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NCDC Newsletter

Quarterly Newsletter from National Centre for Disease Control (NCDC)






Director's Desk

Zoonotic diseases pose huge challenge to both human and animal health. Surveillance holds one of the key measures for early detection and response. This issue of newsletter highlights the surveillance activities coordinated by NCDC to combat the threat.

This issue captures cholera outbreak investigation conducted by Punjab and food borne outbreak investigation carried out by Epidemic Intelligence Officers of NCDC, highlighting the generation of evidence-based recommendations derived from the investigations.

The other sections of this issue report various activities carried out by NCDC and its branches during the third quarter of the year like training of Regional Health Officers on epidemiology, Field Epidemiology Training of Medical Officers from South East Asia Region, training on vector biology and training on lymphatic filariasis.

Laboratory section captures important insights on initiating ELISA testing for parasitic diseases, circulating dengue serotypes in Delhi NCR and laboratory preparedness for yellow fever testing for evacuees from Sudan. In addition, this issue also captures information broadcast on etiology of acute conjunctivitis and global disease alert

We hope that this newsletter has provided you with valuable insights, and updates. As you read through this newsletter, we encourage you to provide us with inputs and ideas so that we may continue to bring information that is useful and valuable to you.

Thematic Area: One Health

Lead Story: Unveiling the emerging threat: A surveillance spotlight on Zoonoses

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Introduction:

Zoonotic diseases inflict a huge burden on both the Human and Animal health systems in India. The existing surveillance systems running in India for both human and animal diseases include Integrated Disease Surveillance Programme (IDSP) for humans under the Ministry of Health and Family Welfare (MoHFW) and National Animal Disease Reporting System (NADRS) and National Animal Disease Referral Expert System (NADRES) for animals under the Department of Animal Husbandry & Dairying (DAHD).

Currently, IDSP monitors data on six zoonotic diseases of human health importance i.e. Anthrax, Crimean-Congo haemorrhagic fever (CCHF), Rabies, Kyasanur Forest Disease (KFD), Leptospirosis and Scrub typhus in Presumptive (P) and Laboratory confirmed (L) case form. IDSP also

Highlights in this issue

receives disease outbreak reports from States/UTs on weekly basis.

Methodology:

The weekly outbreak reports data published on the IDSP website for zoonotic diseases from 2009 to 2023 was compiled for both the probable and lab-confirmed cases of zoonotic diseases and was considered for the analysis. The major zoonotic diseases for which outbreaks were reported were categorized into endemic and emerging zoonoses. An emerging zoonotic disease is defined as a zoonoses which is newly detected in a population or have known to be existed previously but is rapidly increasing in incidence or geographical range.

Zoonotic Outbreaks in India:

Outbreaks of zoonotic diseases in humans have been reported from all regions of India. Of all the states and UT's, 29 States reported outbreaks of one or more zoonotic diseases in the last decade. Figure 1 depicts the percentage of human cases reported in zoonotic outbreaks from 2009 to 2023. From 2009-2013, a total of 191 zoonotic outbreaks were reported and that number nearly doubled to 388 during the next five years i.e. from 2014-2018. Over the years, a significant rise in burden of Scrub typhus can be seen with 2023 alone recording 29 outbreaks of the disease, highest in any single year. Other endemic zoonoses with significant burden are Japanese Encephalitis (JE) and Leptospirosis with most human cases of both the diseases reported in 2014-2018 period. The outbreaks of emerging zoonoses like Nipah virus disease, CCHF, KFD and Zika virus disease were reported more in the 2014-2023 than in the 2009-2013 period. The endemic and emerging zoonoses in the country are further described in detail below.

a) Zoonotic diseases outbreaks reported under IDSP from 2009-2023 (Fig. 2)

- Scrub typhus and JE were reported from every region of the country while Anthrax was confined to the Eastern and Southern region. Leptospirosis outbreaks occurred in all regions except Eastern region.
- The highest number of JE outbreaks were reported from the North-Eastern region i.e. 176 in which Assam accounted for highest number of outbreaks (139 outbreaks) followed by Manipur, Arunachal Pradesh and Meghalaya. Other severely affected states with JE included Bihar, Jharkhand, West Bengal, Uttar Pradesh and Maharashtra. West Nile fever outbreaks have been reported from Kerala and Assam.
- Leptospirosis burden has been observed highest in the Southern followed by Western region. Tamil Nadu reported the highest number of outbreaks followed by Kerala and Maharashtra.
- Scrub typhus outbreaks have been reported from 23 states across the country. Rajasthan and Himachal Pradesh were most affected states in the Northern region with a cumulative of 17 outbreaks of the infection. Similarly, Assam and Arunachal Pradesh were most affected in the North-Eastern with a cumulative of 31 outbreaks, West Bengal (3 outbreaks) in the Eastern, Madhya Pradesh (7 outbreaks) in the Central, Maharashtra (11 outbreaks) in the Western and Puducherry and Tamil Nadu with a cumulative of 13 outbreaks in the Southern region.
- Though Brucellosis being prevalent across India in animals (Jaismon et al. 2023), a cumulative of 12 outbreaks have been only reported in humans from Kerala, Assam and Rajasthan. Other endemic zoonotic diseases for which outbreaks were reported included Animal bite, Human Rabies and Influenza A and Visceral Leishmaniasis.

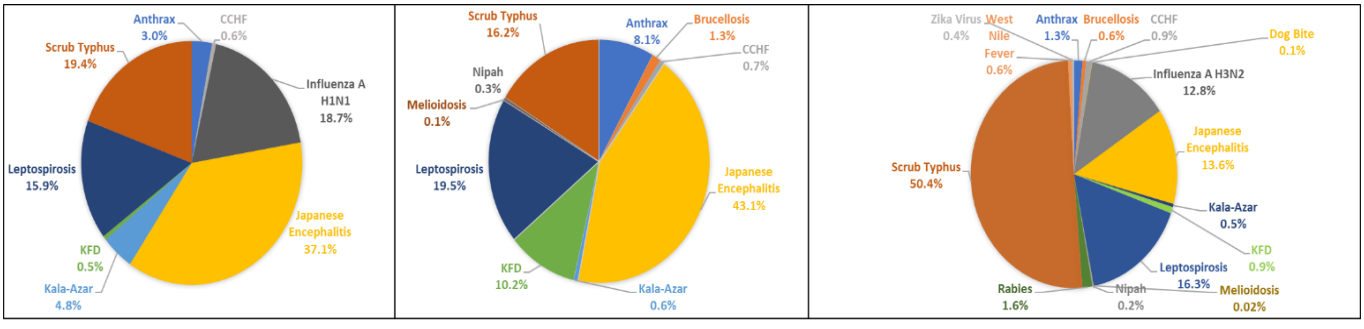

Fig. 1: Percentage of zoonotic diseases reported from 2009-2023

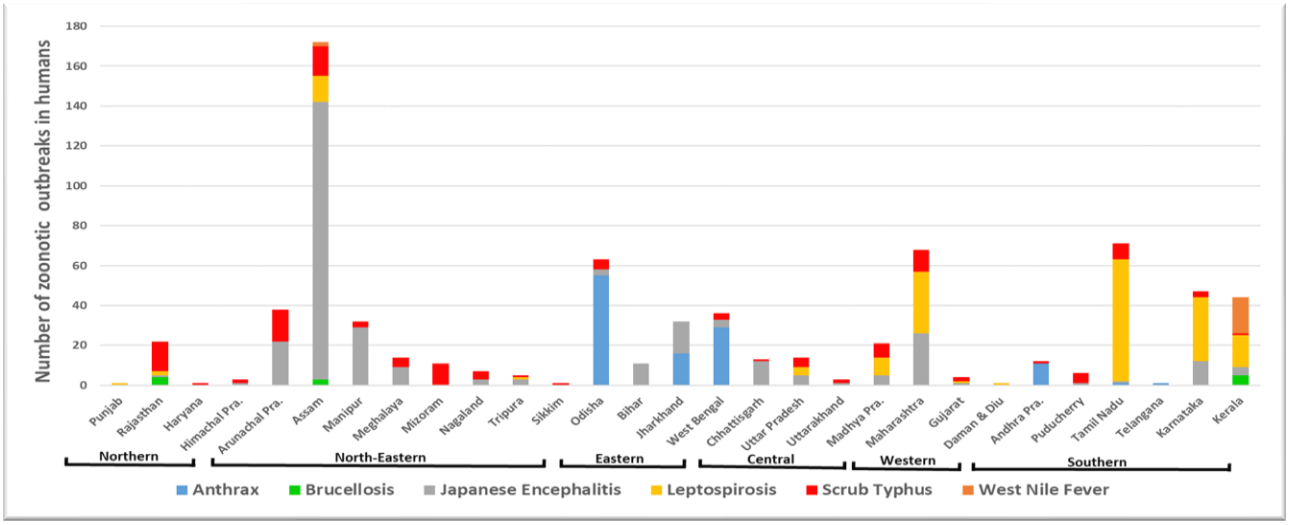

Fig 2: Outbreaks of zoonotic diseases reported in humans from 2009-2023

b) Emerging zoonoses outbreaks

In addition to the endemic zoonoses, outbreaks of a number of emerging zoonotic diseases have also been reported in humans in the recent years. Figure 3 shows the distribution of outbreaks of major emerging zoonotic diseases in India i.e CCHF, Nipah virus disease, KFD and Zika virus infection. The majority of these emerging infections are observed to be concentrated in the Western Ghats biodiversity zone.

- CCHF was first identified during a nosocomial outbreak in Ahmedabad, Gujarat in 2011. Since then, the state has experienced multiple outbreaks almost every year. From 2011 to 2023, a total of 138 CCHF cases were confirmed with 57 fatalities (CFR = 41.3%). The cases have been reported in 15 districts of Gujarat i.e. in Ahmedabad, Kutch, Patan, Surendranagar, Morbi, Jamnagar, Amreli, Aravali, Anand, Gandhinagar, Rajkot, Bhavnagar, Botad, Kheda, and Sabarkantha with Ameri, Kutch Bhavnagar and Ahmedabad being the most affected districts. In 2014, the disease was 1st reported outside Gujarat in Rajasthan, then in 2016 in UP and then in 2018 in Kerala.
- KFD, since its discovery in Karnataka have caused multiple outbreaks in Shivamogga, Uttara Kannada, Chikkamagaluru and Belagavi districts with Shivamogga being the most affected. KFD state of Karnataka 2014. In 2014, the disease was reported from Wayanad and Malappuram districts of Kerala, in 2015 from North Goa, in 2016 from Sindhudurg, Maharashtra and in 2019 from Nilgiris, Tamil Nadu.
- Zika virus was first reported in India from Ahmedabad, Gujarat with 3 cases in 2016, followed by 4th case in Tamil Nadu in 2017. After that Madhya Pradesh (130 cases) and Rajasthan (159 cases) experienced large outbreaks of zika virus disease in 2018. Other affected states include Maharashtra, Kerala and Karnataka.
- Nipah virus disease (NiVD) was first reported from West Bengal and had caused two outbreaks in 2001 in Siliguri and in 2007 in Nadia district. It was first reported in South India from Kerala in 2018 in an outbreak affecting 19 individuals. Since then, Kerala has experienced NiVD outbreaks in 2019 (1 case), 2021 (1 case) and 2023 (6 cases). Kozhikode is the most affected district in Kerala with 26 cases till now.
- Other emerging zoonoses monitored by NCDC include Monkeypox, Zoonotic Tuberculosis, etc. The first outbreak of Monkeypox in India occurred in 2022 with a total of 29 lab confirmed human cases. Recently, a molecular epidemiological surveillance of mycobacterium isolates from human TB cases in India revealed the importance of *Mycobacterium orygis* in addition to *M. bovis* for zoonotic TB surveillance (Dufffy et al. 2020).

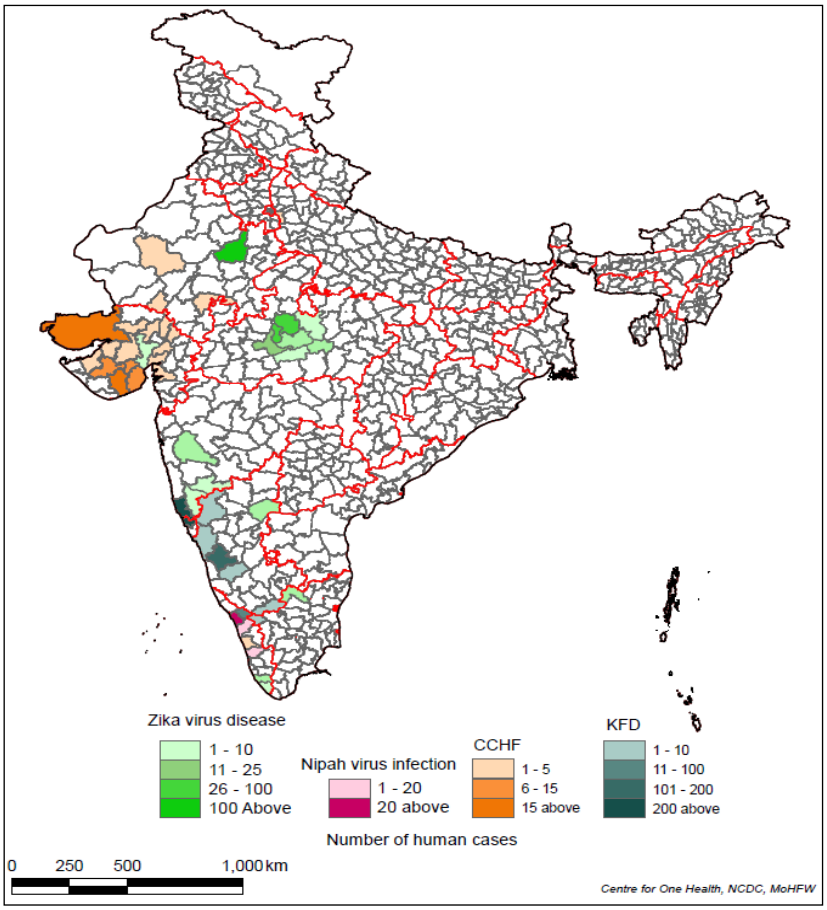

Fig 3: Distribution of outbreaks of major emerging zoonotic disease in India (2009-2023)

Conclusions:

Zoonotic diseases inflict huge burden on both the human and animal healthcare systems in India and their economic burden in terms of lost production in animals is also considerable. Zoonotic disease outbreaks have been reported from 29/36 states and UT's in India. The endemicity of leptospirosis in the Southern and of JE in the North-Eastern & Eastern and of Anthrax in the Eastern region is clearly indicative from IDSP zoonotic outbreak data. The anthropogenic environmental changes, land-use changes, intensification of livestock farming, higher human population density, etc., are risk factors identified for the spread of zoonotic infections like KFD, Nipah virus disease, Zika virus infection and CCHF to non-endemic regions. Like KFD endemicity extended from Karnataka to Kerala in 2014, to Goa in 2015, to Maharashtra in 2016 and to Tamil Nadu in 2019.

India has a huge burden of endemic as well as emerging zoonotic infections, so a systematic surveillance among both human and animal population is necessary for zoonotic disease epidemic preparedness and control. The MoHFW is working in collaboration with DAHD, Indian Council of Agricultural Research (ICAR) and MoEFCC for strengthening zoonotic disease surveillance, laboratory diagnostics and outbreak response using one health approach.

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Bridging the gaps: celebrating 'World Zoonoses Day' for a safer tomorrow

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World Zoonoses Day is observed annually on July 6th to mark the anniversary of the first vaccination against a zoonotic disease by a French scientist named Louis Pasteur in year 1885. Celebration of world zoonoses day is aimed to raise awareness about zoonotic diseases and their impact on human and animal health. As we strive for a healthier and more sustainable future, adopting a One Health approach and implementing proactive measures to prevent and control zoonotic diseases become imperative.

To mark this important occasion, Centre for One Health (CoH), NCDC held a National Conclave on "Uniting for One Health for two consecutive days, 6th-7th July 2023, in Delhi. The conclave witnessed unprecedented convergence with the engagement of high-level delegates from multiple ministries and representatives from various departments like public health, animal health, environment, agriculture, forestry, climate change, and wildlife and development partners, including USAID, WHO, CDC, and PATH.

The conclave witnessed participation from over 160 distinguished guests from 28 states. The objectives of the conclave were:

- Enhance Intersectoral Surveillance for Zoonoses to consolidate and merge diverse data reporting platforms, facilitating data integration.
- Prototype Development for Multi-Sectoral Zoonoses Data Reporting in relevant sectors to record and report zoonotic data from multiple sectors, fostering collaboration and coordinated efforts.
- Emphasize Data Integration in Zoonoses Surveillance to promote a cohesive approach in data collection, analysis, and reporting by prioritizing data integration.

The national conclave was a grand achievement and was followed by valuable recommendations for achieving this shared vision of assuring the well-being of humans, animals, and the environment.

Tiwari, Joint Director & Head, CoH, NCDC to all the states/UTs and institutes strengthened under 'National One Health Programme for Prevention and Control of Zoonoses (NOHP-PCZ)' to observe World Zoonoses Day in all villages, districts and municipal blocks by bringing together all stakeholders (Medical, Veterinary and Wildlife sector) and implementing activities such as webinars, drawing and writing competitions, debates, Farmer's Mela, Vaccination drives and awareness programmes for school children.

The message was well perceived by most of the states and different activities were organised to celebrate the occasion of World Zoonoses Day on 6th July 2023. College of veterinary sciences, Guwahati, Assam organised a free anti-rabies vaccination camp for dogs followed by essay writing competitions on emerging zoonotic diseases and public health threats amongst the veterinary, medical, dental and general science colleges and a drawing competition on one world, one health: prevent zoonoses amongst the school students of class VII- X.

UT of Chandigarh organised a Poster making competition and art contest was organised in school on the theme of Zoonotic Diseases, multiple awareness programmes were organised by different health facilities across the UT of Jammu & Kashmir, awareness camps on Zoonoses prevention and control were arranged for school children and community in general at different PHCs in state of Tripura, awareness lectures were conducted across 20 CHCs and PHCs by DHS, state of Goa.

Similar events and activities were also observed by Regional Coordinators and Sentinel Surveillance Sites strengthened under the NOHP-PCZ.

World Zoonoses day celebration at COVS, Guwahati, Assam

Fortifying Health Security Through Zoonotic Disease Surveillance under 'National One Health Programme for Prevention and Control of Zoonoses (NOHP-PCZ)'

Contributed by: *Dr. Simmi Tiwari [1], Dr. Ajit Shewale/ [2], Dr. Tushar N. Nale [2], Dr. Aastha Singh [3], Dr. Hanul Thukral [4], Dr. Dipti Mishra [5]*
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Introduction

Although 65% of recent major disease outbreaks throughout the world have a zoonotic origin. An analysis of over 300 Emerging Infectious Disease (EID) events around the globe between 1940 - 2004 revealed > 70% originated in wildlife. Some examples include Ebola from Sudan in 1956, KFD emergence from Karnataka (India) in 1957, HIV 1 & Monkeypox from Congo in 1959 and 1970 respectively, Nipah virus from Malasia in 1998, etc. In addition to that, endemic zoonoses like Rabies, Anthrax, Scrub typhus, Brucellosis, Leptospirosis, etc., inflict a huge burden on both the human health and animal health sector in India.

The country has well-established human and animal disease surveillance under the aegis of MoHFW and DAHD respectively, but integration of the two for the zoonotic disease surveillance with One Health approach has not matured enough.

NCDC's role In Zoonotic Disease Surveillance

For joint Human-Animal zoonotic disease surveillance, the Centre for One Health (COH) at NCDC Delhi, runs the "National One Health Programme for Prevention and Control of Zoonoses" (NOHPPCZ), National Rabies Control Programme (NRCP) and Programme for Prevention and Control of Leptospirosis (PPCL). The NOHPPCZ has a network of 15 Regional Coordinators of One Health (RC's) including 4 AIIMS and 45 Sentinel Surveillance Sites on Zoonoses (SSSZ) spread across 30 states & UT's. These institutes are medical and veterinary laboratories supported to provide diagnostic facilities to the states for priority zoonotic diseases in both humans and animals. Additionally, NRCP and PPCL supports 11 and 5 laboratories respectively across India for rabies and leptospirosis surveillance. The priority zoonoses identified for the country in the "National Multi-sectoral One Health Workshop for Zoonotic Disease Prioritization" included Zoonotic Influenza A, Anthrax, Japanese Encephalitis, Brucellosis, Leptospirosis, Rabies, Scrub typhus, Plague and CCHF.

Integrated Zoonotic Disease Surveillance under NOHP-PCZ

a. Zoonotic disease surveillance by Regional Coordinator (RC) under NOHP-PCZ

The RC's are Human and Animal Health institutes working in the field of zoonoses. Each RC has been assigned 2-3 states for coordination of programme activities across the country. The RC's are given the responsibility for the following programme activities in their assigned states:

- Capacity Building Activities
- Strengthening Zoonoses Surveillance and Outbreak Investigations
- Referral Diagnostic Services
- Inter-sectoral Coordination Activities
- Risk Communication and Operational Research on priority zoonoses

From 2019-2023, the RC's have tested approximately 1.09 lakh human and 86 thousand animal samples for various zoonotic disease. The RC's have targeted a total of 19 zoonotic diseases which include both endemic and emerging zoonotic diseases. The zoonotic diseases targeted in human and animals and their positivity is depicted in Fig 1 & 2.

The diseases targeted by the Human and Animal Health institutes were based on regional importance and institute's expertise. Leptospirosis positivity rate was observed highest in Southern region, followed by Eastern & North Eastern region and Northern & Western region. The overall positivity for leptospirosis in humans and animals was 11% and 15% respectively. The endemicity of brucellosis was also observed in all the regions with 10% positivity rate in humans and 7% in animal populations. Japanese Encephalitis positivity stood at 6% in humans and 28% in animals. The Eastern & North Eastern region was most affected with JE due to high positivity among pig population i.e. 39%. Zoonotic diseases like Avian Influenza, Q fever,

Swine Salmonellosis and Bovine tuberculosis also poses a significant threat to human population due to their considerable burden in animal populations. Other diseases targeted by the RC's for laboratory diagnosis included Glanders, CCHF, Zika virus, Rabies, Cysticercosis, Toxoplasmosis, Trypanosomiasis, Scrub typhus etc.

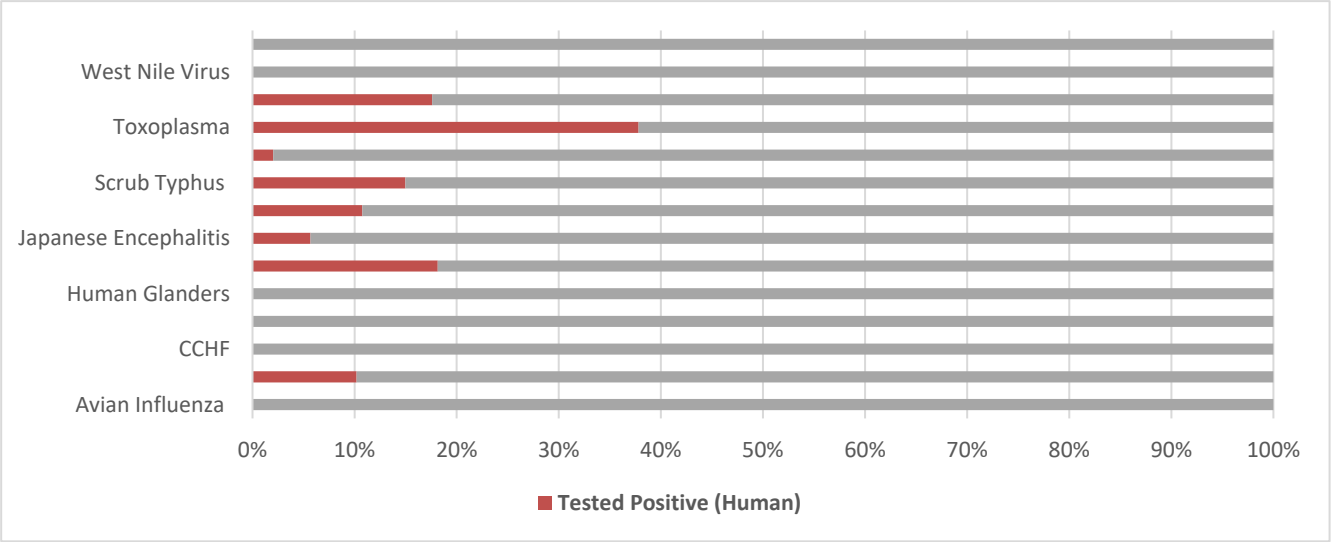

Fig 1: Positivity rate of zoonotic diseases in humans (NOHPPCZ RC's 2019-2023)

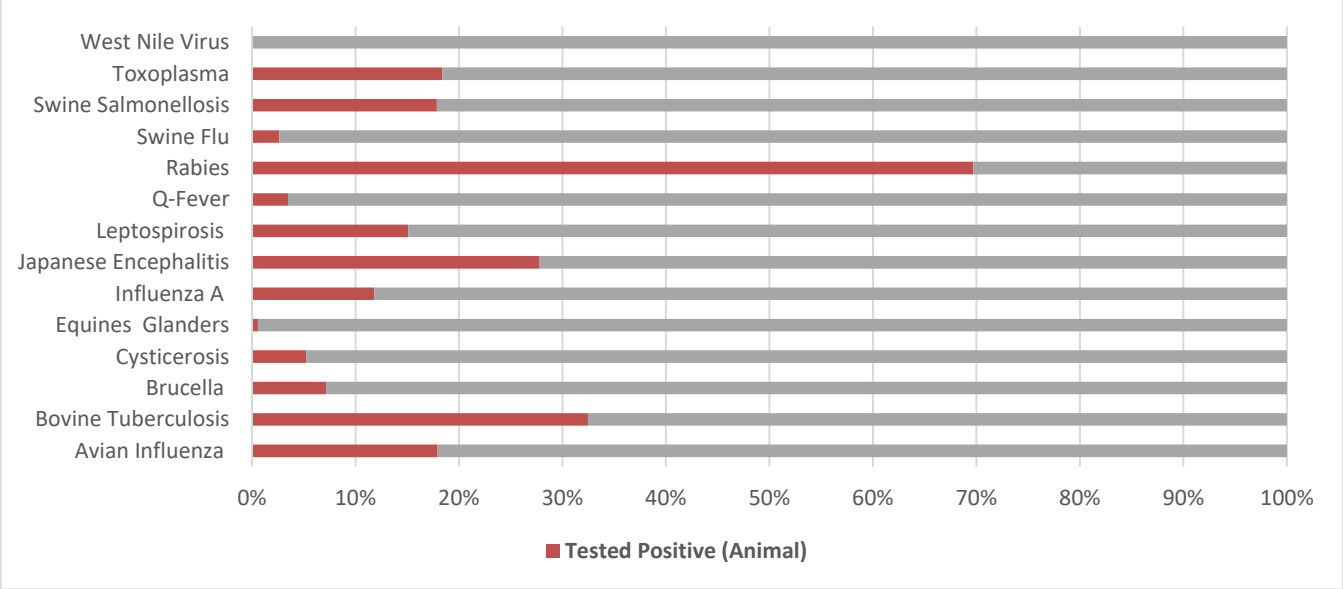

Fig 2: Positivity rate of zoonotic diseases in animals (NOHPPCZ RC's 2019-2023)

a. Zoonotic disease surveillance by Sentinel Surveillance Sites for Zoonoses (SSSZ) under NOHP-PCZ

In the FY 2022-23, the COH, NCDC, Delhi has initiated sentinel surveillance for zoonotic diseases project across the country for the systematic assessment of spatial and temporal trends of zoonotic diseases and to study the exposure factors related to them. These sites are medical & veterinary colleges, ICAR and RDDL laboratories and DPHL's. The sites will target priority zoonoses based on the endemicity in their region. By Dec'23, the COH, NCDC had enrolled 32 sentinel sites in 21 states across the country (Fig 3). It is proposed to expand this network up to 80-100 sites over a period of next five years. A special surveillance module has been developed on Integrated Health Information Platform for real time data entry of laboratory confirmed cases from these sites as shown in Fig 4. It is expected that these sentinel surveillance sites will strengthen the surveillance and diagnostic capacity of states for zoonotic diseases which would help in reflecting the accurate burden of the same.

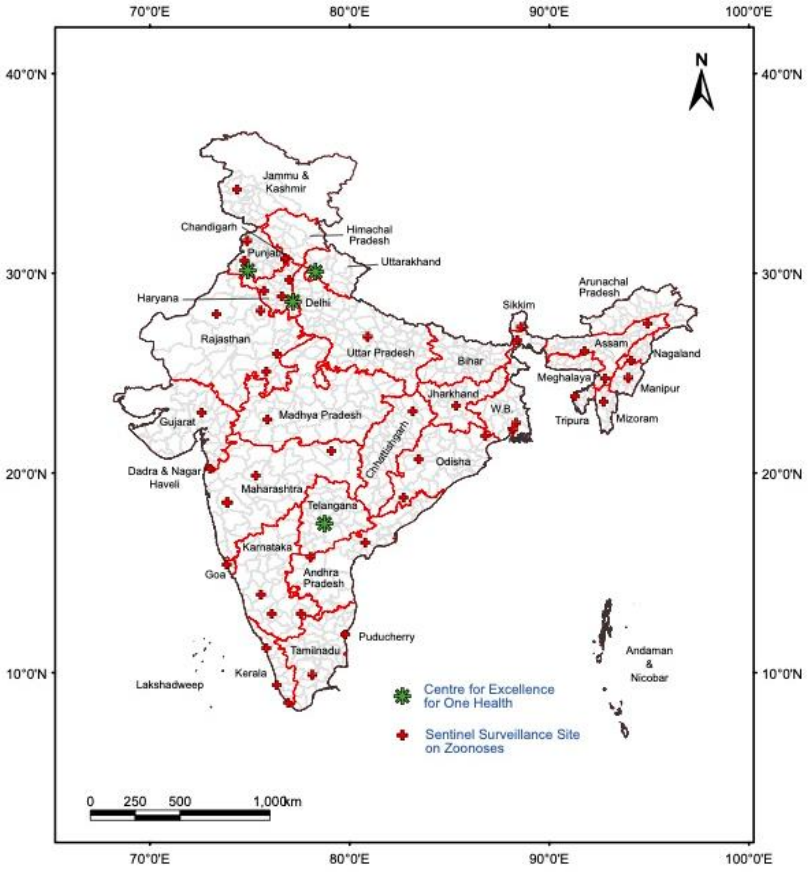

Fig 3: Network of Sentinel Surveillance Sites established under NOHPPCZ till Dec 2023

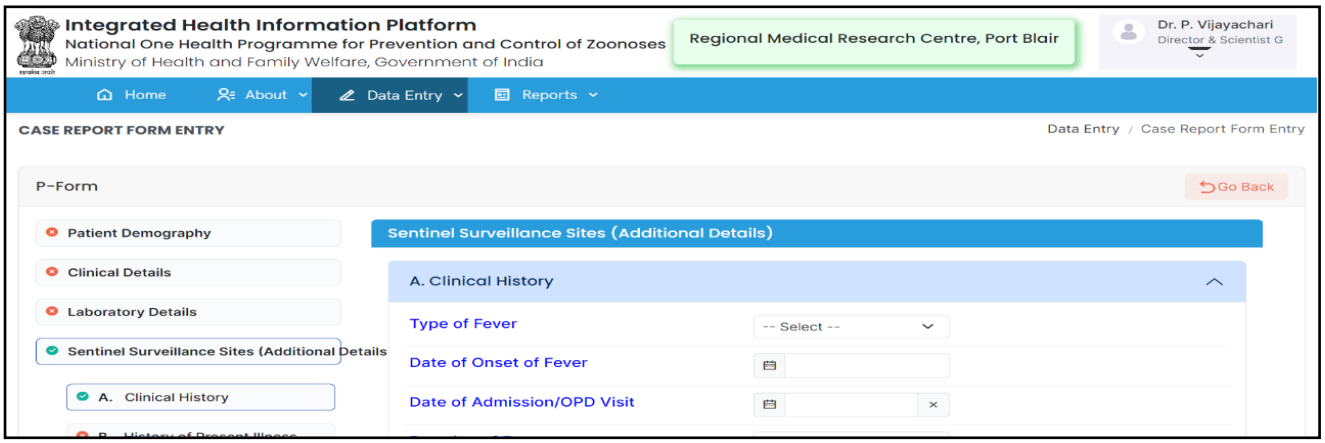

Fig 4: Special Surveillance module for Sentinel Surveillance Sites on Zoonoses on IHIP

Conclusions

Zoonotic disease outbreaks have been reported from 29/36 states and UT's in India. The endemic zoonotic infections like leptospirosis, scrub typhus, rabies, Japanese encephalitis and brucellosis have shown high positivity rate in both animals and humans. The endemicity of leptospirosis in the Southern region and of JE in the North-Eastern & Eastern region is clearly indicative from both IDSP zoonotic outbreak data and laboratory data from NOHPPCZ network.

The Integrated Human-Animal surveillance for zoonotic diseases using one health approach is need of the hour for tackling both endemic and emerging zoonoses and is also proposed by the One Health Joint Plan of Action (2022-2026) by WHO, WOAH, FAO & UNEP. The NOHPPCZ in collaboration with ICAR, DAHD and MoEFCC is working towards establishing the integrated human-animal zoonotic disease surveillance in the country and the RC's and SSSZ's are a working example of the same.

Outbreak Section

Outbreak Investigation of Acute Diarrhoeal Disease among wedding attendees in a village of Rajasthan, India, June 2023

Contributed by: *Dr. Amit Soni[1], Dr. Sushma Choudhary[2], Dr. Anurag Dhoundiyal[3], Dr. Kumbha Gopi[4], Dr. Vijaypal Singh[5], Dr. Tanzin Dikid[6]*

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Background: Rajasthan State reports nearly 100,000 acute diarrheal disease cases every year. A suspected outbreak was reported among the wedding attendees in village Aasoliya ki Madri in Udaipur district of Rajasthan on June 24. State program office (IDSP) was informed about the outbreak and epidemic intelligence service officer (EISO) was deputed on 28 June 2023 to investigate the outbreak with the objectives to describe the epidemiology of outbreak, exposure for the outbreak and to provide evidence-based recommendation for the prevention and control of such outbreaks in future.

Methodology: A wedding happened in the village on 23rd June, 2023. Around 600 guests were invited and around 500 guests from Aasoliya ki Madri village only attended the wedding others were from others district. We defined case as ≥3 loose stools and abdominal pain, nausea, vomiting, fever, or lethargy in a resident of village Aasoliyon ki Madri June 21-29, 2023. Active search of acute gastroenteritis case was carried out in village Aasoliyon ki Madri of population 700. Hence, we established 10 teams, ensuring comprehensive coverage of each individual within a span of 3 days. The team comprised of Accredited Social Health Activist (ASHAs), Auxiliary Nurse Midwives (ANMs) & CHO's (Community Health Officer). House-to-house survey was conducted for case search. For passive case search, we reviewed records for acute diarrhoea cases from Out Patient Department (OPD) and lab registers at PHCs Primary Health Centres (PHCs), Health & Wellness Centres (HWCs), IHIP Portal and district IDSP cell. We collected data on demographic factors, travel history, food history, hospitalization, treatment received. Inspection of the food preparation area was done with in-depth interview of food maker and his team to assess the process of raw material procurement, their quantity, storage, preparation, storage of cooked food. We collected stool samples for microbiological testing and water samples from wedding, and food preparation sites for coliform testing. We conducted a retrospective cohort study among the wedding attendees in village and calculated relative risk (RR) with 95% confidence interval (CI) for the served food items.

Results: We identified 262 cases (54% females); overall attack rate was 37% (262/700), wedding attendees attack rate 57% (262/458) and no case among non-attendants. The median age was 31.5 years (range: 18-48). Cases reported lethargy (76%), nausea (60%), and abdominal pain (57%); Hospitalization was 7% (19/262). The median time between food consumption at wedding and symptom onset was 18 hours (range: 3-22). Upon examining the food preparation area and conducting interviews with the food maker and their team, it was observed that their hand hygiene practices were unsatisfactory during physical examinations. The kitchen's sanitary conditions were subpar, featuring an open area designated for utensil washing in close proximity to the storage of raw vegetables. Regrettably, these raw vegetables were left uncovered, leading to some of them starting to rot. Houseflies were noted around these raw vegetables. The food maker deviated from the standard procedure of serving cooked meals the day after obtaining raw vegetables. Additionally, it was brought to attention that drinking water was directly sourced from a bore well, and this water supply had not undergone chlorination for the past year. Among the wedding attendees exposure to 3/8 food items: mango shake (RR 1.63; 95% CI 1.23-2.15), daal (RR 1.58; 95% CI 1.2-1.96) and pudi (RR 1.57; 95% CI 1.27-1.94) had higher association with illness.

The food preparation site was different from the wedding venue (food served) and used unchlorinated borewell water. Water sample (1/1) from the food preparation site tested positive for coliforms. Stool samples (4/4) and water samples (3/3) from wedding venue tested negative.

Limitations: -An identification of the species and a laboratory confirmation of the source of infection could not be carried out. We could not reach the people who came from outside the village and attended the wedding. We also could not conduct interview with the catering staffs that were hired on the daily wages.

Conclusions: A point source outbreak of acute gastroenteritis among wedding attendees in village X was likely associated with consumption of food prepared using contaminated water. The clinico-epidemiological findings and presence of coliforms in water are suggestive of E. Coli as likely agent.

Recommendations:

Short term

1. Drinking water should be chlorinating in the water supply.
2. Food safety and good hygiene practices should be maintained in the cooking area

Long term

1. Regular water testing for chlorination and contamination of drinking water
2. During any outbreak of gastroenteritis, stool samples should be collected timely.
3. Ensure testing of all food samples in any gastroenteritis outbreak.

Sensitization of field staff about survey

House to house survey and interviews

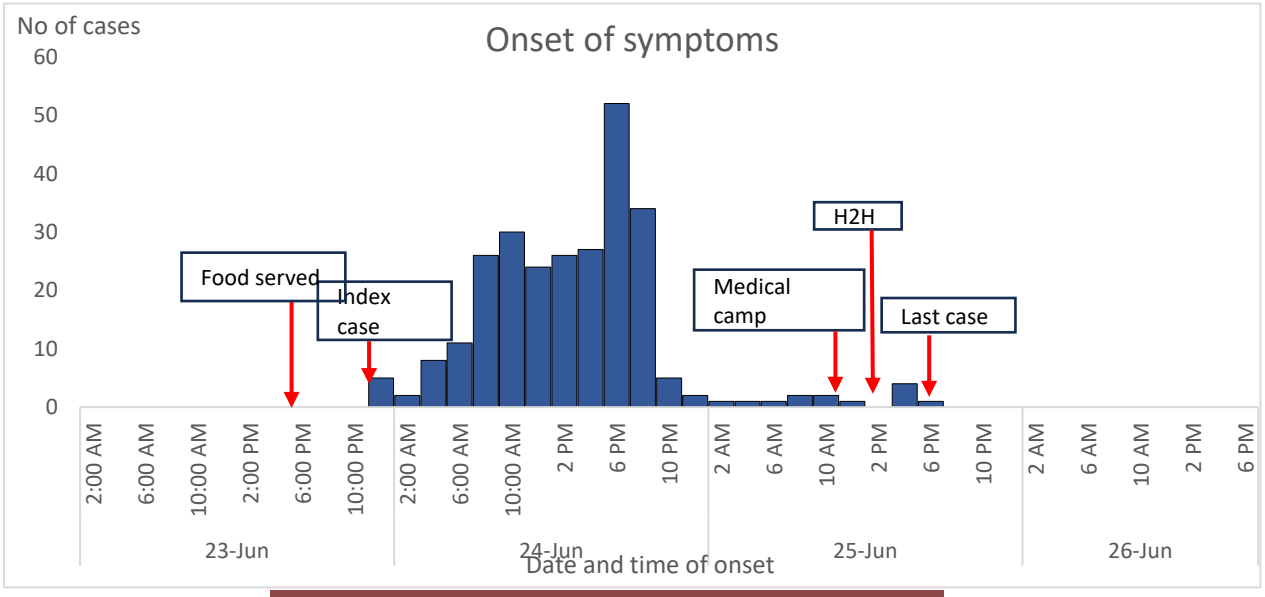


Fig 1: Time of onset of symptoms in diarrhea cases N-262

S.NO	Food items	Ill attack rate(N-262)	Non- ill attack rate(N-196)	RR	CI
1	**Drink mango shake**	**96.18%**	**89.69%**	**1.63**	**(1.23-2.15)**
2	**Daal**	86.25%	71.65%	**1.58**	**(1.2-1.96)**
3	**Plain Pudi**	84.35%	69.07%	**1.57**	**(1.27-1.94)**
4	**Roti**	88%	78.35%	**1.42**	**(1.12-1.8)**
5	Palak Pudi	61.83%	60.31%	1.03	(0.83-1.28)
6	Chhole	52%	54.64%	0.93	(0.75-1.15)
7	Rice	69.46%	73.2%	0.89	(0.70-1.14)
8	Pani Patasi	53%	58.25%	0.87	(0.70-1.09)

Table 1: Food exposure history

Cholera Outbreak Investigation in Jalandhar, Punjab, July-August 2023

Contributed by: *Dr. Shobhna Bansal[1], Dr. Amardeep Khairon[2], Dr. Sakshi Gaur[3], Mr. Sukhwinder Singh[4], Ms Tajinder[5]*

[1] District Epidemiologist, IDSP, [2] Medical Officer, UPHC, Dada Colony, [3] Consultant Epidemiologist, CSU – IDSP, [4] XEN, Jalandhar, [5] ANM, UPHC Dada Colony

Cholera is an acute diarrhoeal infection caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae*. Cholera is an infective disease transmitted through the ingestion of contaminated food or water. It can cause severe acute watery diarrhoea and in its severe form leads to high case fatality, if left untreated. However, it remains a global threat to public health and an indicator of inequity, lack of social development or unrest. In July 2023, Punjab experienced heavy flood situation due to excessive rainfall in Punjab and the neighboring state of Himachal Pradesh and subsequent release of water from dams. This resulted in inundation of 2147 ha area in Jalandhar by mid-July.

On 31st July 2023, the District Surveillance Unit received reports regarding few cases of watery diarrhea in SG Nagar, Jalandhar. A district level RRT was constituted immediately comprising of Dr. Shobhna Bansal (District Epidemiologist) and Dr. Amardeep Khairon (Medical Officer, UPHC Dada Colony) and Tajinder (ANM). Mr Sukhwinder Singh from XEN also aided the investigation and control efforts. Amardeep Khairon (Medical Officer, Urban Primary Health Centre, Dada Colony) and Tajinder (ANM). Mr Sukhwinder Singh from XEN also aided the investigation and control efforts.

Methodology: A Rapid Response Team reached the Sanjay Gandhi Nagar Mohalla, Jalandhar affected area with diarrhoea cases in Gali no. 2. There were no reported cases for Acute Diarrheal Diseases in the area in the past years, therefore an epidemiological investigation was done for the identified cluster.

Clinical case definition: A case was defined as any person who had experienced the symptoms of pain in stomach and loose watery diarrhea in Sanjay Gandhi Nagar Mohalla in last 3 days during the investigation i.e., 31st July to 17th August 2023.

Field Visit: The RRT visited the area and took detailed case histories of the patients admitted in nearby private hospital (Sacred Heart). The RRT started an active case search and line listing of cases in the adjacent areas of Sanjay Gandhi Nagar Mohalla that had the same water supply as initial cases had reported a foul smell emanating from the municipal water supply. The RRT with the municipal corporation officials observed the

chlorination and inspected the pipelines used in the water supply in the villages

Laboratory Investigation:

A total of 11 water samples were taken and sent to State Public Health Laboratory Kharar for bacteriological examination

1. Tube well water
2. Municipal Supply Handpump water
3. Tap water from different houses
4. House water (house Pots and used for drinking purpose)

A total of 4 Stool samples of cases (2 from admitted and 2 from community) were collected for and sent for culturing to DPHL Jalandhar.

Results:

Descriptive epidemiology and lab findings

- The total population of the Mohalla was 7830 (approx.)
- Out of which, 41 developed the symptoms of acute watery diarrhea with attack rate of 5 per 1000 population.
- Median age of cases (range)= 28 (1, 64)
- Out of which,
- 18 (44%) were males and 23 (56%) were females.
- 13 were below 10 years of age, out of which 4 required hospital admission.
- 16 cases required hospital admission (39.0%). Out of these, 5 were children (<10 years) 7 were aged between 25-45 years and 4 cases were aged 50 years and above.
- Growth of V. cholera was observed in 3 out of 4 stool samples and bacteria was isolated from 1 out of 11 water samples sent for bacteriological testing.

Environmental findings:

Water sources of the area (SG Nagar Mohalla)

1. One tube well located in the central park (water tested and found fit for drinking)
2. Hand pumps connected to municipal water supply
3. Illegal connections to municipal water supply

Public Health Action

- Municipal Corporation officials were informed immediately.

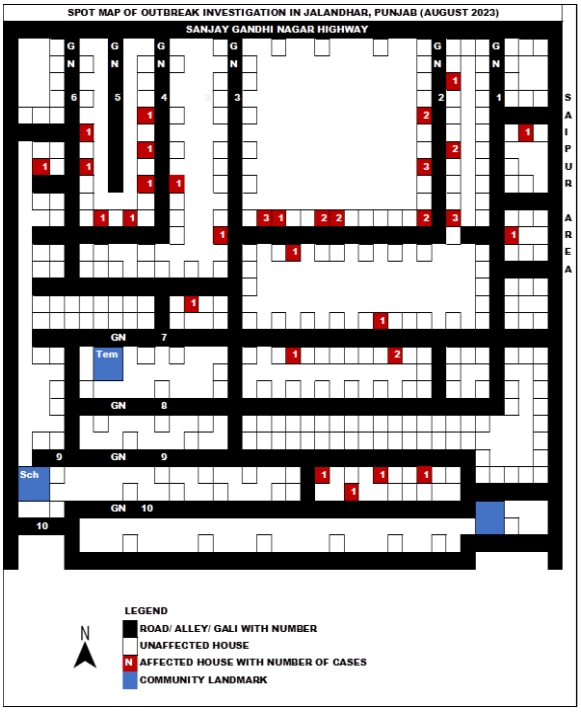


Fig 1: Spot map of cases in Sanjay Gandhi Nagar, Jalandhar, Jul-Aug 2023

- Municipal Corporation officials were informed immediately.
- A medical camp was organized in the nearby Gurudwara Sahib and chlorine tablets, ORS sachets and Zn+ tablets were distributed to the patients. Patients who were severely sick were referred to a nearby private hospital.
- IEC activities regarding water borne diseases have been done. Along with this announcement through the Gurudwara was also done continuously.
- Tankers were also provided by the Municipal Corporation Jalandhar. Workers from MC department checked the pipeline to find out the fault.
- Sterile Containers were given to the patients suffering from diarrhoea to collect the stool samples.
- Health Education regarding boiling of water and hand washing technique were given to the affected persons.
- Instructions regarding the maintenance of hygiene and sanitation were given.
- Chlorine tablets were distributed in every house.
- Water tanks were also provided by the Municipal Corporation for the area.

- Information related to chlorination of drinking water was also imparted by the health staff.
- Heath awareness regarding WBDs were given by the MPHW(F) and ASHA of the concerned area.
- Follow up of the patients was done by the local health staff of the concerned dispensary.
- Correction of leakages of the pipelines supplying water to the households by the municipal corporation.
- The sewage pipeline blockages were cleared by the municipal corporation.

Recommendations

Short term:

1. Chlorination/ boiling of drinking water by the residents using the distributed halogen tablets with immediate effect.
2. Raw food such as vegetables or fruits must be washed or cleaned before consuming by the residents.
3. Continued awareness activities targeting hand washing with soap and safe water before eating food and after using the washroom should be undertaken by the health department.
4. IEC activities should be done to spread awareness regarding self-care in case of diarrhoea onset and when to report to the health facilities.

Long term:

1. Water Pipelines should be checked every 6 months for any faulty connections/ leaks by the Municipal Corporation.
2. Sewage pipeline blockages must be checked and fixed every 6 months.
3. Routine (monthly) water sampling and examination of water samples from the piped water supply system of the area at 3 levels (the source, distribution point, consumption point) should be done more frequently by the water supply and sanitation department on a regular basis till safe drinking water is ensured.
4. High alert for cholera should be issued by the district health authorities with copy to the district and municipal administration if the water level rises too high during monsoon season to ensure preparedness and high index of suspicion.

Field photos

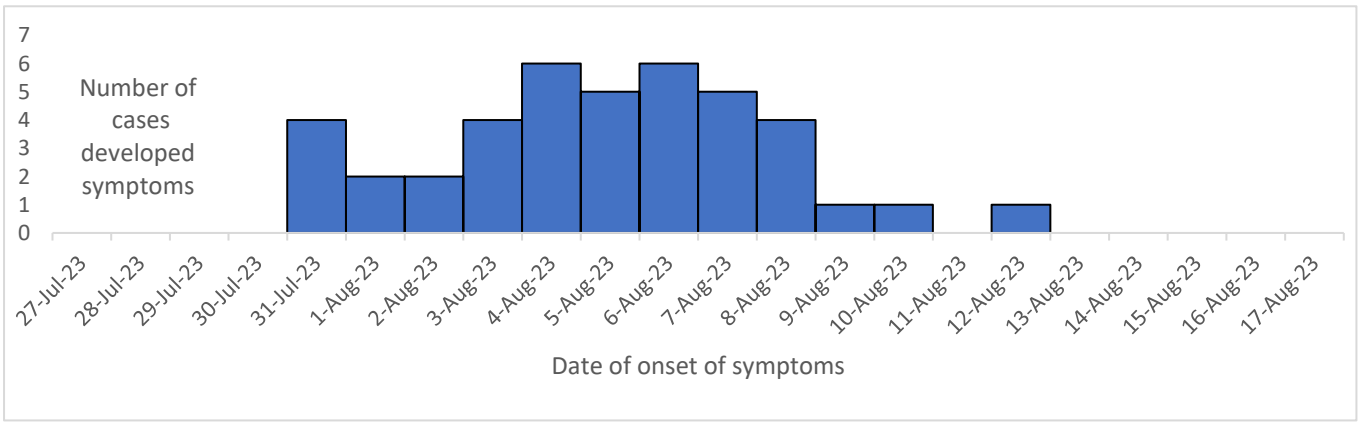


Fig 2: Distribution of cases with date of symptom-onset, Jalandhar, Jul-Aug 2023

NCDC trains Regional Health Officers in Epidemiology and National Health Programmes

Contributed by: *Dr. Suneet Kaur[1], Dr. Arti Bahl[2], Dr. Shikha[3]*
[1] Deputy Director, NCDC,[2] Additional Director & HOD Epidemiology Division, NCDC, [3] Research Assistant, NCDC

A two-day training workshop was organised by Epidemiology Division, NCDC Delhi on 12 and 13 July 2023 for Regional Health Officers (RHOs) to orient the newly appointed officers at Regional Health Offices under Directorate General of Health Services on their roles and responsibilities. The training content included sessions on epidemiology, International Health Regulations (IHR) and National Health Programmes w.r.t. vector borne diseases, non-communicable diseases, leprosy, tuberculosis, rabies and IDSP/IHIP.

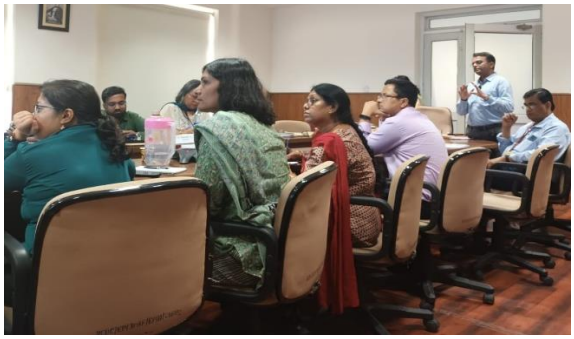
The training was attended by 12 RHOs from Lucknow, Pune, Thiruvananthapuram, Bhubaneswar, Bangalore, Chennai and Raipur. Majority (7) of the participants had less than 1 year of experience at the current place of posting.

The training workshop was inaugurated by Prof (Dr) Atul Goel, DGHS and Director NCDC on 12 July 2023. The inaugural session was attended by Senior officers from NCDC and ministry, trainees from Regional Health Offices. Dr. Arti Bahl, Additional Director & HOD, Epidemiology Division, NCDC welcomed the participants and dignitaries and highlighted that it was the first time such a training was organised by Epidemiology Division for RHOs. Dr. Anil Kumar, Principal Advisor, NCDC spoke on importance of enhancing skills in data interpretation and analysis in the field of work of RHOs. Dr. Nikhilesh Chandra, Additional DDG emphasised on the significance of community health and the need for new directions in public health orientation.

Technical Sessions during the training covered roles and responsibilities of RHOs in public heath, importance of data analysis and interpretation in functioning of RHOs, descriptive epidemiology, surveillance data analysis of vector borne diseases, leprosy, tuberculosis, Integrated Disease Surveillance Programme/Integrated Health Information Platform (IDSP/IHIP) data, non-communicable diseases data, antimicrobial consumption surveillance data, prioritisation of diseases/health problems, outbreak investigation, role of RHOs in international health regulations and development of State action plans on One-Health.

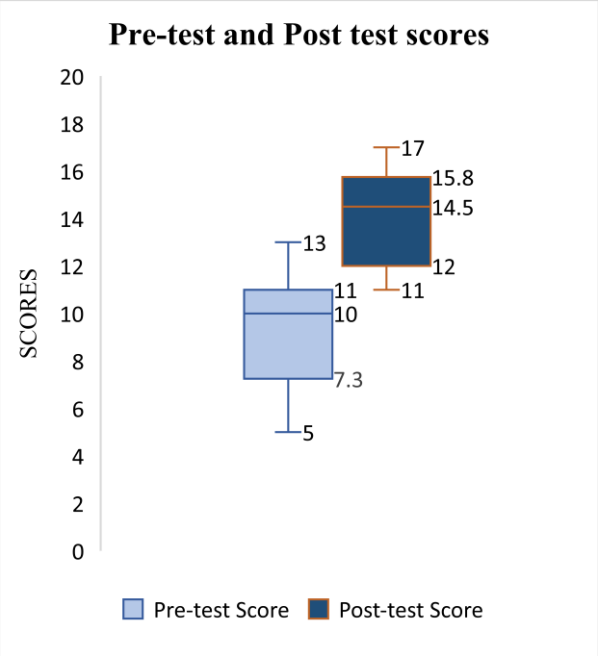
The sessions were a mix of lectures, hands on exercises and table top exercises. Pretest and post-test of the participants was conducted on their knowledge with respect to epidemiology and national health programmes showed improvement in scores of all the participants. The workshop ended with valedictory session

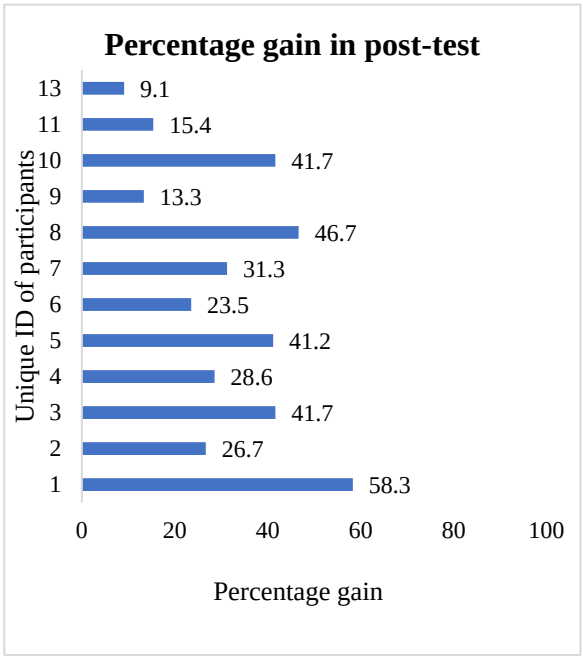
Prioritizing public health problem session by Dr. Suneet Kaur

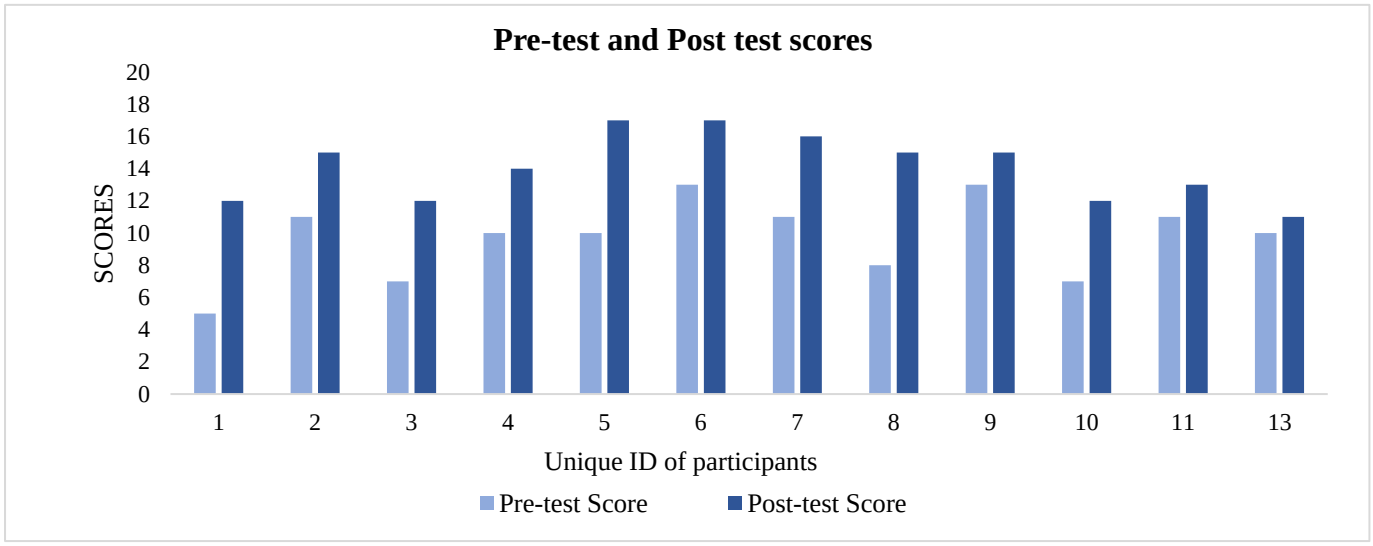


Session on zoonotic diseases by Dr Ajit Shewale

Distribution of certificates to participant







Group photo with Prof. (Dr) Atul Goel, HODs and RHOs

Regional Field Epidemiology Training (FETP) programme for Health Personnel of South East Asia Region, National Centre for Disease Control, 17th July - 13th October'23

Contributed by: *Dr. Anubhav Srivastava[1], Dr. Arti Bahl[2]*
[1] Deputy Director, NCDC,[2] Additional Director & HOD Epidemiology Division, NCDC

The National Centre for Disease Control (NCDC), Delhi is a WHO Collaborating Centre for Epidemiology and Training. Its mandate is to strengthen technical capabilities and skills of health professionals in field application of epidemiology in prevention & control of diseases.

Among the various training programmes conducted, Field Epidemiology Training Programme (FETP) for Health Personnel (MOs) & Paramedical FETP are the two key WHO sponsored activities.

About the training:

- One of the prestigious courses of the South East Asia Region for the medical officers working in the field of public health.
- Tailor made programme for participants from countries of South East Asia Region to strengthen the epidemiological skills, understand disease dynamics in community and intervention for its prevention and control
- FETP is conducted at NCDC once a year. So far, 23 FETP batches conducted, 310 participants trained since 1996.
- Last batch was held pre-pandemic in 2019. Subsequent batches were skipped due to Covid-19 situation.
- This year, 6 participants from Sri Lanka (2), Bhutan (2), Nepal (1) and India (1) joined the training programme.
- The course is of three months duration: 5 weeks for classroom sessions, 6 weeks for field practice include undertaking community survey, outbreak, investigation, analysis of health data and evaluation of district surveillance system and 2 weeks for finalization of reports and preparation of slides and presentation of field reports; and evaluation of performance.
- The training covers modules on Principles of epidemiology, Introduction to biostatistics, Disease surveillance, Outbreak investigation and response, role of the laboratories in public health, Emerging infectious diseases, Communication and health promotion, International health regulation, Basic computer applications, and Field practice.

Senior faculty of the NCDC and officers of SafetyNet participated in the Programme. The methodology of FETP involved a variety of teaching/learning approaches such as lectures, discussions, modular exercises, demonstration and fieldwork. The trainees acquired basic skills for use of computers and EPI INFO at computer workstations in the computer laboratory.

Field Survey: During the field posting, all the participants were posted at Alwar branch of NCDC from 28th Aug to 06th Oct 2023. The participants were placed under supervision of field supervisors from NCDC Delhi and Dr. Naveen Chharang, Joint Director and Branch officer in-charge of the NCDC branch who supervised the groups and field visit arrangements.

The field exercises included:

- Review the district surveillance system- Evaluation of IDSP-IHIP in Alwar, Rajasthan, August / September 2023
- Conduct community survey- Hypertension Morbidity Survey Among Adults in Village X, Alwar, Rajasthan from August 2023 to September 2023
- Analyze health data- Prescription Audit in a District hospital in Alwar, Rajasthan, India 2023
- Investigation of an outbreak.

Assessment: The training programme was evaluated through comparing the performance of the participants before the course through assessment questionnaire. The post training assessment was done on 13th Oct 2023 and feedback of the training was also taken. Expectations from the training programme was also assessed at the start of the training.

Valedictory programme held on 11th Oct'2023 in the presence of Director In-charge, NCDC, HoDs, Faculty of Epidemiology and other invited officials and certificates were distributed.

NCDC Conducts training on Vector Biology & Vector Management

Contributed by: *Dr. Pranab Jyoti Bhuyan[1], Dr. Himanshu Chauhan[2], Dr. Tanzin Dikid[3], Dr. Simmi Tiwari[4], Dr. Monil Singhai[5], Dr. Naveen Tuli[6], Dr. Shubha Garg[7], Sukhvir Singh[8], Diwakar Singh Dinesh[8], Rina Kumawat[9], Arun Chouhan[9], Shiva Kamlakannan[9], Namita Soni[9]*

[1] Joint Director, NCVBDC, [2] Joint Director & OIC IDSP, NCDC, [3] Joint Director &OIC Centre for CME&VM, NCDC, [4] Joint Director &OIC Centre for One Health, NCDC, [5] Joint Director & OIC CAZD, NCDC, [6] DHO Delhi, [7] Deputy Director, [8] Consultant, NCDC, [9] Assistant Director, NCDC

Training on "**Vector Biology and Vector Management**" was organized by CME & VM, at NCDC Delhi from 26 June to 07 July 2023. Three Vector Control participants from the Kolkata Municipal Corporation from Kolkata state which is endemic for vector borne diseases were trained during this training.

The course curriculum comprised on presentations, inter-personal discussions, laboratory demonstrations and field exercises including pre-test and post-test evaluations. The subjects included all the aspects of disease profile, vector biology, identification, surveillance strategy and tools, entomological indicators, entomological indicators, prevention and control components of VBDs.

Dr. Tanzin Dikid, Joint Director & HoD CME & VM welcomed the participants and mentioned about the objectives of the training. The resource persons were drawn from National Centre for Vector Borne Diseases Control (NCVBDC), Municipal Corporation of Delhi, Zoonosis, Parasitology and IDSP divisions of NCDC Delhi beside CME & VM division. Field exercises and Laboratory demonstrations were also supported by MCD, Delhi.

Breeding Sites Found in JJ Colony & Harijan Colony

RNA virus extraction from mosquitoes

NCDC sensitizes insect collectors on Vector Collection Methods

Contributed by: *Dr. Tanzin Dikid[1], Sukhvir Singh[2], Diwakar Singh Dinesh[2], Rina Kumawat[3], Arun Chouha3[5], Shiva Kamlakannan[3], Namita Soni[3]*

[1] Joint Director &OIC Centre for CME&VM, NCDC, [2] Consultant, NCDC, [3] Assistant Director, NCDC

A Sensitization Training on "**Vector Collections methods & different Preservation techniques**" was organized by Centre for Medical Entomology and Vector Management (CME&VM), at NCDC Delhi on 26th September & 27th September 2023 in two batches for thirty-four Insect Collectors (IC) posted in NCDC (Hqr.) Delhi and branch offices.

The course curriculum comprised on presentations, inter-personal discussions, Insectary & Museum visit and campus survey. The subjects included all the aspects of disease profile, vector biology, identification, display of different surveillance tools, demonstration on different vector collections methods & their preservations techniques, demonstration of rearing of mosquitoes & sandfly, museum visit and campus survey.

Dr. Tanzin Dikid, Joint Director & HoD CME & VM welcomed the participants and mentioned about the objectives of the training. The resource persons were drawn from CME & VM division only.

Demonstration on use of different Entomological tools

A Sensitization Lecture on biology of different vectors and their identification

A visit to Sandfly colony

Laboratory Section

Circulation of Dengue serotypes in Delhi NCR

Contributed by: *Ms. Preeti Khatri[1], Dr. Neha Gupta[2], Dr. Monil Singhai[3]*
[1] Laboratory Technician, [2] Assistant Director, [3] Joint Director & OIC CAZD, NCDC

Dengue is the most rapidly spreading vector-borne viral disease globally with a high number of cases and deaths being reported from India with epidemic potential. The reliable estimates of the burden of dengue and duly notification in surveillance systems are important to inform policy and research. It is well observed that severe dengue is more likely to occur with a secondary DENV infection than with the primary DENV infection. There are four reported serotypes of DENV from India namely DENV1-4. Serotype 2 is considered more dangerous than other serotypes as it has a greater potential to cause dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) and it is more readily transmitted than other serotypes. Moreover, secondary infection with serotype 2 after the first heterotypic infection has been observed to be more likely to cause DHF/DSS.

Figure 1 depicts the trends of prevalent dengue serotypes from 2019 till September 2023. The trend this year shows an increased prevalence of DEN 1 serotype as compared to last two years.

DEN2 remains the most prevalent serotype this year as was in 2021 and 2022. DEN4 serotype which was not prevalent for the past 3 years has resurfaced again. Since past few years, mixed infections consisting of patients harboring more than 1 serotype concurrently are being observed. Till 2018, the division had been relying on conventional polymerase chain reaction (PCR) test followed by sequencing for identification of Dengue serotypes. From 2019 onwards, the division has adopted a new protocol using serotype specific PCR/ kit-based real time PCR which can also detect mixed Dengue serotype infections. Around 18.75% samples tested showed prevalence of mixed infection with DEN1 and DEN3 serotypes in 2023 while co-infection with DEN2 and DEN3 had been reported in 2021. There is no consensus on clinical outcomes of cases with multiple serotype infections in dengue. Thus, it is critical that relationship between coinfection with multiple serotypes and clinical outcomes be closely monitored to understand the importance of this emerging trend in the management of dengue cases.

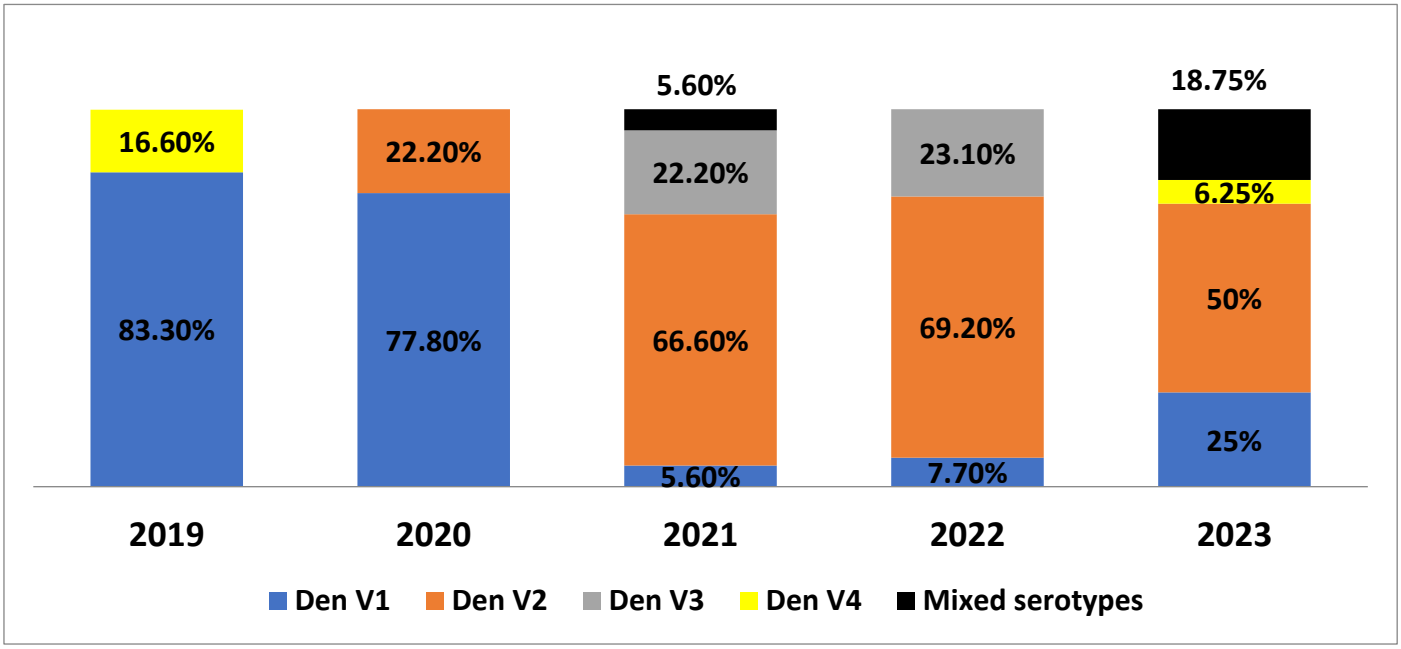


Fig1: Percent stacked bar chart to depict Dengue serotypes from 2019-2023 prevalent in Delhi

Initiating IgG ELISA tests for four parasitic pathogens in DPD, NCDC

Contributed by: *Dr. Shubha Garg[1], Dr. Vinay Garg[2]*
[1] Deputy Director, NCDC, [2] Joint Director & OIC DPD, NCDC

Parasitic infections are usually considered neglected public health problem. Entero-parasitic infections in humans occur primarily through contaminated food or the ingestion of soil contaminated with eggs or free-living larvae of parasites. Early diagnosis of parasitic infections is difficult at times because of lack of the pathognomic signs/ symptoms. Also, owing to nonspecific clinical and biochemical parameters such as eosinophilia, raised muscle enzymes etc., subsequent chronic forms of the parasitic diseases are also not easily diagnosed. Microbiological laboratory investigations play a crucial role for the diagnosis of such infestations.

In the view of the same, the Department of Parasitic Diseases (DPD) at National Centre for Disease Control has validated and initiated IgG Enzyme linked immunosorbent assay (ELISA) testing for four organisms namely, Entamoeba histolytica, Trichinella spiralis, Strongyloides and Toxocara spp. It may be pertinent to note that, the antibody ELISA must be considered only as a screening test for parasitic exposure and results should be correlated with patient's clinical history and supporting pathologic/ radiological findings to confirm the diagnosis. These tests can not only aid in the timely diagnosis of parasitic diseases in patients but can also yield possibilities for event based epidemiological investigations and parasitic disease surveillance in high-risk population in non-endemic areas.

NCDC participates in External Quality Assurance Proficiency testing of Monkey Pox

Contributed by: *Ms Yosman[1], Dr. Vishesh Sood[2], Dr. Monil Singhai[3]*
[1] ARO, NCDC, [2] Assistant Director, NCDC, [3] Joint Director & OIC CAZD, NCDC

The Centre for Arbovirus and Zoonotic Diseases (CAZD) is responsible for supporting the country in detecting and diagnosing zoonotic diseases of outbreak origin and public health emergency of international concern (PHEIC) that pose a risk to public health. Currently, the laboratory is equipped to test nearly 24 different zoonotic diseases, including viral, bacterial, and parasitic pathogens. Monkey pox was declared as PHEIC on 23 July 2022. CAZD played a key role in laboratory preparedness and response during the monkeypox (MPOX) outbreak that occurred in India in August 2022. The laboratory successfully validated commercial kits using limited known positive/ negative patient samples during the process.

As External Quality Assessment (EQA) is vital to providing quality laboratory services, CAZD participated in EQA for WHO-Monkeypox virus detection by molecular methods. The EQA activity was proposed by the World Health Organization to evaluate the performance of laboratories in detecting MPOX virus using molecular methods. INSTAND, Germany, provided the EQA panel (EQAP). The Molecular Lab at CAZD tested these EQAP samples and submitted its report on June 30, 2023. The samples were extracted using a kit based standard operating protocol and tested using two commercial real-time PCR kits: CAZD has received a certificate of participation for EQA activity on September 9, 2023. There were 171 participating laboratories in the EQA, and the overall success rate was 80.1%. The results submitted by the CAZD showed 100% concordance. The detailed results are summarized below:

	Sample	Results	Monkeypox virus real-time PCR Kit 1		Monkeypox virus real-time PCR Kit 2	
			CAZD Reported results	Inference	CAZD Reported results	Inference
1	01	Positive	Positive	Concordant	Positive	Concordant
2	02	Below detection limit/Negative	Below detection limit/Negative	Concordant	Below detection limit/Negative	Concordant
3	03	Below detection limit/Negative	Below detection limit/Negative	Concordant	Below detection limit/Negative	Concordant
4	04	Positive	Positive	Concordant	Positive	Concordant
5	05	Below detection limit/Negative	Below detection limit/Negative	Concordant	Below detection limit/Negative	Concordant

Laboratory Preparedness for Yellow Fever Testing of Repatriated evacuees from Sudan for Suspected Yellow Fever cases

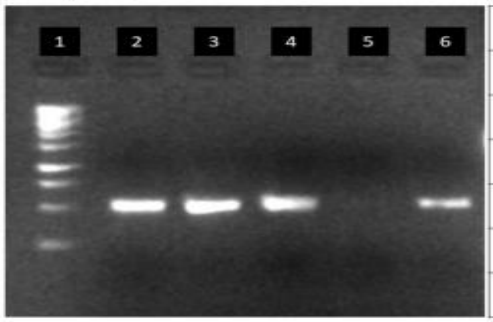
Contributed by: *Sumit Shukla[1], Dr. Cordelia Siddiqui[2], Dr. Monil Singhai[3]*
[1] Laboratory Technician, NCDC, [2] DAD, NCDC, [3] Joint Director & OIC CAZD, NCDC

Indian Armed Forces launched Operation Kaveri on 24 April 2023 to repatriate Indian citizens and foreign national nationals stranded in Sudan due to ongoing conflict between army and paramedical forces of the country that has put people at risk. Sudan is a North African nation endemic to many viral diseases including yellow fever. Keeping this in mind, the nationals repatriated were kept in a quarantine facility for a week following evacuation and Centre for Arboviral and Zoonotic Diseases had done Laboratory preparedness for yellow fever testing.

Yellow fever is an arboviral disease caused by yellow fever virus (YFV). In most cases infection is mild but in approximately 12% of population infected severe illness results which is fatal. A The conventional PCR identifies a 502 bp fragment between E gene and NS1 gene of YF.

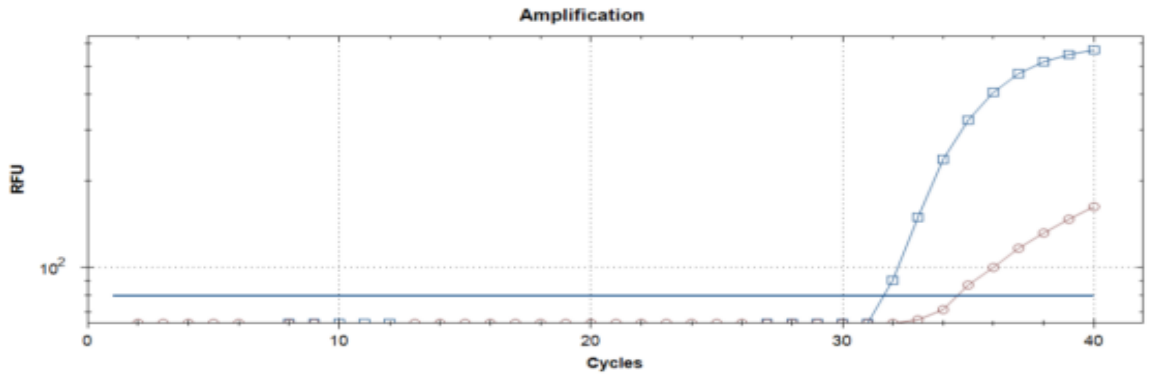
The real-time RT-PCR assay amplifies and detects a 105 bp fragment of NS3 gene of YFV. The preparedness for both conventional as well as real-time PCR was generated for 80 samples with conventional method and 200 samples for qRT-PCR method. The assay was standardized inhouse and quality control runs were done accordingly. 3 samples were received at CAZD from suspected yellow fever cases and all were found negative.

SN	Control	Remarks
1	PC (in-house)	Positive band at ~500 bp. The control has been previously validated using sequencing.
2	Amplification product (at 1:100, 1:1000, and 1:10,000 dilution)	Positive band at ~500 bp. Amplification products can be used as PC at these dilutions.
3	NTC	Valid run.



Well	Remarks	Remarks
1	1kb DNA Ladder	-
2	Amplification Product (1:100 dil)	Band at ~500 bp. Positive Result
3	Amplification Product (1:1000 dil)	Band at ~500 bp. Positive Result
4	Amplification Product (1:10000 dil)	Band at ~500 bp. Positive Result
5	NTC	No band. Valid Assay.
6	PC (in-house)	Band at ~500 bp. Control has been previously validated by Sequencing.

Fig 1: Gel image of QC run for conventional RT-PCR for YFV



Curve	Details	Shape	CT value	Remarks
	In-house Positive Control	Sigmoidal/ Characteristic	31.75	Test is valid
	NTC	Linear/non-characteristic	-	Test is valid

Fig 2: Amplification curves of QC run of Realtime PCR- Yellow fever

NCDC Branches Section

NCDC Kozhikode conducted Training course on Lymphatic Filariasis Elimination (LFE)

Contributed by: *Dr. Sayana Bhaskaran K[1], K. Regu[2], R. Rajendran[2] & NCDC Kozhikode team*
[1] Medical Officer, NCDC, Kozhikode, [2] Consultant, NCDC, Kozhikode,

National Centre for Disease Control Kozhikode conducted five days training course on Lymphatic Filariasis Elimination (LFE) for Medical Officers/Biologists/District Programme Officers from 7th - 11th August 2023. Total 16 participants from Tamil Nadu, Madhya Pradesh, Maharashtra and Chhattisgarh attended the training.

Lymphatic Filariasis (LF), a major public health problem in India, is targeted for elimination by 2030 as per target set by Global Programme to Eliminate Lymphatic Filariasis (GPELF). In order to support the goal of elimination, National Centre for Disease Control has been conducting trainings on Lymphatic Filariasis.

Dr. Sayana Bhaskaran.K, Medical Officer & Officer in charge of NCDC Kozhikode welcomed the participants and gave the introduction about the training. Training comprised of technical sessions to give theoretical knowledge, field activity and hands on experience of laboratory diagnostic procedures. The key resource persons were Dr. K. Regu, Consultant and Dr.R.Rajendran, Consultant from NCDC Kozhikode. Technical sessions include History, epidemiology, clinical manifestations, diagnosis, treatment, mass drug administration, morbidity management of Lymphatic Filarisis and other vector borne diseases. In the field, participants learned the entomological surveillance of *Culex quinquefasciatus* mosquitoes, the vector of bancroftian filariasis and *Aedes* mosquitoes, the vectors of Dengue, Chikungunya and Zika virus as well as the night blood smear collection for microfilariae. Hands on training were given on mosquito dissection, larval collection and identifying the larvae under microscope, preparation of blood smear for LF microscopy, staining and examination. Field activity & Laboratory demonstrations were imparted by officers and staff from NCDC Kozhikode. Certificates were distributed to the participants on completion of the training programme.

Ongoing training session

Training Participants

Night Blood Survey for mf

Water holding containers from field

Global Disease Alert

Contributed by: *NFP IHR Secretariat, Division of Public Health Preparedness & NCD*

1. **Circulating Vaccine-Derived Poliovirus Type 2 (cVDPV2) – Indonesia**
   11 January 2024
   Indonesia reported four cases of circulating vaccine-derived poliovirus type 2 (cVDPV2) from October 2022 to February 2023, with three cases occurring in Aceh province and one case in West Java province. In response to the new cVDPV2 cases detected in Indonesia, several public health responses are underway. As per protocol, detailed case investigation and risk assessment have been conducted. Coordination across country and regional levels with the global polio eradication initiative is ongoing.

2. **Western Equine Encephalitis - Argentina**
   28 December 2023
   Argentina reports a human case of Western Equine Encephalitis after more than two decades. Between 25 November and 27 December of 2023, a total of 1182 outbreaks of WEE disease have been identified in equines in 12 provinces of the country. Argentina's national Ministry of Health is also working together with the National Food Safety and Quality Service and the Ministries of Health of the Province of Santa Fe and of other affected provinces, on the implementation of preventive measures, epidemiological surveillance and outbreak control actions.

3. **Anthrax - Zambia**
   8 December 2023
   Zambia faces an anthrax outbreak, originating from wild hippopotamus consumption. As of 20 November 2023, 684 suspected human cases, including four deaths (CFR 0.6%) were reported from 44 out of 116 districts in nine of Zambia's 10 provinces. On the animal side, as of 21 November 2023, 568 domestic and wild animal cases were reported across 11 districts in Eastern, Southern, and Western provinces. With the support of the Food and Agriculture Organization of the United Nations (FAO), livestock vaccination is ongoing. Efforts have been made to strengthen event-based surveillance (EBS) and early detection mechanisms. Provision of essential medical supplies has been prioritized, in addition to public sensitization. Active surveillance is ongoing across healthcare facilities and within communities, including contact tracing.

4. **Influenza A(H1N2) Variant Virus Infection - United Kingdom and Northern Ireland**
   1 December 2023
   The UK reports its first case of swine-origin influenza A(H1N2) virus infection, emphasizing sporadic human cases linked to swine influenza viruses. The case reported onset of mild symptoms on 5 November. A respiratory sample was collected and further analyzed as part of the national routine influenza surveillance programme. Local epidemiological investigations and public health management, have been implemented, including case investigation, contact tracing and enhanced local surveillance for persons with occupational exposure to pigs/farms and the wider local community. Laboratory investigations are being conducted in collaboration with the UKHSA, Animal and Plant Health Agency (APHA), and the Crick Institute laboratories to further understand the virological characteristics of this virus

5. **Avian Influenza A (H5N1) - Cambodia**
   29 November 2023
   Between 24 and 25 November 2023, the Ministry of Health of Cambodia notified WHO of two confirmed

[1] *https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON500*
[2] *https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON499*
[3] *https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON497*
[4] *https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON496*
[5] *https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON495*

cases of human infection with influenza A(H5N1) from the same village in Kampot Province. The Ministry of Health's national and sub-national rapid response teams, with support from the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of Environment, have initiated and coordinated the detailed investigation of the avian influenza outbreak in Kampot Province including searching for additional suspected cases and contacts, collecting and testing samples from backyard birds and conducting health education campaigns to prevent transmission in the community.

6. Upsurge of Respiratory Illnesses Among Children - Northern China

23 November 2023

China's National Health Commission reported on a nationwide increase in the incidence of respiratory diseases, predominantly affecting children. There were clusters of undiagnosed pneumonia in children's hospitals in Beijing, Liaoning and other places in China. Since mid-October, enhanced outpatient and inpatient surveillance has been implemented for respiratory illnesses covering a broad spectrum of viruses and bacteria, including, for the first time, Mycoplasma pneumoniae.

7. Mpox (Monkeypox) - Democratic Republic of the Congo

23 November 2023

From 1 January through 12 November 2023, a total of 12,569 suspected mpox cases, including 581 suspected mpox deaths (case fatality ratio: 4.6%), have been reported in 156 health zones from 22 out of 26 (85%) provinces in the Democratic Republic of the Congo. This is the highest number of annual cases ever reported, with new cases in geographic areas that had previously not reported mpox, including Kinshasa, Lualaba, and South Kivu. The Ministry of Public Health, Hygiene and Prevention prepared a budgeted national mpox preparedness and response plan. Further to this plan, an mpox Emergency Operations Centre and Incident Management Team were inaugurated in February 2023.

8. Diphtheria - Guinea

18 October 2023

From 4 July to 13 October 2023, a total of 538 cases of diphtheria, were reported in the Kankan region, in the east-central part of Guinea. Guinea has strengthened epidemiological surveillance for early detection and case management. Daily coordination and monitoring meetings on the response activities are underway at the regional level, led by the regional health inspector and with the support of WHO, MSF-Belgium and other partners in the region. Notification of all suspected cases of diphtheria, investigation initiation, and monitoring of contacts as soon as possible has been enhanced. Contact tracing, identification of an isolation zone at the Balato health post in the prefecture of Kouroussa and briefing of the healthcare workers on the case definition and prevention measures are ongoing.

9. Dengue - Chad (16 October 2023)

As of 1 October, there have been 1342 suspected cases, including 41 confirmed cases reported across eight health districts in four provinces. Abéché health district in Ouaddaï province, is the current epicentre of the outbreak. The Ministry of Public Health and Prevention has initiated a number of key response activities including Strengthening surveillance and coordinating the response, including active case finding in healthcare facilities and the community and in-depth epidemiological investigations including regularly updating the case line list. Increasing early case detection capacity by disseminating community alert definition of cases and procuring rapid diagnostic tests for health facilities. Ensuring effective logistics and operational support, including the transportation of samples for confirmation.

[6] *https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON494*
[7] *https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON493*
[8] *https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON492*
[9] *https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON491*

Information Broadcast

Infective Etiology of Acute Conjunctivitis

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Conjunctivitis can result from many causes, including viruses, bacteria, allergens, contact lens use, chemicals, fungi, and certain diseases.

Viral Conjunctivitis

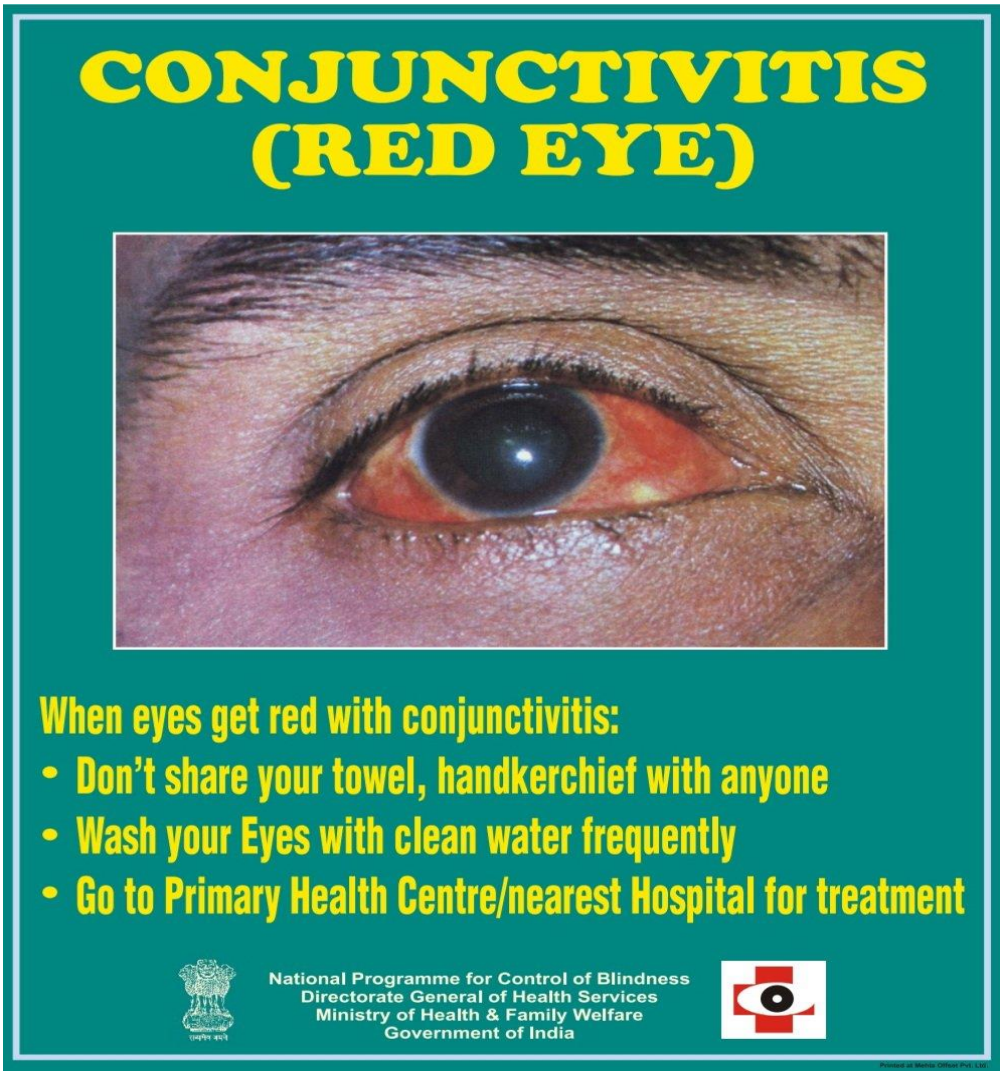
- Adenoviruses (most common)
- Rubella virus
- Measles virus
- Herpes simplex virus
- Varicella-zoster virus
- Epstein-Barr virus
- Coxsackievirus A24
- Enterovirus 70

Acute Bacterial Conjunctivitis

- *Haemophilus influenzae*
- *Streptococcus pneumoniae*
- *Moraxella catarrhalis*
- *Chlamydia trachomatis*
- *Staphylococcus aureus*
- *Moraxella lacunata*
- *Neisseria gonorrhea*
- *Neisseria meningitides*

Acute bacterial conjunctivitis is the most common form of bacterial conjunctivitis. In children it is often caused by *Haemophilus influenzae*, *Streptococcus pneumoniae*, or *Moraxella catarrhalis.*

Hyperacute bacterial conjunctivitis is caused by *Neisseria gonorrhoeae* or *Neisseria meningitidis.* Chlamydial and Gonococcal conjunctivitis is seen in neonates and sexually active individuals. *Fungal pathogens such as Pneumocystis* spp, and Candida spp can also cause conjunctivitis.



NCDC Buzz

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