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प्रकोप चेतावनी

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National Health Mission

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Inside

Investigation Report: Acute Diarrhoeal Disease Outbreak at Radhakund, Mathura, Uttar Pradesh, November 2016

Background

Acute Diarrhoeal Diseases (ADDs) are one of the commonest infections especially among under five children. In 2015, more than 12 million cases of ADD with 1216 deaths were reported in India. Uttar Pradesh accounted for about 7.75 lacs cases and 320 deaths of these (1). In 2015, 450 ADD outbreaks were reported by IDSP which accounted for about one third of all outbreaks reported by IDSP in the year (2). WHO estimates that globally safe drinking water and basic sanitation are key interventions to prevent diarrhea. India has 97 million people without access to clean drinking water and 626 million people lack basic sanitation facilities (3).

On 11 November 2016, Mathura District IDSP reported rise of Acute Diarrhoeal Disease (ADD) cases from Radhakund, Mathura, Uttar Pradesh since 02 November, 2016. Three deaths were reported on 01, 04 and 06 November, 2016. On 21 November, 2016, National Centre for Disease Control (NCDC) deployed 2 Epidemic Intelligence Service Officers (EISO) to assist in the investigation. The investigating team comprised of District epidemiologist and a pharmacist from Community Health Centre (CHC) Govardhan apart from two EISOs. The investigation was carried out with objectives to describe the characteristics of the outbreak, identify risk factors and propose recommendations.

Radhakund is a small town of religious importance located in Govardhan block of Mathura district, Uttar Pradesh (India) about 25 kms from Mathura. Administratively Radhakund has a Nagar Panchayat (NP) office which is responsible for water supply, hygiene and sanitation of the town. Radhakund NP has population of 7,511 of which 3,977 are males while 3,534 are females with a total of over 1,652 houses as per Census India 2011. However, there is floating population of tourists who come to stay in the town for a month during October-November (month of *Kartik*) every year when their number varies from 20,000 to 30,000.

Methods

The team reviewed surveillance data available at the IDSP portal to confirm the existence of ADD outbreak and interviewed District Epidemiologist, Medical Officer In-charge and other doctors of CHC, Govardhan to collect information regarding the outbreak and the control measures taken.

a. Case finding

Case definition

For descriptive purpose we defined suspected case as loose stool of three or more frequency within 24 hours in a resident of Radhakund between 31 October and 11 November 2016.

Active and passive surveillance:

Active surveillance by house to house case search was conducted in Radhakund. Information about age, gender, place of residence and date of onset of illness was collected. 14 tourists were interviewed telephonically after getting their mobile phone numbers from the house owner where these tourists were staying at the time of illness. The team also conducted passive surveillance by reviewing case records, OPD registers, in-patient register of CHC Govardhan, line list of admitted ADD cases treated in CHC Govardhan and cases treated in out-reach health camps on 03 and 05 November 2016 on out-patient basis conducted as part of outbreak control measures**.**

The team analysed the data to describe the occurrence of cases over time using an epidemic curve, spot map to understand the geographic distribution, and age and gender distribution of cases.

b. Hypothesis Generation:

The team interviewed local private health practitioners, Food and Drug safety officer, Executive officer and Chairman of Nagar Panchayat. The team was informed that most cases were tourists who were visiting Radhakund for a religious festival. Based on the results of the descriptive epidemiology and hypothesis generating interviews, it was suspected that the illness was associated with drinking water supplied from *tankiwali pipeline*.

c. **Case control study**:

We conducted a 1:2 unmatched case control study to test the hypothesis.

i) **Study population**: All residents of Radhakund from 26 Oct 2016 to 11 Nov 2016.

ii) **Case definition:** The same as above used for case finding.

iii) **Control definition**: An individual residing in Radhakund from 31 Oct 2016 to 5 Nov 2016, who did not suffer from any diarrhoeal episode during this time period. Persons with chronic diarrhoeal illness and children below 1 year of age were excluded.

iv) **Sample size**: All the cases who were available for the study, were included in the study. Thus we had a total of cases (n=49) and controls (n=101).

v) **Sampling technique**

Cases: All available cases identified by active case search who were willing to be interviewed were taken as cases for the case control study.

Controls: The team selected healthy controls in a ratio of 1:2 through systematic random sampling covering whole of Radhakund wherein each control was selected from every 12^{th} house of the town.

vi) **Data Collection.** The team collected data using a pre-structured questionnaire, about socio-demographic details, disease, treatment taken and possible risk factors after prior informed written consent of the participant.

vii) **Data Analysis.** The team entered the data in Epi info 7.2 software and analysed it for calculating odds ratio for suspected risk factors for the disease.

d. **Lab Investigations**

No stool or vomitus sample was collected from any case for lab investigation anytime during the outbreak. Clinicians and paramedical staff were heavily busy in treating overwhelming number of patients and sample collection got ignored. Moreover stool testing facility was not available in the hospital. There were no symptomatic cases when our team joined investigation.

e. **Environmental Investigations**

The team assessed sources of water and water supply network of Radhakund. The team visited public tube wells (bore wells) and overhead tanks located in the town and carried out location mapping of water sources and pipelines on a spot map. The team traced water pipelines by walking all along these pipelines from source to end points and verified it with the records provided by the Nagar Panchayat office. The team assessed general hygiene and sanitation of the town especially the pond of religious significance "Radhakund" based on which town is named.

The team visited Meera Manoranjan Ashram (from where about 44 cases were reported) and interviewed manager and workers. The team assessed complete campus for the hygiene, sanitation and water supply.

District food safety office representative collected food samples on 07 November 2016 from various places of Radhakund and were sent for testing for adulteration. Four water samples were collected in sterile bottles for microbiological examination and included one from Radhakund, two from piped water supply and one from overhead tank. The team reviewed reports of water samples test. The team summarized data by sample collection date, source of sample and test result.

Results

The team reviewed weekly data of ADD cases in CHC Govardhan, which has catchment population of Radhakund for 2014-16. The team confirmed an increase in incidence of diarrhoea beyond the expected frequency as represented graphically in figure-1).

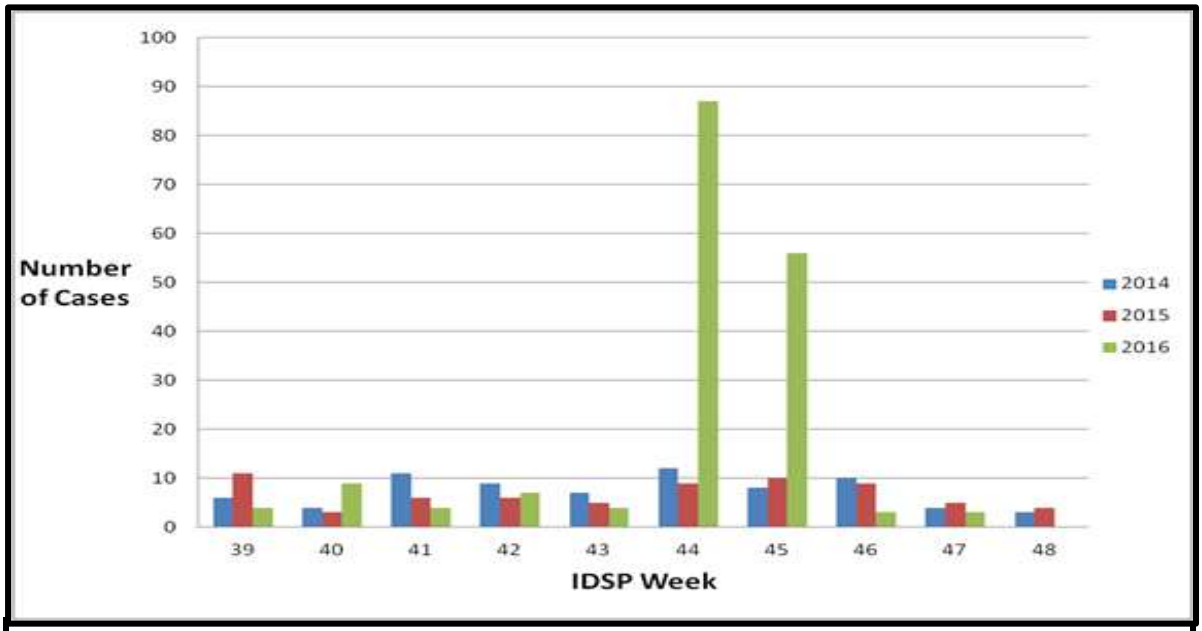

Fig. 1: Number of acute diarrhoeal disease cases in CHC Govardhan, 2014-2016.

Descriptive Epidemiology

a. **Distribution of cases as per time**

After data cleaning and removal of duplicates, a total of 339 cases were identified of which 285 (84%) cases were tourists. The team collected information of patients from four sources:-

- 66 cases identified by active case search in the community.
- 92 admitted cases in CHC Govardhan.
- 156 cases identified and treated by outreach health camp in Radhakund as a response for outbreak control by local health authority.
- 25 admitted cases in RK Mission hospital Vrindavan.

Figure-2 shows the distribution of cases over time. Cases started occurring from 31 October, 2016. Maximum cases occurred on 03 November 2016 followed by 05 November 2016 as these are the dates of outreach health camps. No new cases were reported after 11 November, 2016

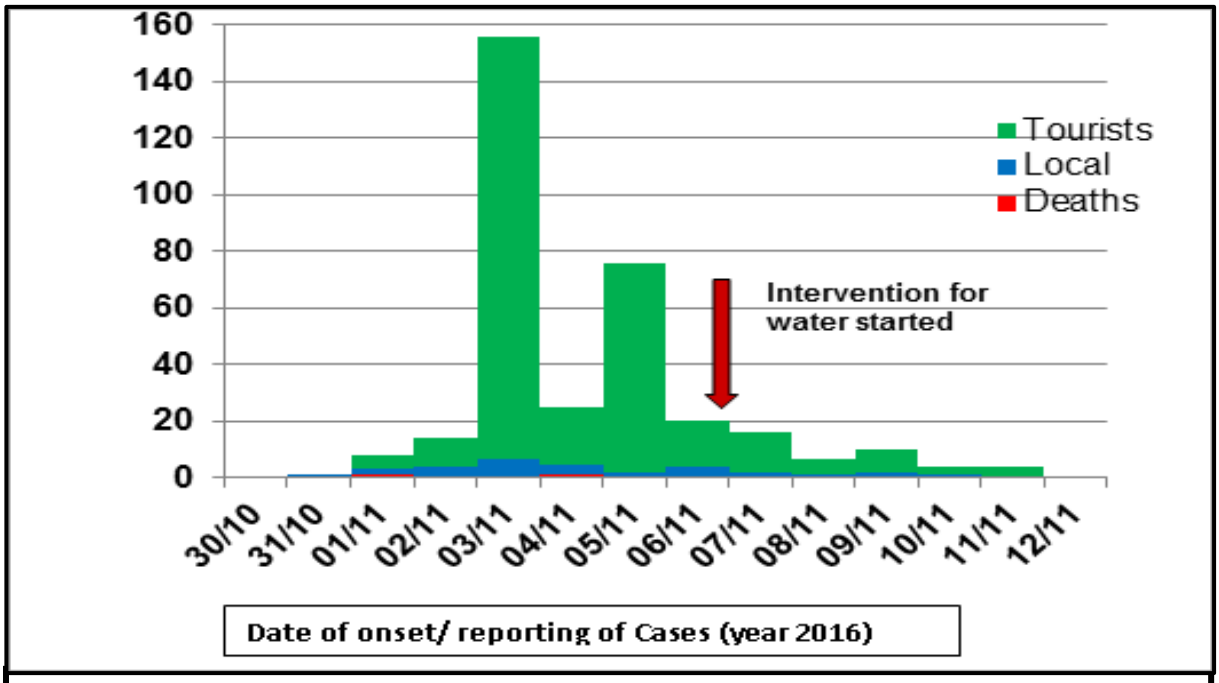

Fig. 2: Distribution of all ADD cases by date of reporting/ onset, Radhakund, Uttar Pradesh, 2016 (n=339).

b. Distribution of cases as per Age and Sex

Median age of the cases was 60 yrs. with range of 1- 81 yrs. Most commonly affected age group was 51- 60 years. Females accounted for about two third of cases (64.5%). About 1/3rd of the cases were hospitalized and 2 confirmed deaths due to ADD were reported with an overall CFR of 0.6%. The findings are summarised in table 1.

Table-1: Distribution of Cases by Age and Sex (n=339)

Age group	Female n (%)	Male n (%)	Total (%)
1-10	7 (50)	7 (50)	14 (4.1)
11-20	16 (61.5)	10 (38.5)	26 (7.7)
21-30	5 (33.3)	10 (67.7)	15 (4.4)
31-40	10 (71.4)	4 (28.6)	14 (4.1)
41-50	45 (65.2)	24 (34.8)	69 (20.4)
51-60	70 (77)	21 (23)	91 (26.8)
61-70	55 (61.8)	34 38.2)	89 (26.2)
71-80	11 (57.9)	8 (42.1)	19 (5.6)
>80	1 (50)	1 (50)	2 (0.6)
Total	220 (64.5)	119 (35.5)	339 (100)

c. Distribution of cases in place

The team prepared a spot map (not to the scale) representing the town. Place of residence of about one third cases (N=110) was identified and was marked on the map. The network of water supply was plotted on the map. Clustering of the cases was observed in houses supplied from "tankiwali" pipeline.This is depicted in the spot map (figure-3).

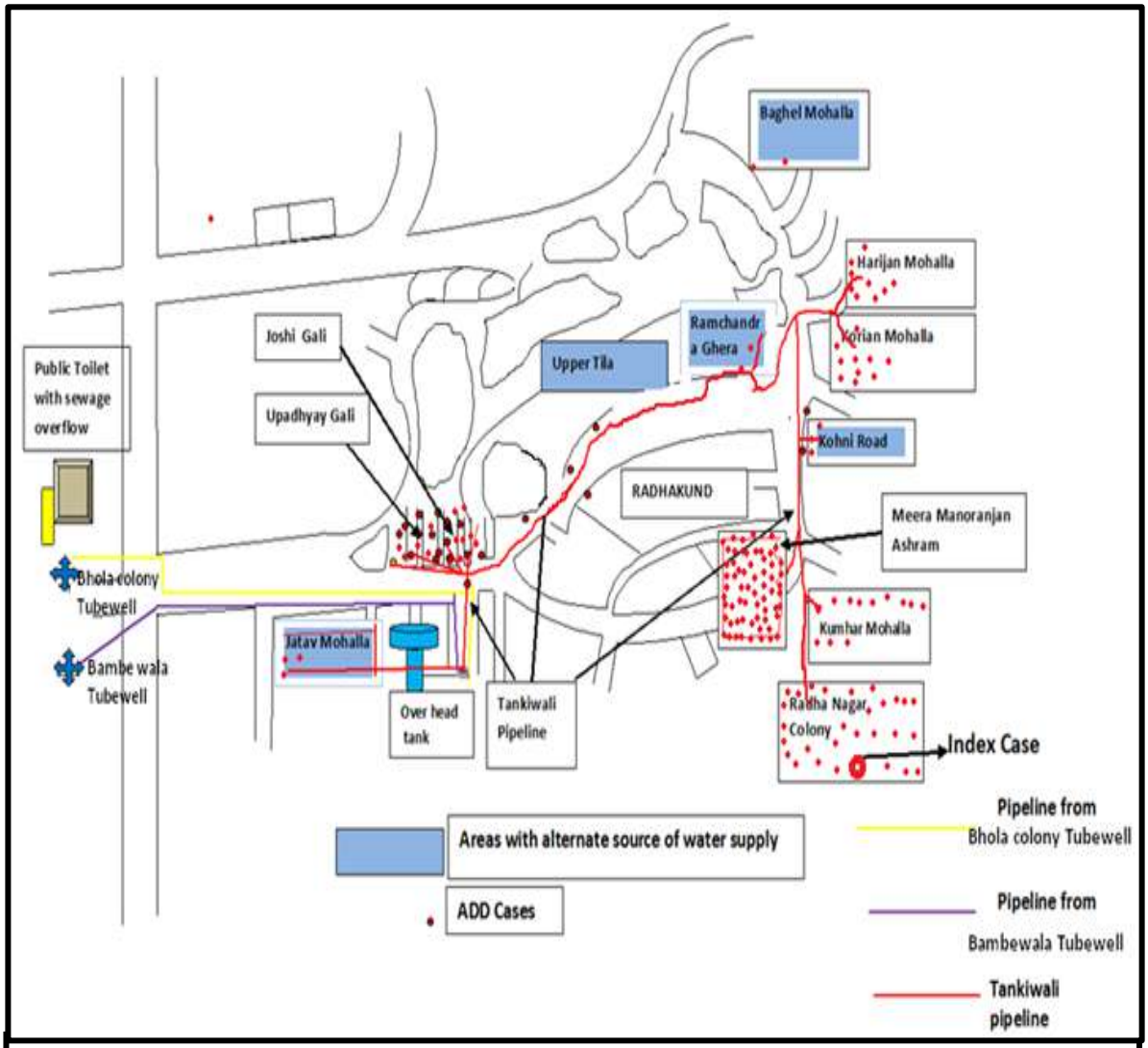

Fig. 3 Spot Map Showing Distribution of ADD Cases and Water Supply Network in Radhakund, Mathura, November 2016 (N= 121)

d. Distribution of symptoms among ADD cases in Radhakund identified by active search in the community

All cases (100%) had diarrhoea followed by vomiting in 94% of cases, and pain abdomen (23%) and fever (3%) were rare.

Case control study results

The team interviewed a total of 49 cases and 101 controls for the case-control study. Cases and controls had similar socio-demographic characteristics such as age, gender, education and occupation and type of family (table-2).

Table 2: Socio-demographic characteristics of Cases and Controls (N= 150)		
Variable	**Cases n (%) (N=49)**	**Controls n (%) (N=101)**
Age		
Median age (range) in years	37 (Range 1-80)	39 (Range 3-82)
Gender		
Female	28 (57.1)	53 (52.5)
Education		
Illiterate	19 (38.8)	26 (25.7)
Less than Primary	12 (24.5)	10 (9.9)
Primary completed	11 (22.4)	23 (22.8)
Secondary	6 (12.2)	18 (17.8)
Matric	1 (2.0)	13 (12.9)
Graduate and above	0 (0)	11 (10.9)
Occupation		
Labourer	2 (4.1)	3 (3.0)
Skilled worker	9 (18.4)	9 (8.9)
Student	23 (46.9)	29 (28.7)
Office worker	0 (0.0)	2 (2.0)
Stays at house	13 (26.5)	45 (44.6)
Agriculture worker	0 (0.0)	6 (5.9)
Shopkeeper	1(2.0)	3(3)
Others	1 (2.0)	4(4)
Type of Family		
Nuclear	26 (53.1)	63 (62.4)
Joint	20 (40.8)	31 (30.7)
Three generation	3 (6.1)	7 (6.9)

Bivariate analysis showed the odds of disease was 10.5 times more in those drinking tap water as compared to other sources of water (OR 10.5, 95% CI 3.1- 35.6), table 2.

Drinking water from *tankiwali pipeline* was associated with a higher OR of almost 18 (OR 18.0, 95% CI 7.6- 45.6) table-3.

Table 3: Bivariate analysis of Risk Factors Associated with Diarrhoea (N=150)

Risk Factor	Point Estimate of Odds Ratio	Lower Limit of Odds Ratio	Upper Limit of Odds Ratio	Reference Level for Odds Ratio
Drinking tap water from any pipelines	10.58	3.1	35.6	Drinking water from other sources
Drinking tap water from Tankiwali pipeline	18.0	7.6	45.6	Drinking water from other sources (including other pipeline's tap water)

We carried out a subset analysis for cases and controls residing in the localities supplied by *tankiwali* pipeline (44 cases and 81 controls).

Lab Investigations. The reports of microbiological tests on water samples collected on 07 November 2016 show that two out of four water samples were tested positive for Vibrio cholerae at SN Medical College, Agra. Both of these samples were drawn from *tankwali* pipeline. Other two samples had gross bacterial contamination.

Environmental Investigation

Water supply system

The source of water supply in Radhakund is through following sources:-

a) Public Tube wells (five in numbers) connected through a network of supplying pipelines with inter-connections in these pipelines at few points.
b) Personal well/ boring connected to motor-pump or hand pump.
c) Public hand-pump (shallow) - very few of them

The water supply system through pipelines was established in year 1978 with only one pipelines i.e. *tankiwali pipeline* with 450 houses in the town. Now there are five water pipelines supplying water to 1209 houses. These pipelines are fed by five tubewells. The pipelines supply water to definite areas of Radhakund through household taps and community taps. This is the main source of water supply for drinking and cooking. Water is distributed without any treatment viz. filtration/ chlorination at any point from source to consumer end. An outline of water supply network through tubewells and pipelines is attached as above.

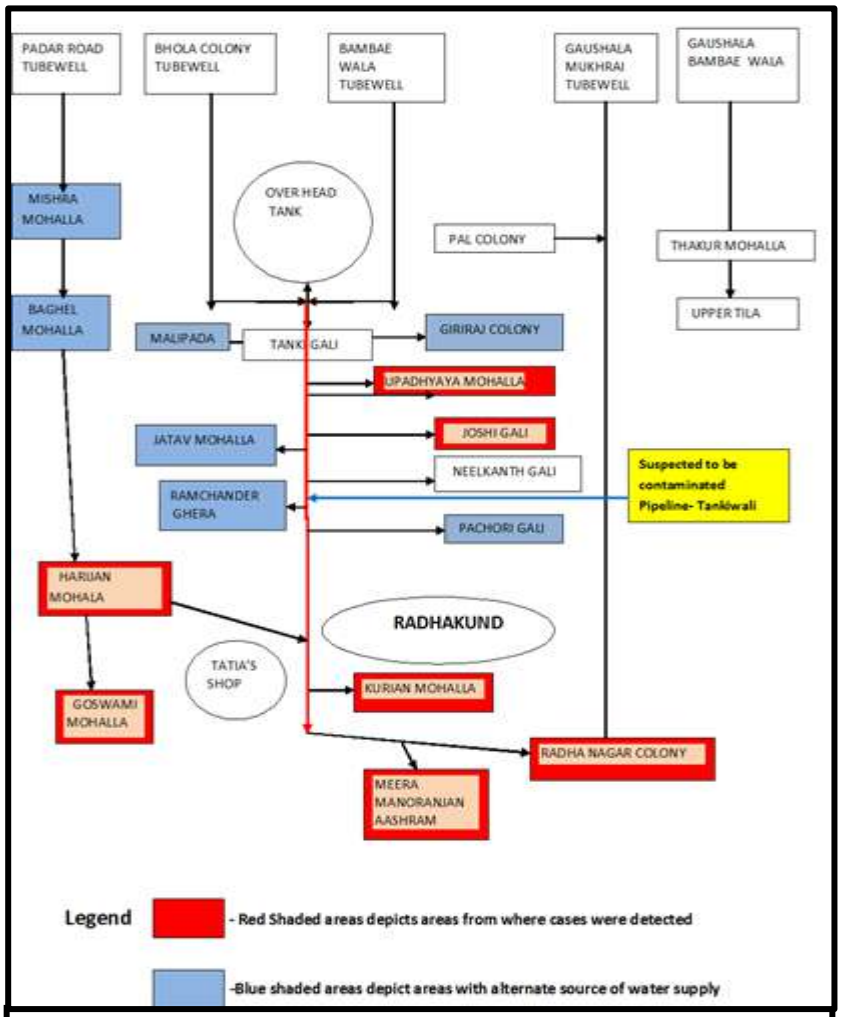

Fig 4: Flow chart of water supply, Radhakund

The pipeline from Bhola colony tube well (near public toilets) and tube well No.2 (near Bamba/ canal) runs independently for about 800 meters and then join together near water overhead tank into a single broader pipeline called **"***tankiwali pipeline***"** which supplies most of the area of the town (about 750 houses out of 1209 houses) including the areas where most of the local and tourist cases were residing. This is the oldest pipeline in the town dating more than 35 years back.

The *tankiwali pipeline* also supplies water to the overhead storage tank. The supply is controlled by a 'T' valve. Water from pipeline can either be directed to flow to overhead tank and then to distributing pipelines network or directly to distributing pipeline network.

One to one interviews with locals revealed that the *tankiwali pipeline* is susceptible to frequent cracks and leaks as this is the oldest pipeline in the town. The investigators attempted to verify this with record of repair available with Nagar Panchayat. Six applications for repair of the pipeline in different places were received in the month of February 2016.

The other three tube wells are located in periphery of the town and supply the specific areas exclusively (around 450 houses out of 1209 houses), as marked in the spot map. The network of pipelines from these tube wells were laid in the year of 2002-2004. However terminal ends of water pipeline from padhal road tube well join the *tankiwali* pipeline before Kurian mohalla. Households further downstream are therefore supplied by mixed water from these two tube wells (Harijan mohalla and Meera manoranjan area).

The water is released usually in morning and evening i.e. twice a day. The two tube wells supplying *tankiwali pipeline* are the only ones which have generator power supply. When electricity is not available, water is supplied only to *tankiwali pipeline* as others do not have power back-up. Also time of switching on the water pump at different tube wells varies. Thus there is good possibility of retrograde water entering into terminal part of pipeline supplied by padhal road tube well through its junction with *tankiwali pipeline* just before "kurian mohalla".

A spot map of cases superimposed with water pipelines shows clustering of cases along the areas supplied by the *tankiwali pipeline*. There were few cases at terminal end of padhal road pipeline in "Harijan Mohalla".
There is no routine water surveillance for assessing the quality and fitness for drinking water.

Alternate drinking water sources.

Other sources of drinking water in the town apart from tap water supply and personal/ community hand pumps are as under:-

1. Government R.O. plant having own boring from where people can collect water in 20 l refillable water bottles.
2. Private R.O. water plant having own boring supplying 20 l refillable water bottles.

Sewage Disposal in Radhakund

Most of the houses have got sanitary latrines connected with septic tanks, however these septic tanks are not connected to any soakage pit. There is no central sewage line in the town. It was observed that sewage from many of the household septic tanks overflow into community drains alongside roads. There are few community toilet complexes, sewage from which also overflows to open ground one of which is in close proximity (60 feet) to Bhola colony tube well (130 feet deep) which is the source of water supply for "*tankiwali pipeline"*. Two of such community septic tanks were observed to have sewage overflow at the time of environmental survey by the team.

Between 23 Oct to 31 Oct 2016 many important religious dates fell, there was a mass gathering of tourists as many as 2 lacs/ per day in Radhakund on peak day. Sanitary arrangements in the form of 3 mobile toilets were made available for the tourists however they were grossly insufficient in terms of numbers. Moreover these were established about 2 km away from place of stay of these tourists, along parikrama marg (21 km road along which tourists walk). The number of visitors outnumbers the sanitary facilities available in the town. Many instances of sewage overflow in multiple places were reported in this time-period.

Radhakund Pond

The town has a 40 x 40 m unprotected cemented tank. It is believed that taking a dip in the pond and drinking drops of water from it (achman) makes people free of all sins. Therefore the practice of "achman" is common among the locals and tourist. The pond is surrounded by mostly temples and few houses. Water sample drawn from this pond had reported gross contamination with bacteria.

Weather

No rainfall was reported at Radhakund in whole of October and November months of the year 2016.

Control measures by the district for the outbreak included the following:

1. Outpatient camps were organized on 03 and 05 November 2016.
2. The overhead tank was cleaned and super chlorinated on 7 November, 2016
3. Order prohibiting drinking water from *tankiwali pipeline* was issued on 7 November 2016 till 09 November 2016.
4. Chlorine tablets were distributed to residents.
5. Public announcements were made regarding consumption of water after boiling on 07 November 2016.

Limitations

1. Most cases were tourists who had left Radhakund before the investigation therefore the generalizability of the analytic investigation results is restricted to the study population, although drinking tap water was a common risk factor between locals and tourists.
2. No human clinical samples were collected and tested for isolating etiological agent.
3. Exact source of infection could not be identified.

Conclusion

A large outbreak of acute diarrhoeal disease affecting 339 cases occurred in Radhakund, Mathura from 31 Oct 2016 to 11 November 2016. The results from epidemiological investigation, lab report of water samples and environmental investigation point to a water-borne outbreak most likely due to contamination of tankiwali pipeline water supply. The sudden increase in the number of cases could be due to a recent breach in the water pipeline at a time when there was a mass gathering event in the town of Radhakund overburdening the sewage system.

Recommendations

Based on the epidemiological evidence generated by analytical study, environmental investigation and lab investigations, following recommendations are made to prevent such outbreaks in future:-

Recommendations for the short term:-

1. Adequate treatment of water at sources and before releasing from overhead tank by chlorination to achieve a free chlorine level of at least 1 ppm at source after 1 hour of contact period and 0.5 ppm at the consumer level.
2. Relocation of public toilet away from tube well 1 and 2 as sewage spillage near water source could have led to contamination of these water sources (Bhola colony tube well and Bambe wala tube well).
3. Health education of the population for water hygiene and hand-washing.

Recommendations for the long term

1. Thorough survey of pipeline (specifically *tankiwali pipeline*) and holistic repair to avoid frequent cracks.
2. Regular cleaning of overhead tank and maintenance of record of the same and routine periodic water surveillance for checking its fitness for drinking.
3. Invest in a sewage system for the NP area and convert existing open wastewater drains to covered drains.
4. Enhanced sanitation and toilet facilities and safe drinking water availability during festival season.
5. Regular cleaning of Radhakund pond and recycle of water. Establishment of large capacity RO plant to recycle and treat its water may be explored.
6. Routine periodic water surveillance for checking its fitness for drinking.
7. Enhance the routine disease surveillance especially during festive seasons so as to detect the outbreak early and report it early.
8. Sensitisation of doctors and health workers of CHC Govardhan for lab testing of clinical specimens specially in case of an outbreak and enhancement of lab diagnostic services

References

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2. Integrated Disease Surveillance Program (IDSP) 2015, available from http://www.idsp.nic.in/index4.php?lang=1&level=0&linkid=403&lid=3685 accessed on 04 Jan 2017.
3. World Health Organisation Fact sheet Water, Sanitation hygiene, available from http://www.who.int/water_sanitation_health/monitoring/jmp2012/fast_facts/en/ accessed on 27 Dec 2016.

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

* Data extracted from IDSP Portal (www.idsp.nic.in) as on 28 March, 2017.

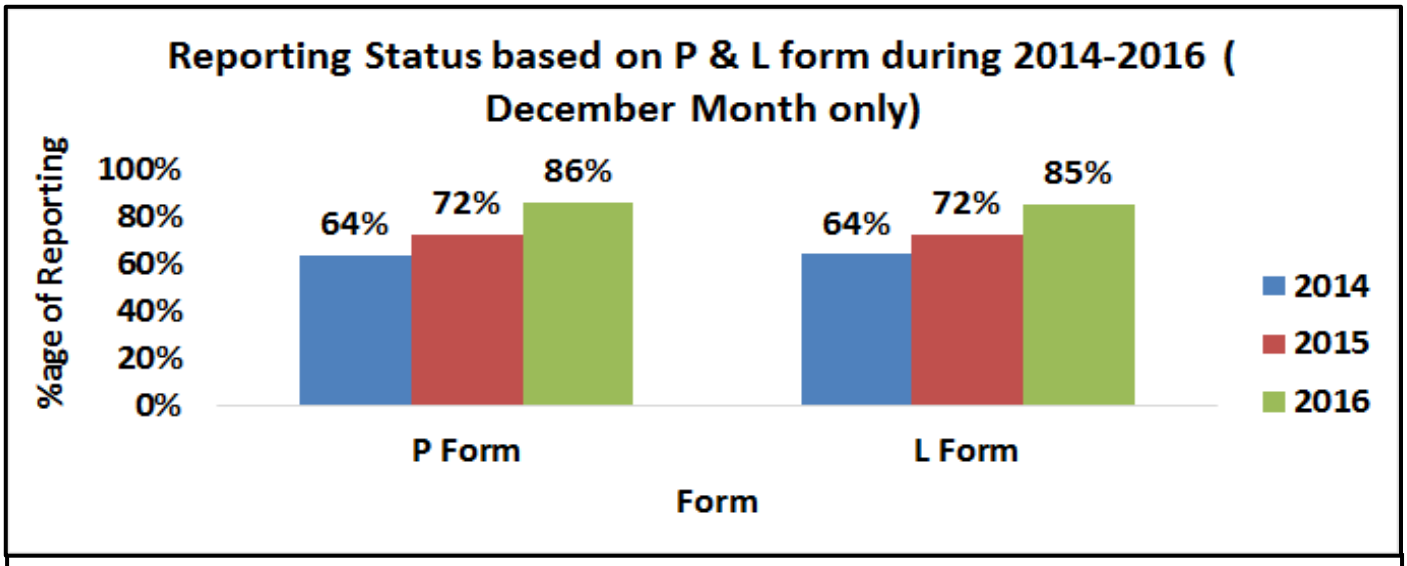


Fig. 5: Reporting Status based on P & L form during December 2014-2016

As shown in fig 5, in December 2014, 2015 and 2016, the 'P' form reporting percentage (i.e. % RU reporting out of total in P form) was 64 %, 72% and 86% respectively across India, for all disease conditions reported under IDSP in P form. Similarly, L form reporting percentage was 64%, 72% 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.

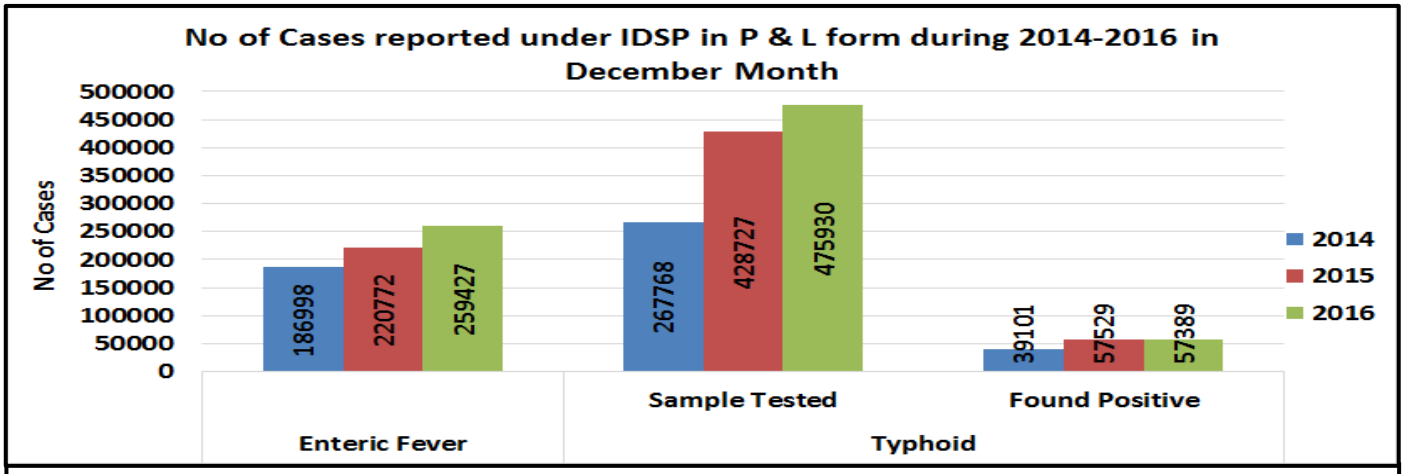


Fig. 6 No. of Enteric Fever Cases reported under P & L form during December 2014-2016

As shown in fig 6, number of presumptive enteric fever cases, as reported by States/UTs in 'P' form was 186998 in December 2014; 220772 in December 2015 and 259427 in December 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in December 2014; 267768 samples were tested for Enteric fever, out of which 39101 were found positive. In December 2015; out of 428727 samples, 57529 were found to be positive and in December 2016, out of 475930 samples, 57389 were found to be positive.

Sample positivity has been 14.6%, 13.4% and 12.1% in December 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.

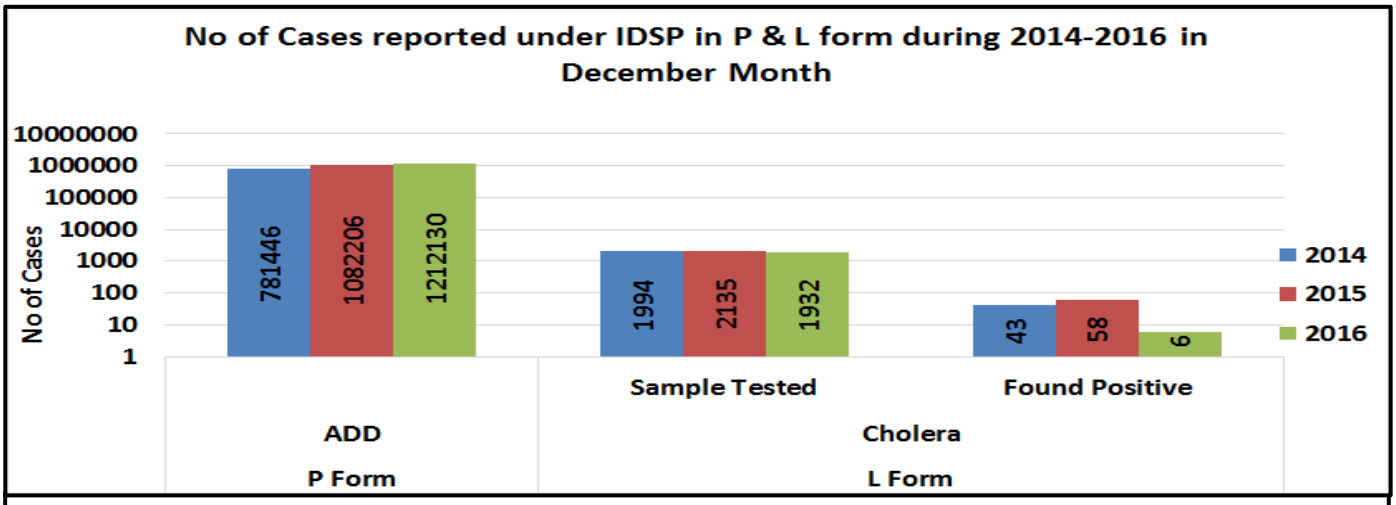


Fig. 7: No. of ADD Cases reported under IDSP in P form & Lab confirmed Cholera cases in L form during December 2014-2016

As shown in fig 7, number of Acute Diarrhoeal Disease cases, as reported by States/UTs in 'P' form was 781446 in December 2014; 1082206 in December 2015 and 1212130 in December 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in December 2014, 1994 samples were tested for Cholera out of which 43 tested positive; in December 2015, out of 2135 samples, 58 tested positive for Cholera and in December 2016, out of 1932 samples, 6 tested positive.

Sample positivity of samples tested for Cholera has been 2.0%, 3.0% and 0.3% in December month of 2014, 2015 & 2016 respectively.

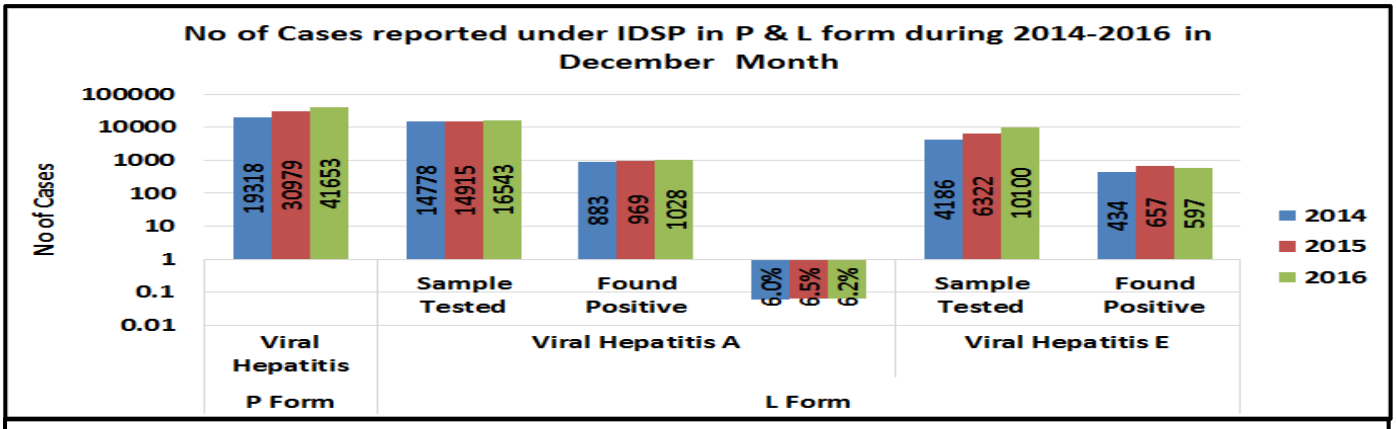


Fig. 8: No of Viral Hepatitis Cases reported under IDSP in P form & Viral Hepatitis A & E cases reported under L form during December 2014-2016

As shown in fig 8, the number of presumptive Viral Hepatitis cases was 19318 in December 2014, 30979 in December 2015 and 41653 in December 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 December 2014; 14778 samples were tested out of which 883 were found positive. In December 2015; out of 14915 samples, 969 were found to be positive and in December 2016, out of 16543 samples, 1028 were found to be positive.

Sample positivity of samples tested for Hepatitis A has been 6.0%, 6.5% and 6.2% in December month of 2014, 2015 & 2016 respectively.

As reported in L form for Viral Hepatitis E, in December 2014; 4186 samples were tested out of which 434 were found positive. In December 2015; out of 6322 samples, 657 were found to be positive and in December 2016, out of 10100 samples, 597 were found to be positive.

Sample positivity of samples tested for Hepatitis E has been 10.4%, 10.4% and 5.9% in December month of 2014, 2015 & 2016 respectively.

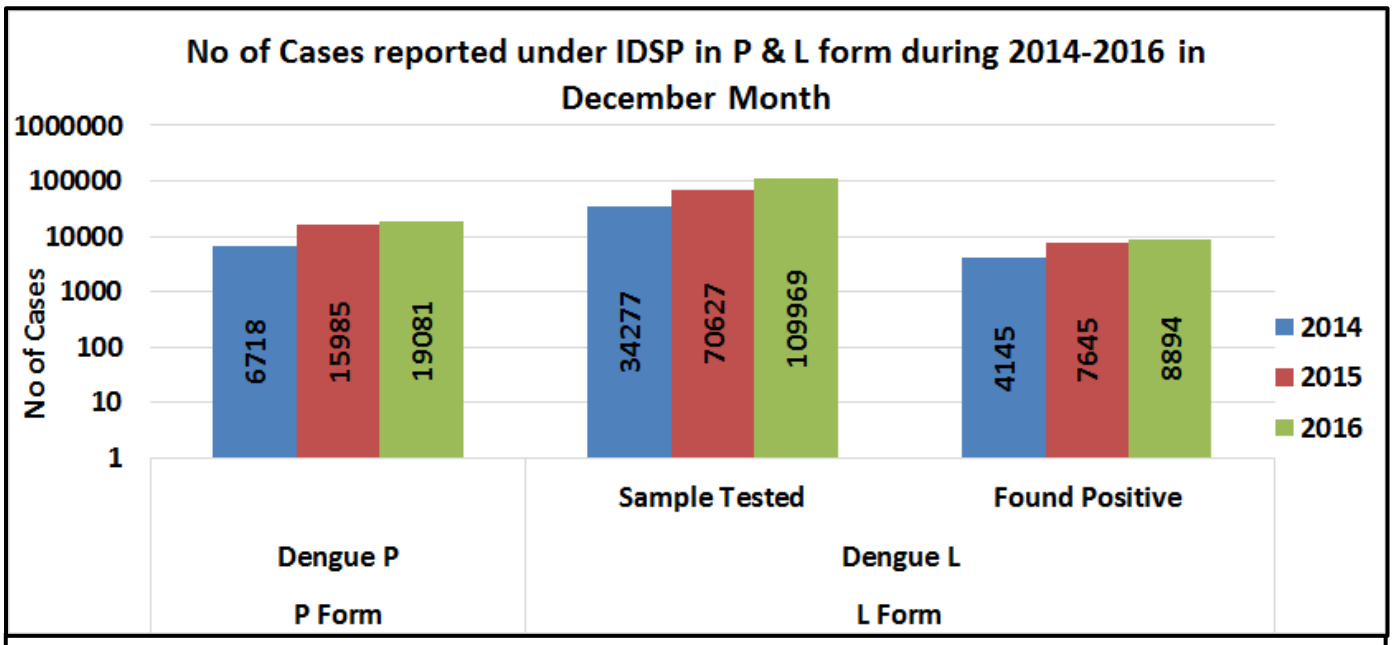


Fig. 9: No. of Dengue Cases reported under IDSP in P & L form during December 2014-2016

As shown in fig 9, number of presumptive Dengue cases, as reported by States/UTs in 'P' form was 6718 in December 2014; 15985 in December 2015 and 19081 in December 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in December 2014; 34277 samples were tested for Dengue, out of which 4145 were found positive. In December 2015; out of 70627 samples, 7645 were found to be positive and in December 2016, out of 109969 samples, 8894 were found to be positive.

Sample positivity of samples tested for Dengue has been 12.1%, 10.8% and 8.1% in December month of 2014, 2015 & 2016 respectively.

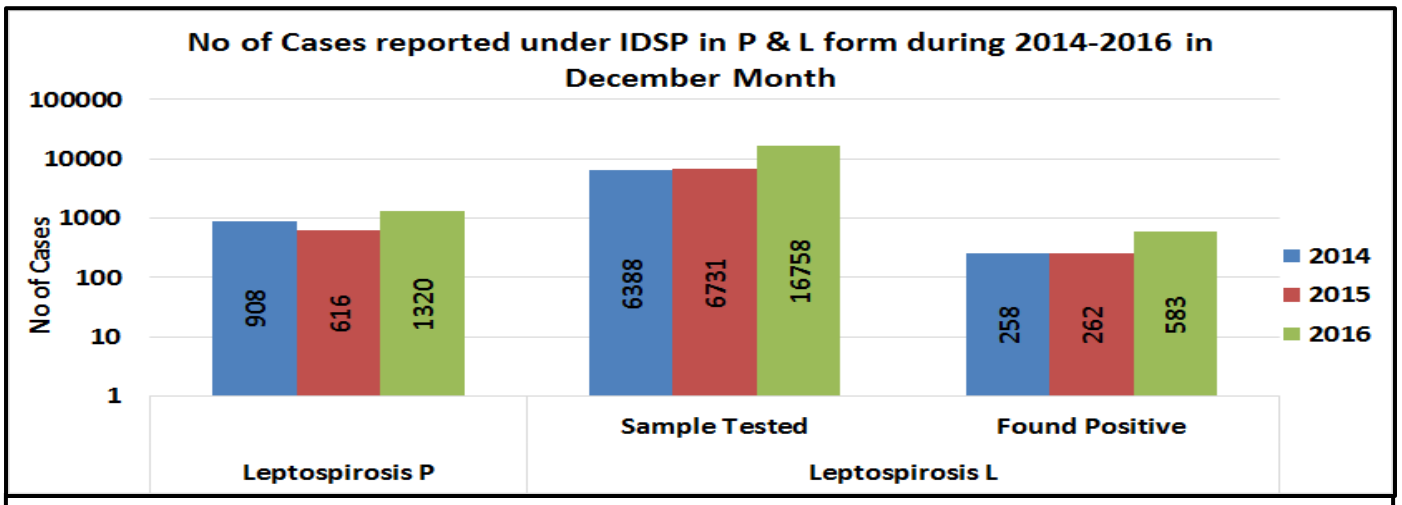


Fig. 10: No. of Leptospirosis Cases reported under IDSP in P & L form during December 2014-2016

As shown in fig 10, number of presumptive Leptospirosis cases, as reported by States/UTs in 'P' form was 908 in December 2014; 616 in December 2015 and 1320 in December 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in December 2014; 6388 samples were tested for Leptospirosis, out of which 258 were found positive. In December 2015; out of 6731 samples, 262 were found to be positive and in December 2016, out of 16758 samples, 583 were found to be positive.

Sample positivity of samples tested for Dengue has been 4.0%, 3.9% and 3.5% in December month of 2014, 2015 & 2016 respectively.

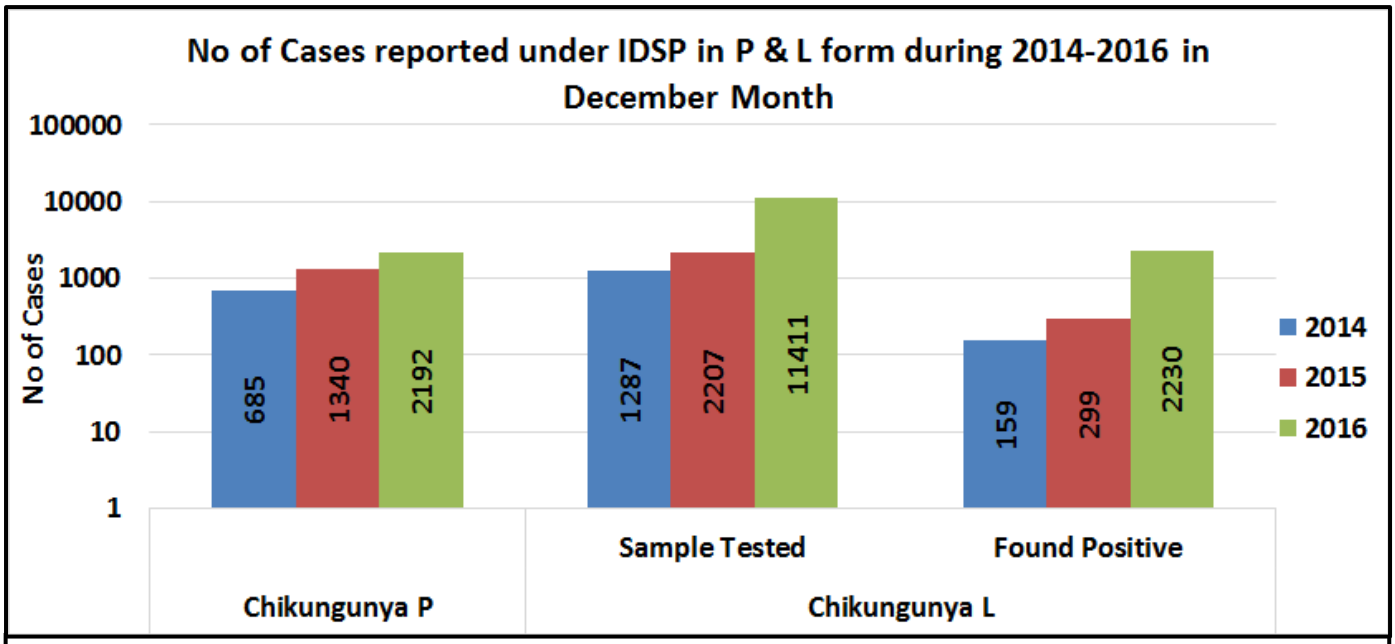


Fig. 11: No. of Chikungunya Cases reported under IDSP in P & L form during December 2014-2016

As shown in fig 11, number of presumptive Chikungunya cases, as reported by States/UTs in 'P' form was 685 in December 2014; 1340 in December 2015 and 2192 in December 2016. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in December 2014; 1287 samples were tested for Chikungunya, out of which 159 were found positive. In December 2015; out of 2207 samples, 299 were found to be positive and in December 2016, out of 11411 samples, 2230 were found to be positive.

Sample positivity of samples tested for Chikungunya has been 12.4%, 13.5% and 19.5% in December month of 2014, 2015 & 2016 respectively.

Fig 12: State/UT wise P form completeness % for December_2016

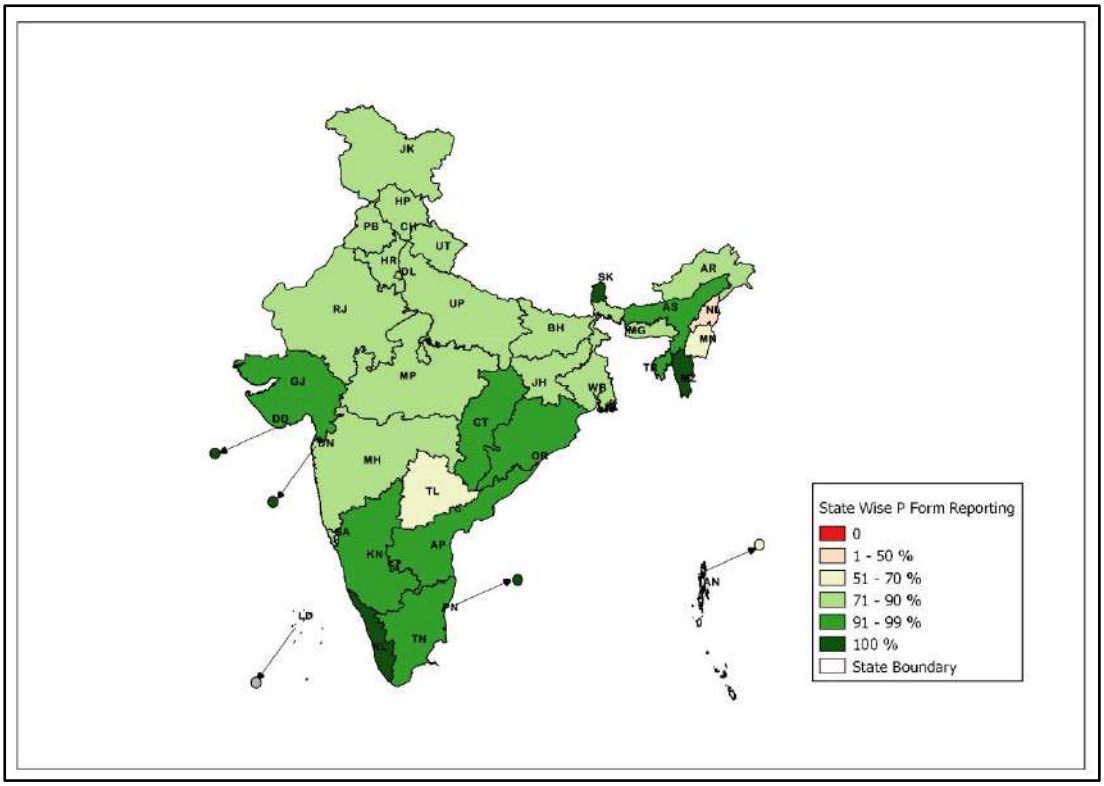


Fig 13: State/UT wise L form completeness % for December_2016

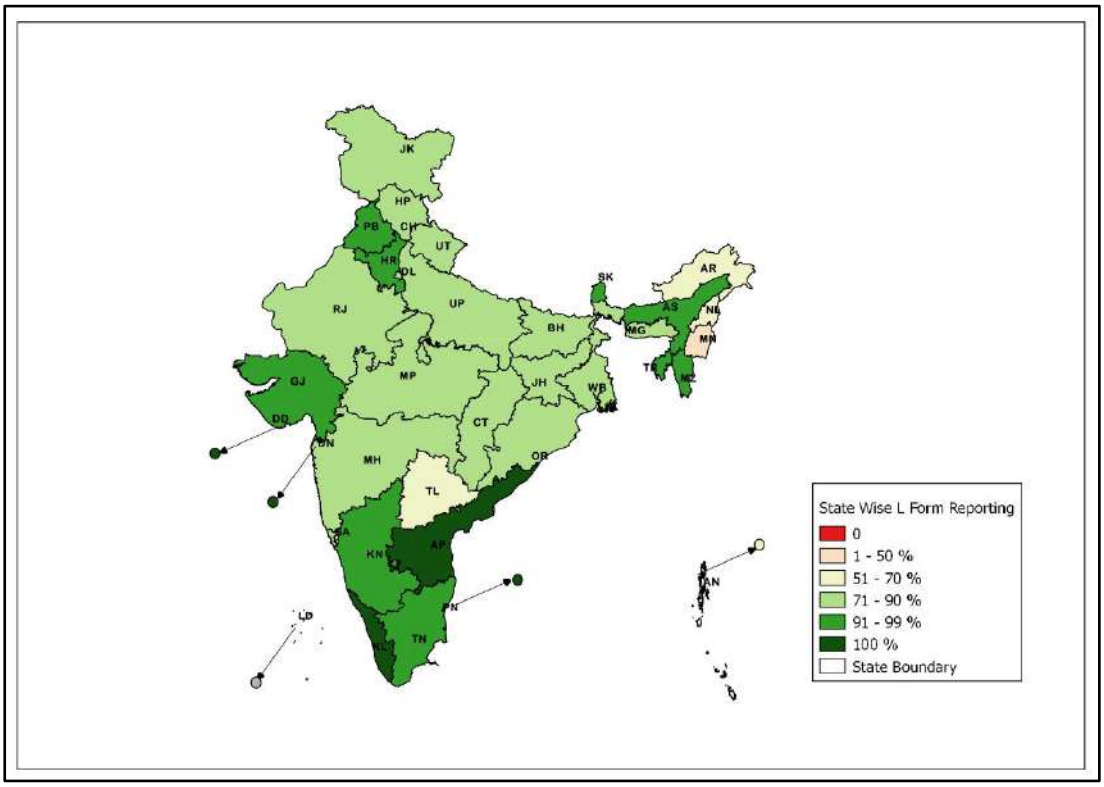


Fig 14: State/UT wise Presumptive Enteric fever cases and outbreaks for December 2016

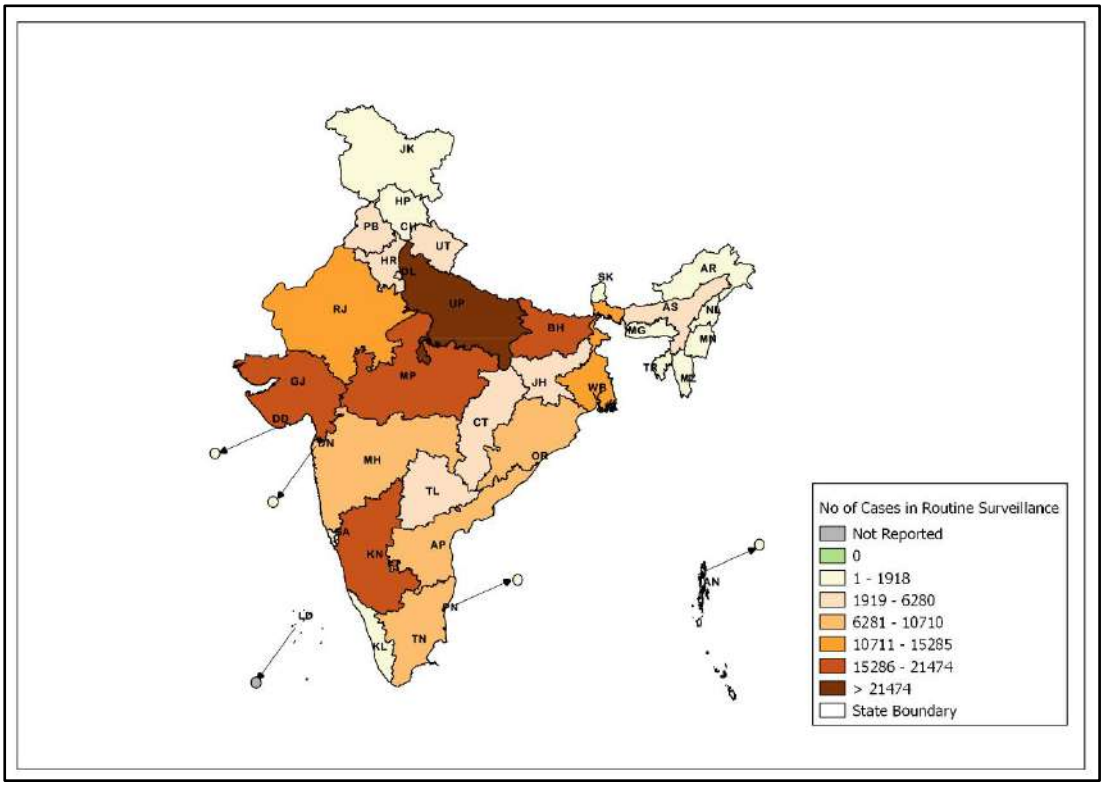


Fig 15: State/UT wise Lab Confirmed Enteric Fever cases and outbreaks for December 2016

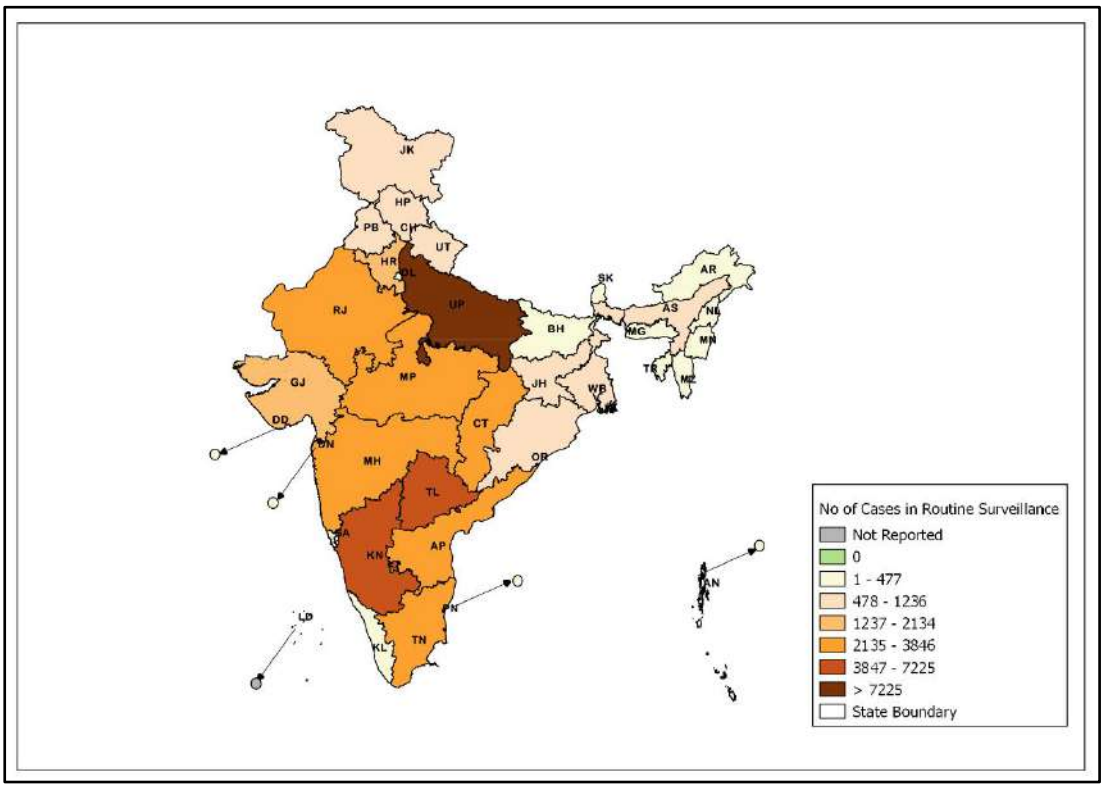


Fig 16: State/UT wise Presumptive ADD cases and outbreaks for December_2016

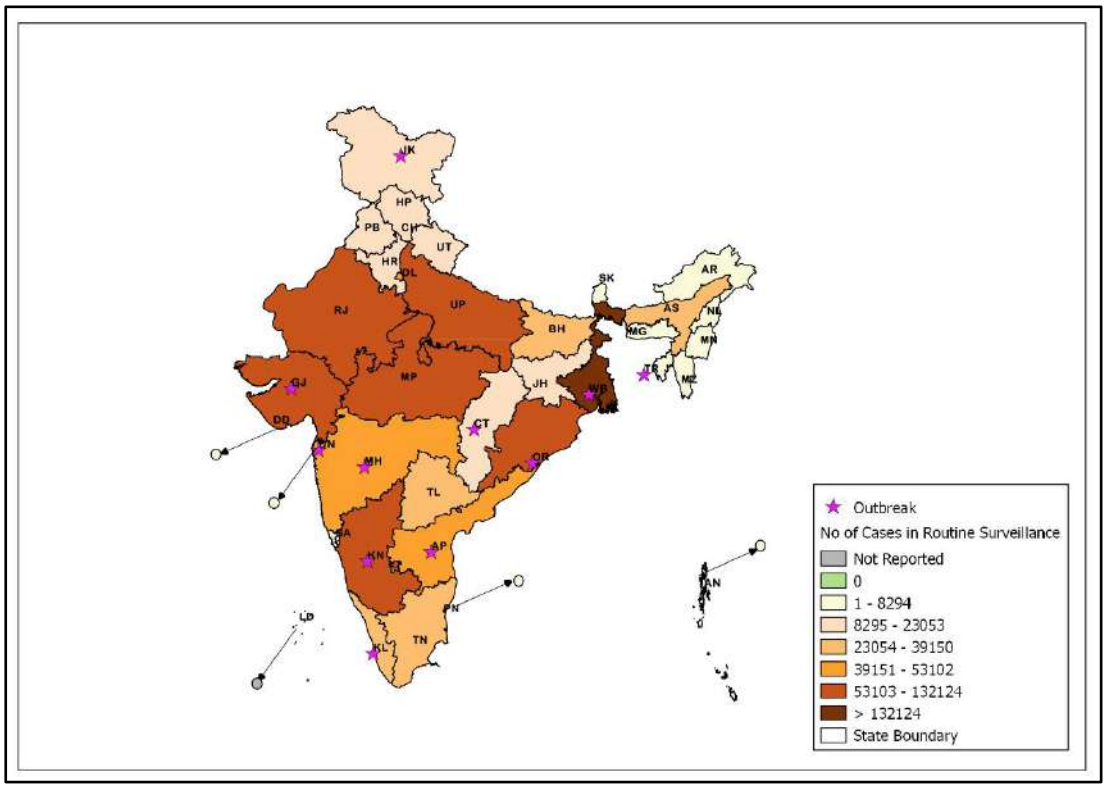


Fig 17: State/UT wise Lab Confirmed Cholera cases and outbreaks for December_2016

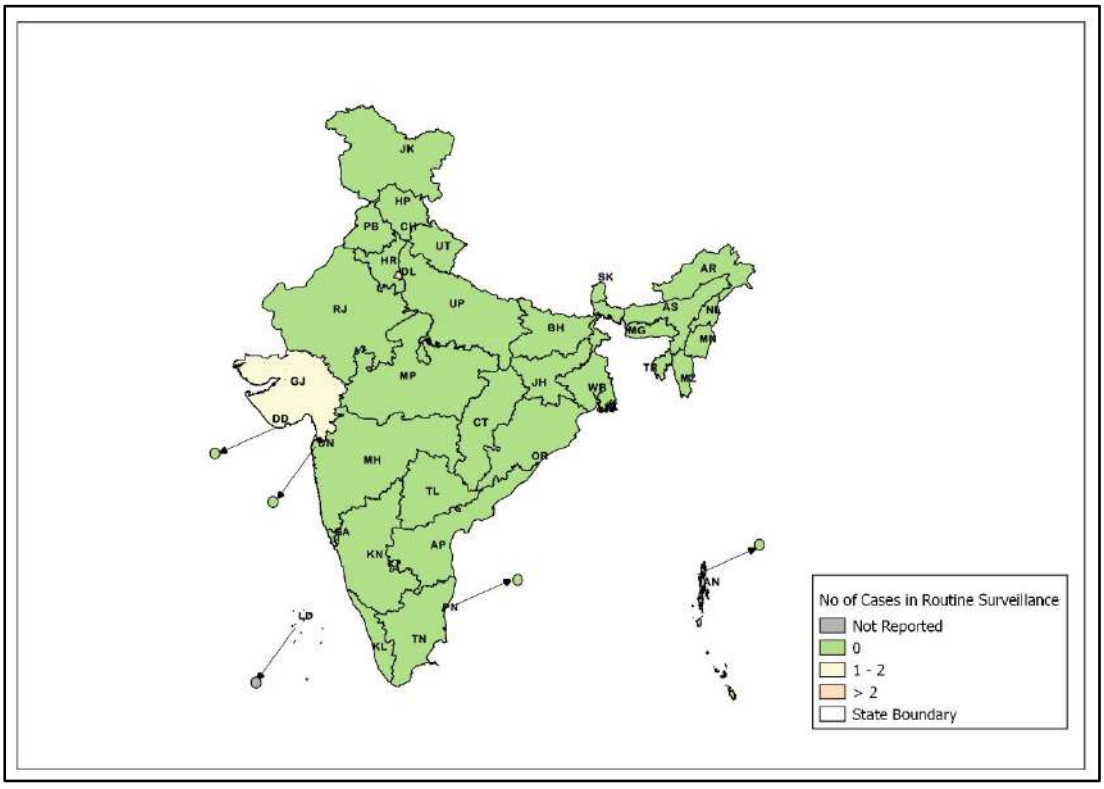


Fig 18: State/UT wise Presumptive Viral Hepatitis cases and outbreaks for December 2016

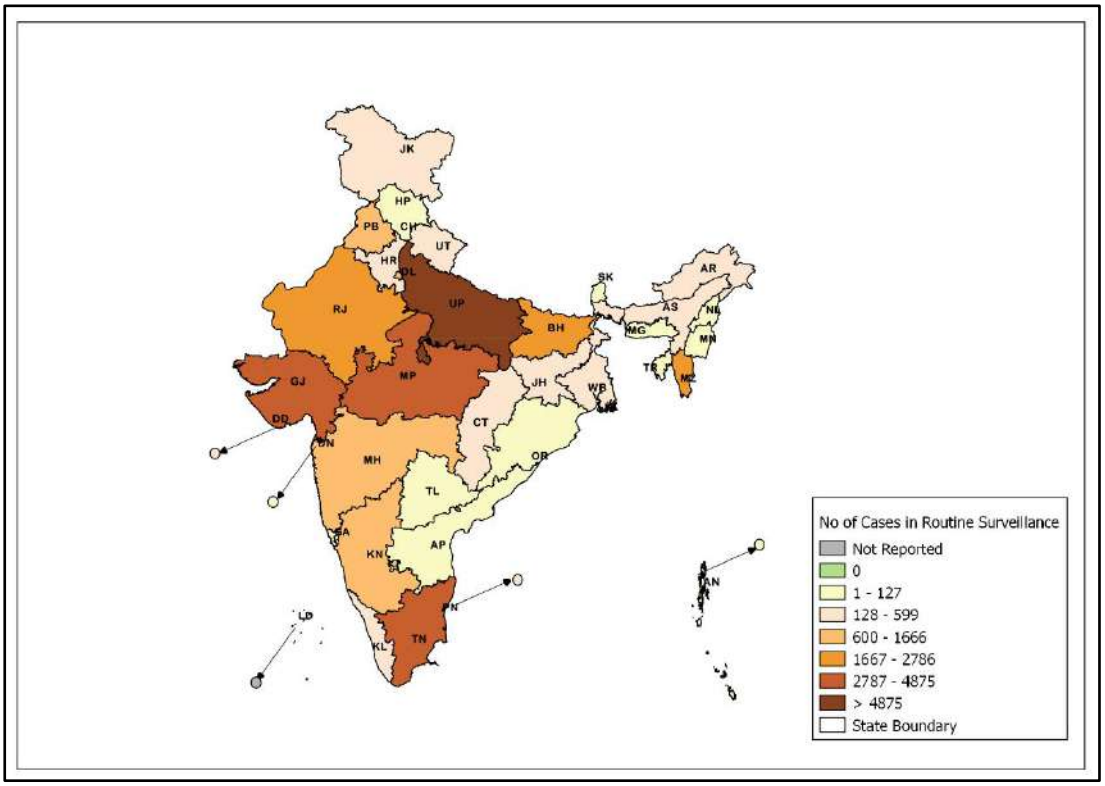


Fig 19: State/UT wise Lab confirmed Viral Hepatitis A cases and outbreaks for December 2016

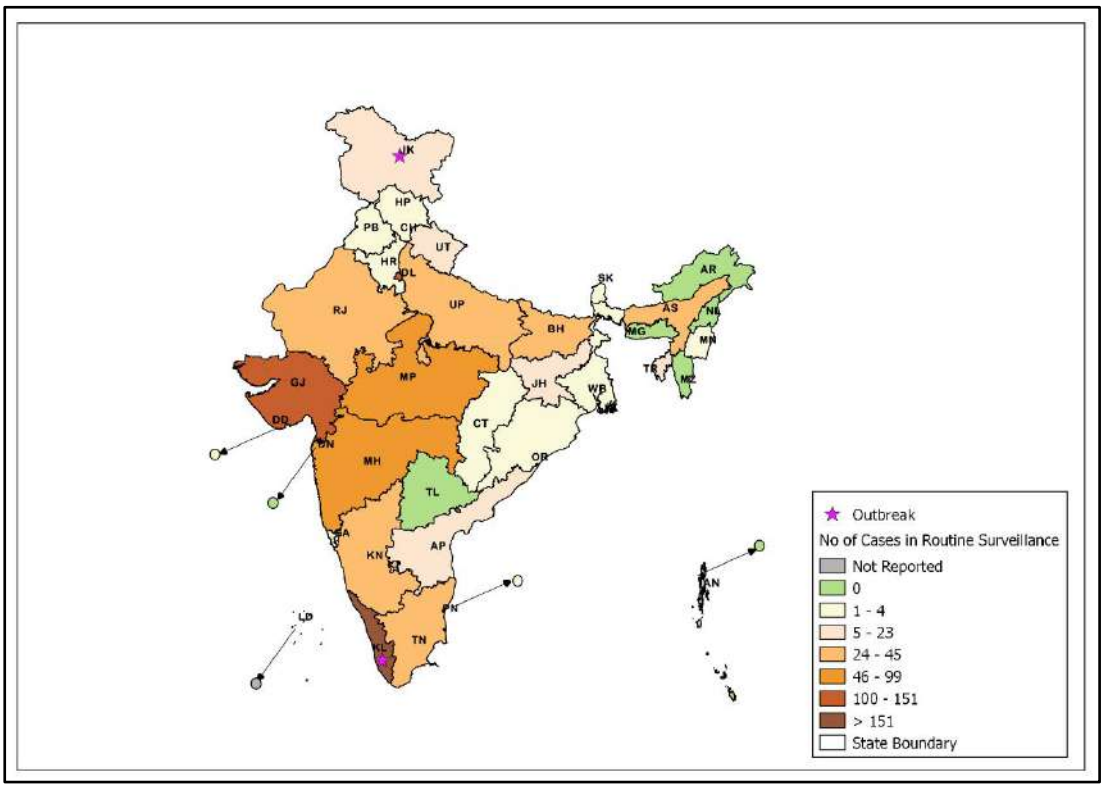


Fig 20: State/UT wise Lab confirmed Viral Hepatitis E cases for December 2016

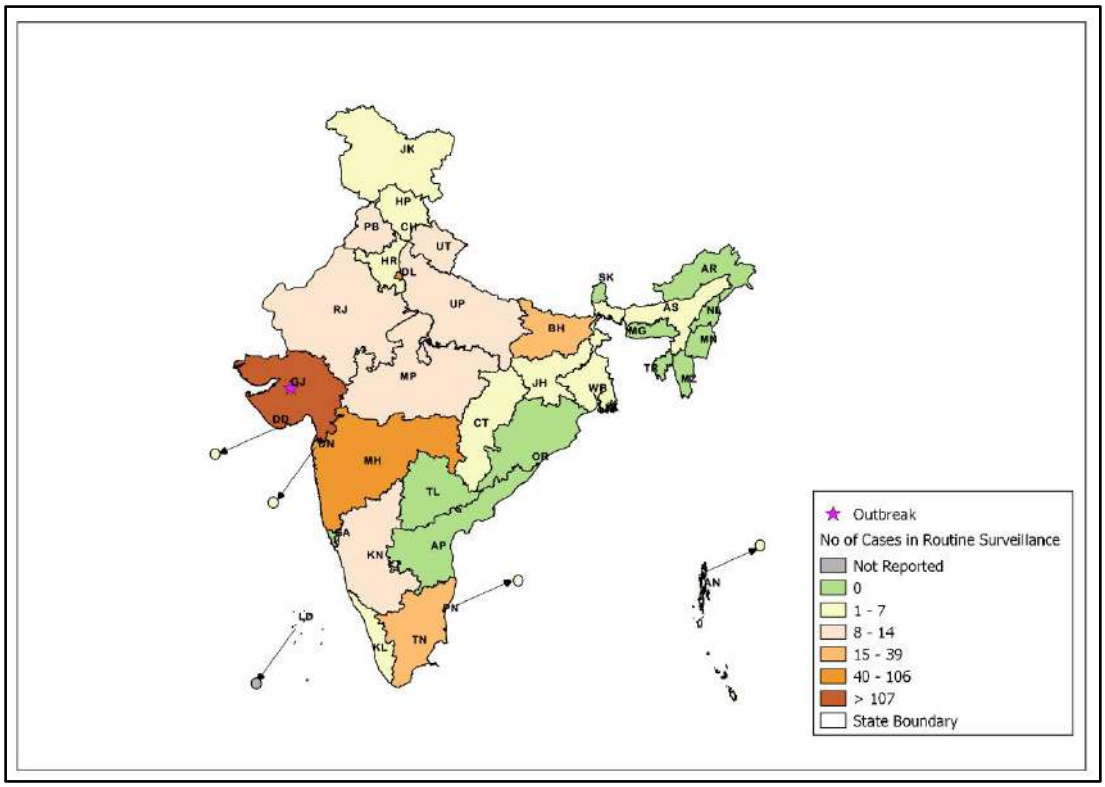


Fig 21: State/UT wise Presumptive Dengue cases & outbreaks for December 2016

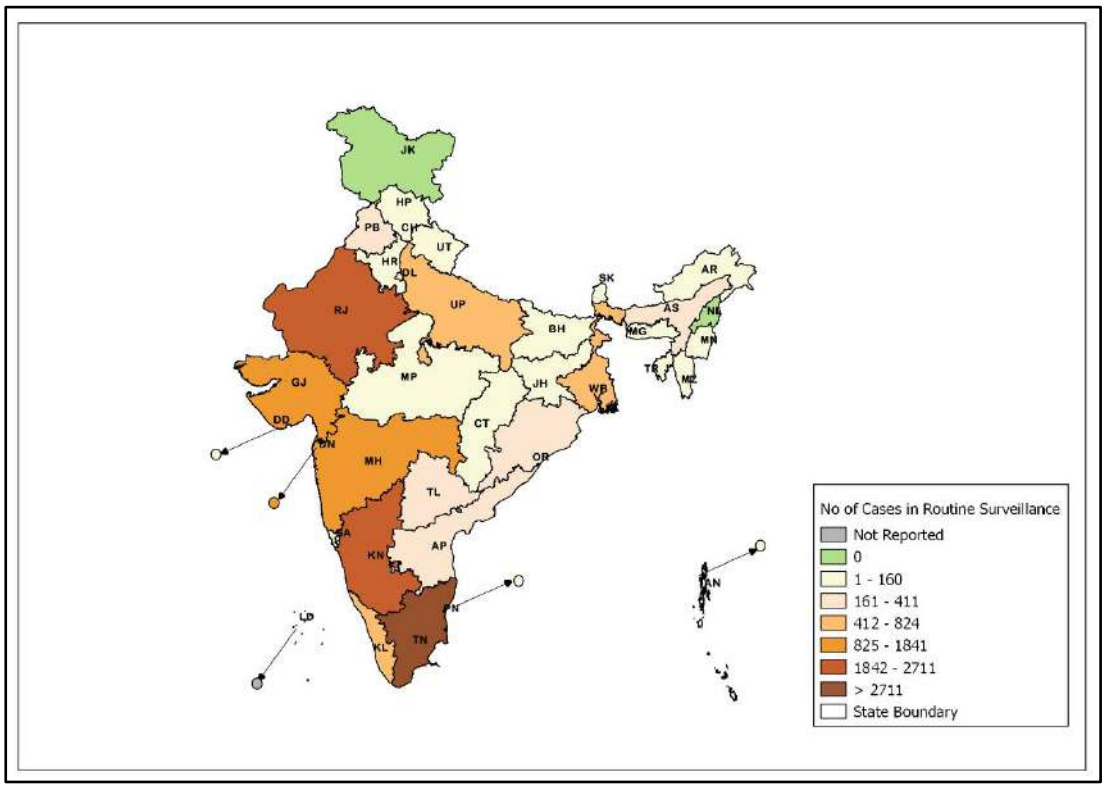


Fig 22: State/UT wise Lab confirmed Dengue cases & outbreaks for December_2016

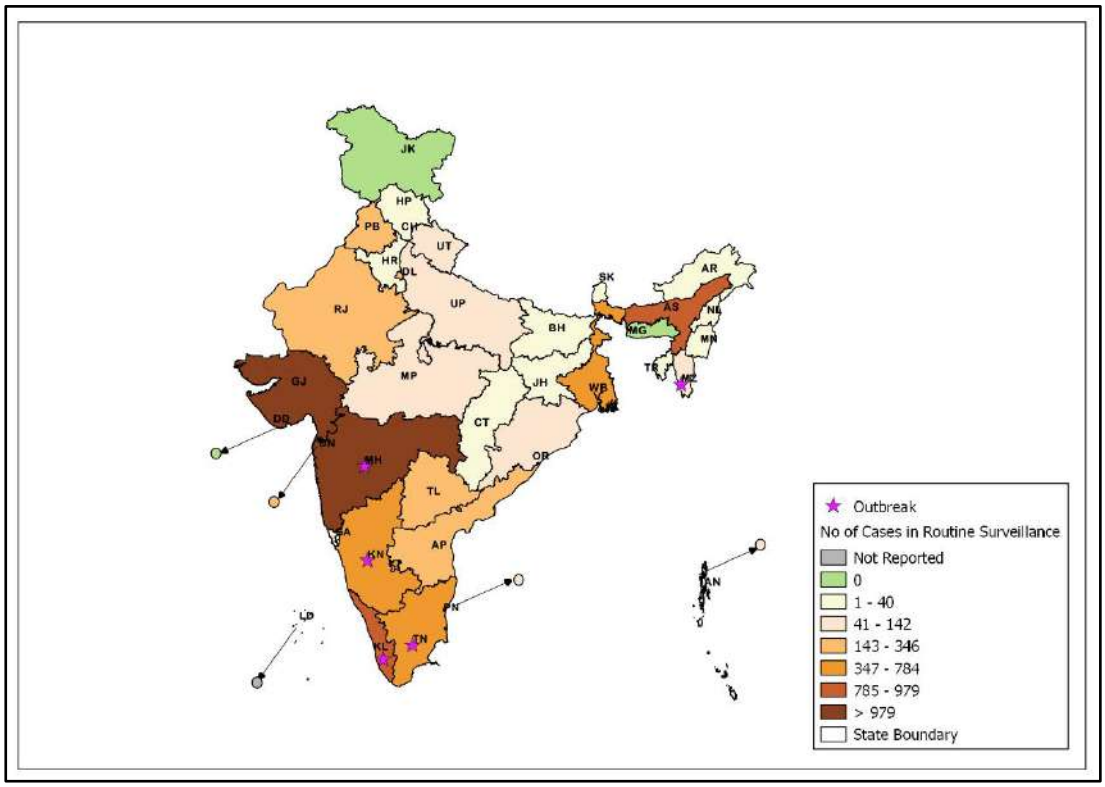


Fig 23: State/UT wise Presumptive Leptospirosis cases for December_2016

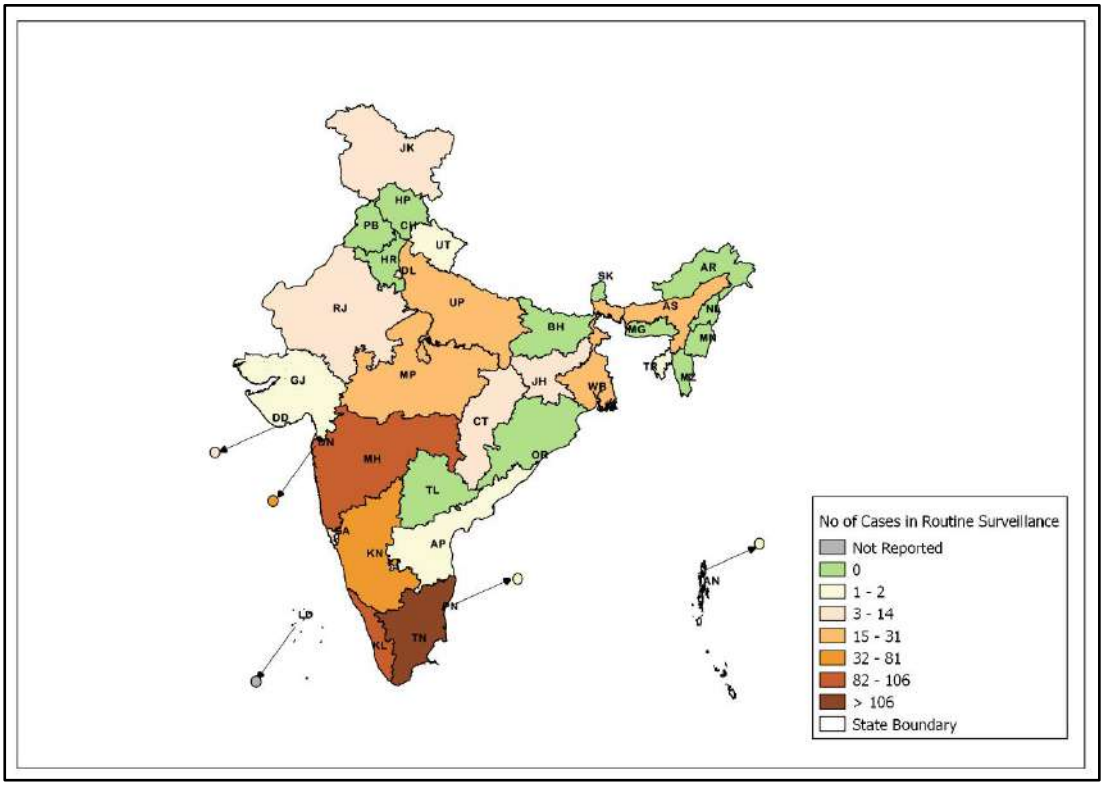


Fig 24: State/UT wise Lab Confirmed Leptospirosis cases & outbreaks for December 2016

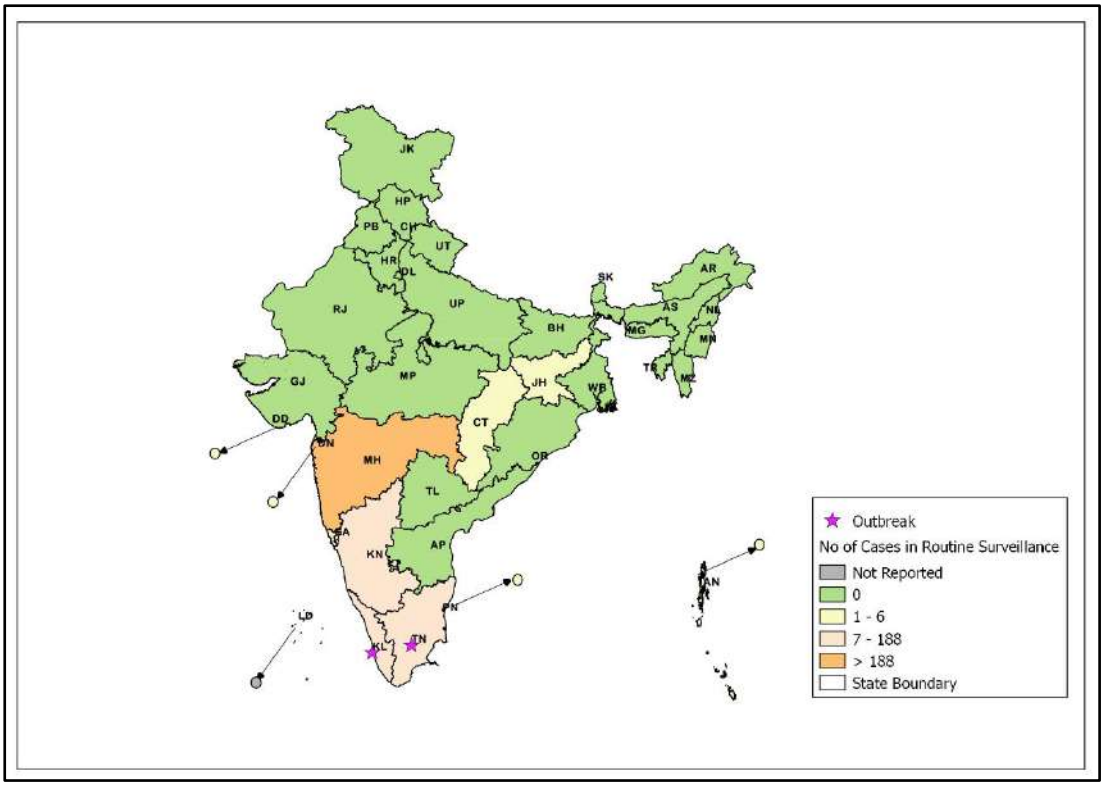


Fig 25: State/UT wise Presumptive Chikungunya cases & outbreaks for December 2016

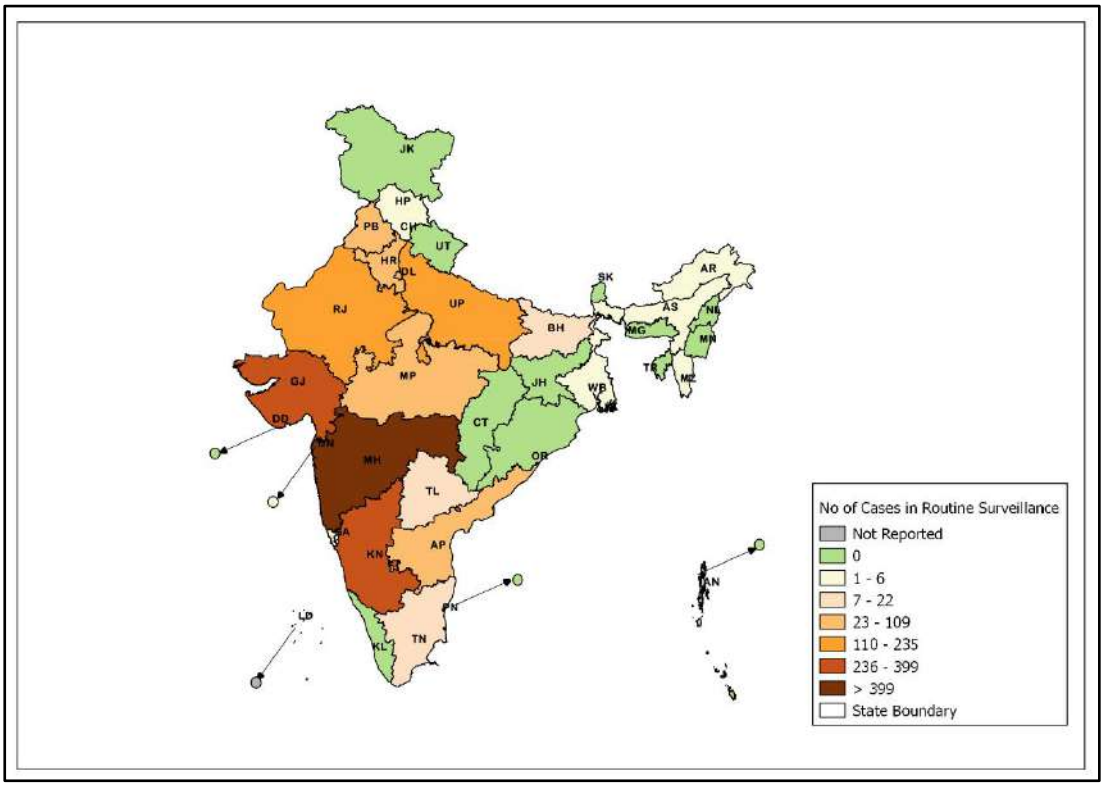


Fig 26: State/UT wise Lab Confirmed Chikungunya cases & outbreak for December_2016

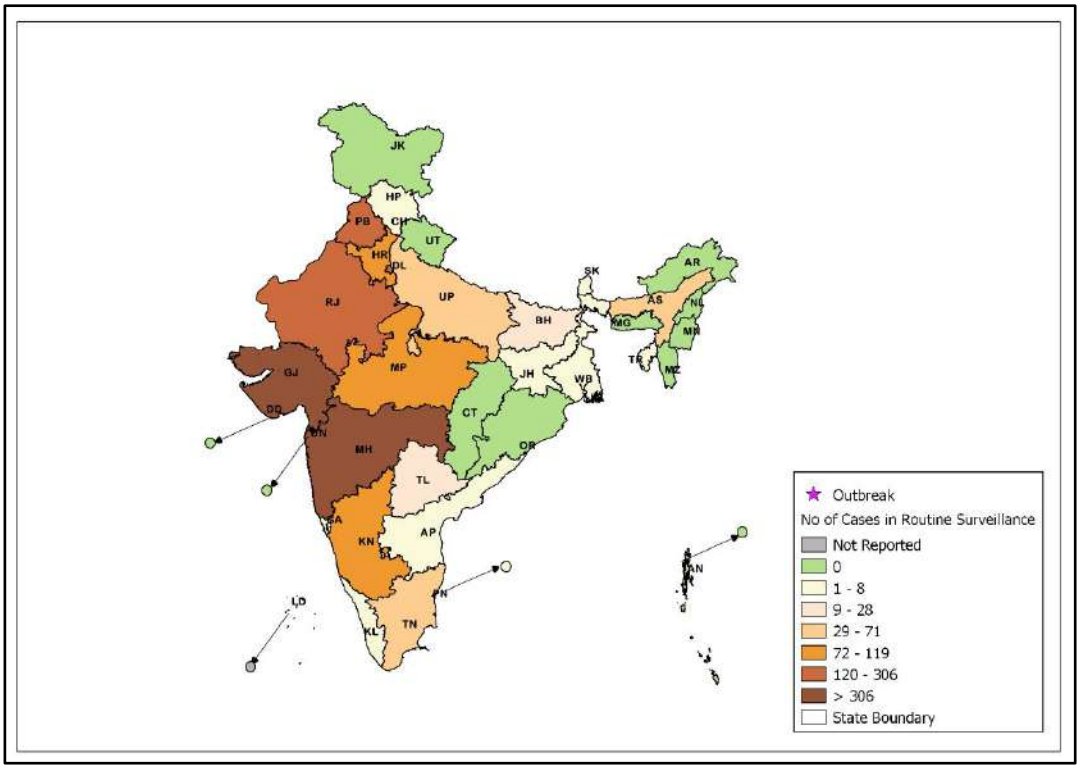
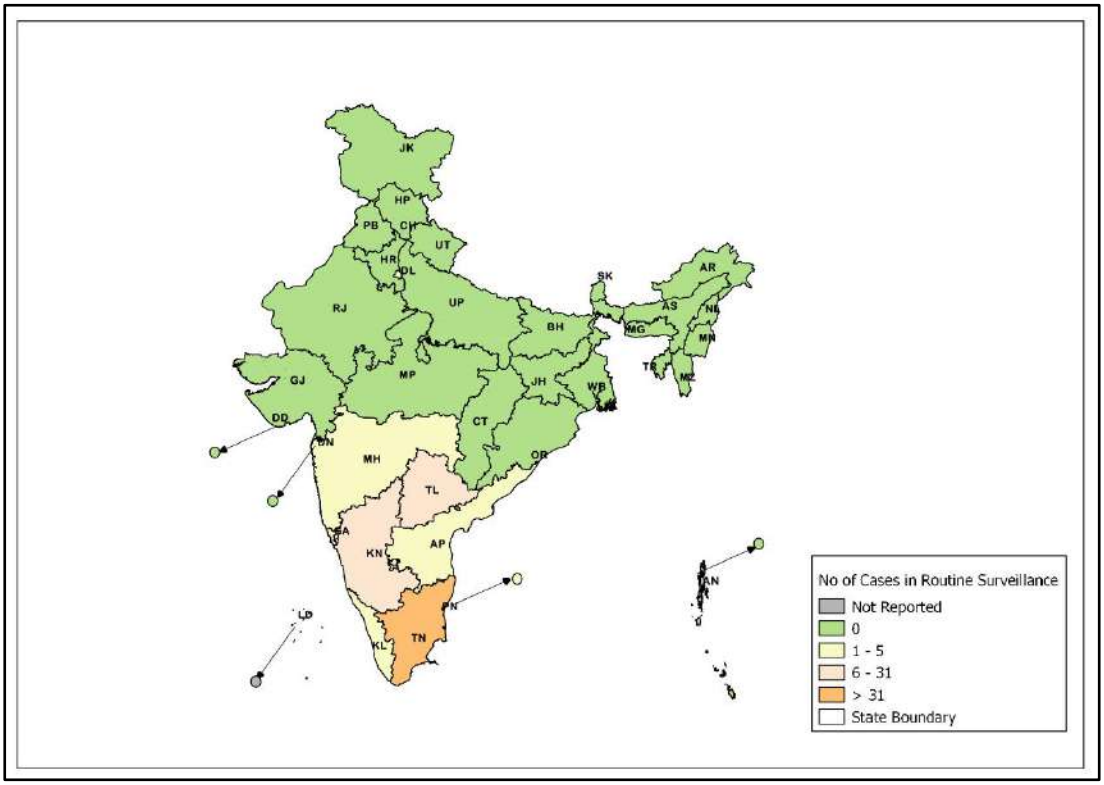


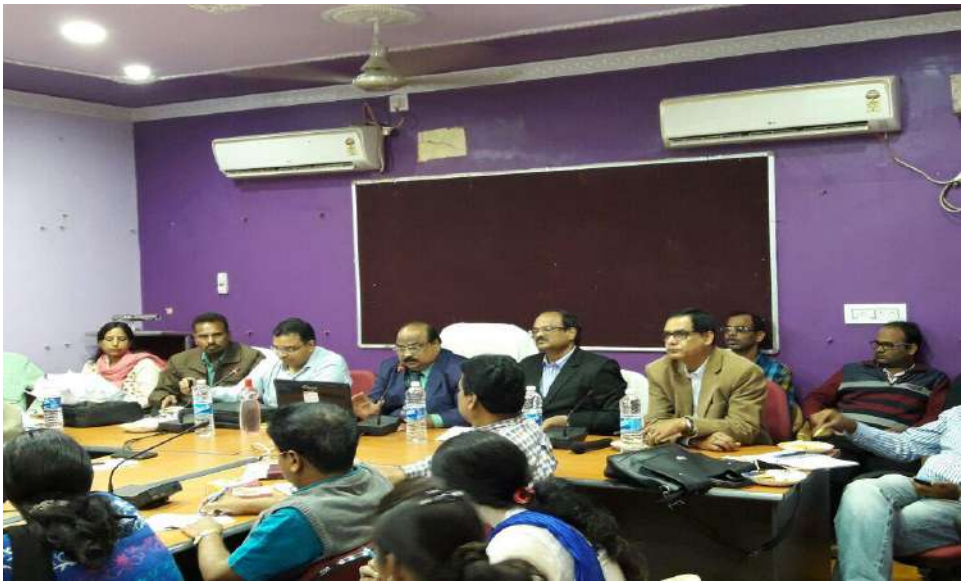
Fig 27: State/UT wise Influenza A (H1N1) cases & outbreak for December_2016



Action from the field

- Dr Pranay Verma Asstt. Director IDSP visited to Andhra Pradesh for IDSP State Review meeting from 26 to 29.12.16.

- Dr Jyoti Asstt. Director IDSP visited to Ranchi, Jharkhand for Kala Azar Review meeting from 29 to 31.12.16.
- Dr Sanket Kulkarni Asstt. Director IDSP visited Khorda, Odisha to investigate an outbreak of avian flu from 27.12.16 to 04.01.17.



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.

Acknowledgement:

This Disease Alert from IDSP acknowledges the contribution of Dr. S. Venkatesh Director NCDC, Dr. Pradeep Khasnobis NPO IDSP, and Dr. Jyoti Asstt. Director IDSP, Ms. Ritu Malik Consultant GIS IDSP, Mr. Priyank Pandya Communication Officer IDSP, Mr. Prasun Sharma Statistician-cum-Programmer IDSP & Ms. Sujata Malhotra Data Manager IDSP.

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