



मासिक आई डी एस पी निगरानी विवरणी

Monthly IDSP Surveillance Report

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National Health Mission

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Investigation of Hepatitis E Outbreak in Ramnagar, District Jalandhar, Punjab, March-June 2017

Introduction

Viral hepatitis caused by hepatitis viruses A through E, still remains a major public health problem in India. Hepatitis E is a viral agent responsible for hepatitis outbreak as well as sporadic cases of hepatitis in developing countries. Although hepatitis A and E, both enterically transmitted, are highly endemic in India, HEV is responsible for most of these epidemics. HEV is responsible for 10-40% of acute hepatitis and 15-45% of acute liver failure in India. The virus is transmitted by faeco-oral route, often through water or food supply contaminated by faeces. Intra-familial transmission is not common for hepatitis E virus. Acute viral hepatitis due to hepatitis E virus is a self-limiting disease but may cause fulminant hepatitis in pregnant women. The incubation period ranges from 15 days to 60 days, usually 30 days to 45 days.

The team comprising of the following members visited Mumbai, Maharashtra from 27/06/2017 to 04.07.2017 to review rising trends of cases and deaths related to H1N1 in the State of Maharashtra. The team members were:

- Dr. Rajesh Kumar, Professor and Head, School of Public Health, PGIMER, Chandigarh
- Dr. Tanzin Dikid, Deputy Director, National Centre for Disease Control, Delhi
- Dr Akshay Kumar, EIS officer, National Centre for Disease Control, Delhi
- **Dr. Gagandeep Singh Grover State Programme Officer, IDSP and NVBDCP Punjab**
- Dr. Rajesh Yadav, Public Health Specialist, CDC, India

Timeline of events

Cluster of jaundice cases was reported by the residents of Ramnagar colony, district Jalandhar, Punjab on 18th May 2017 to MPHWS (Multi-purpose Health Workers). The RRT (Rapid Response Team) of district initiated an outbreak investigation on same day. A rapid survey found 11 cases of jaundice in that area. Blood samples from all cases were sent to Government Medical College Amritsar for Hepatitis A and E serology (MAC ELISA). Five water samples were sent for bacteriological examination. Ten cases were found positive for Hepatitis E by serology and all water samples were found to be unsatisfactory (probable number of coliforms/100 ml of water = 180+).

Action taken by district:

The water supply of the affected area was stopped followed by supply of potable drinking water through water tankers for two days. A one-day medical camp was organized on 19th May 17 (10 cases of jaundice found), chlorine tablets were distributed to residents.

On 19th June 2017, one EIS (Epidemic Intelligence Service) officer from NCDC (National Centre for Disease Control) New Delhi, posted in State IDSP (Integrated Disease Surveillance Programme), Punjab joined the outbreak investigation with following objectives- to systematically describe the epidemiology of outbreak, to assess the risk factors associated with illness and to recommend measures to prevent future outbreaks.

Methods

The team defined a suspect case as “acute jaundice characterized by yellow discoloration of sclera or dark urine with at least one of the following symptoms (fever, anorexia, fatigue, upper quadrant abdominal pain), in a resident of Ramnagar colony, district Jalandhar, Punjab, from 16 March to 19 June 2017”. A probable case was defined as “a suspect case whose serum bilirubin is above 1.1 mg/dl or SGOT and SGPT are above 46 and 50 Units respectively”. A confirmed case was defined as “a suspect or probable case whose blood serum sample was found positive for Hepatitis IgM E or A or both IgM E and A”.

House to house search for cases was done with the help of 4 ASHAs (Accredited Social Health Activist) in Ramnagar colony having population of 8125. Line list available from DSU (District Surveillance Unit) from the previous camps or surveys were also used. Enhanced passive surveillance to find new cases coming to local health practitioners was done.

Data collection and analysis

Structured questionnaire was prepared and translated in local language (Punjabi). Demographic details, clinical history (date of onset, yellow discoloration of sclera, fever etc.), treatment history, pregnancy, laboratory results and risk factors were captured in the questionnaire. Map of area was prepared with the help of ASHAs and Google map. Data analysis was done in Epi info-7 for time, place and person distribution of cases.

Laboratory investigation:

Blood samples were collected from six suspected patients with date of onset less than 14 days. Stool samples were collected from five patients with date of onset less than 14 days. Both blood and stool samples were sent to Department of Virology, PGIMER Chandigarh for serology (Hepatitis A and E) and morphology of HEV.

Environmental Investigation:

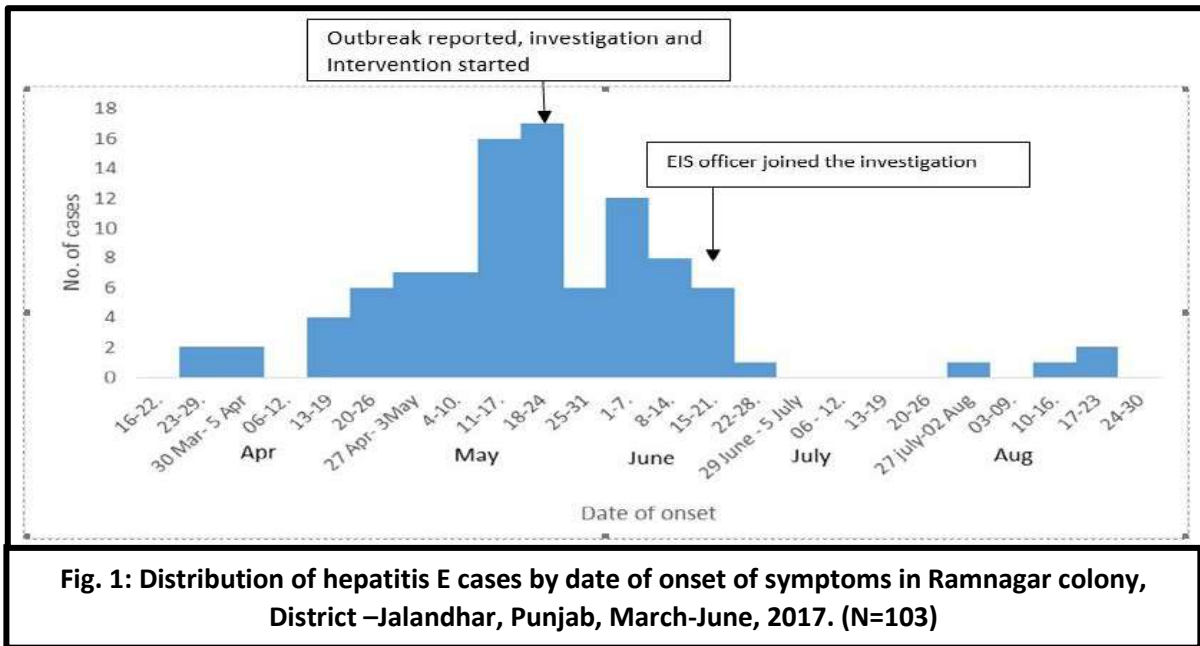
In-depth review of water supply and sewerage system was done to assess for likely contamination of drinking water with sewage. All water sources in the area were identified. Water samples from two tube wells and 14 different sites (6 from non-affected area and 8 from affected area) were collected and sent to State Public Health Laboratory, Department of Health, Punjab at Chandigarh, for bacteriological examination for coliforms, faecal coliforms and chlorine level. The team also assessed the method of water purification being routinely used at the supply reservoir level.

Results

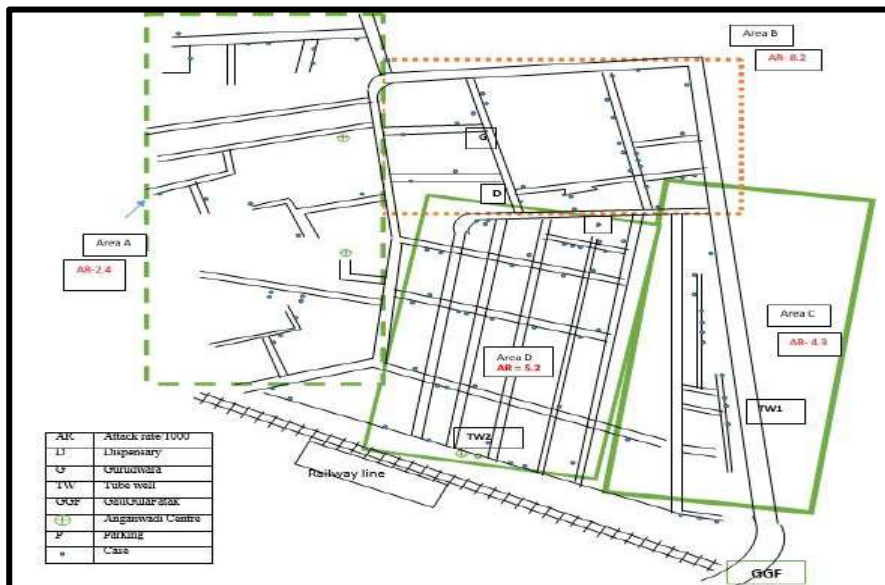
Descriptive epidemiology

A review of IDSP data showed there was no case of jaundice (S form) or viral hepatitis (P form) has been reported from the area in past one month and in same time period of previous year. Interviews with local private practitioners (who are not in the reporting network of IDSP) also revealed that they saw an average of 30-40 cases of jaundice in previous 2 month. Both these findings pointed out to the possibility of existence of an outbreak.

A total of 103 cases were found, 90 suspected cases were from house to house search and 13 suspected cases were from enhanced passive surveillance. Majority of cases were female (54.4 %), median age (range) was 24 year (2-80 years). The attack rate was high among female (14.4 per thousand) than male (11.1 per thousand). Number of affected pregnant women were eight and the attack rate in pregnant women was 127 per thousand (8/63). There was no deaths reported due to jaundice in Ramnagar.



Most probably the index case occurred on 28th March 2017 (based on medical record and recall history of patient), but the outbreak was reported on 18th May 2017 followed by investigation and intervention by RRT. The maximum cases were reported between 18th and 24th May followed by fall in number of cases in next week. The cases again start rising between 1st and 7th June followed by gradual fall. No case was reported after 24th June 2017. (Figure 1)



The colony was divided into four sections (A, B, C & D) according to the area allotted to ASHA for their field work. The spot map is showing the distribution of cases in the area; cases were widely distributed. (Figure 2)

Table 1. Distribution of cases by areas in colony and their house attack rate (N=90)						
Area	Number of cases	Number of houses affected	Number of houses	House attack rate (%)	Population	Population attack rate per thousand
B	31	28	340	8.2	1958	15.8
D	25	21	403	5.2	2376	10.5
C	16	15	350	4.3	1703	9.4
A	18	15	630	2.4	2088	8.6
Total	90	79	1723	4.6	8125	11.1

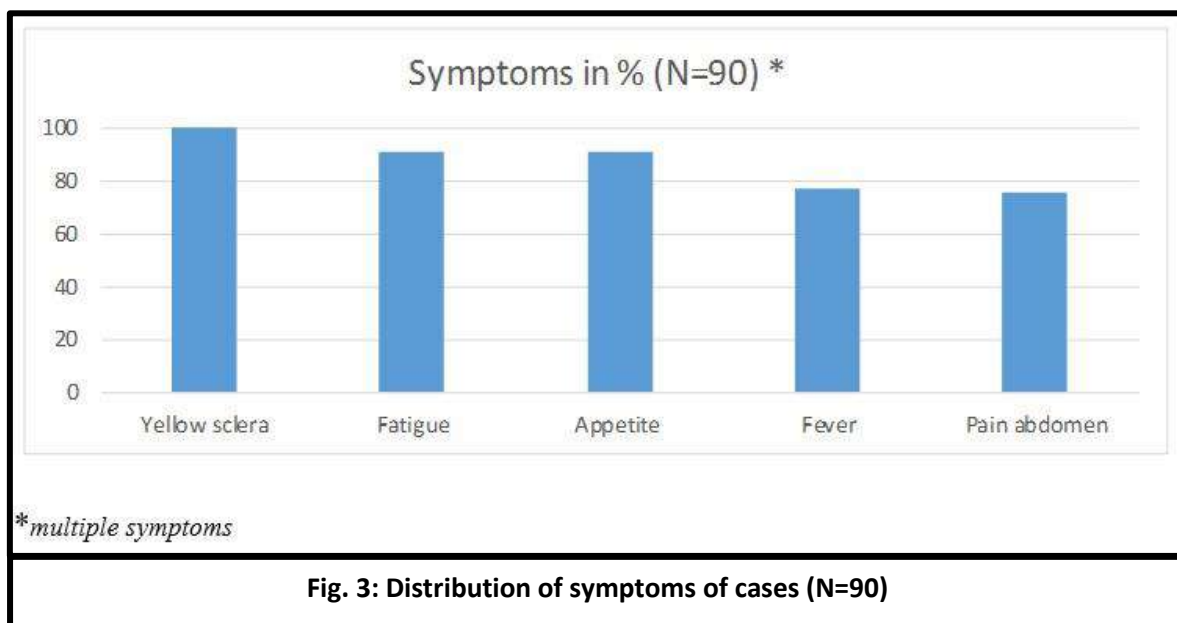
Seventy nine houses were affected with jaundice, total house attack was 4.6 %, and the house attack rate was highest in area B and minimum in area A. Population attack rate was also highest in area B and minimum in area A. There were 11 houses having more than one case. (Table 1)

Table 2. Attack rate among cases by age group			
Attack rate age wise (N=103)			
Age group (year)	Population	Number of cases	Attack rate per 1000
≤10	1431	13	9.1
11-20	1307	22	16.8
21-30	1698	36	21.2
31-40	1292	21	16.2
41-50	1029	6	5.8
51-60	928	3	3.2
>60	430	2	4.7

The attack rate was highest in age group 21-30 years and lowest in age group 51-60 years. The age group between 11-40 years was highly affected.

Table 3 Attack rate among cases by gender			
Attack rate gender wise (N=103)			
Gender	Number of patients	Population	Attack rate per 1000
Male	47	4243	11.1
Female	56	3882	14.4

Females were more affected with jaundice. (Table 3). Fourteen cases of jaundice were hospitalized for the condition and only two (2.2%) had no improvement during discharge but were stable later.



Among jaundiced patients fatigue and loss of appetite were the most common symptoms followed by fever and pain abdomen (Figure 3).

Health seeking behavior	Number (%)
Private	72 (80)
Government	15 (16.7)
None	3 (3.3)

Most of the jaundice cases went to private medical practitioners and three cases didn't take any medical consultation. (Table 4)

Risk factors	Number (%)
Usual source of drinking water	
Municipal (Tap water)	88 (97.8)
Own boring	1 (1.1)
Private water source outside colony	1 (1.1)
Change in usual source of drinking water between March-June 2017	
Yes	35 (38.9)
No	55 (61.1)
Current source of drinking water	
Government supply (tap water)	55 (61.1)
Water tanker (from own expense)	25 (27.8)
Bottle water	7 (7.8)
Ground water	3 (3.3)
Opinion on drinking water between March and June 2017 *	
Clear water	14 (15.6)
Dirty water	61 (67.8)
Foul smelling	36 (40)
Methods for water purification between March and June 2017	

Boiling	26 (28.9)
Filter	22 (24.4)
Chlorine tablet	20 (22.2)
Nil	17 (18.9)
Reverse Osmosis (RO) Purifier	5 (5.6)
Use of market ice between March and June 2017	
No	59 (65.6)
Rarely (once in 4 month)	11 (12.2)
Occasionally (1-2 times/month)	17 (18.9)
Frequently	3 (3.3)

**multiple options*

Usual source of drinking water among cases was tap water from municipal supply (97.8%), around 40% cases changed their usual source of drinking water between March-June 2017. Those who changed the usual source of drinking water were using water from water tanker from their own expense (27.8%). The municipal water supply was clean according to 15.6 % cases but was dirty and foul smelling according to 67.8 and 40% cases respectively. Boiling (28.9%) was the most preferred method for water purification and 18.9% cases were not using any method for water purification. Use of market ice was nil among most of the cases (65.6%) and frequently among only very few cases (3.3%).

Table 5 Laboratory investigation result	
Lab investigation	Number (%) (Cut off)
Blood serum for IgM HEV (Mac-Elisa) (N=17)	15 (88.2) (Positive)
Blood serum for HEV morphology	0
Stool for HEV morphology	0

A total of 15 out of 17 patients were found positive for hepatitis E IgM antibodies, the result of 11 patients (10 positive) was available from previous investigations (GMC Amritsar) while for 6 patients (5 positive) from current investigation (PGIMER). Virus could not be identified in blood and stool sample therefore morphology of virus was not possible.

Environment investigation results:

Only one water sample taken from tube well was satisfactory and all other water samples taken from different area shows coliform growth by MPN (Most Probable Number) method i.e., one out of 16 water samples.

Table 7 Water sample result

Sl. No	Water source and location	Result
1.	Tap water, in the vicinity of supply reservoir Tube well #1	Potable for drinking
2.	Tap water, from house in the vicinity of supply reservoir Tube well #2	Bacterial contamination (MPN>180) No faecal streptococci (above 43 degree Celsius after 24-48 hour incubation)
3.	Tap water, from houses having cases and history of sewer overflow in the street. N=8 houses	Bacterial contamination (MPN>180) = 8/8 houses. No faecal streptococci (above 43 degree Celsius after 24-48 hour incubation) = 8/8
4.	Tap water, from houses having cases but no history of sewer overflowing N= 4 houses	Bacterial contamination (MPN>180) = 4/4 No faecal streptococci (above 43 degree Celsius after 24-48 hour incubation) = 4/4
5.	Tap water, from houses with no case of jaundice but history of sewer overflow in the street N= 2 houses	Bacterial contamination (MPN>180) = 2/2 No faecal streptococci (above 43 degree Celsius after 24-48 hour incubation) = 2/2

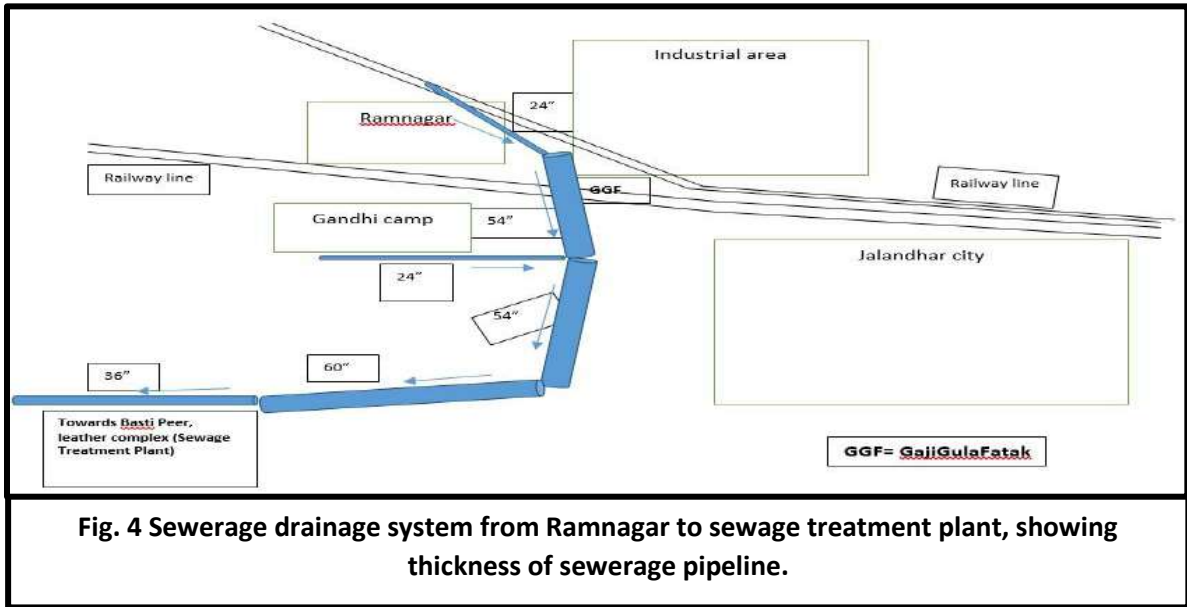
Discussions with Officials of Municipal Corporation revealed that water supply for the area is intermittent, i.e., morning (5.30 am to 9 am), afternoon (12 noon-2 pm) and evening (5 pm to 9 pm). The water is supplied by two tube wells (Tube well #1 and # 2) and both are interconnected. Water is pumped directly from ground source. There is no overhead or underground tank for its storage. Bleaching powder mixed with water is directly poured into the tube well in a quantity of 10 kg per month, once a month, the water is then supplied only after a contact period of half hour.

Water pipelines were laid down around 35 years ago, and sewage pipelines were laid around 30 years ago. The depth of sewerage line is 10-12 feet in main lines and 7-8 feet in branches and the depth of water pipelines is 6-7 feet. There is always a gap of 1-2 feet depth between water pipeline and sewerage pipeline, both are on opposite side of the road.

Super-suctioning of sewerage pipeline started on 8th May, 2017 and completed on 31st May, 2017. To undertake this procedure the sewer lines just outside Ramnagar was blocked and the flow was diverted to its tributaries. The residents informed that during this procedure period, sewer water had overflown onto the streets of Ramnagar. The super-suctioning was done because of regular complaints from residents about the spillage of sewer water in the street of Ramnagar since first week of April 2017.

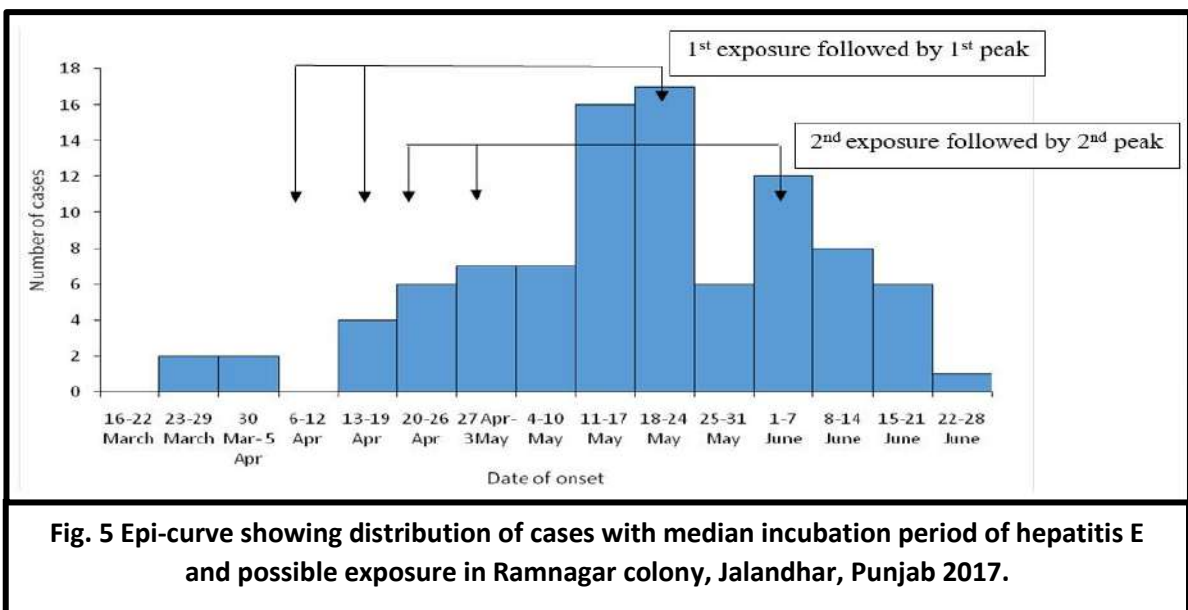
Sub-divisional officer (SDO, Municipal Corporation Jalandhar) informed that there were 490 legal connection of water supply out of 600. The illegal connections were taken with improper welding from in and around sewer line due to which the water pipes get eroded.

Probably due to spillage of sewer water from mainhole in the streets of Ramnagar, followed by its seepage underground towards improper welded or eroded water pipes, the drinking water might have got contaminated



This figure shows the flow of sewage from Ramnagar to sewage treatment plant. The MC Officials also informed that sewerage pipeline diameter is increasing from Ramnagar towards sewage treatment plant, but after it crossed the city the diameter of pipeline decreases by almost half of previous diameter. This faulty design often leads to blockage of the sewage line and its backflow.

To generate a hypothesis, we reviewed the descriptive epidemiology and the environmental assessment data.



- The average incubation period for hepatitis E is 5-6 weeks
- The 1st peak occurred on 18-24 May, therefore exposure must have occurred between 6-12th April and 13-19th April. This period of exposure is roughly coinciding with the period of spillage of sewer water in the streets of Ramnagar, i.e., first week of April.
- The 2nd peak occurred on 1-7th June, therefore the exposure must have occurred between 20-26th April and 27th April – 3 May. This period of exposure is roughly coinciding with the period of super-suctioning that started from 8th April to 29th April.

Conclusion

Based on the epidemiological, laboratory and environmental findings we conclude that Hepatitis E outbreak occurred in Ramnagar colony due to widespread contamination of drinking water supply, likely by any one of the following reason:

1. Spillage of sewer water in the street, followed by contamination of drinking water. Spillage of sewer water occurred due to blockage of sewage line due to faulty design (narrow distal end) as well as during super-suctioning procedure. (Incubation period is coinciding with spillage)
2. Mixing of raw sewage with drinking water in illegal water pipeline connections through breaks in improperly welded joints assisted by negative pressure due to intermittent water supply.

Recommendations:

Short term:

To Health Department:

1. Continue surveillance in the affected area until no new cases are reported for 120 days after last documented case. Early diagnosis and referral of pregnant women suffering from acute jaundice.
2. Distribution of chlorine tablets in the community for household water decontamination by peripheral health workers. One 500 mg chlorine tablet (500 mg tablet contains 30 mg of available chlorine) for 20 litre of drinking water. Chlorine tablets to be crushed before dissolving in water and the drinking water should be used only after 30 minutes of mixing.
3. IEC (Information Education and Communication) activities regarding boiling of water for atleast 3 minutes, storing water in a container with lid, using utensil with handle to draw water from container and hand wash before cooking and eating food by ASHAs and ANMs (Auxillary Nurse Midwife) during their routine visit in affected area, by MO during their routine clinic

To Local Government Bodies:

1. Installation of chlorine dosage pump at tube wells for disinfection of water at supply reservoir level.
2. In future whenever super suctioning is to be carried out, it should be preceded by issuing health warnings to the local population with adequate measures for supply of potable drinking water for the period of procedure.

Long term:

To Health Department:

1. Increase the network of reporting units under IDSP to cover private medical practitioners and Indian system of Medicine to pick-up early warning signals of any waterborne outbreak in the community for quick targeted action.

To Local Government Bodies:

1. Faulty design in sewerage drainage to be corrected to prevent frequent obstruction of the sewer lines and risk of contamination of drinking water.
2. Water quality surveillance system to be set up to monitor adequate levels of chlorine at the user level.

Action taken by district:

1. New water pipelines has already been laid down by MC Jalandhar in the area, for which connection is yet to be taken by the residents.
2. Chlorine tablets distributed to every households with IEC activity regarding boiling of drinking water before use till the new connection is taken.
3. Chlorination of ground water done.
4. Since 10th July the water supply from regular tap water has been stopped, drinking water is being supplied only through water tanker. The orders is till the water supply from new pipeline started.

Surveillance data of Enteric Fever, Acute Diarrhoeal Disease, Viral Hepatitis A & E, Dengue Leptospirosis and Chikungunya During June 2015-2017*

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

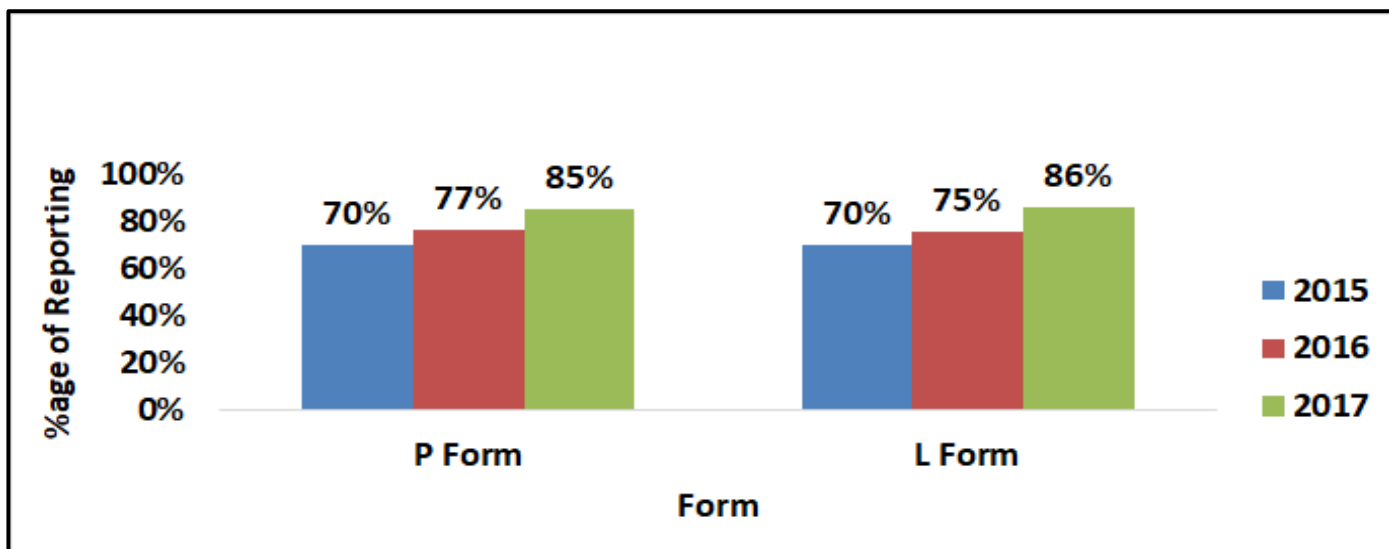


Fig. 6: RU wise Reporting Status based on P & L form during June 2015 - 2017

As shown in fig 6, in June 2015, 2016 and 2017, the 'P' form reporting percentage (i.e. % RU reporting out of total in P form) was 70 %, 77% and 85% respectively across India, for all disease conditions reported under IDSP in P form. Similarly, L form reporting percentage was 70%, 75% and 86% 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.

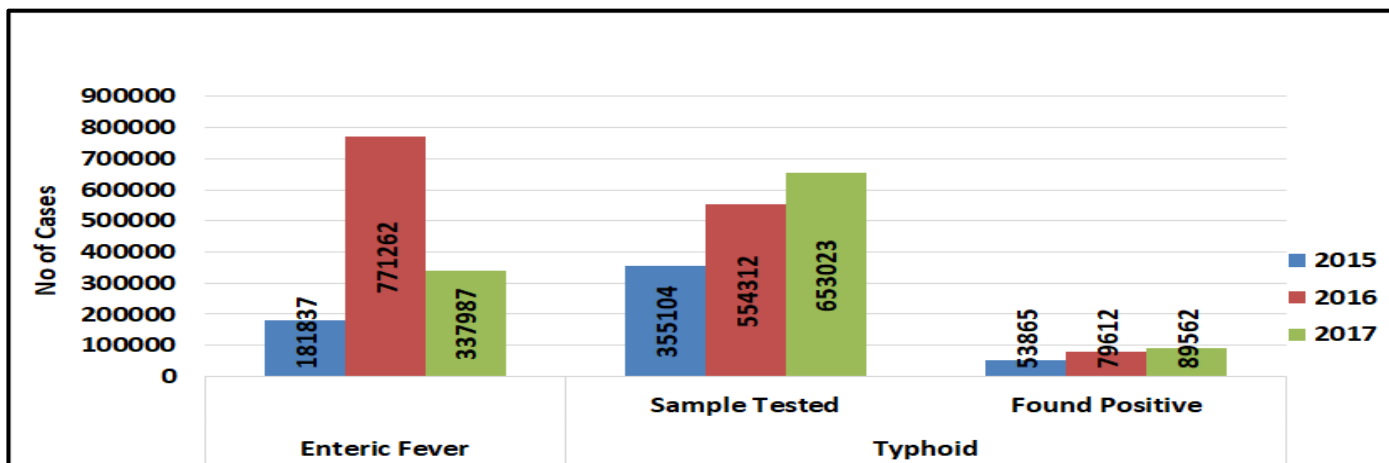


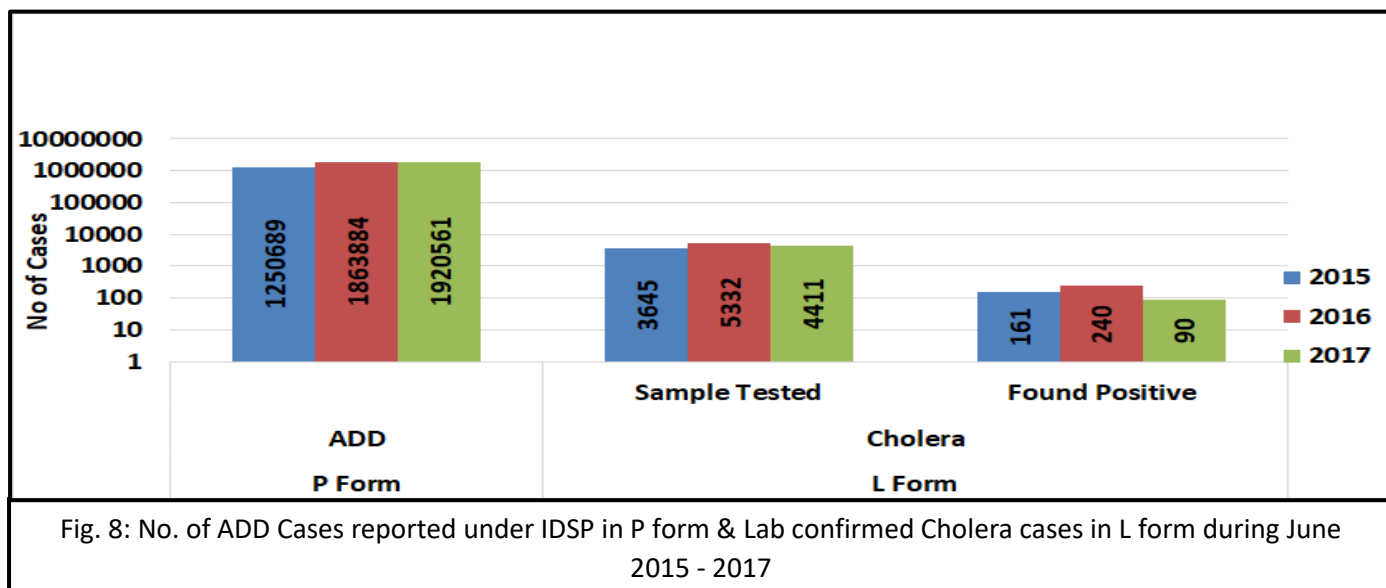
Fig. 7 No. of Enteric Fever Cases reported under P & L form during June 2015 - 2017

As shown in fig 7, number of presumptive enteric fever cases, as reported by States/UTs in 'P' form was 181837 in June 2015; 771262 in June 2016 and 337987 in June 2017. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in June 2015; 355104 samples were tested for Enteric fever, out of which 53865 were found positive. In June 2016; out of 554312 samples, 79612 were found to be positive and in June 2017, out of 653023 samples, 89562 were found to be positive.

Sample positivity has been 15.2%, 14.4% and 13.7% in June month of 2015, 2016 & 2017 respectively.

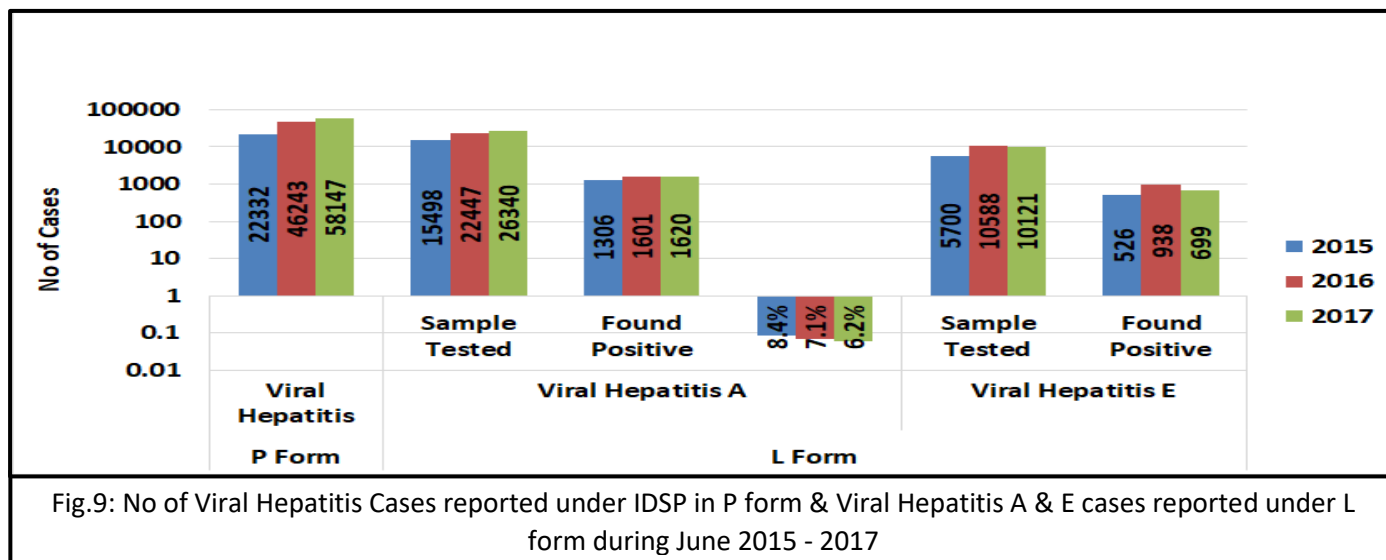
Limitation: The test by which above mentioned samples were tested could not be ascertained, as currently there is no such provision in L form.



As shown in fig 8 number of Acute Diarrhoeal Disease cases, as reported by States/UTs in 'P' form was 1250689 in June 2015; 1863884 in June 2016 and 1920561 in June 2017. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in June 2015, 3645 samples were tested for Cholera out of which 161 tested positive; in June 2016, out of 5332 samples, 240 tested positive for Cholera and in June 2017, out of 4411 samples, 90 tested positive.

Sample positivity of samples tested for Cholera has been 4.4%, 4.5% and 2.0% in June month of 2015, 2016 & 2017 respectively.



As shown in fig 9, the number of presumptive Viral Hepatitis cases was 22332 in June 2015, 46243 in June 2016 and 58147 in June 2017. These presumptive cases were diagnosed on the basis of case definitions provided under IDSP.

As reported in L form for Viral Hepatitis A, in June 2015; 15498 samples were tested out of which 1306 were found positive. In June 2016 out of 22447 samples, 1601 were found to be positive and in June 2017, out of 26340 samples, 1620 were found to be positive.

Sample positivity of samples tested for Hepatitis A has been 8.4%, 7.1% and 6.2% in June month of 2015, 2016 & 2017 respectively.

As reported in L form for Viral Hepatitis E, in June 2015; 5700 samples were tested out of which 526 were found positive. In June 2016; out of 10558 samples, 938 were found to be positive and in June 2017, out of 10121 samples, 699 were found to be positive.

Sample positivity of samples tested for Hepatitis E has been 9.2%, 8.9% and 6.9% in June month of 2015, 2016 & 2017 respectively.

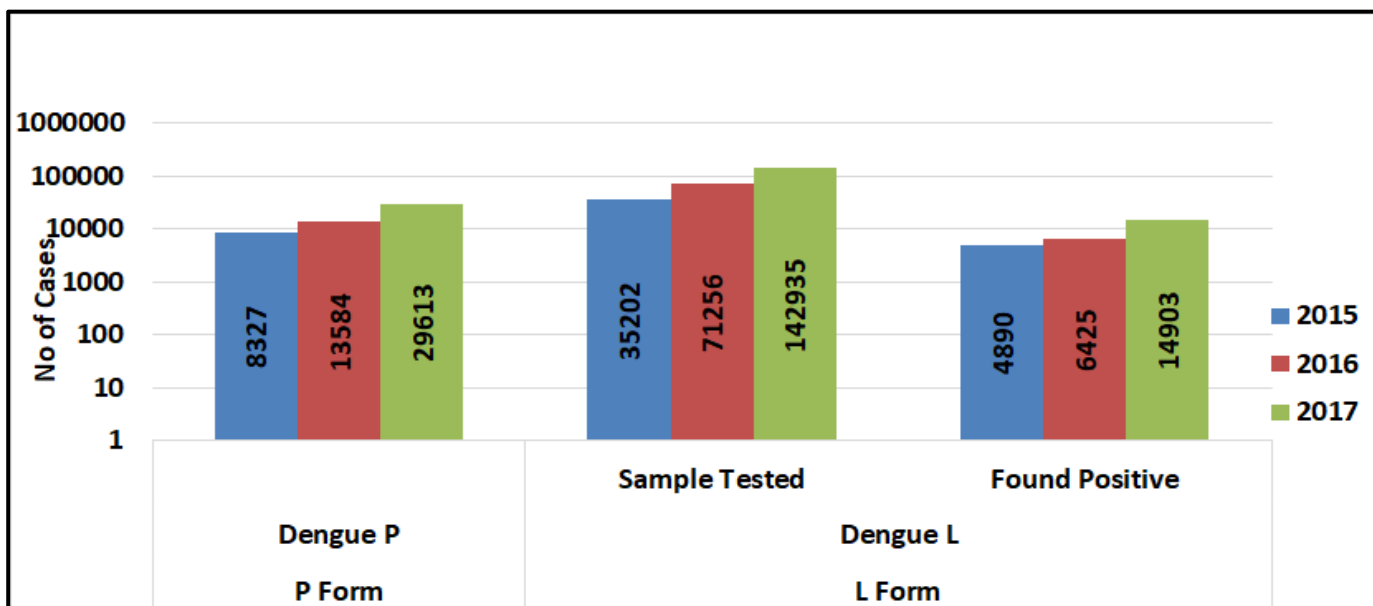


Fig. 10: No. of Dengue Cases reported under IDSP in P & L form during June 2015 - 2017

As shown in fig 10, number of presumptive Dengue cases, as reported by States/UTs in 'P' form was 8327 in June 2015; 13584 in June 2016 and 29613 in June 2017. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in June 2015; 35202 samples were tested for Dengue, out of which 4890 were found positive. In June 2016; out of 71256 samples, 6425 were found to be positive and in June 2017, out of 142935 samples, 14903 were found to be positive.

Sample positivity of samples tested for Dengue has been 13.9%, 9.0% and 10.4% in June month of 2015, 2016 & 2017 respectively.

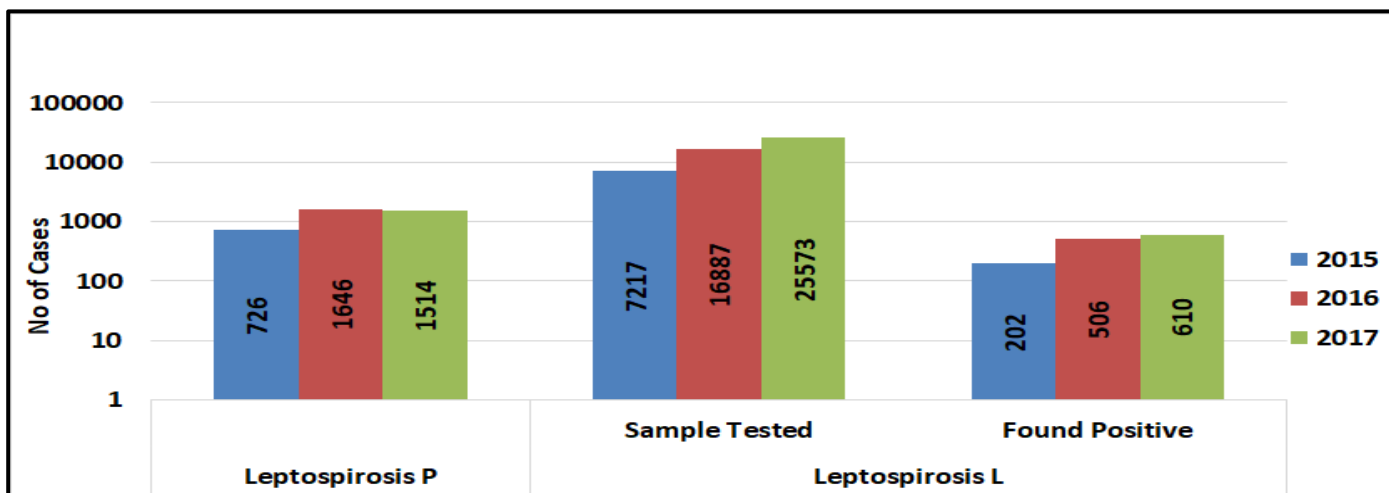
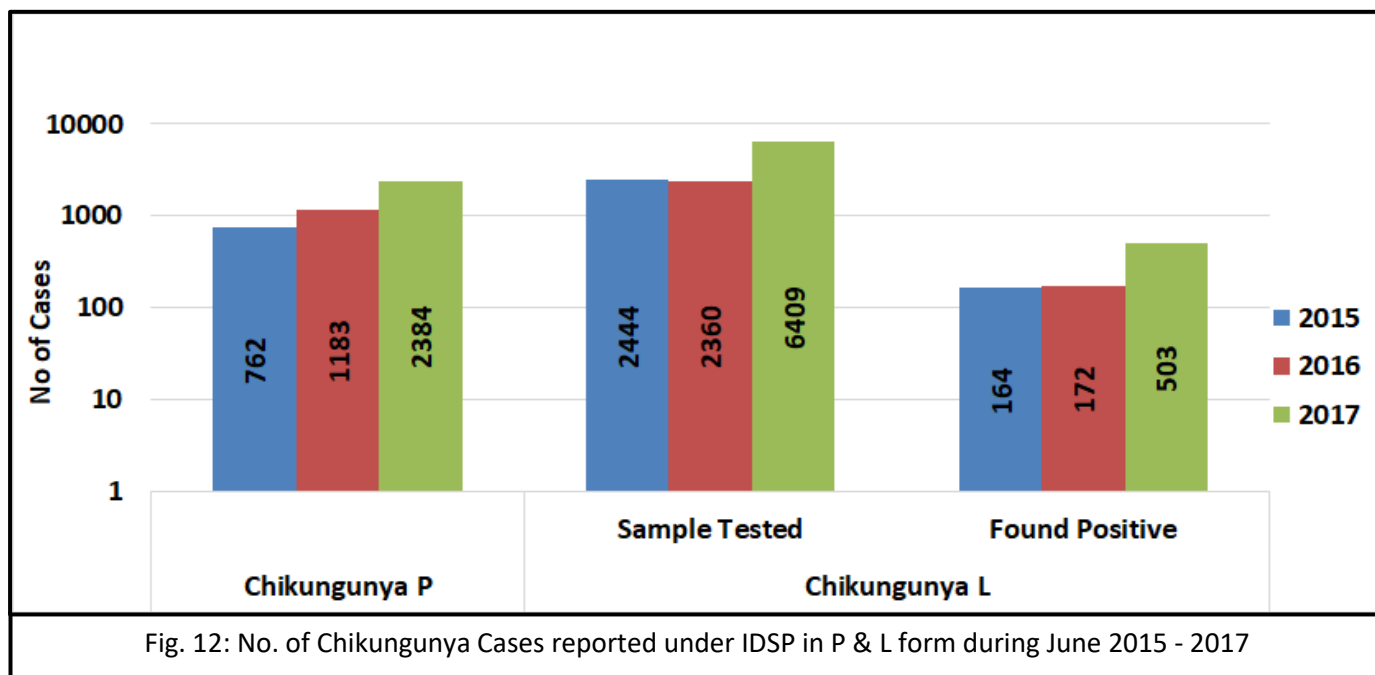


Fig. 11: No. of Leptospirosis Cases reported under IDSP in P & L form during June 2015 - 2017

As shown in fig 11, number of presumptive Leptospirosis cases, as reported by States/UTs in 'P' form was 726 in June 2015; 1646 in June 2016 and 1514 in June 2017. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in June 2015; 7217 samples were tested for Leptospirosis, out of which 202 were found positive. In June 2016; out of 16887 samples, 506 were found to be positive and in June 2017, out of 25573 samples, 610 were found to be positive.

Sample positivity of samples tested for Leptospirosis has been 2.8%, 3.0% and 2.4% in June month of 2015, 2016 & 2017 respectively.



As shown in fig 12, number of presumptive Chikungunya cases, as reported by States/UTs in 'P' form was 762 in June 2015; 1183 in June 2016 and 2384 in June 2017. These presumptive cases are diagnosed on the basis of standard case definitions provided under IDSP.

As reported in L form, in June 2015; 2444 samples were tested for Chikungunya, out of which 164 were found positive. In June 2016; out of 2360 samples, 172 were found to be positive and in June 2017, out of 6409 samples, 503 were found to be positive.

Sample positivity of samples tested for Chikungunya has been 6.7%, 7.3% and 7.8% in June month of 2015, 2016 & 2017 respectively.

Fig 15: State/UT wise Presumptive Enteric fever cases and outbreaks for June 2017

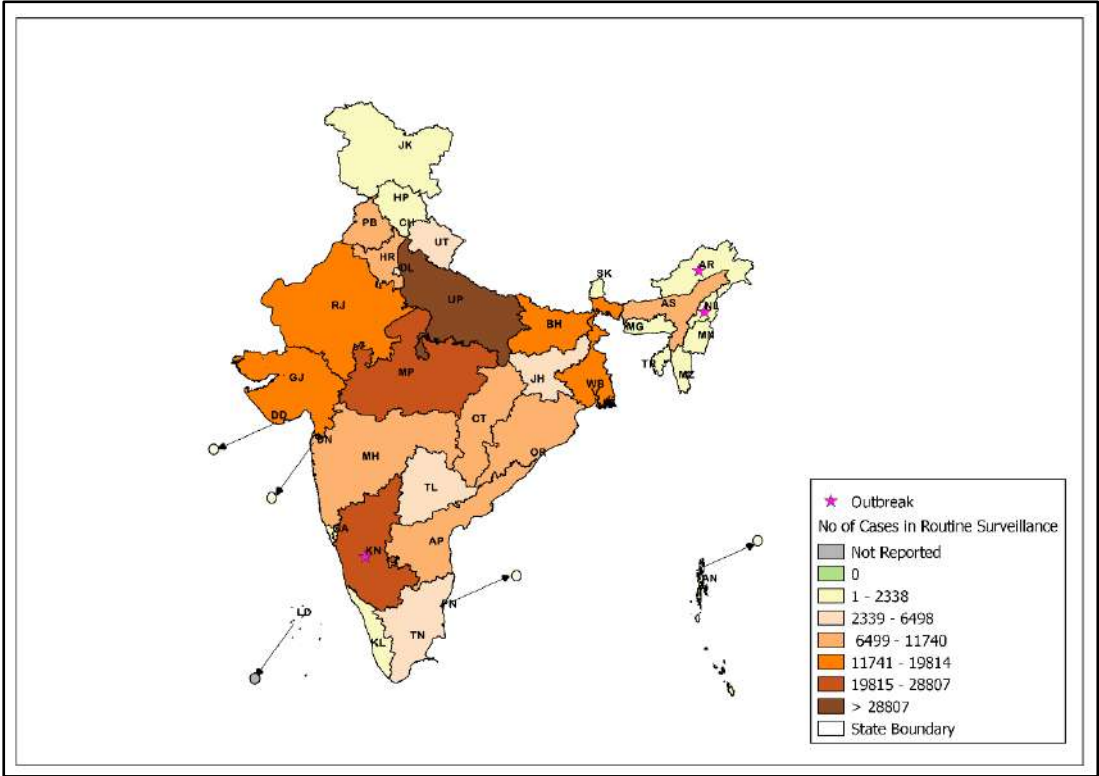


Fig 16: State/UT wise Lab Confirmed Enteric Fever cases and outbreaks for June 2017

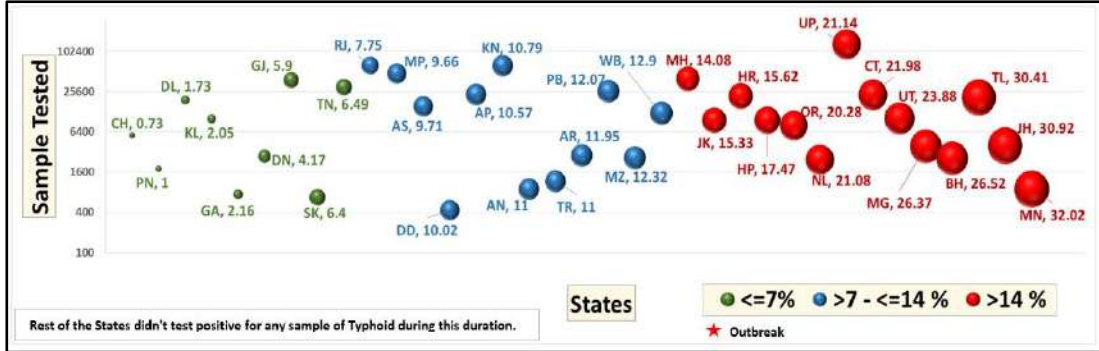


Fig 16: State/UT wise Presumptive ADD cases and outbreaks for June 2017

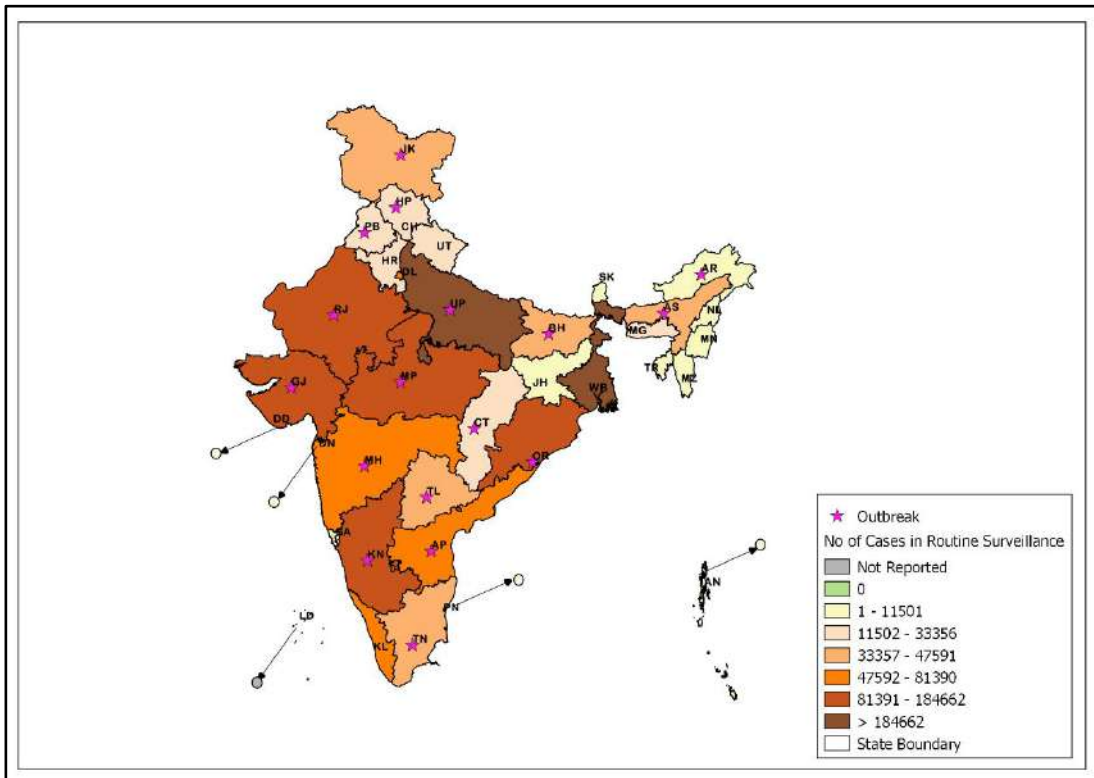


Fig 17: State/UT wise Lab Confirmed Cholera cases and outbreaks for June 2017

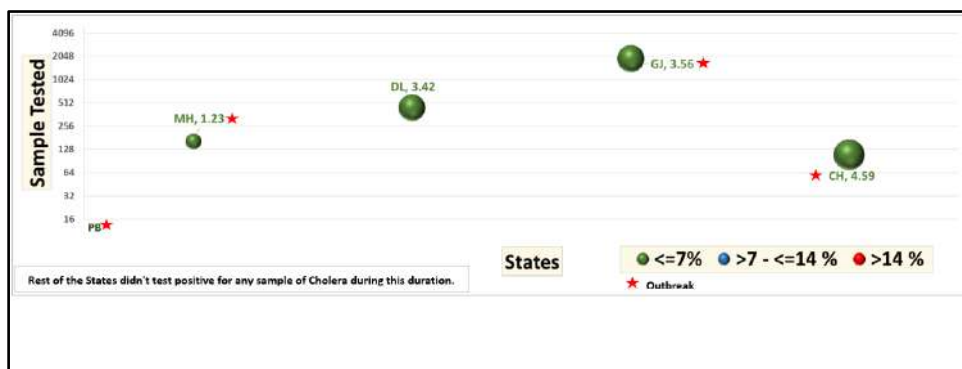


Fig 18: State/UT wise Presumptive Viral Hepatitis cases and outbreaks for June 2017

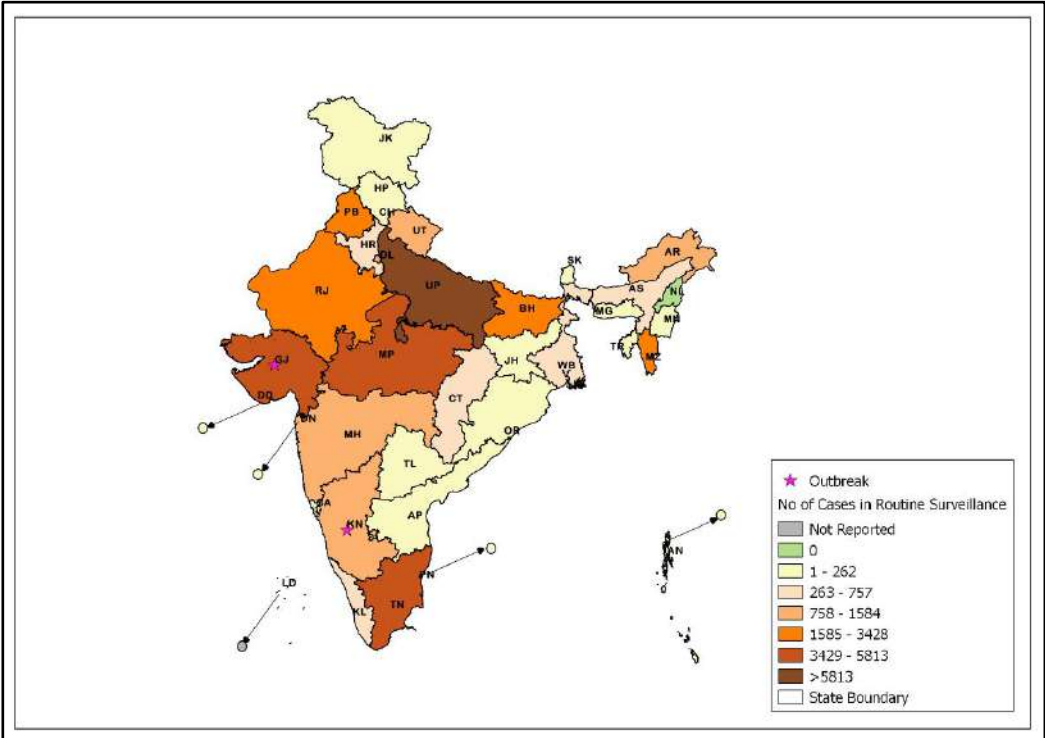


Fig 19: State/UT wise Lab confirmed Viral Hepatitis A cases and outbreaks for June 2017

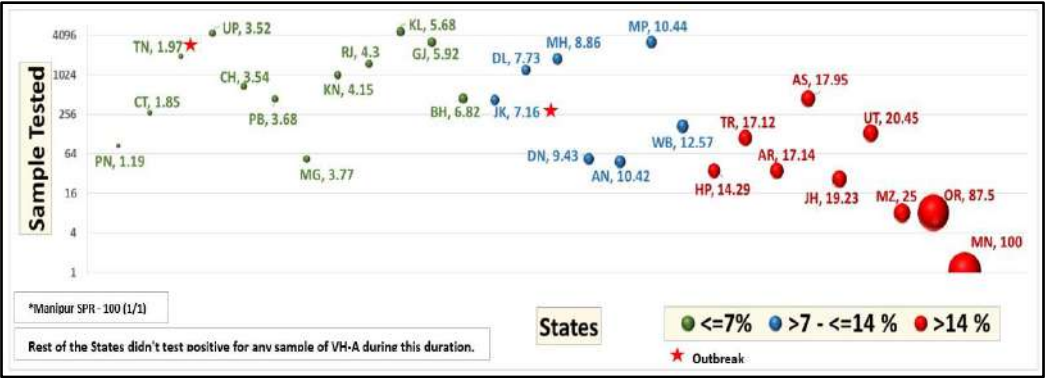


Fig 20: State/UT wise Lab confirmed Viral Hepatitis E cases for June 2017

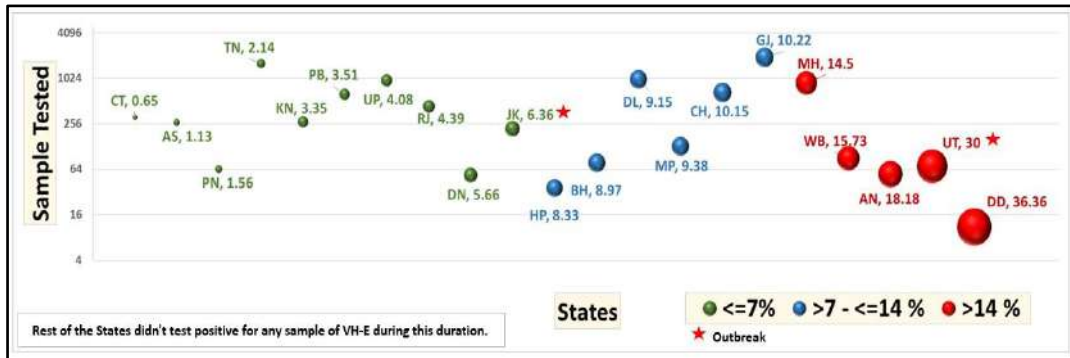


Fig 21: State/UT wise Presumptive Dengue cases & outbreaks for June 2017

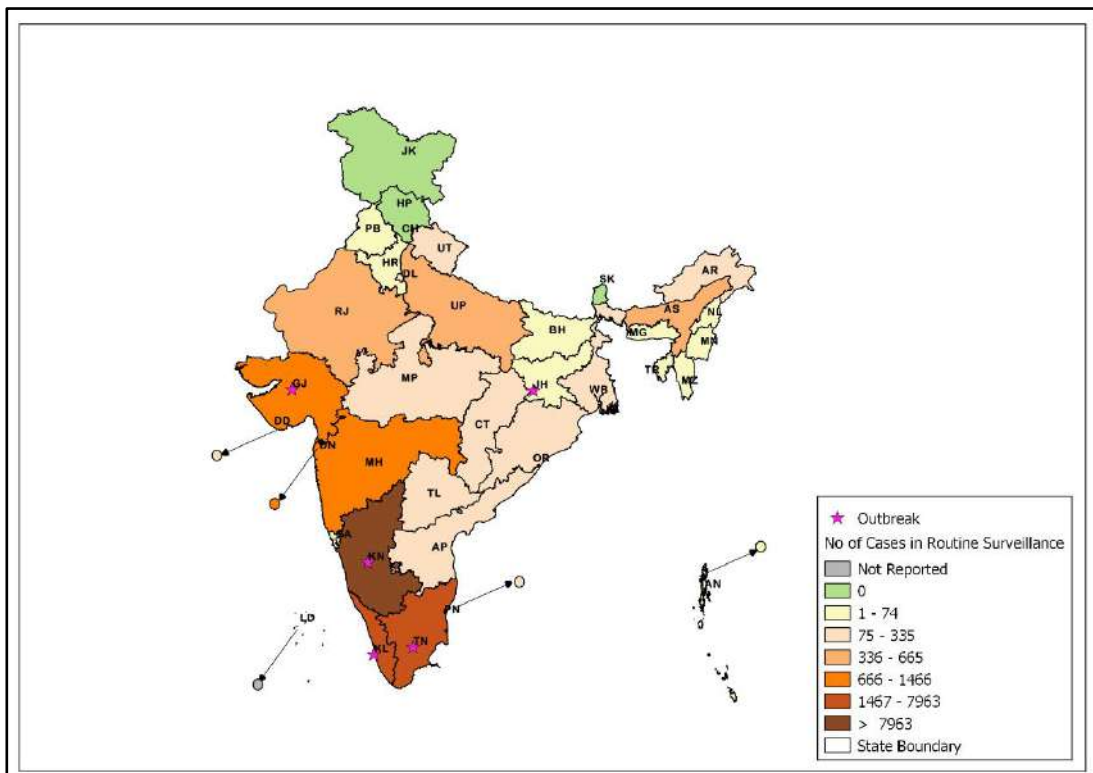


Fig 22: State/UT wise Lab confirmed Dengue cases & outbreaks for June 2017

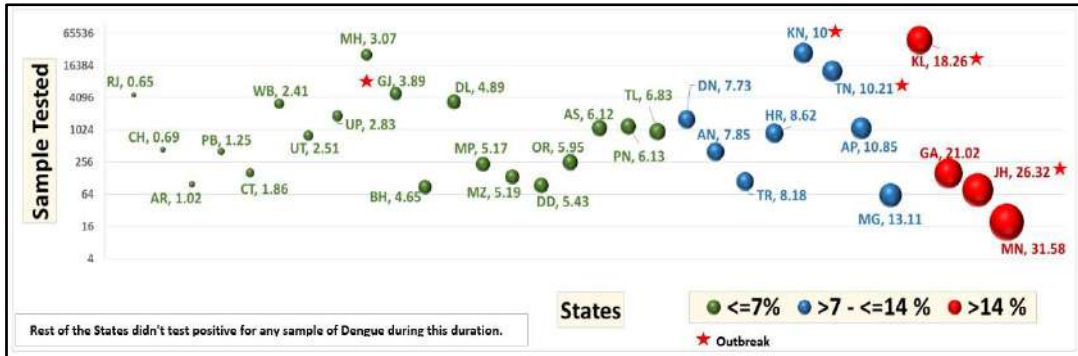


Fig 23: State/UT wise Presumptive Leptospirosis cases for June 2017

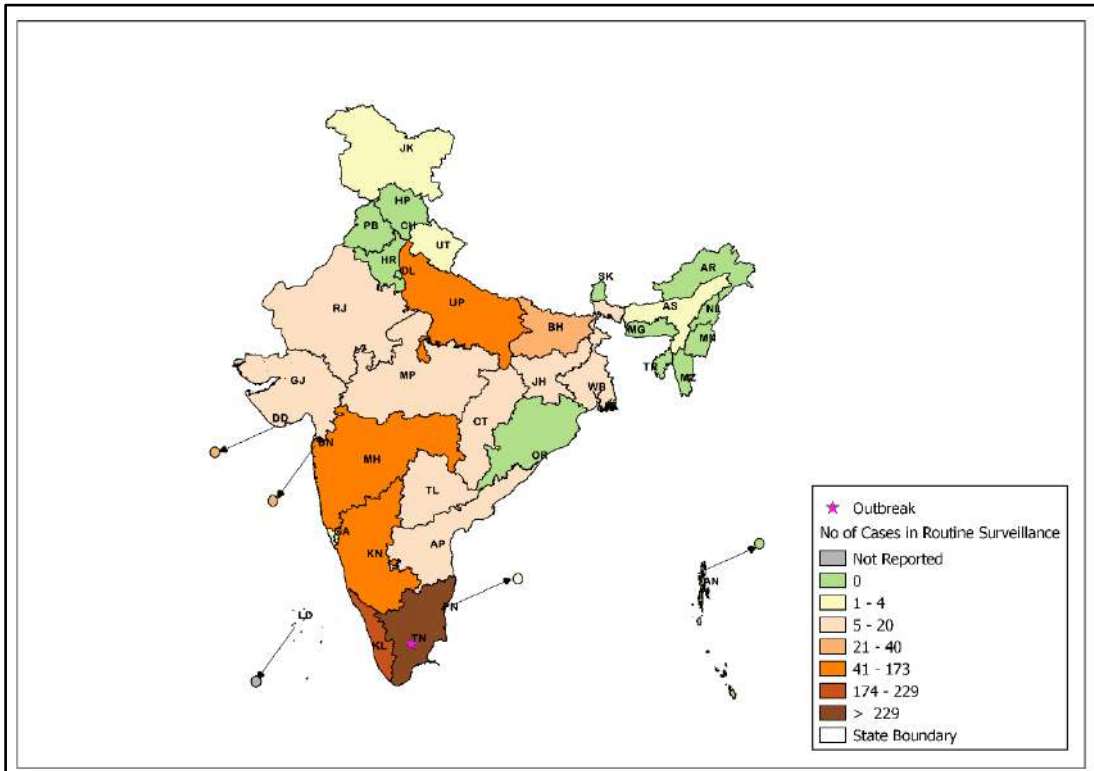


Fig 24: State/UT wise Lab Confirmed Leptospirosis cases & outbreaks for June 2017

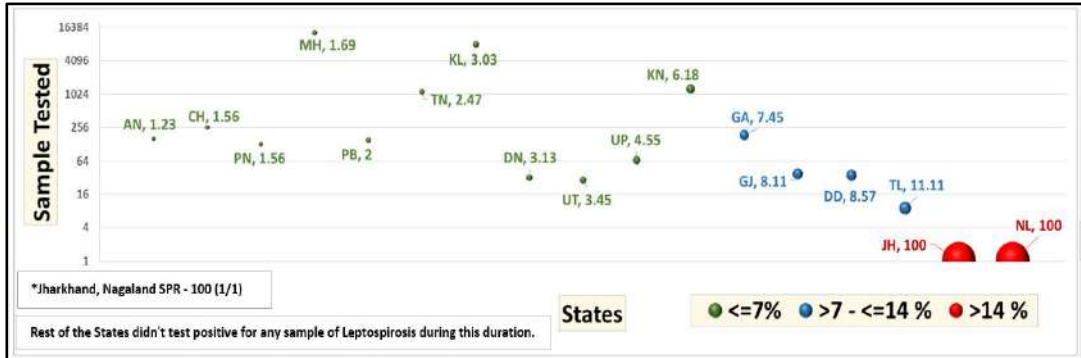


Fig 25: State/UT wise Presumptive Chikungunya cases & outbreaks for June 2017

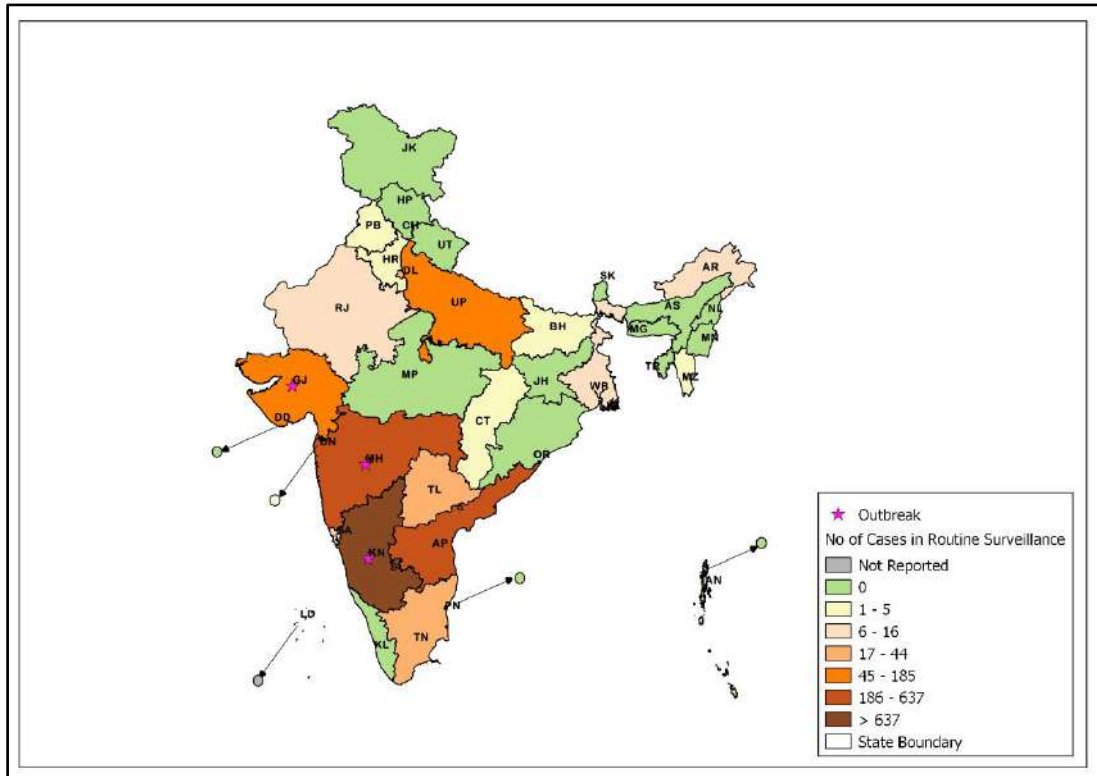


Fig 26: State/UT wise Lab Confirmed Chikungunya cases & outbreak for June 2017

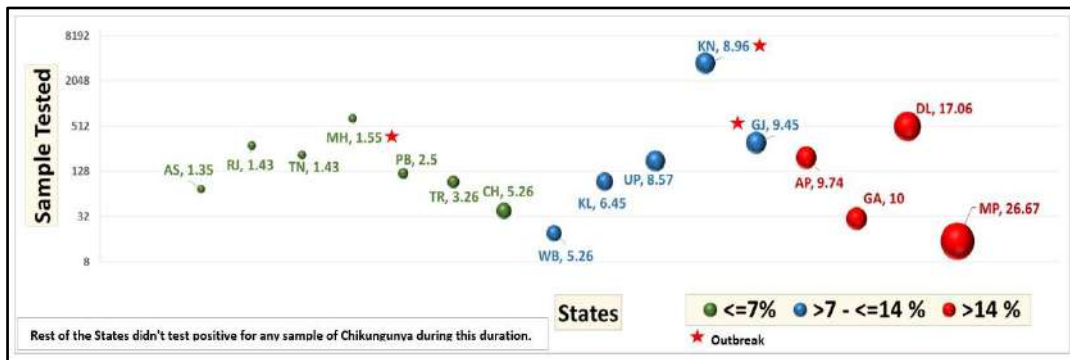
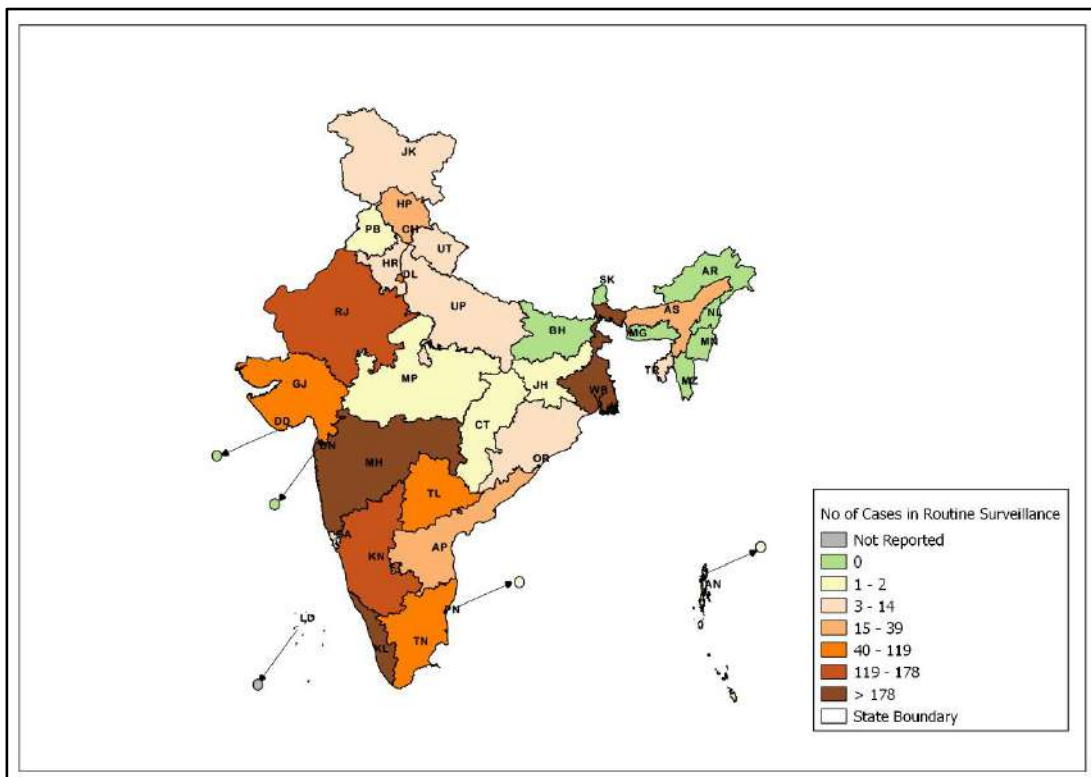


Fig 27: State/UT wise Influenza A (H1N1) cases & outbreak for June 2017



Action from the field

- A Central team of IDSP, NCDC consisting of Dr .Pradeep Khasnobis, Sr CMO & Off NPO; Dr Suhas Dhandore (Team Lead) & Dr Suneet Kaur, Consultant Epidemiologist; Dr. Uma Gupta, Consultant Microbiologist; Mr Ajay Kumar, Consultant IT; Mr Amit Mittal, Consultant Finance and Ms Sujata Malhotra, Data Manager visited Haryana and conducted an in-depth review of IDSP implementation in the State from 20th – 23rd June 2017. State Surveillance Unit (SSU) – Haryana, Districts Karnal and Mewat and their respective health facilities were visited and reviewed by the Central team.



- A Central team from NCDC comprising of Dr Nishant Deputy Director (PH) and Dr Partha Rakshit Deputy Director (Microbiology) investigated an outbreak of measles at Longding, Arunachal Pradesh in June 2017



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 leptospire 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 leptospire 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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