1129810/2018/O/O NCDC

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Disease Alert
प्रकोप चेतावनी

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

July 2018

Inside

Investigation of Cholera Outbreak at Bhadola Village, Model Town, North District, Delhi

Background

On 10th May 2018 clustering of 5 laboratory confirmed cholera cases of village Bhadola, Model town sub district of North district of Delhi were reported to Central Surveillance Unit (CSU), IDSP by district surveillance unit of north Delhi district surveillance unit (DSU) of IDSP. Cases were tested and confirmed by Maharishi Valmiki Infectious disease hospital (MVIDH). Two Epidemic intelligence officers along with other officials of NCDC and state officials visited the affected area on 11th May. Investigation was done to describe and confirm the outbreak, determine the risk factors and recommendation to control and prevention.

Methodology

For confirmation of outbreak we compared the reported cholera cases for the past 3 year for the month of April and May of Delhi, north Delhi, Village Bahoda.

A suspect case of cholera was defined as "history of 3 or more than 3 loose stool in a resident of village Bahoda between 1st April to 27th of May and laboratory confirmed case as a suspect case whose sample tested positive for *Vibrio cholerae culture*".

We searched house to house for suspect case identification and also enhance passive surveillance at MVIDH, Indira Nagar Municipal Corporation of Delhi dispensary and three other local private health providers. Unmatched1:1 case control study was done to determine risk factors. Control was defined as absence of three or more than tree loose stool in a resident of village Bahoda between 1 April and 27 May 2018. Stool samples for *Vibrio cholerae,* O1and O139, salmonella, and shigella species were tested by culture at Maharshi Valmiki Infectious Disease Hospital, Delhi. We tested drinking water sample by most probable number (MPN) for bacteriological examination (feacal coliform) at MVIDH laboratory, Delhi. Drinking water samples were also tested for residual chlorine by Ortho toludine test. We also assessed drinking water supply and sewage system

Results

129 cases having three or more loose stools within 24 hours in of which six (5%) were laboratory confirmed for Vibrio cholera. Median age was 14.5 years (range: 5 days-80 years) and there were 67 (52 %) females. Of 129 cases, 35 (27%) were hospitalized and there were no deaths. Symptoms were abdominal pain (70, 54%), vomiting

(57, 44%), and fever (37, 29%). Overall attack rate was 1.79% (129/7208); area 1 had 2.1% (85/3948), area 2 had 1.6% (39/2300), and area 3had 0.5% (5/960) (Table 1). The epidemic curve shows multiple peaks and long time span, indicating a propagated outbreak.

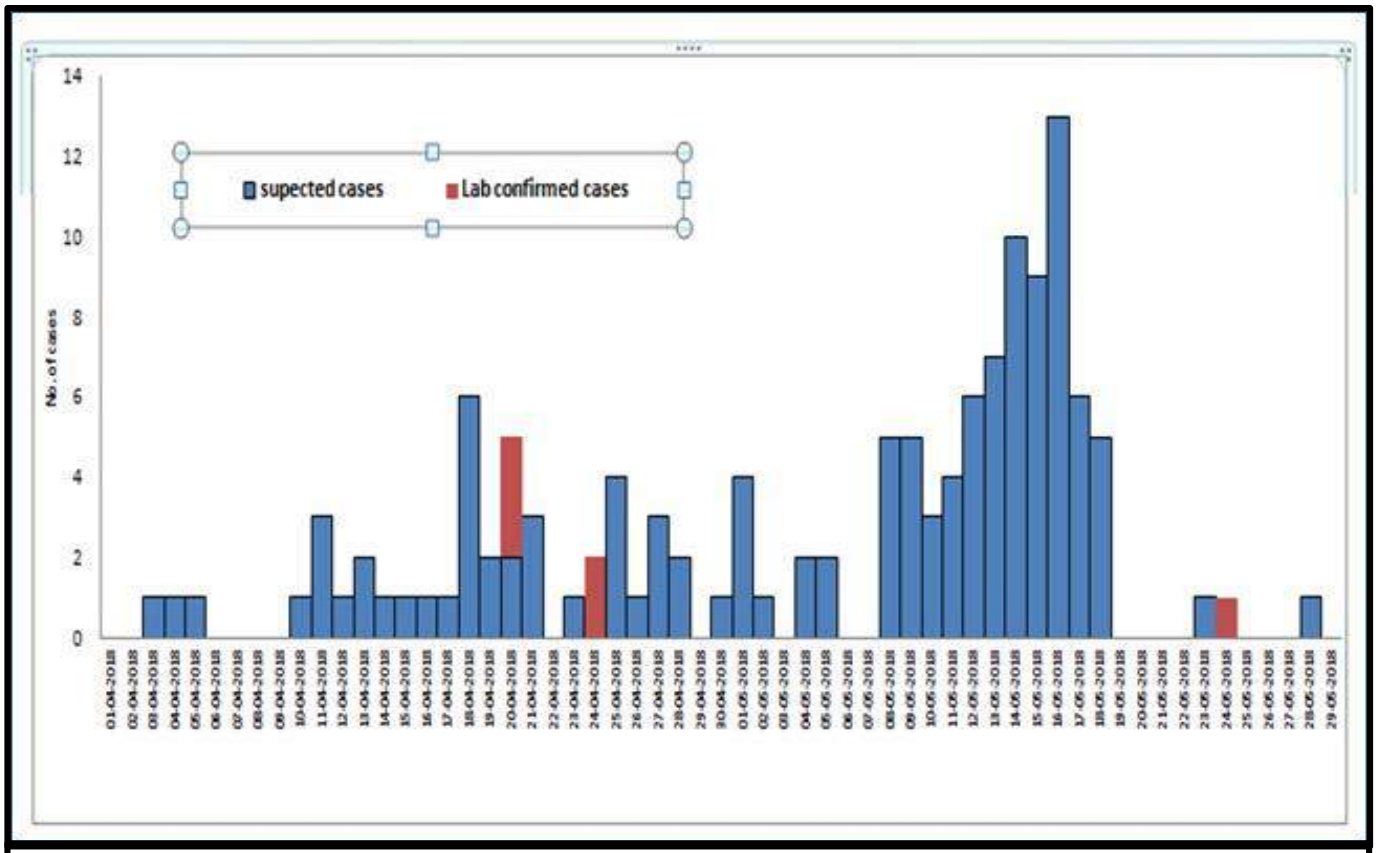


Fig. 1: ***Acute diarrheal diseases and Vibrio cholera cases by date of illness onset, village Bhadola, North Delhi. India, April-May 2018 (N=129)***

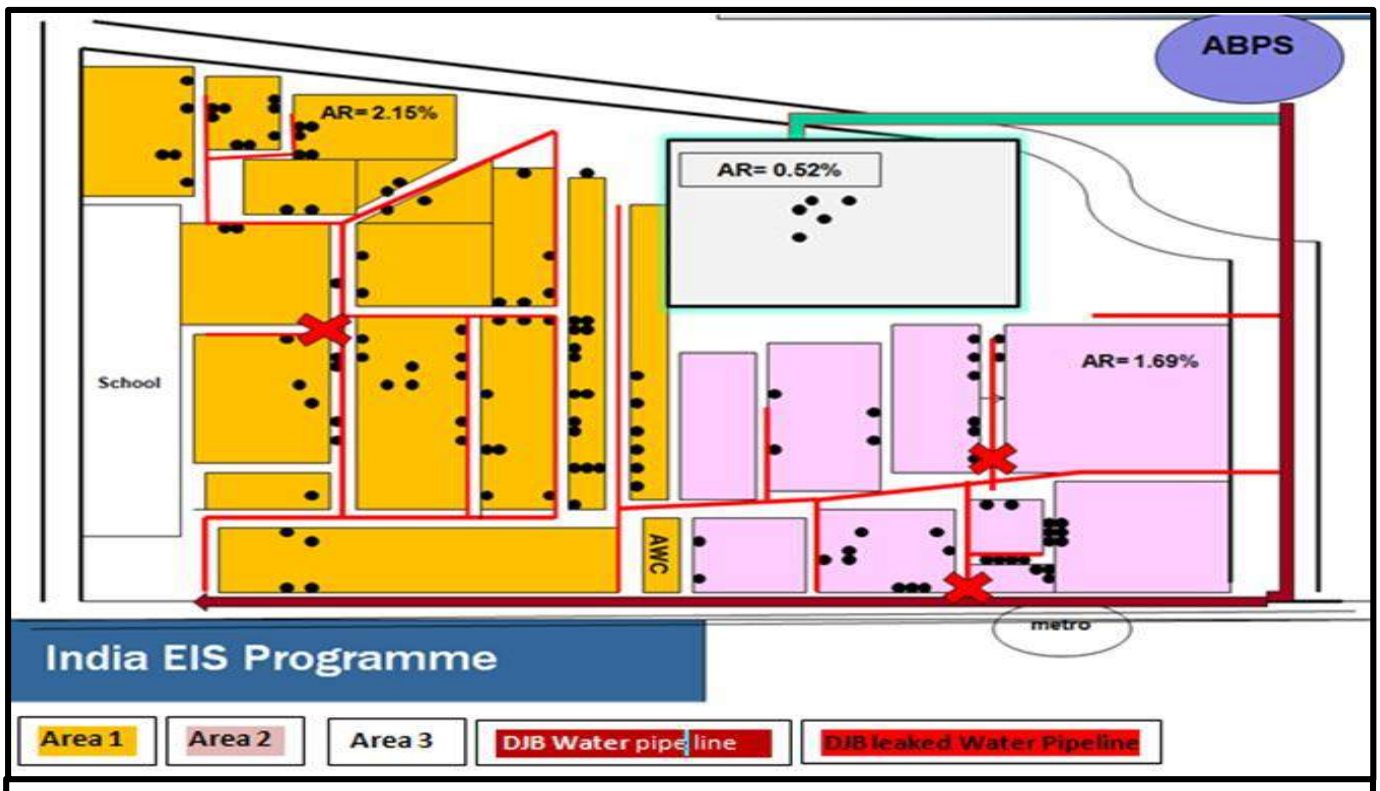


Fig. 2: ***Acute diarrheal diseases and Vibrio cholera cases, village Bhadola, North Delhi, India, April-May 2018 (N=129)***

Table 1: ***Description of acute diarrheal diseases and Vibrio cholera cases, village Bhadola, District North, Delhi, India, 1 April - 29 May 2018 (N=129)***

Cases	**n**	**%**
Suspect	123	95
Laboratory confirmed	6	5
Median age in years (range)	14.5 (5 days-80 years)	-
Cases ≤ 5 year	47	36
Female	67	52
Hospitalized	35	27
Died	0	0
Median duration of illness (range)	3 days (1-30 days)	
Attack rate (cases/population)	129/7208	1.79
Area 1	85/3948	2.15
Area 2	39/2300	1.69
Area 3	5/960	0.52
Symptoms		
>3 loose stools in 24hours	129	100
Abdominal pain	70	54
Vomiting	57	44
Fever	37	29
Other (cough, headache, body ache, hypertension)	6	5
Treatment		
Intra venous fluid	23	18

Case control study was conducted with 45 cases and 45 control. Statistically significant association was found between drinking municipal/DJB supply water, drinking untreated (boiled, filtered, or chlorinated) water, and not always washing hands with soap before beverage/food consumption ($p<0.05$).

Logistic regression analysis showed that odds of illness were 3.72 (95% CI: 1.09, 12.63) times higher among those who drank municipal/DJB supplied water, and 3.03 (95% CI: 1.27, 7.19) times higher among those who did not boil/filter/chlorinate/treat water before drinking, and 9.51 (95% CI: 1.13, 79.60) times higher among those who did not always wash hand with soap before beverage/food consumption than those who did. (Table 2).

Table 2: ***Multivariate analysis for selected exposure, village Bhadola, District North, Delhi 1April-29 May 2018 (N=90)***

	OR	**95%CI**	**aOR**	**95%CI**
Drinking water source at home-Delhi Jal Board (DJB)	**3.72**	**1.09-12.63**	2.58	0.65-10.17
Does not boils/filters/chlorinates/treats water before drinking	**3.03**	**1.27-7.19**	2.40	0.88-6.52
Does not always washes hand with soap before beverage/food consumption	**9.51**	**1.13-79.60**	**11.58**	**1.33-100.41**

In the multivariable regression logistic regression model we found that odds were 11.58 (95% CI: 1.33, 100.41) times higher among those who did not always wash hand with soap before beverage/food consumption than those who did after controlling for municipal/DJB supplied water and treating drinking water.

Of 12 stool samples collected from active cases, 6 (50%) tested positive for *Vibrio cholerae* 01 Ogawa Haitian strain. All tested negative for salmonella, shigella. In environmental results 15 tested for fecal bacteriology, eight (53%) were found unfit. Of 10 tested for free residual chlorine, two (20%) were found unfit. In village Bhadola majority of households (86%) were using booster pumps to draw water from municipal pipelines and were storing drinking water in utensils to meet their daily requirement. At three places drinking water pipeline was found to be leaking and was prone to contamination since it overlapped the open sewage. We found that in village Bhadola the sewage system was open

Conclusions

This was a laboratory confirmed cholera outbreak, associated with consumption of contaminated water in village Bhadola prolonged due to person to person transmission in the community. Mixing of drinking water with sewage leading to water contamination was found at multiple sources; municipal water source, no treatment of water at home before consumption, and consuming beverage/food without washing hands with soap were risk factors for illness. It is recommended regarding educating community about hand hygiene and adoption of point of use water treatment before drinking such as boiling and chlorination for prevention of diarrhea and cholera. DJB should set up system for regular monitoring of water quality atdistribution point and also randomly from household level, extensively in North Delhi. Administration (public health department of MCD and DJB) needs to checks for leaks in drinking water pipeline once a week. Ensure that all suspect cases are referred to health care providers for treatment and laboratory investigations.

Prone for cross contamination due to overlapping of pipeline and in close proximity of sewage water. This is the common finding in Bhadola village

Surveillance data of Enteric Fever, Acute Diarrhoeal Disease, Viral Hepatitis A & E, Dengue Leptospirosis and Chikungunya During July 2016 - 2018*

* Data extracted from IDSP Portal (www.idsp.nic.in) as on November 01, 2018.

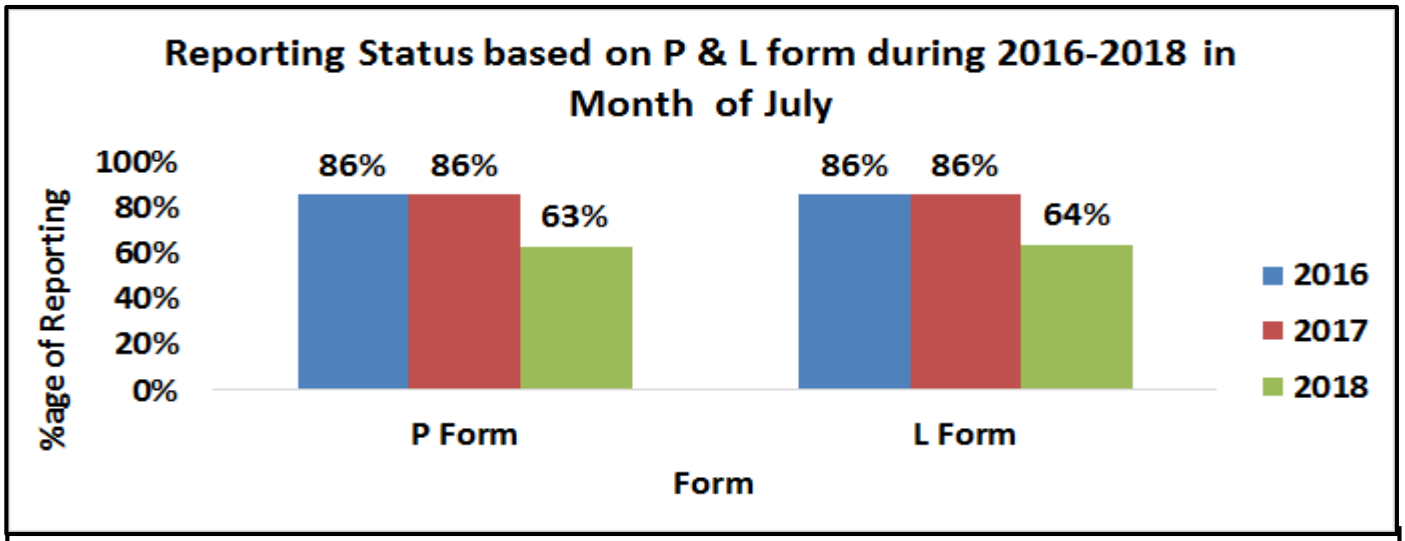


Fig. 3: RU wise reporting based on P & L form during July 2016 - 2018

As shown in Fig 3, in July 2016, 2017 and 2018, the 'P' form reporting percentage (i.e. % RU reporting out of total in P form) was 86%, 86% and 63% respectively across India, for all disease conditions reported under IDSP in P form. Similarly, L form reporting percentage was 86%, 86% and 64% 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 increased over the years in both P and L form, thereby improving the quality of surveillance data.

Fig 4: State/UT wise P form completeness % for July2018

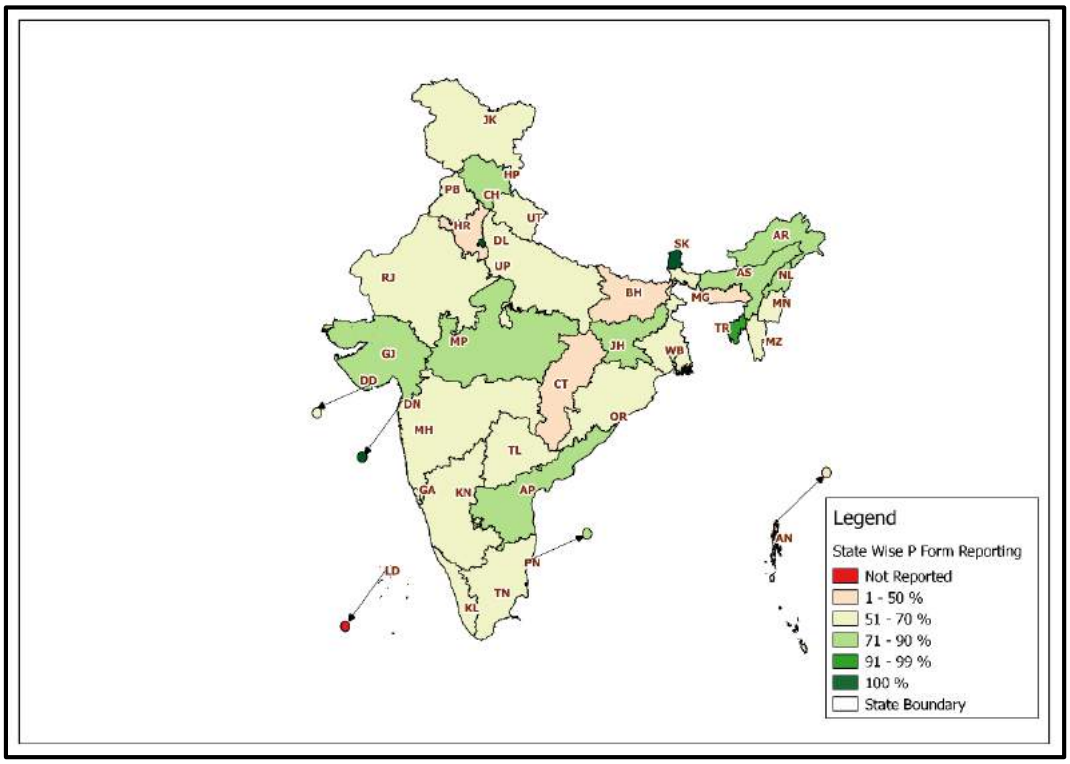
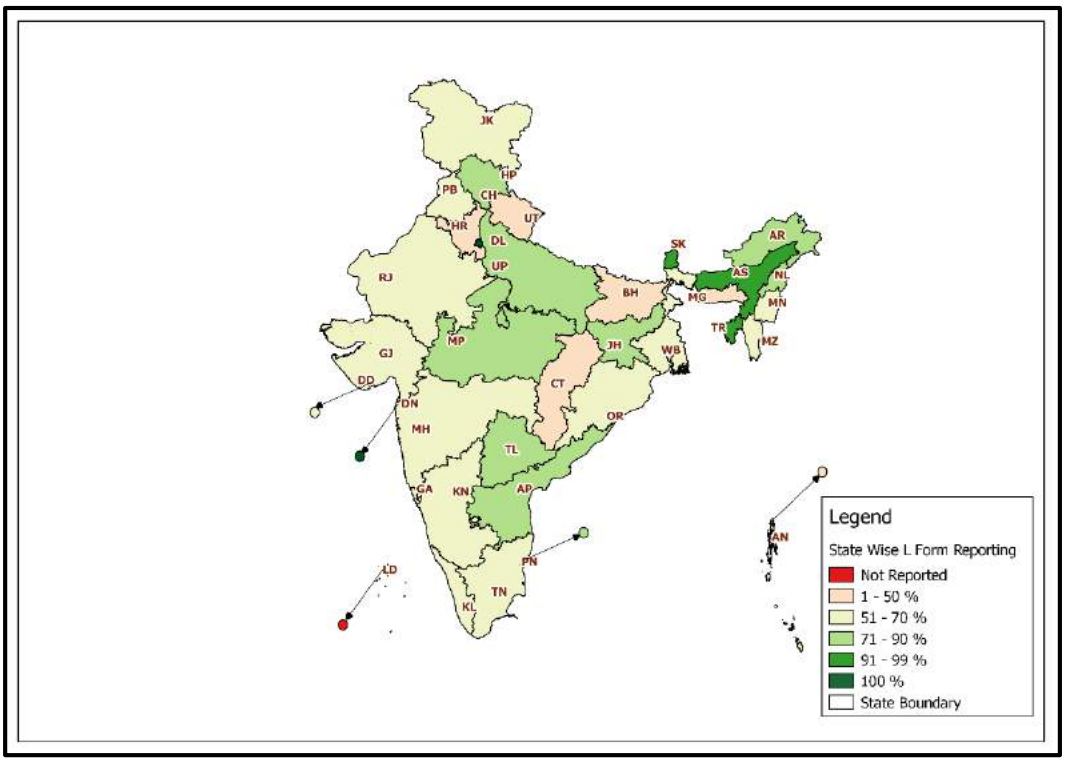


Fig 5: State/UT wise L form completeness % for July2018



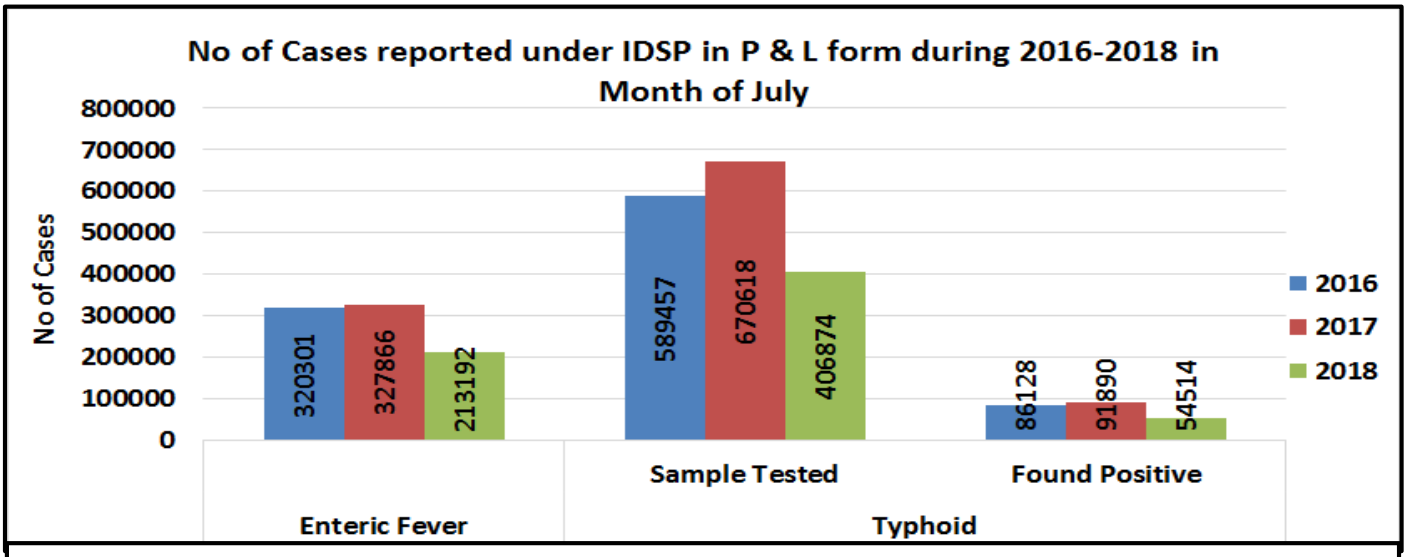


Fig. 6 No. of Enteric Fever Cases reported under P & L form during July 2016 - 2018

As shown in Fig 6, number of presumptive enteric fever cases, as reported by States/UTs in 'P' form was 320301 in July 2016; 327866 in July 2017 and 213192 in July 2018. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in July 2016; 589457 samples were tested for Typhoid, out of which 86128 were found positive. In July 2017; out of 670618 samples, 91890 were found to be positive and in July 2018, out of 406874 samples, 54514 were found to be positive

Sample positivity has been 14.61%, 13.70% and 13.39% in July month of 2016, 2017 & 2018 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: State/UT wise Presumptive Enteric fever cases and outbreaks for July 2018

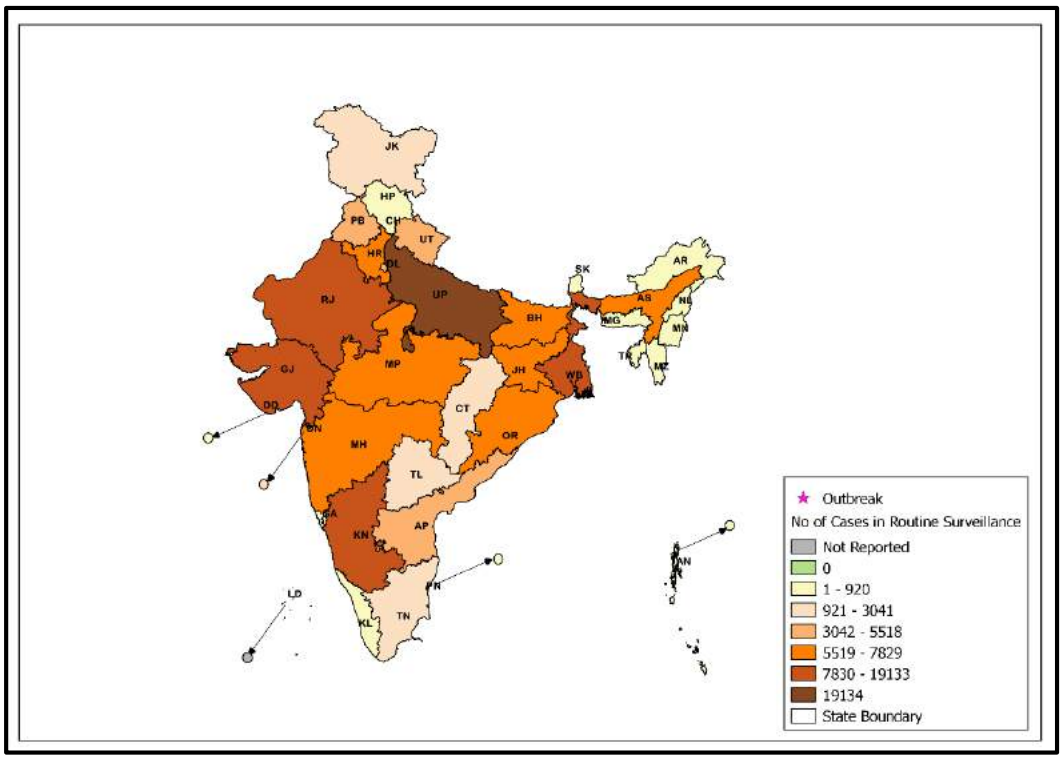
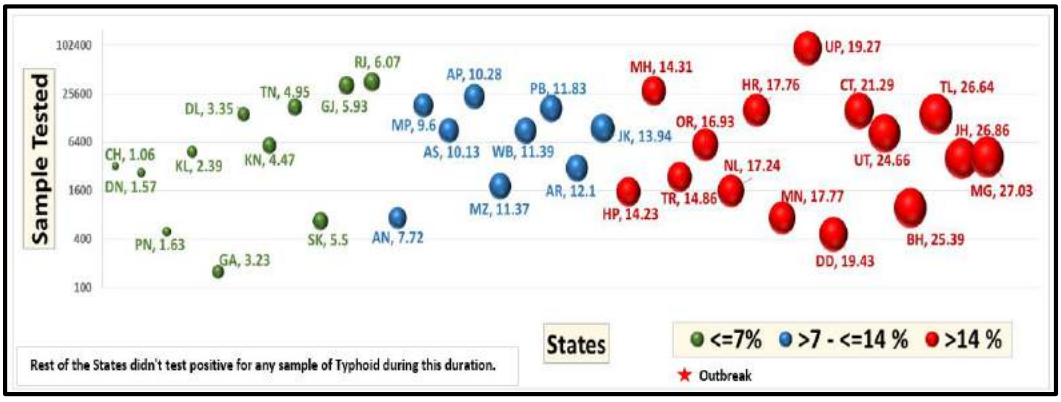


Fig 8: State/UT wise Lab Confirmed Typhoid cases and outbreaks for July 2018



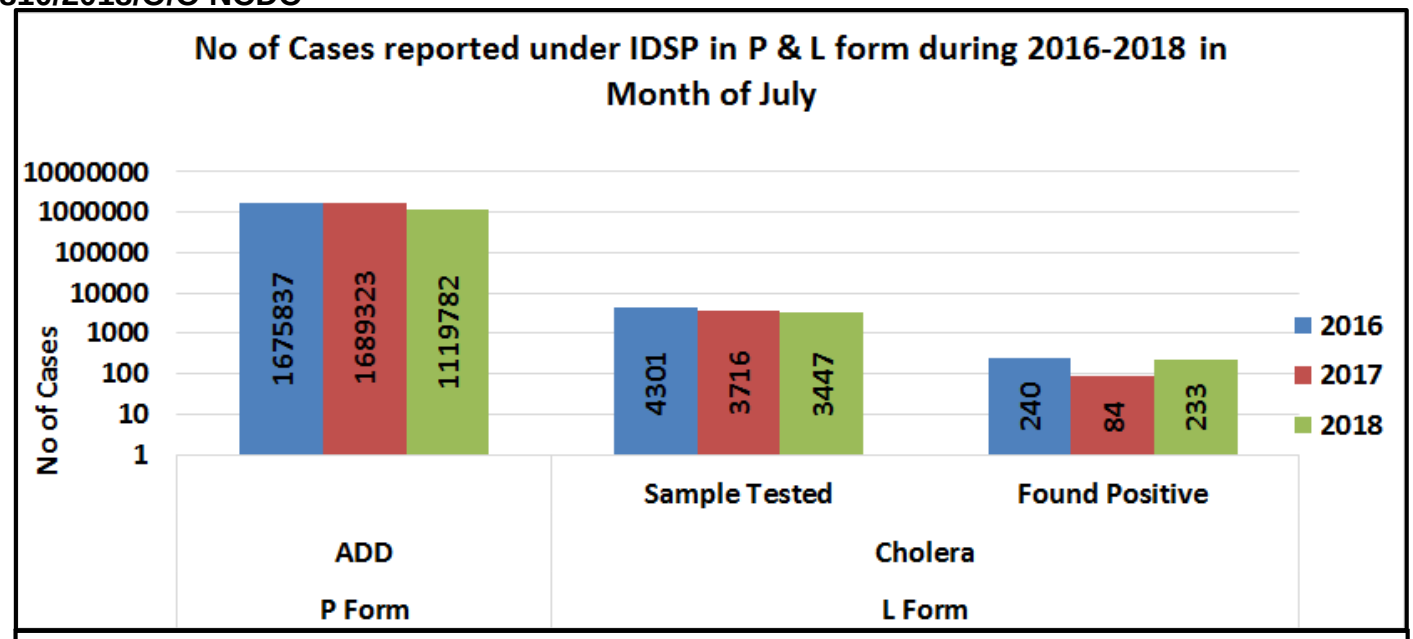


Fig. 9 No. of ADD Cases reported under IDSP in P Form & Cholera Cases in L form during July 2016 - 2018

As shown in Fig 9, number of Acute Diarrhoeal Disease cases, as reported by States/UTs in 'P' form was 1675837 in July 2016; 1689323 in July 2017 and 1119782 in July 2018. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in July 2016, 4301 samples were tested for Cholera out of which 240 tested positive; in July 2017, out of 3716 samples, 84 tested positive for Cholera and in July 2018, out of 3447 samples, 233 tested positive.

Sample positivity of samples tested for Cholera has been 5.58%, 2.26% and 6.76% in July month of 2016, 2017 & 2018 respectively.

Fig 10: State/UT wise Presumptive ADD cases and outbreaks for July 2018

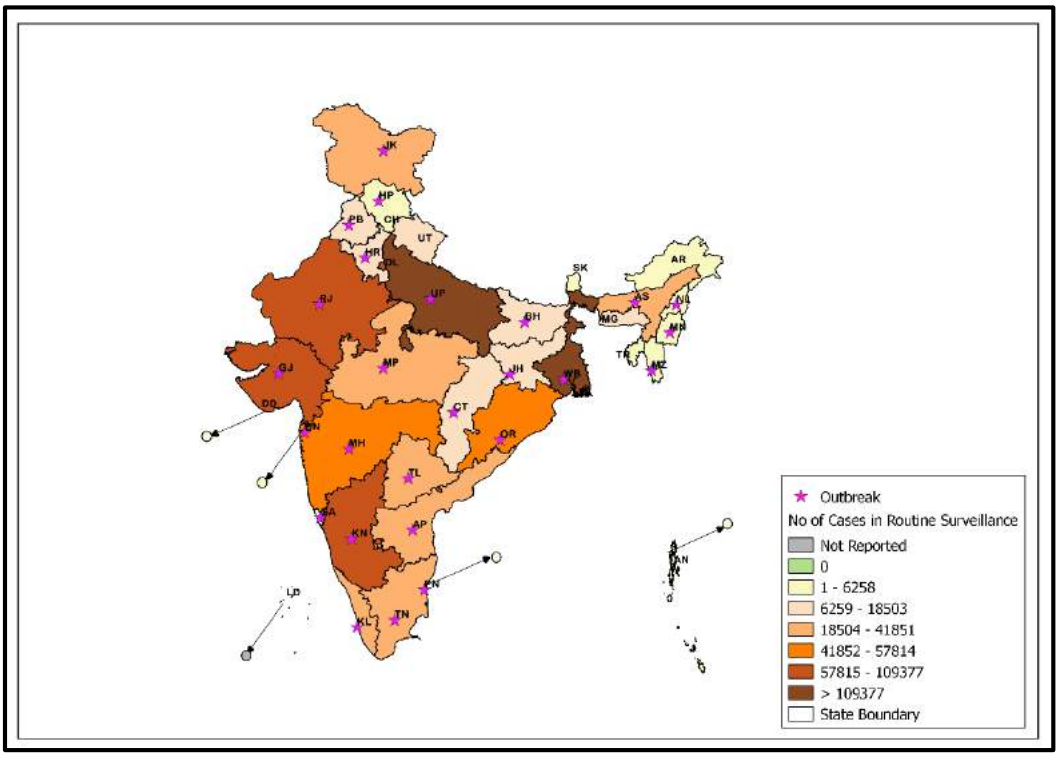
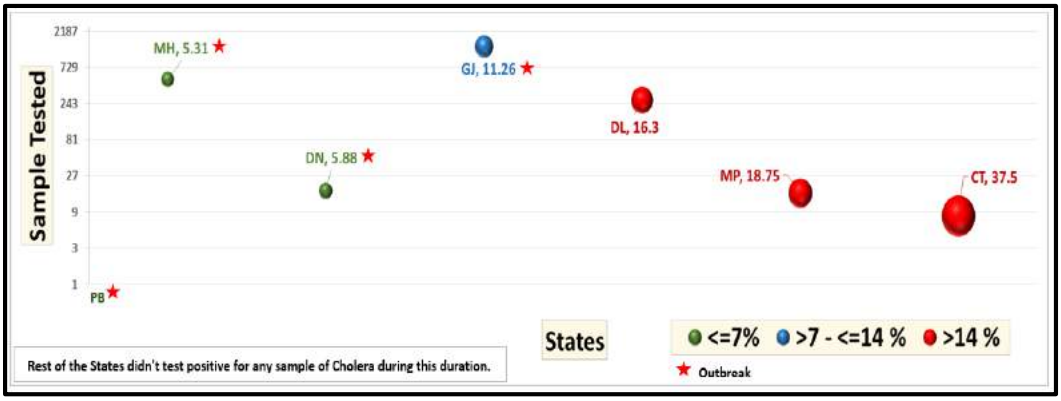


Fig 11: State/UT wise Lab Confirmed Cholera cases and outbreaks for July 2018



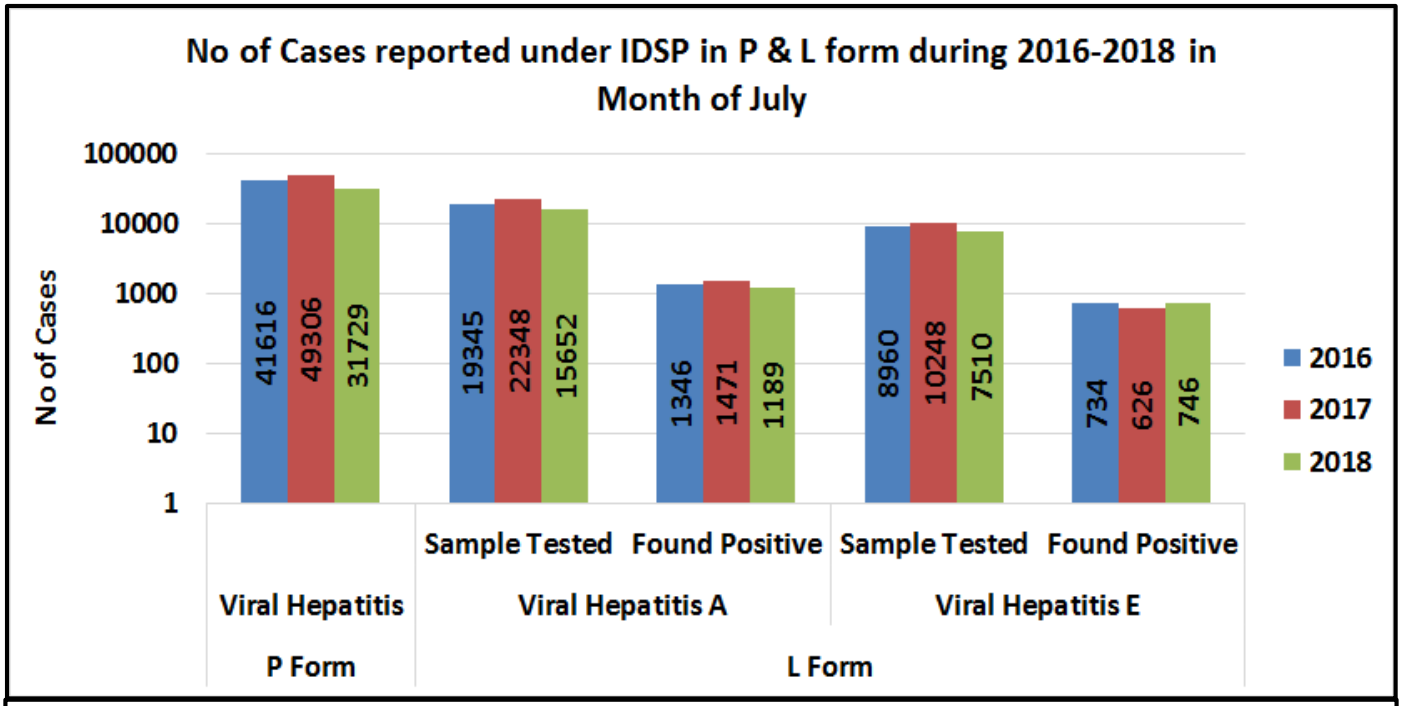


Fig 12: No of Viral Hepatitis Cases reported under IDSP in P form & Viral Hepatitis A & E cases reported under L form during July 2016 - 2018

As shown in Fig 12, the number of presumptive Viral Hepatitis cases was 41616 in July 2016, 49306 in July 2017 and 31729 in July 2018. These presumptive cases were diagnosed on the basis of case definitions provided under IDSP.

As reported in L form for Viral Hepatitis A, in July 2016; 19345 samples were tested out of which 1346 were found positive. In July 2017 out of 22346 samples, 1471 were found to be positive and in July 2018, out of 15652 samples, 1189 were found to be positive.

Sample positivity of samples tested for Hepatitis A has been 6.96%, 6.58% and 7.59% in July month of 2016, 2017 & 2018 respectively.

As reported in L form for Viral Hepatitis E, in July 2016; 8960 samples were tested out of which 734 were found positive. In July 2017; out of 10248 samples, 626 were found to be positive and in July 2018, out of 7510 samples, 746 were found to be positive.

Sample positivity of samples tested for Hepatitis E has been 8.19%, 6.11% and 9.93% in July month of 2016, 2017 & 2018 respectively.

Fig 13: State/UT wise Presumptive Viral Hepatitis A cases and outbreaks for July 2018

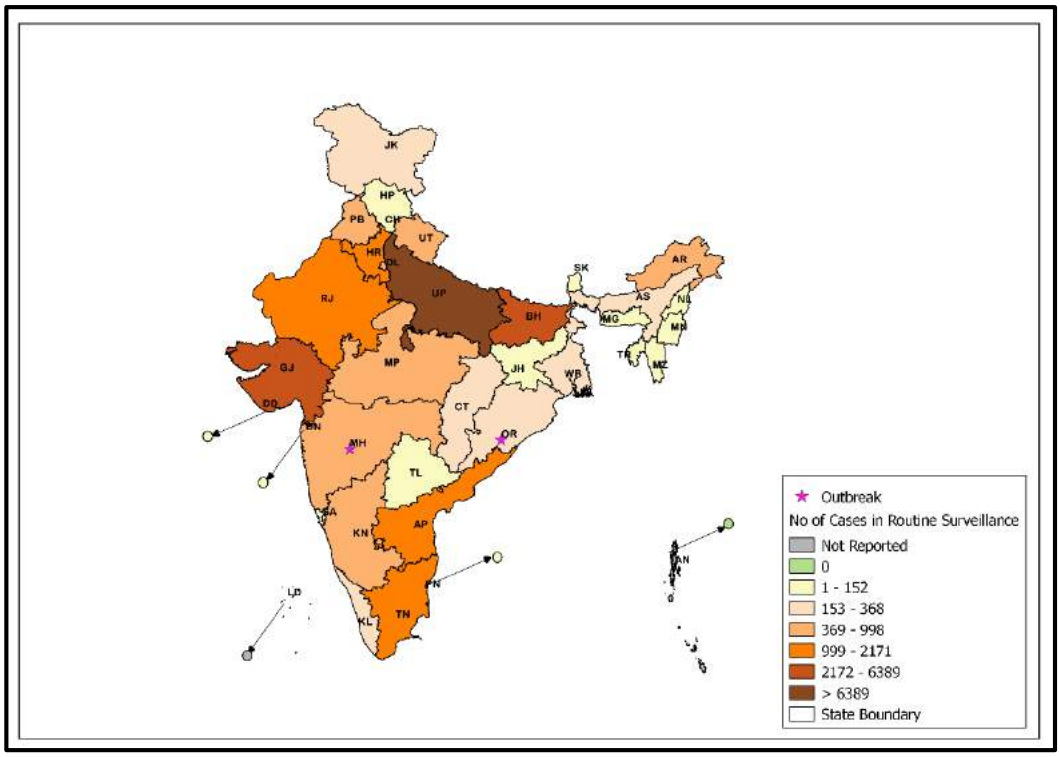


Fig 14: State/UT wise Lab Confirmed Viral Hepatitis A cases and outbreaks for July 2018

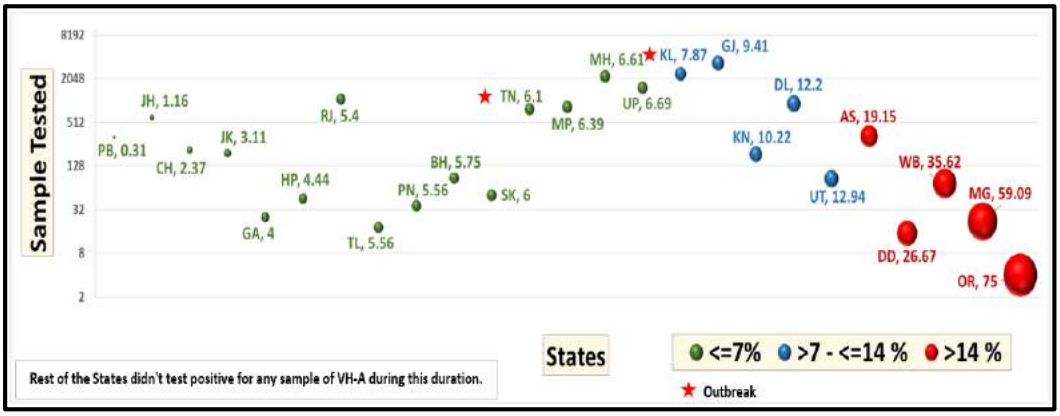
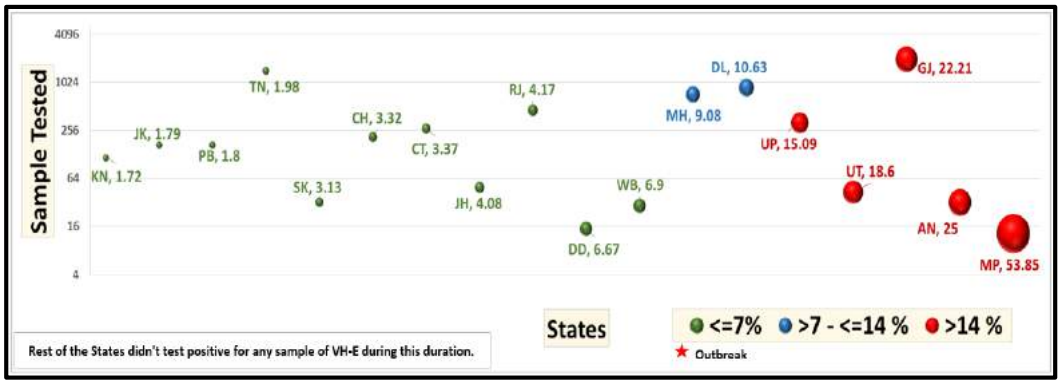


Fig 15: State/UT wise Lab Confirmed Viral Hepatitis E cases and outbreaks for July 2018



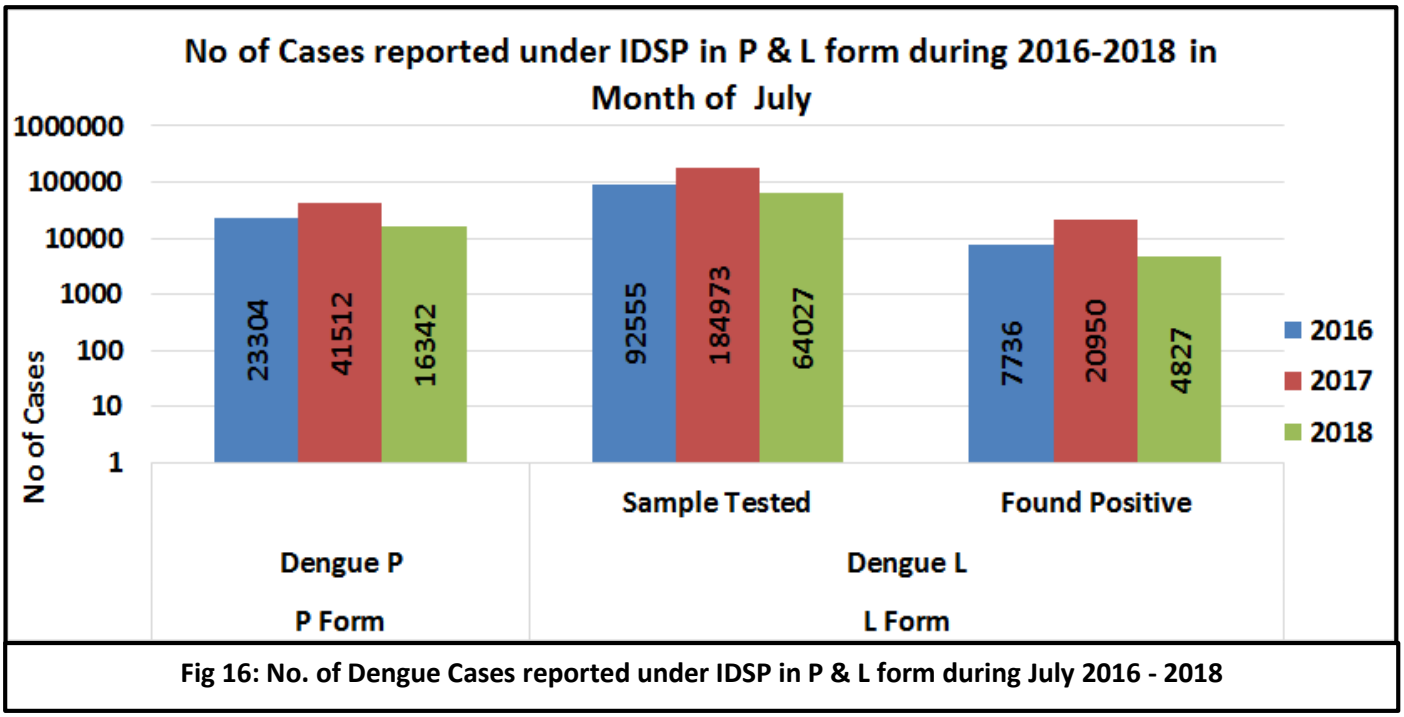


Fig 16: No. of Dengue Cases reported under IDSP in P & L form during July 2016 - 2018

As shown in Fig 16, number of presumptive Dengue cases, as reported by States/UTs in 'P' form was 23304 in July 2016; 41512 in July 2017 and 16342 in July 2018. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in July 2016; 92555 samples were tested for Dengue, out of which 7736 were found positive. In July 2017; out of 184973 samples, 20950 were found to be positive and in July 2018, out of 64027 samples, 4827 were found to be positive.

Sample positivity of samples tested for Dengue has been 8.36%, 11.36% and 7.54% in July month of 2016, 2017 & 2018 respectively.

Fig 17: State/UT wise Presumptive Dengue cases and outbreaks for July 2018

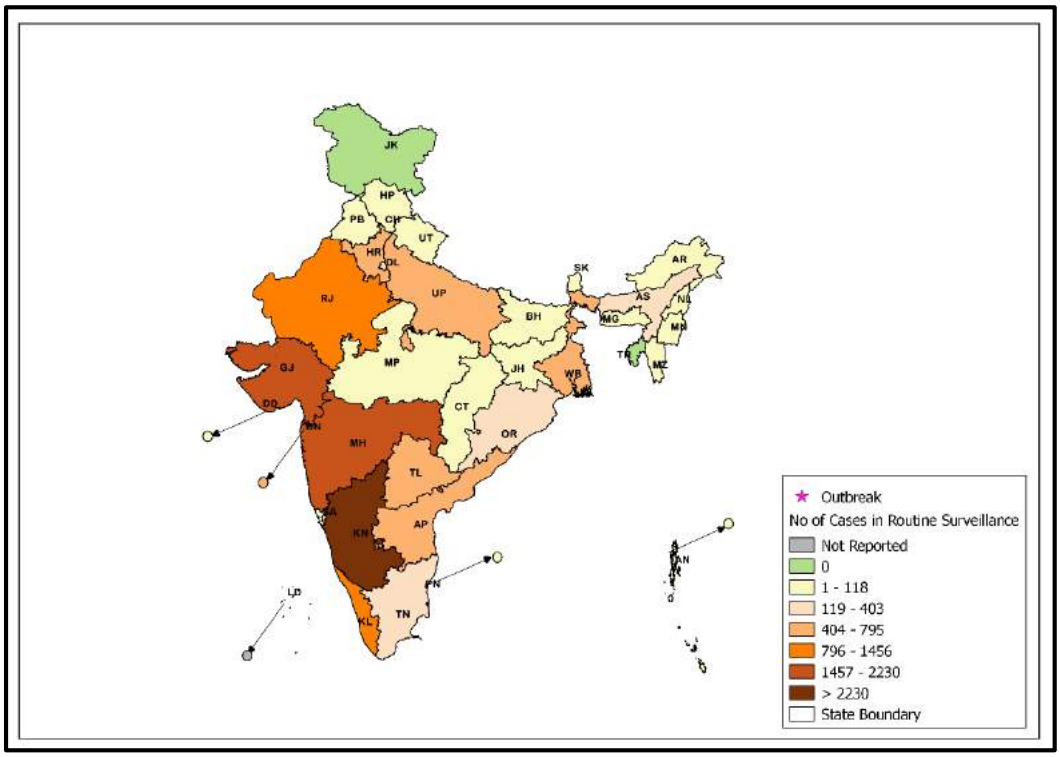
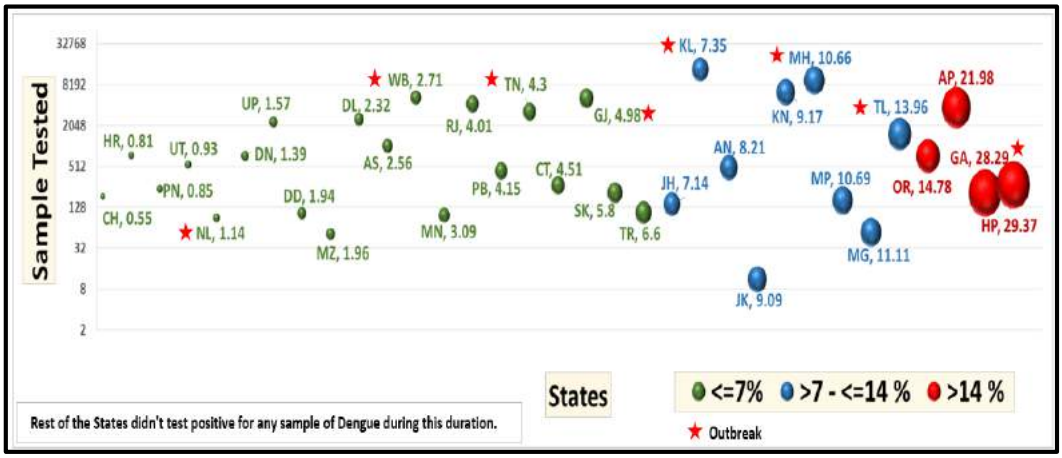


Fig 18: State/UT wise Lab Confirmed Dengue cases and outbreaks for July 2018



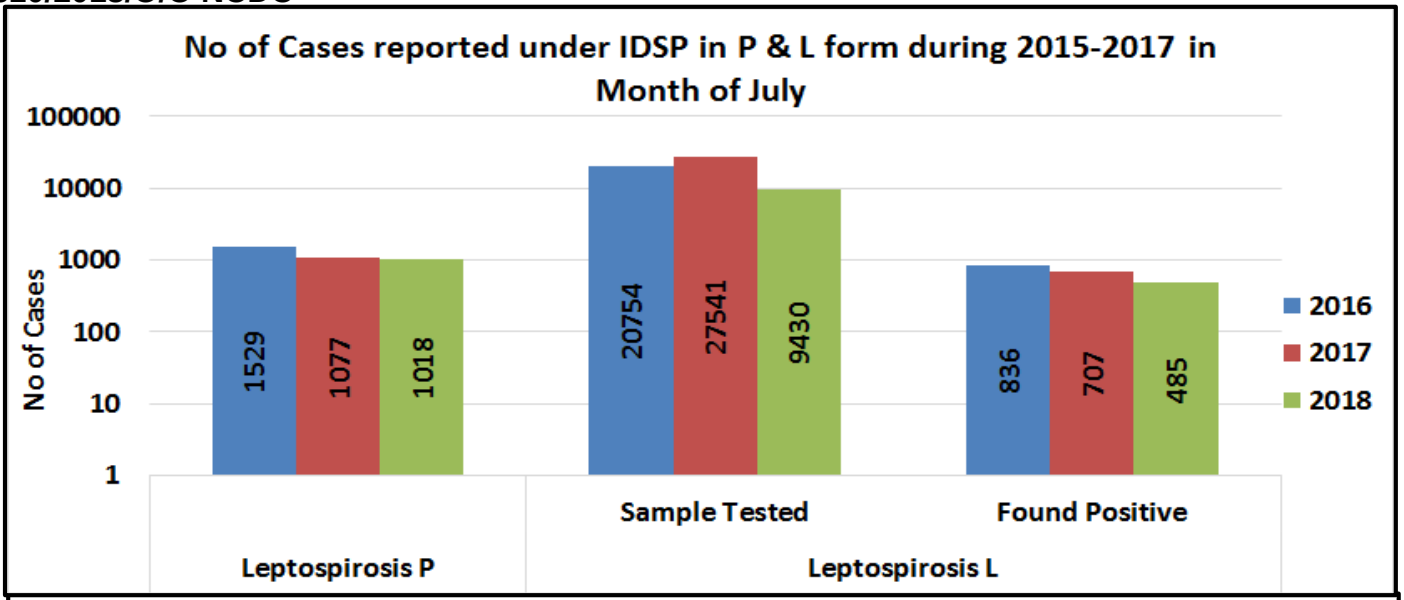


Fig 19: No. of Leptospirosis Cases reported under IDSP in P & L form during July 2016 - 2018

AAs shown in Fig 19, number of presumptive Leptospirosis cases, as reported by States/UTs in 'P' form was 1529 in July 2016; 1077 in July 2017 and 1018 in July 2018. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in July 2016; 20754 samples were tested for Leptospirosis, out of which 836 were found positive. In July 2017; out of 27541 samples, 707 were found to be positive and in July 2018, out of 9430 samples, 485 were found to be positive.

Sample positivity of samples tested for Dengue has been 4.03%, 2.57% and 5.14% in July month of 2016, 2017 & 2018 respectively.

Fig 20: State/UT wise Presumptive Leptospirosis cases and outbreaks for July 2018

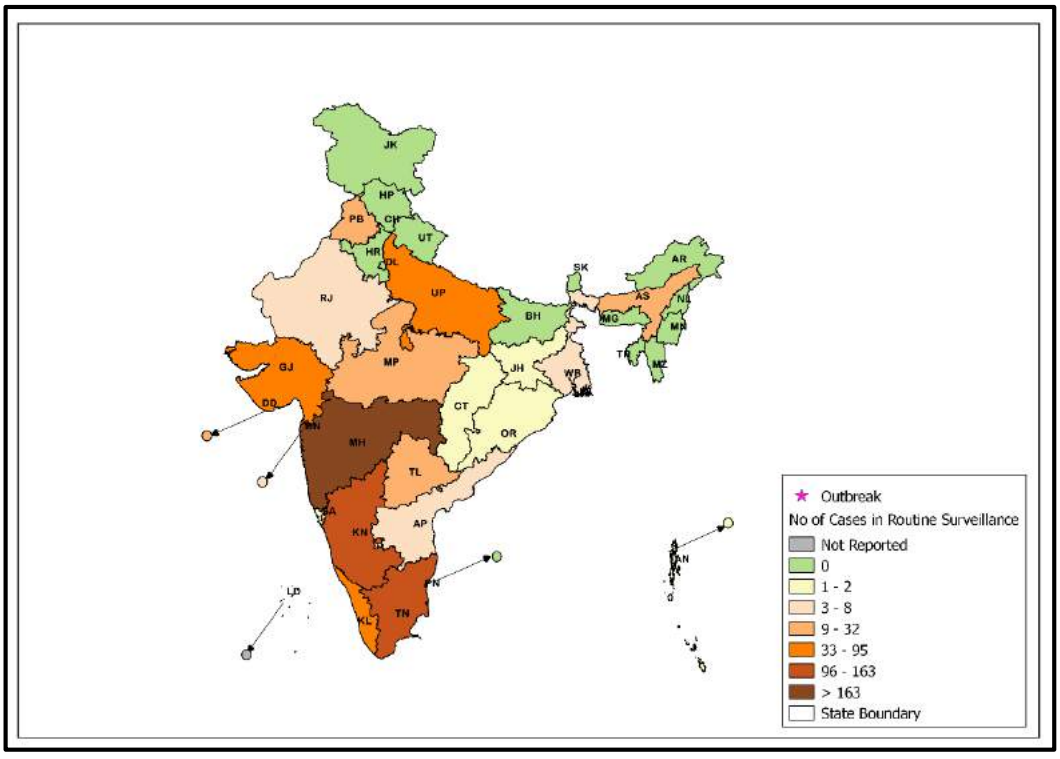
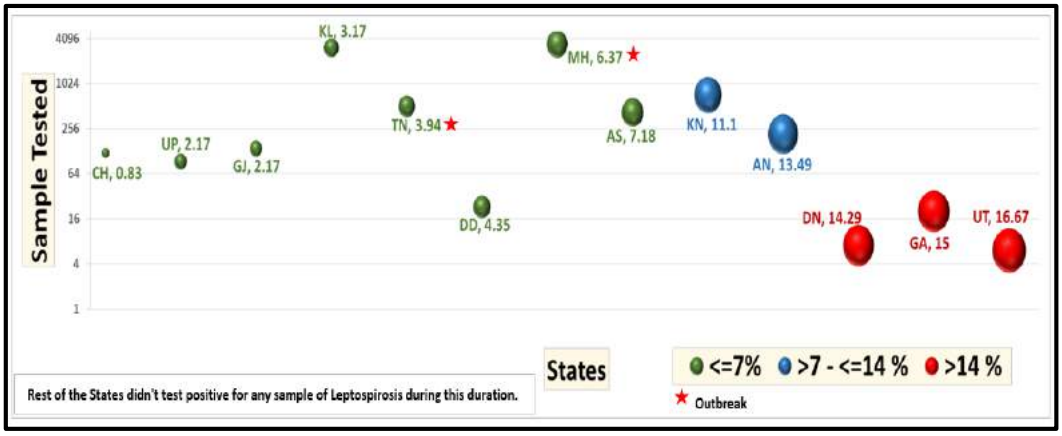


Fig 21: State/UT wise Lab Confirmed Leptospirosis cases and outbreaks for July 2018



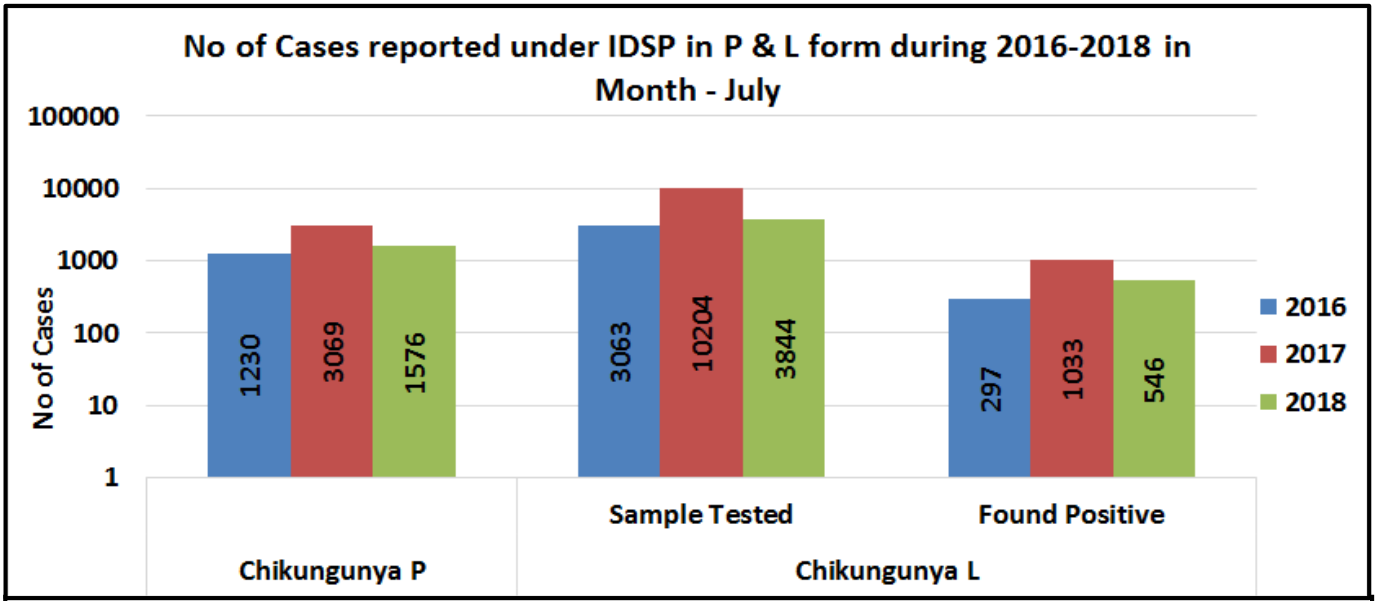


Fig. 22: No. of Chikungunya Cases reported under IDSP in P & L form during July 2016 - 2018

As shown in Fig 22, number of presumptive Chikungunya cases, as reported by States/UTs in 'P' form was 1230 in July 2016; 3069 in July 2017 and 1576 in July 2018. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in July 2016; 3063 samples were tested for Chikungunya, out of which 297 were found positive. In July 2017; out of 10204 samples, 1033 were found to be positive and in July 2018, out of 3844 samples, 546 were found to be positive.

Sample positivity of samples tested for Chikungunya has been 9.69%, 10.12% and 14.20% in July month of 2016, 2017 & 2018 respectively.

Fig 23: State/UT wise Presumptive Chikungunya cases and outbreaks for July 2018

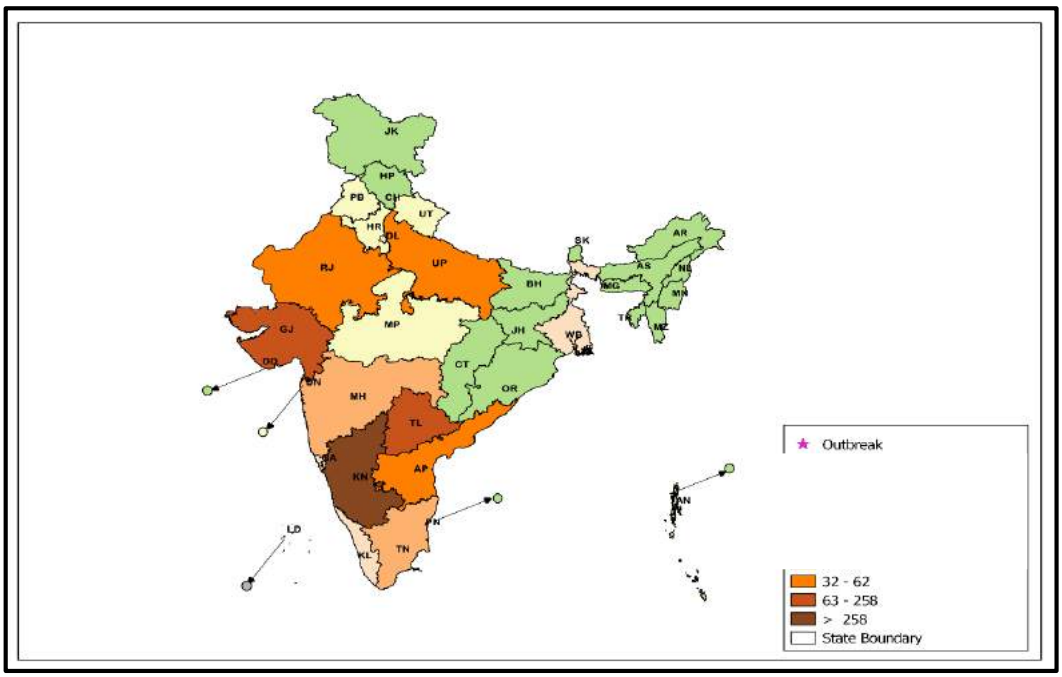


Fig 24: State/UT wise Lab Confirmed Chikungunya cases and outbreaks for July 2018

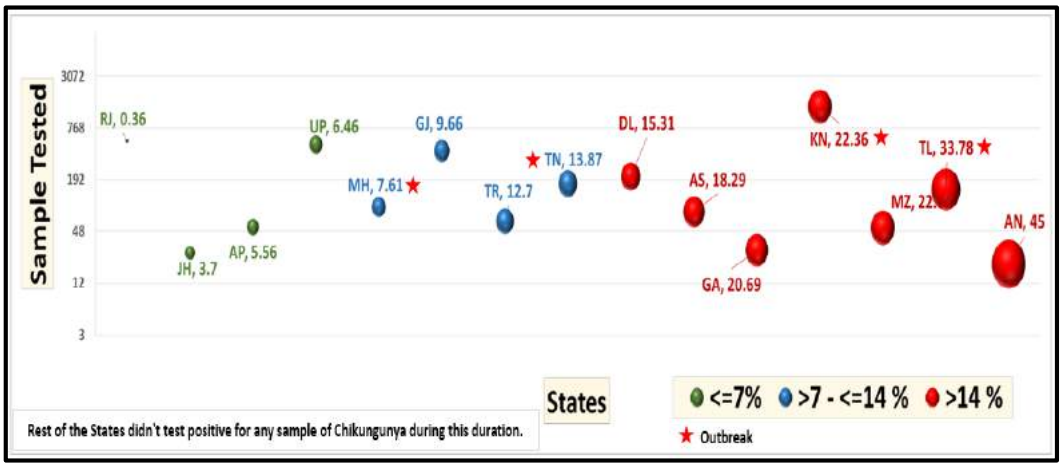
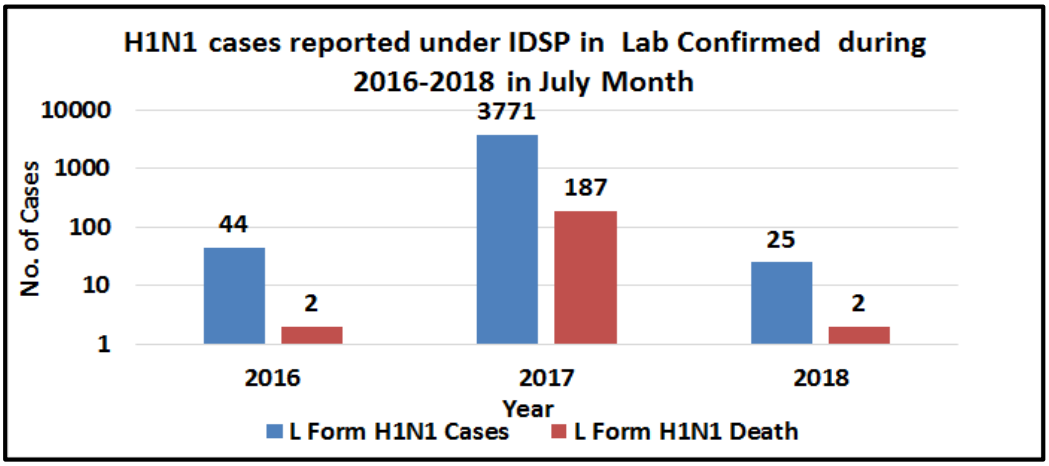


Fig 25: H1N1 cases reported under IDSP in L Form during 2016-2018 in July Month



As shown in Fig. 25 there were 44 cases and 2 deaths reported in L form in July 2016. In July 2017; there were 3771 cases and 187 deaths and in July 2018, there were 25 cases and 2 deaths.

Case fatality rate for H1N1 were 4.54%, 4.96% and 8.00% in July month of 2016, 2017 & 2018 respectively.

Fig 26: State/UT wise Presumptive H1N1 cases and outbreaks for July 2018

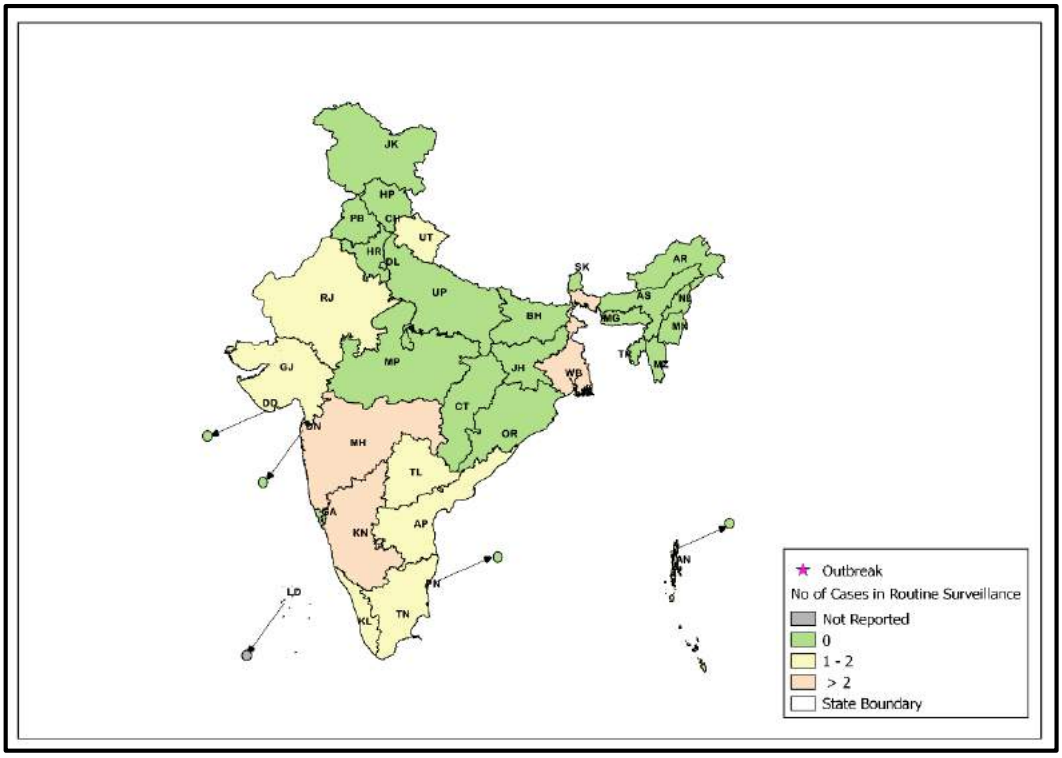
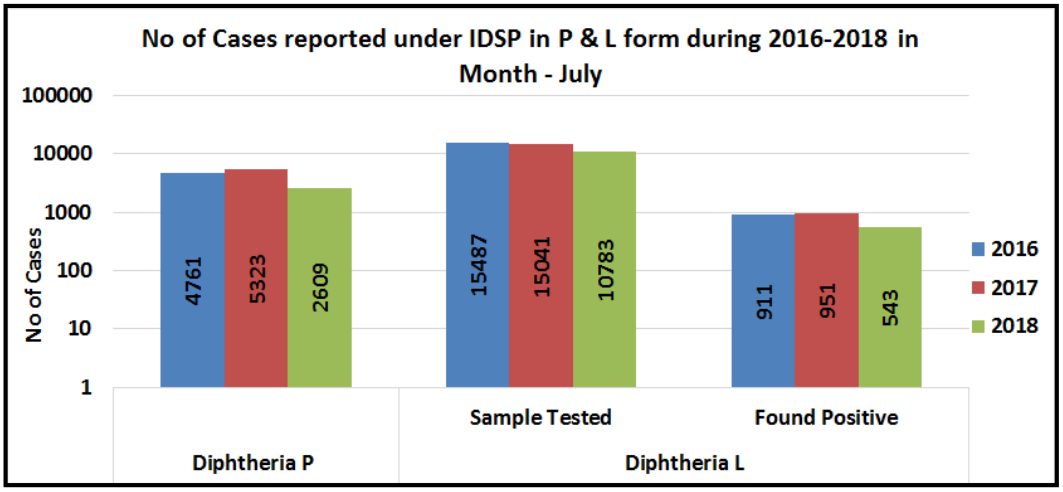


Fig 27: Diphtheria cases reported under IDSP under P & L Form during 2016-2018 in July Month



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As shown in Fig 27, number of presumptive Diphtheria cases, as reported by States/UTs in 'P' form was 4761 in July 2016; 5323 in July 2017 and 2609 in July 2018. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in July 2016; 15487 samples were tested for Diphtheria, out of which 911 were found positive. In July 2017; out of 15041 samples, 951 were found to be positive and in July 2018, out of 10783 samples, 543 were found to be positive.

Sample positivity of samples tested for Diphtheria has been 5.88%, 6.32% and 5.03% in July month of 2016, 2017 & 2018 respectively.

Fig 28: Presumptive Diphtheria cases reported under IDSP under P & L Form during 2016-2018 in July Month

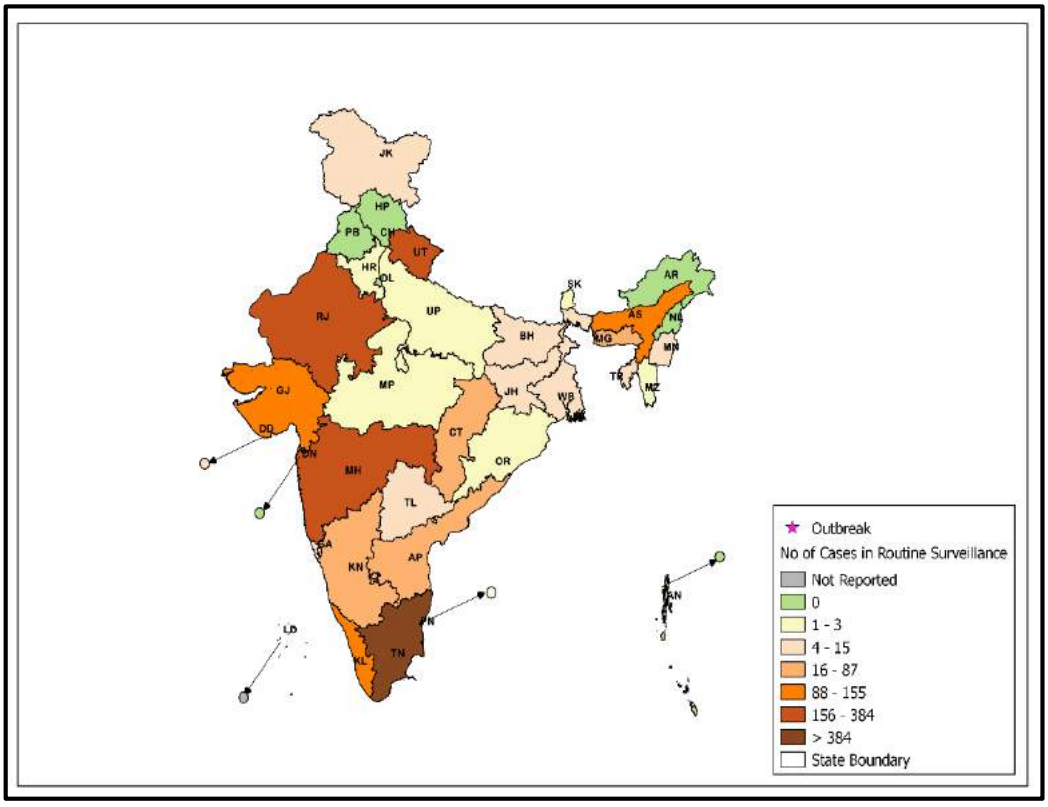
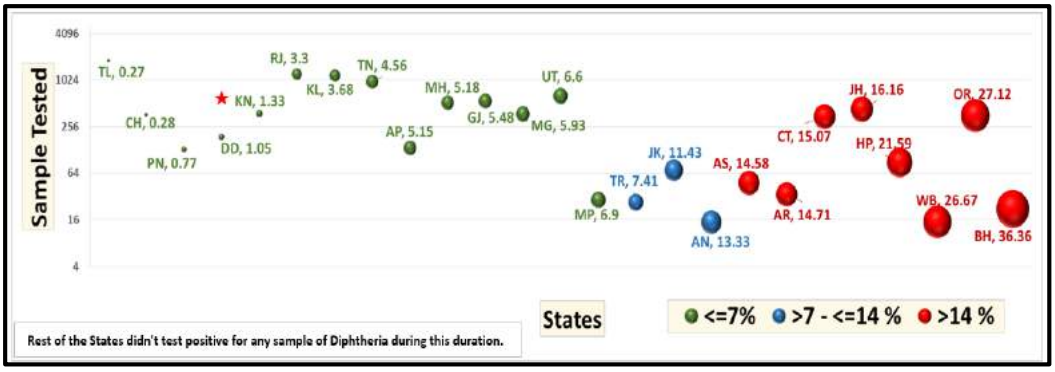


Fig 29: Lab Confirmed Diphtheria cases reported under IDSP under P & L Form during 2016-2018 in July Month



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

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