found to be positive.

Sample positivity of samples tested for Hepatitis A has been 6.7%, 6.9% and 5.4% in November month of 2014, 2015 & 2016 respectively.

As reported in L form for Viral Hepatitis E, in November 2014; 5138 samples were tested out of which 472 were found positive. In November 2015; out of 4246 samples, 413 were found to be positive and in November 2016, out of 7345 samples, 529 were found to be positive.

Sample positivity of samples tested for Hepatitis E has been 9.2%, 9.7% and 7.2% in November month of 2014, 2015 & 2016 respectively.

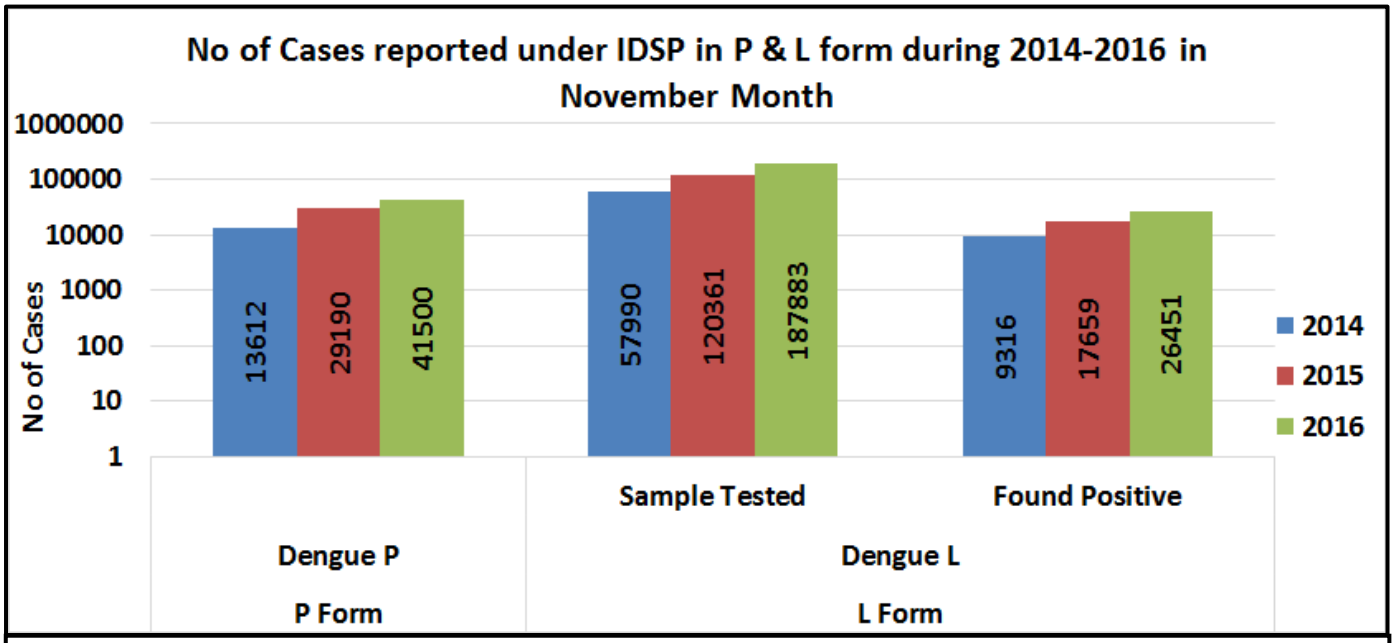


Fig. 9: No. of Dengue Cases reported under IDSP in P & L form during November 2014-2016

As shown in fig 9, number of presumptive Dengue cases, as reported by States/UTs in 'P' form was 13612 in November 2014; 29190 in November 2015 and 41500 in November 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in November 2014; 57990 samples were tested for Dengue, out of which 9316 were found positive. In November 2015; out of 120361 samples, 17659 were found to be positive and in November 2016, out of 187883 samples, 26451 were found to be positive.

Sample positivity of samples tested for Dengue has been 16.1%, 14.7% and 14.1% in November month of 2014, 2015 & 2016 respectively.

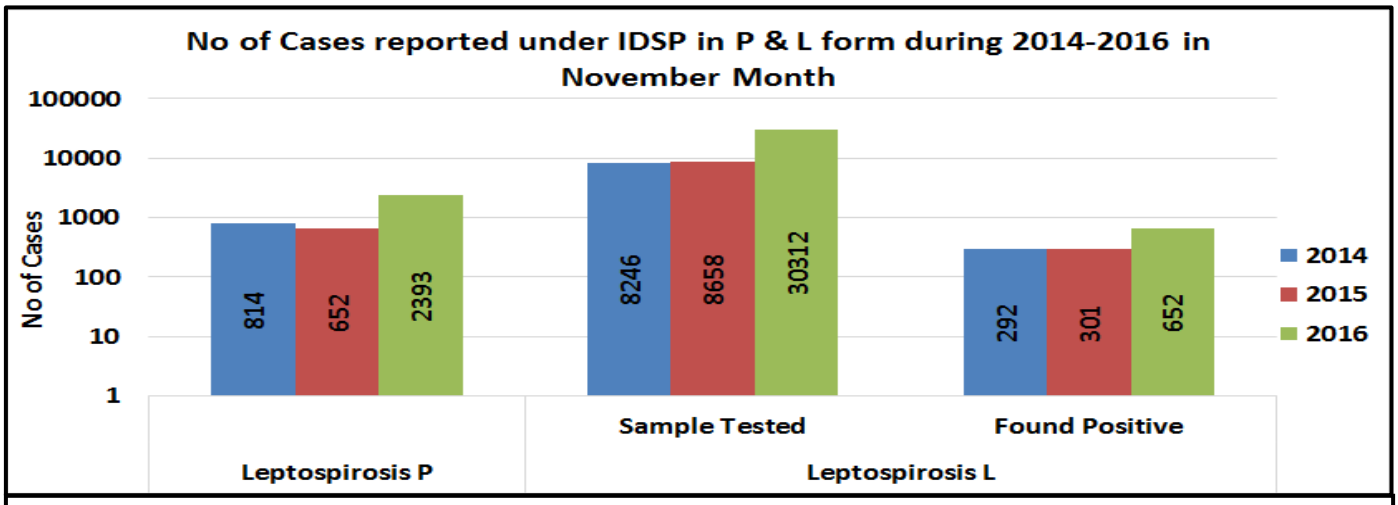


Fig. 10: No. of Leptospirosis Cases reported under IDSP in P & L form during November 2014-2016

As shown in fig 10, number of presumptive Leptospirosis cases, as reported by States/UTs in 'P' form was 814 in November 2014; 652 in November 2015 and 2393 in November 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in November 2014; 8246 samples were tested for Leptospirosis, out of which 292 were found positive. In November 2015; out of 8658 samples, 301 were found to be positive and in November 2016, out of 30312 samples, 652 were found to be positive.

Sample positivity of samples tested for Dengue has been 3.5%, 3.5% and 2.2% in November month of 2014, 2015 & 2016 respectively.

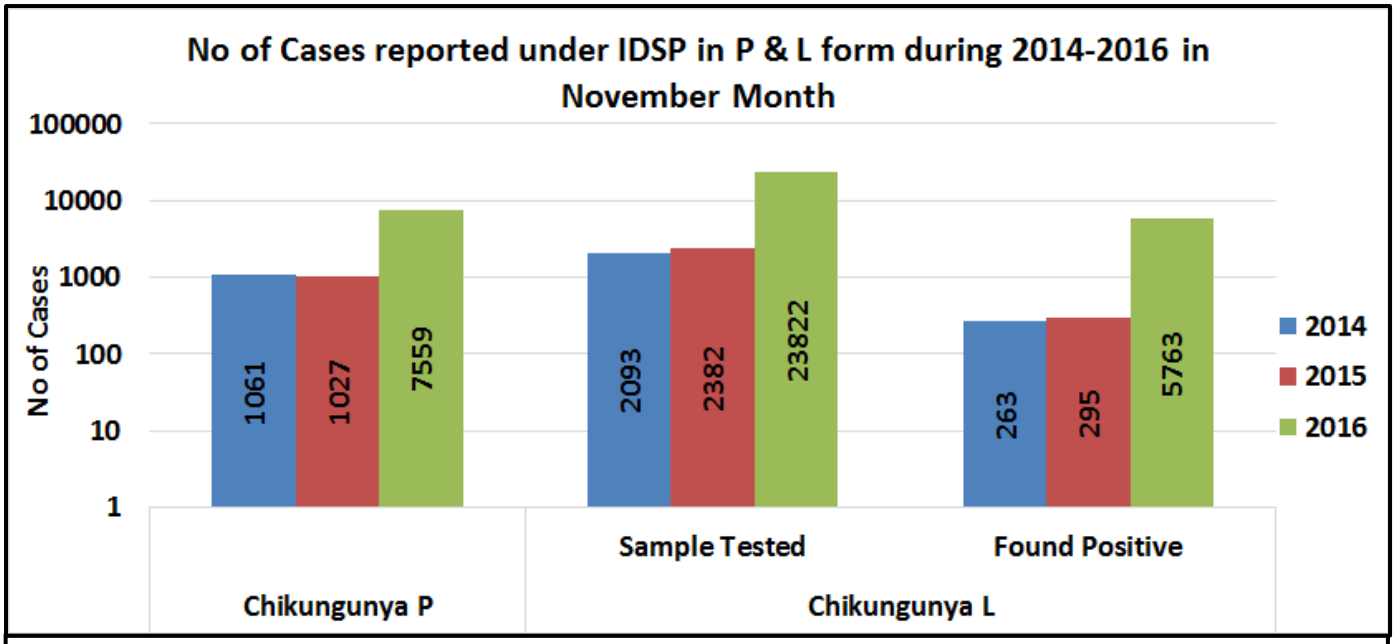


Fig. 11: No. of Chikungunya Cases reported under IDSP in P & L form during November 2014-2016

As shown in fig 11, number of presumptive Chikungunya cases, as reported by States/UTs in 'P' form was 1061 in November 2014; 1027 in November 2015 and 7559 in November 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in November 2014; 2093 samples were tested for Chikungunya, out of which 263 were found positive. In November 2015; out of 2382 samples, 295 were found to be positive and in November 2016, out of 23822 samples, 5763 were found to be positive.

Sample positivity of samples tested for Chikungunya has been 12.6%, 12.4% and 24.2% in November month of 2014, 2015 & 2016 respectively.

Fig 12: State/UT wise P form completeness % for November 2016

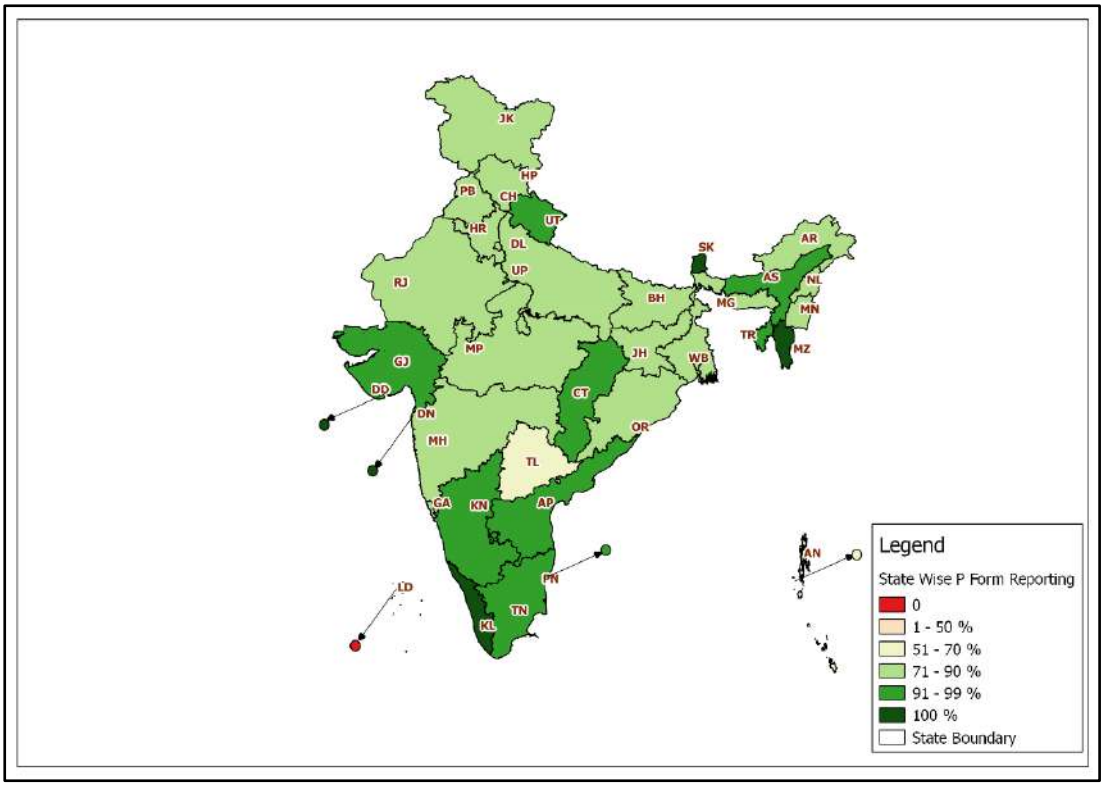


Fig 13: State/UT wise L form completeness % for November 2016

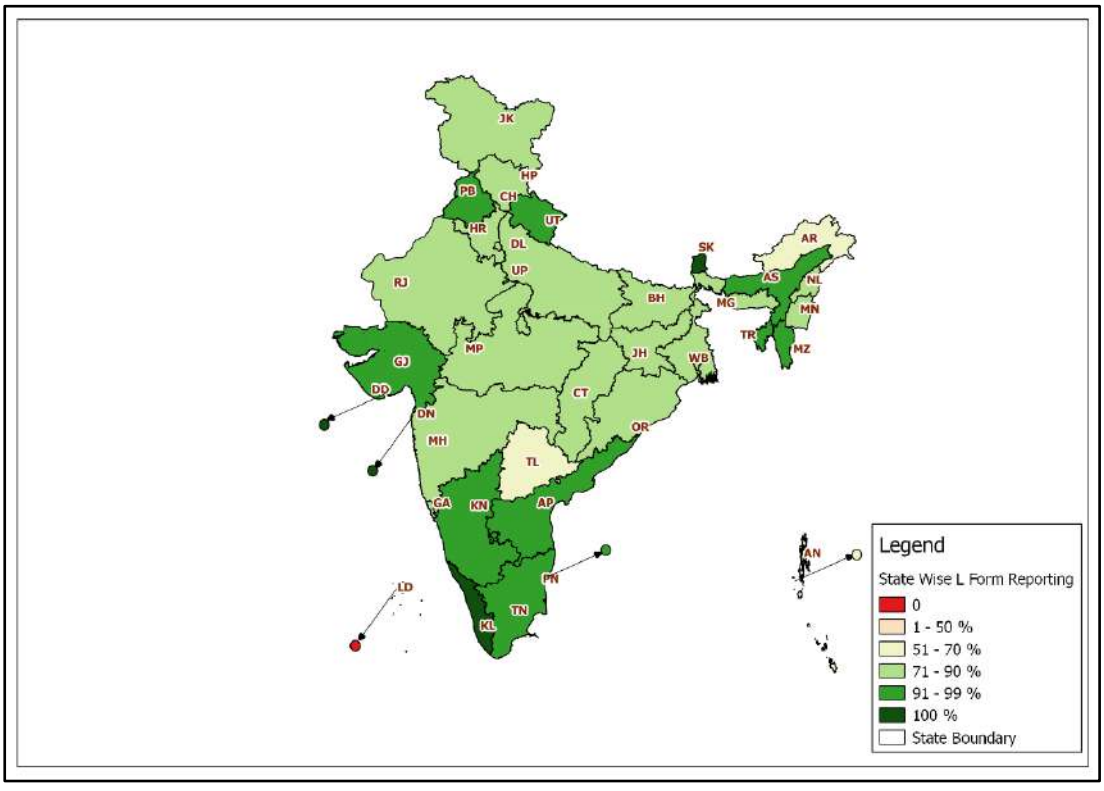


Fig 14: State/UT wise Presumptive Enteric fever cases and outbreaks for November 2016

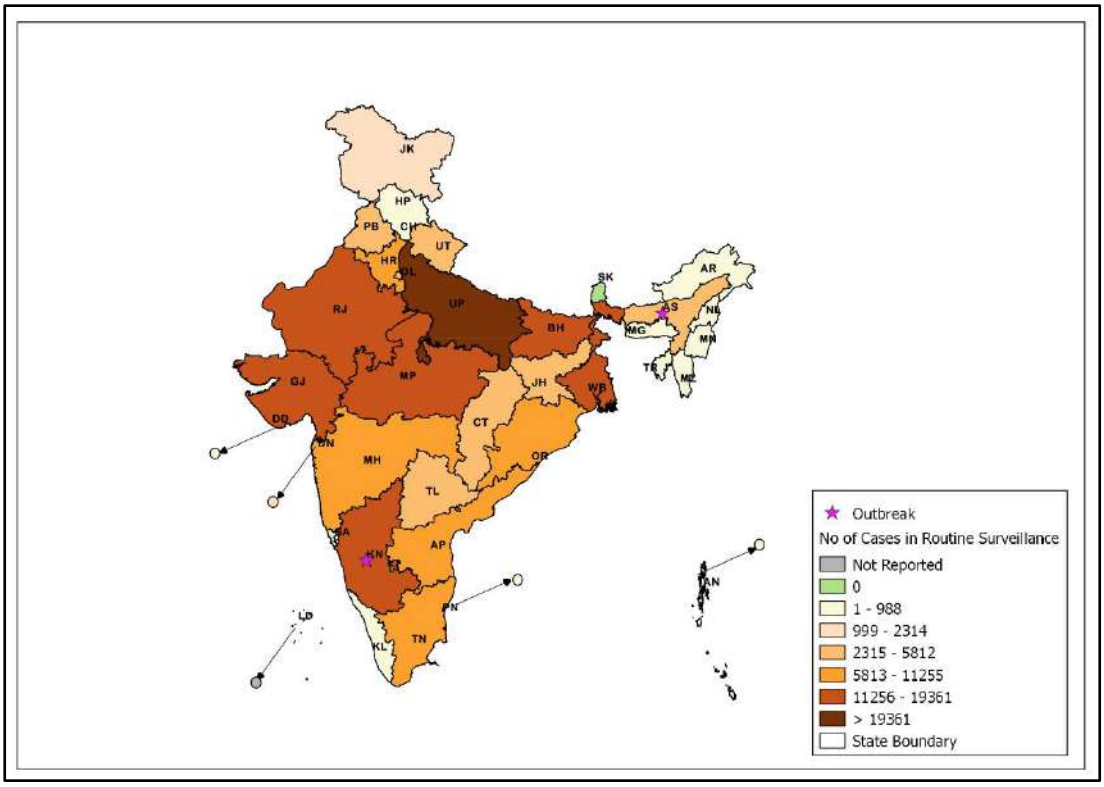


Fig 15: State/UT wise Lab Confirmed Enteric Fever cases and outbreaks for November 2016

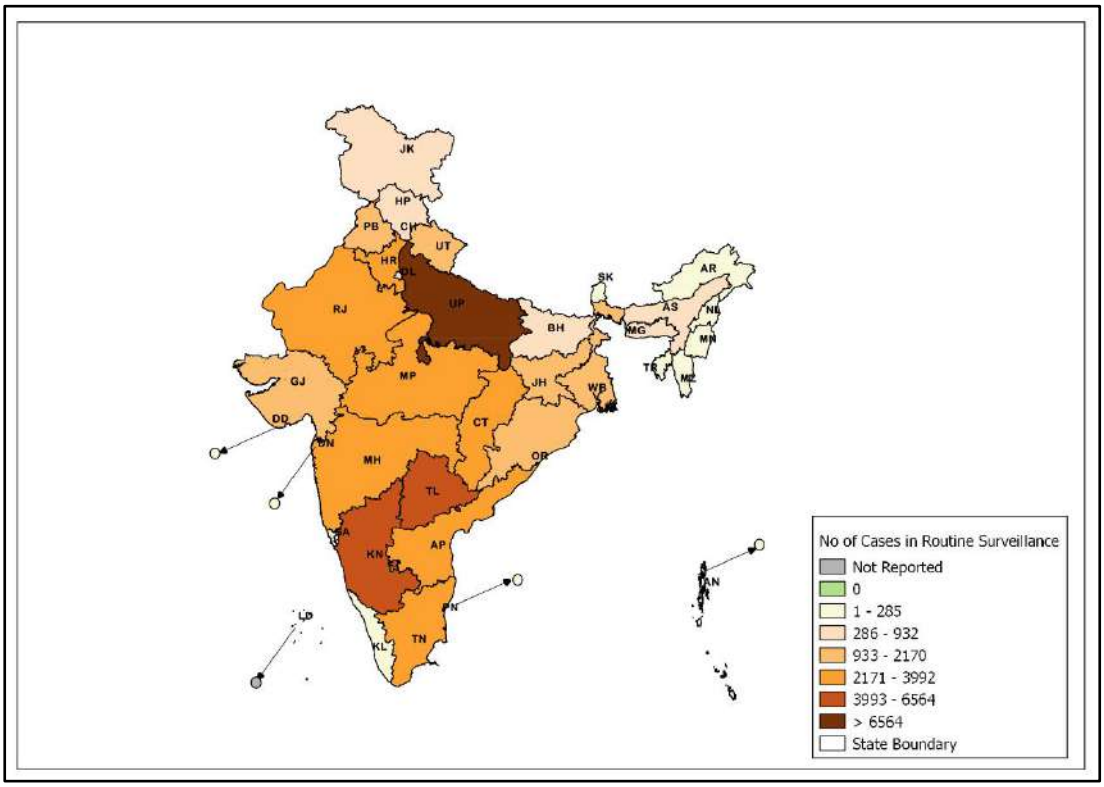


Fig 16: State/UT wise Presumptive ADD cases and outbreaks for November 2016

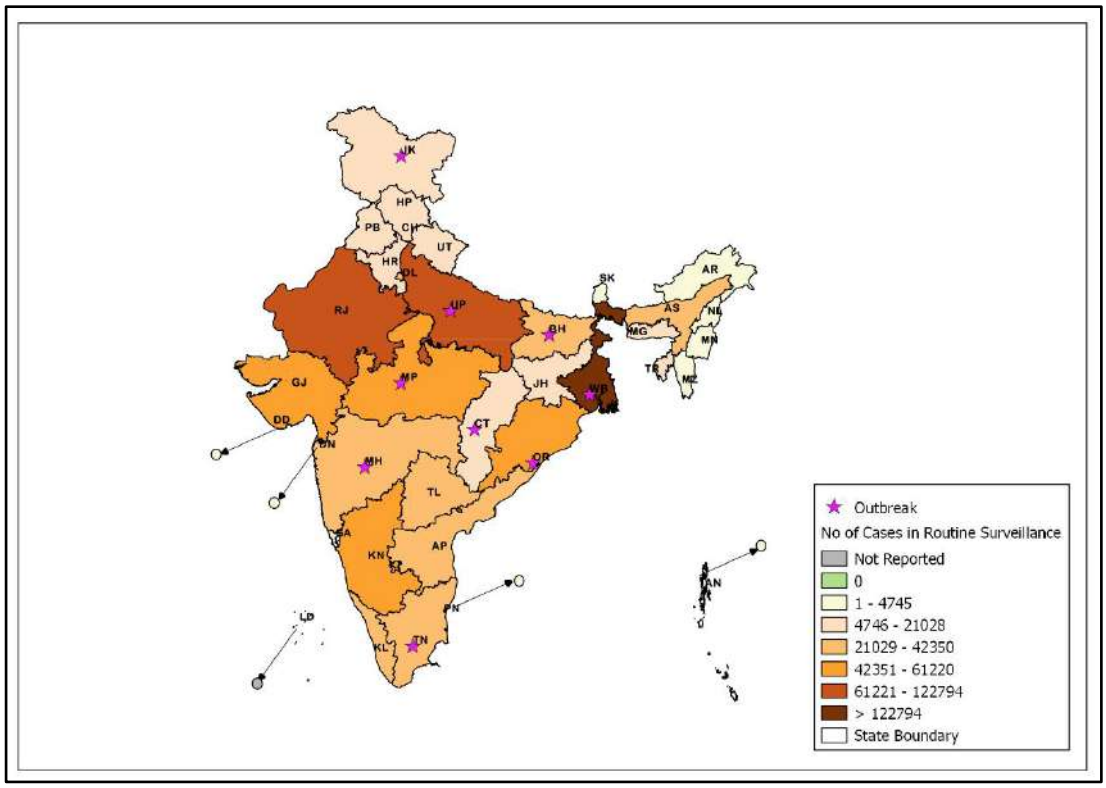


Fig 17: State/UT wise Lab Confirmed Cholera cases and outbreaks for November 2016

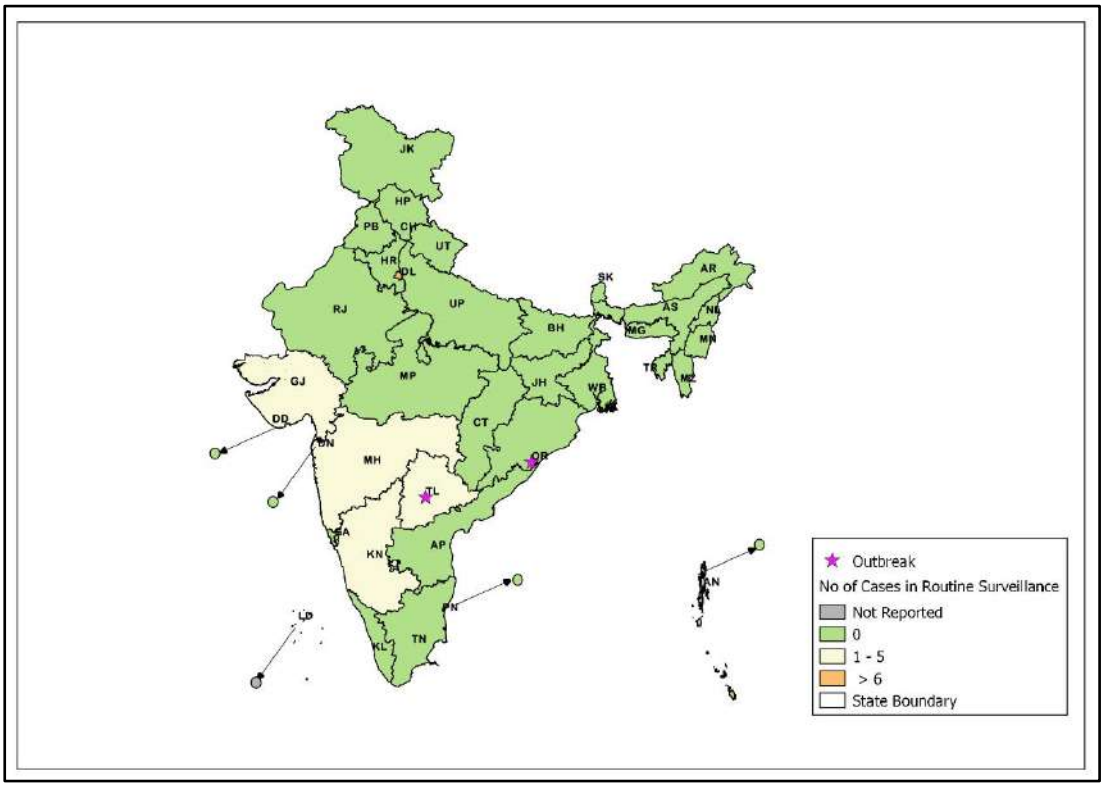


Fig 18: State/UT wise Presumptive Viral Hepatitis cases and outbreaks for November 2016

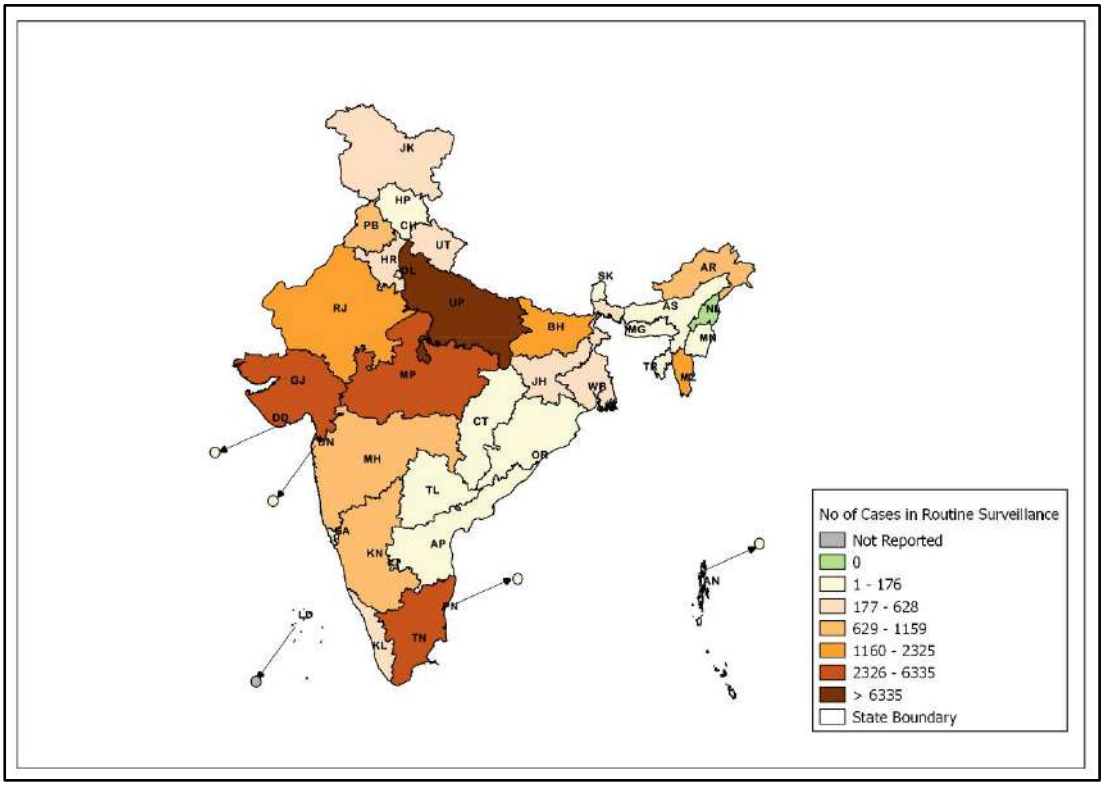


Fig 19: State/UT wise Lab confirmed Viral Hepatitis A cases for November 2016

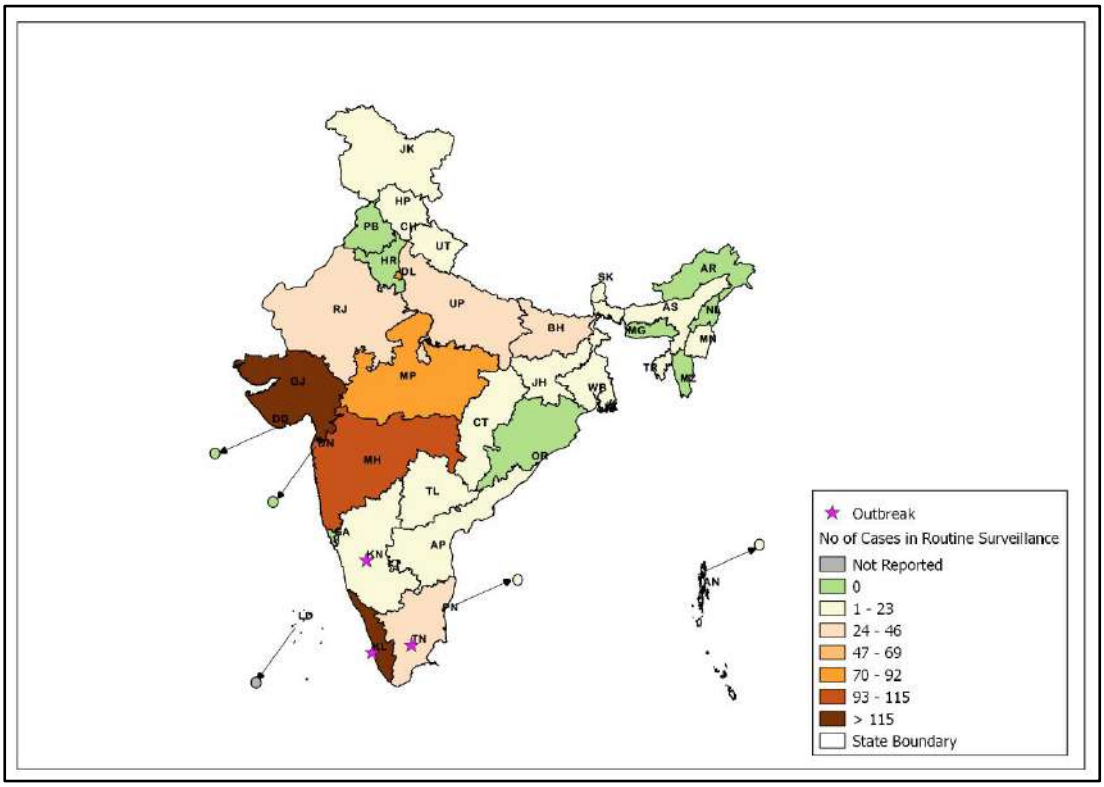


Fig 20: State/UT wise Lab confirmed Viral Hepatitis E cases for November 2016

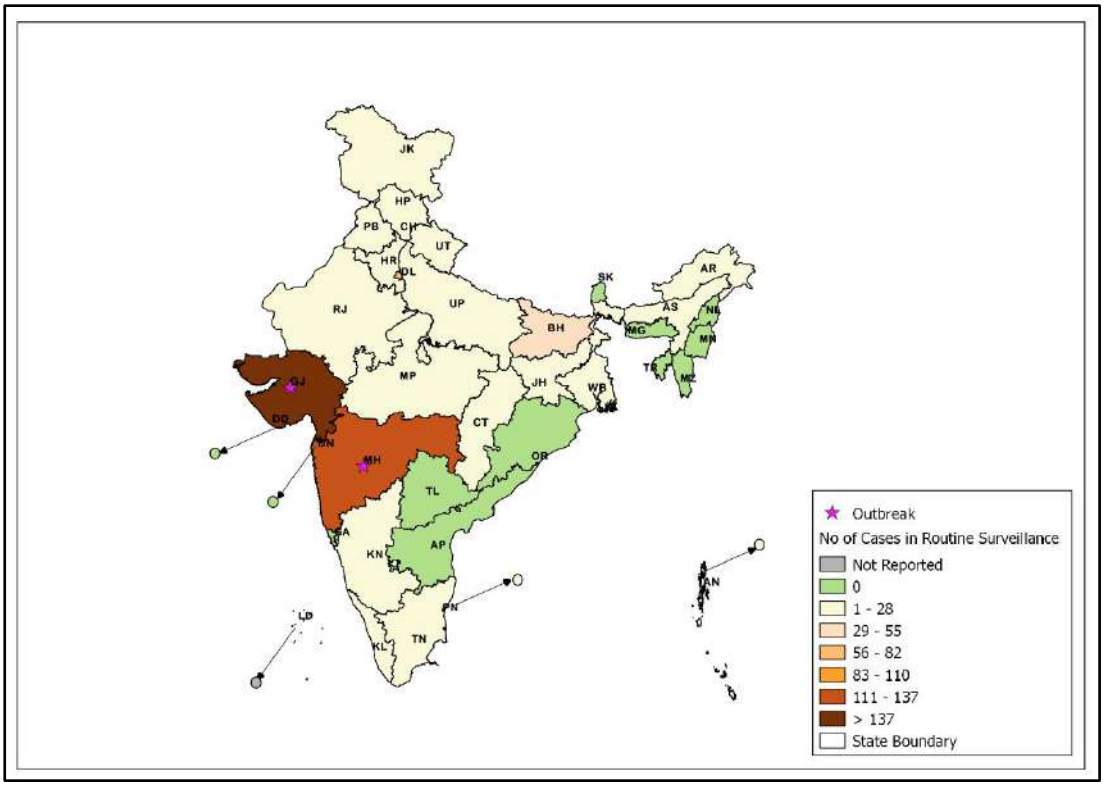


Fig 21: State/UT wise Presumptive Dengue cases & outbreaks for November 2016

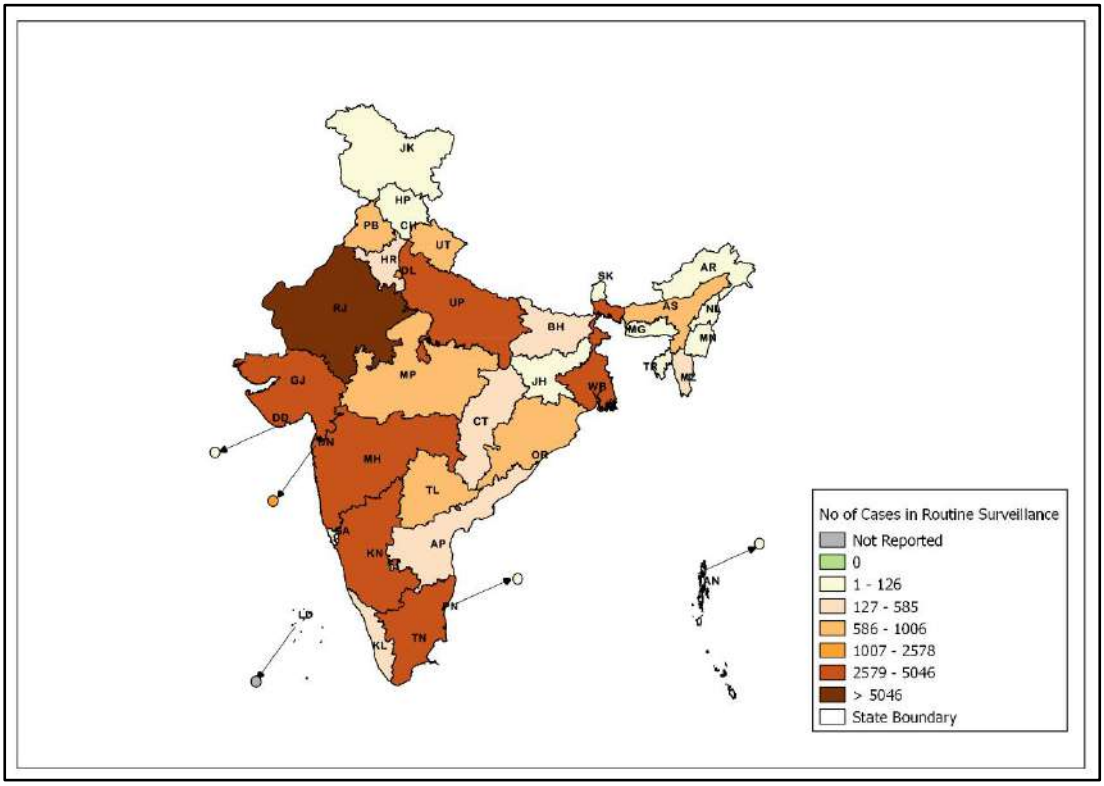


Fig 22: State/UT wise Lab confirmed Dengue cases for November 2016

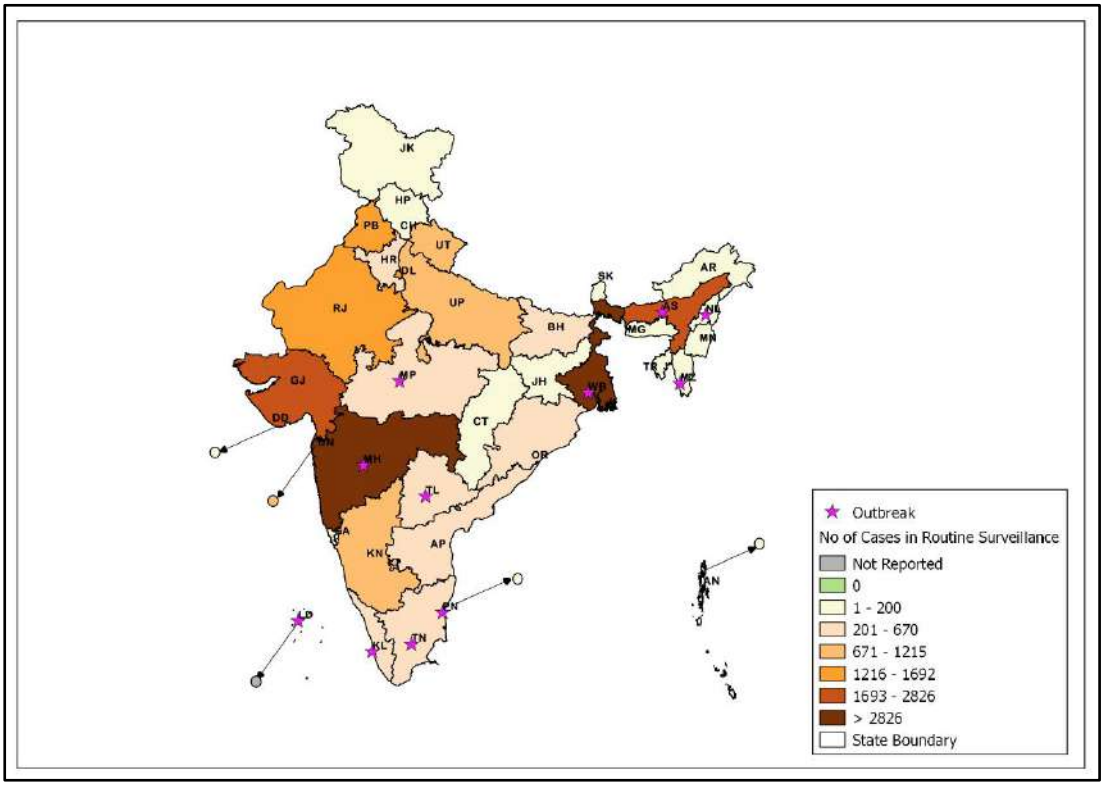


Fig 23: State/UT wise Presumptive Leptospirosis cases for November 2016

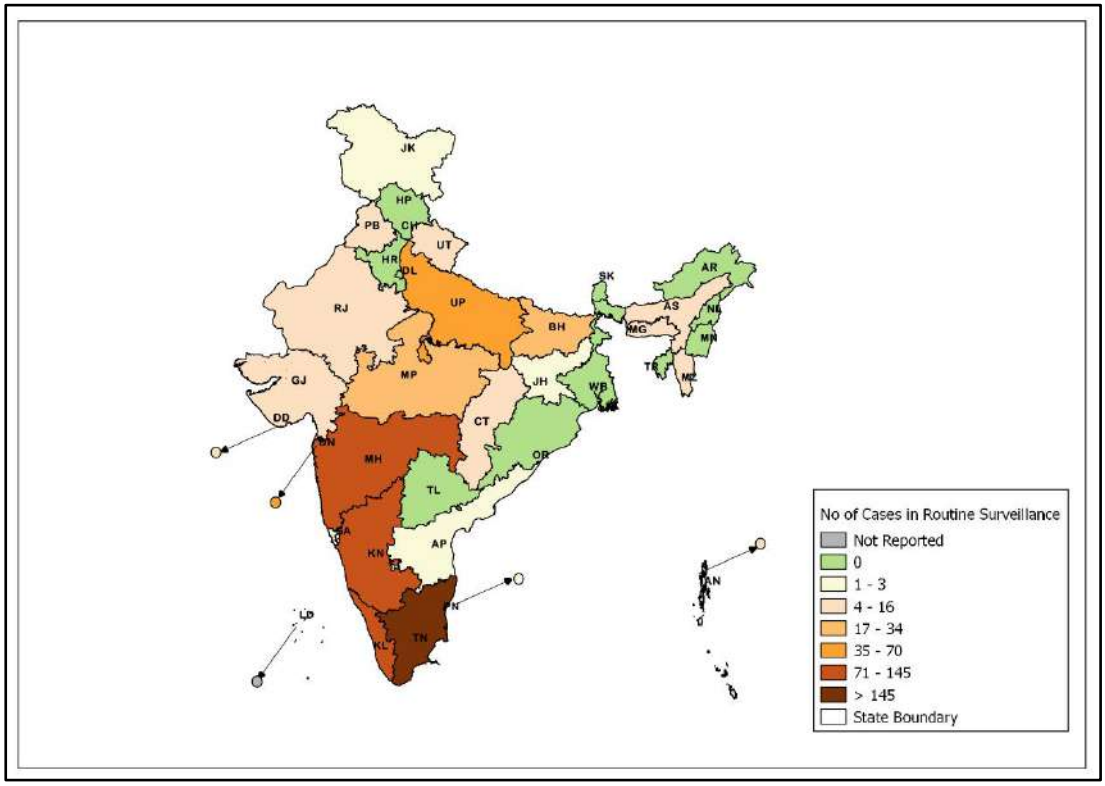


Fig 24: State/UT wise Lab Confirmed Leptospirosis cases & outbreaks for November 2016

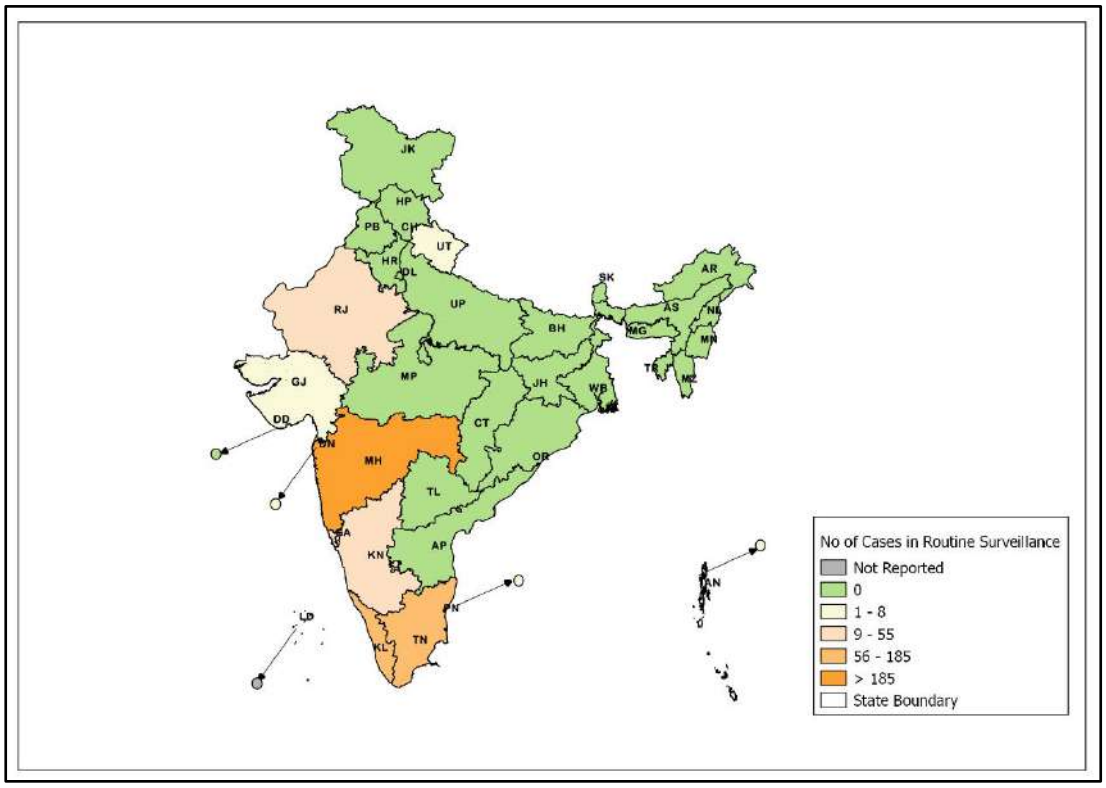


Fig 25: State/UT wise Presumptive Chikungunya cases & outbreaks for November 2016

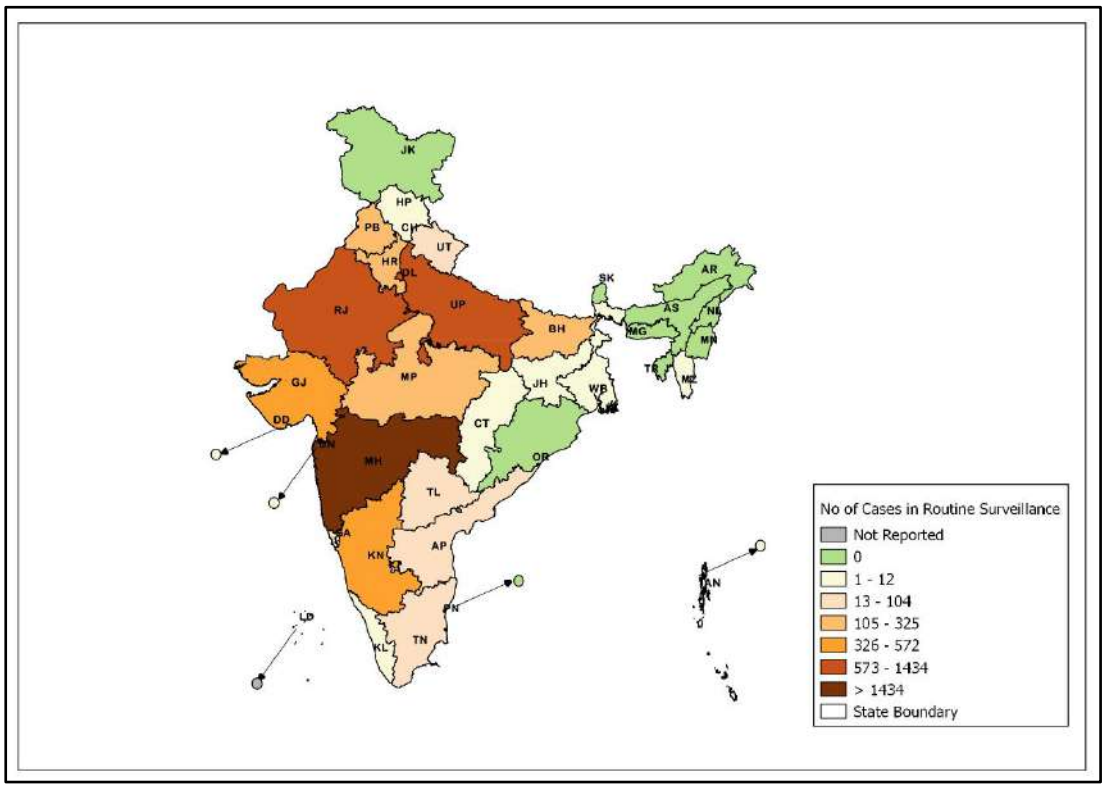


Fig 26: State/UT wise Lab Confirmed Chikungunya cases & outbreak for November 2016

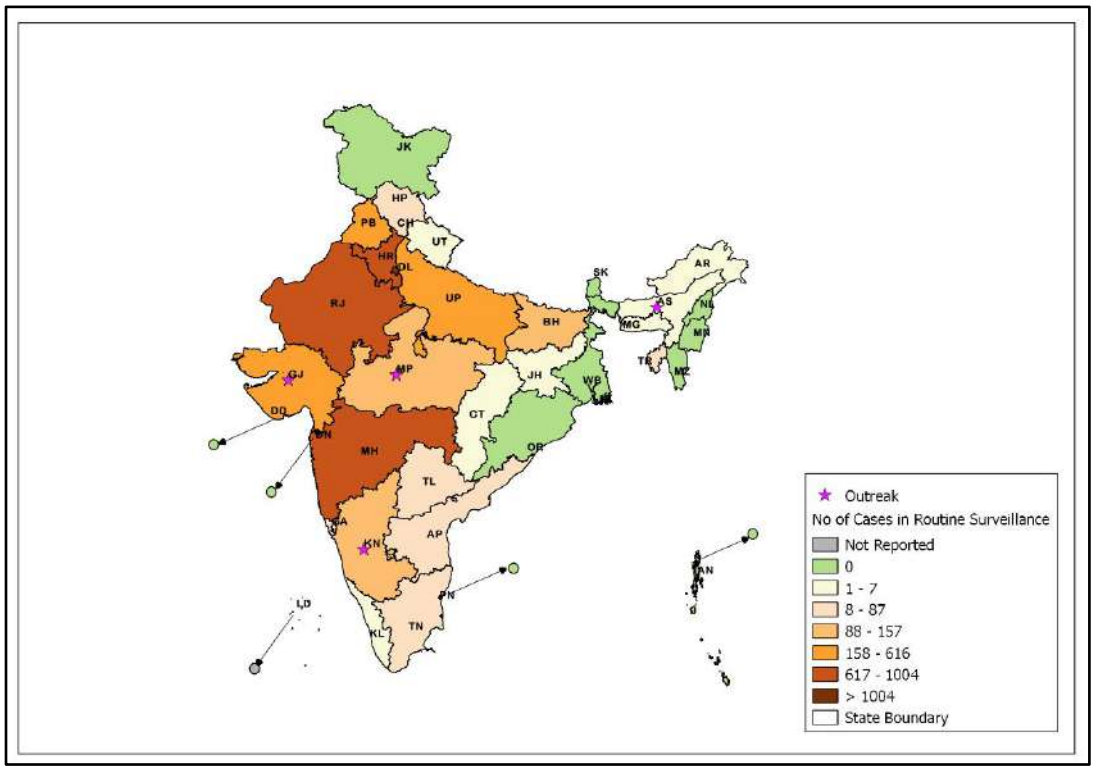
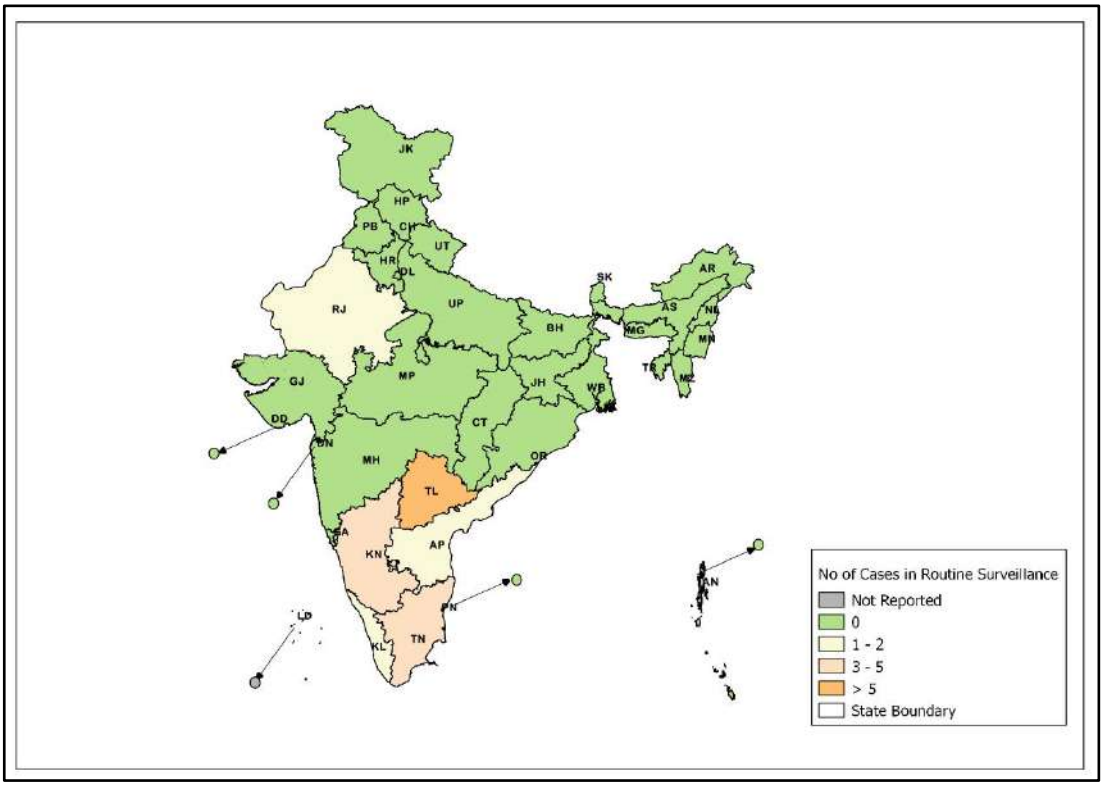


Fig 27: State/UT wise Influenza A (H1N1) cases & outbreak for November 2016



Action from the field

- Dr Lata Kapoor Joint Director IDSP & Dr Jyoti Asstt. Director IDSP visited to Guwahati, Assam for State IDSP review meeting on 17 & 18.11.16.

Glossary:

- **P form:** Presumptive cases form, in which cases are diagnosed and reported based on typical history and clinical examination by Medical Officers.
- **Reporting units under P form:** Additional PHC/ New PHC, CHC/ Rural Hospitals, Infectious Disease Hospital (IDH), Govt. Hospital / Medical College*, Private Health Centre/ Private Practitioners, Private Hospitals*
- **L form:** Lab confirmed form, in which clinical diagnosis is confirmed by an appropriate laboratory tests.
- **Reporting units under L form:** Private Labs, Government Laboratories, Private Hospitals(Lab.), CHC/Rural Hospitals(Lab.),
- HC/ Additional PHC/ New PHC(Lab.), Infectious Disease Hospital (IDH)(Lab.), Govt. Hospital/Medical College(Lab.), Private Health Centre/ Private Practitioners(Lab.)
- **Completeness %:** Completeness of reporting sites refers to the proportion of reporting sites that submitted the surveillance report (P & L Form) irrespective of the time when the report was submitted.

Case definitions:

- **Enteric Fever: Presumptive**: Any patient with fever for more than one week and with any two of the following: Toxic look, Coated tongue, Relative bradycardia, Splenomegaly, Exposure to confirmed case, Clinical presentation with complications e.g. GI bleeding, perforation, etc. AND/OR Positive serodiagnosis (Widal test)
  Confirmed: A case compatible with the clinical description of typhoid fever with confirmed positive culture (blood, bone marrow, stool, urine) of *S. typhi*/ S paratyphi.
  ARI/ ILI**:-**An acute respiratory infection with fever of more than or equal to 38° C and cough; with onset within the last 10 days.
- **Acute Diarrheal Disease: Presumptive Acute Diarrheal Disease (Including Acute Gastroenteritis):** Passage of 3 or more loose watery stools in the past 24 hours. (With or without vomiting).
- **Confirmed Cholera**: A case of acute diarrhoea with isolation and identification of Vibrio cholera serogroup O1 or O139 by culture of a stool specimen.
- **Viral Hepatitis**: **Presumptive**: Acute illness typically including acute jaundice, dark urine, anorexia, malaise, extreme fatigue, and right upper quadrant tenderness.
  Confirmed: Hepatitis A: A case compatible with the clinical description of acute hepatitis with demonstration of anti-HAV IgM in serum sample.
  Confirmed: Hepatitis E: A case compatible with the clinical description of acute hepatitis with demonstration of anti-HEV IgM in serum sample.

- **Dengue**: **Presumptive**: An acute febrile illness of 2-7 days duration with two or more of the mentioned manifestations:

- Headache, Retro-orbital pain, Myalgia, Arthralgia, Rash, haemorrhagic manifestations, leukopenia, or Non-ELISA based NS1 antigen/IgM positive. (A positive test by RDT will be considered as probable due to poor sensitivity and specificity of currently available RDTs.)

Confirmed: A case compatible with the clinical description of dengue fever with at least one of the following:

- Demonstration of dengue virus NS-1 antigen in serum sample by ELISA.
- Demonstration of IgM antibodies by IgM antibody capture ELISA in single serum sample.
- IgG seroconversion in paired sera after 2 weeks with fourfold increase of IgG titre.
- Detection of viral nucleic acid by polymerase Chain reaction (PCR).
- Isolation of the dengue virus (virus culture +ve) from serum, plasma, leucocytes.
  (Source – Dengue National guidelines, NVBDCP 2014)

- **Leptospirosis Case Definition**: **Presumptive Leptospirosis**: Acute febrile illness with headache, myalgia and prostration associated with a history of exposure to infected animals or an environment contaminated with animal urine With one or more of the following:
  - Calf muscle tenderness
  - Conjunctival suffusion
  - Oliguria or anuria and/or proteinuria
  - Jaundice
  - Haemorrhagic manifestations (intestines, lung)
  - Meningeal irritation
  - GI symptoms (Nausea/ Vomiting/ Abdominal pain/Diarrhoea)
  - And/or one of the following:-
    - A positive result in IgM based immune- assays, slide agglutination test or latex agglutination test or immunochromatographic test.
    - A Microscopic Agglutination Test (MAT) titre of 100/200/400 or above in single sample based on endemicity.
    - Demonstration of leptospires directly or by staining methods

  Lab Confirmed Leptospirosis: A case compatible with the clinical description of leptospirosis with at least one of the following:
  - Isolation of leptospires from clinical specimen.
  - Four fold or greater rise in the MAT titre between acute and convalescent phase serum specimens run in parallel. (Source: -National Guidelines on Diagnosis, Case Management Prevention and Control of Leptospirosis NCDC 2015).
- **Chikungunya case definition: Presumptive Case Definition**: An acute illness characterised by sudden onset of fever with any of the following symptoms: headache, backache, photophobia, severe arthralgia and rash.
  - Lab confirmed: A case compatible with the clinical description of chikungunya fever with at least one of the following: Demonstration of IgM antibodies by IgM antibody capture ELISA in a single serum sample.
  - Detection of viral nucleic acid by PCR.
  - Isolation of chikungunya virus from clinical specimen. (Source – Mid Term Plan Guidelines, NVBDCP 2013.

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Data shown in this bulletin are provisional, based on weekly reports to IDSP by State Surveillance Unit. Inquiries, comments and feedback regarding the IDSP Surveillance Report, including material to be considered for publication, should be directed to: Director, NCDC 22, Sham Nath Marg, Delhi 110054. Email: dirnicd@nic.in & idsp-npo@nic.in

Prepared by: Central Surveillance Unit, IDSP under guidance of Director, NCDC