COVID 19 SENTINEL SURVEILLANCE

Volume 3 (June-July 2020)

COVID-19 (nCorona) Virus Outbreak Control and Prevention State Cell

Department of Health & Family Welfare

Government of Kerala

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Message

The COVID pandemic is continuing all throughout the world and in Kerala. In order to understand the various aspects related to the disease, it is important to have a well thought out surveillance mechanism. In the fight against COVID in the last half-year, the knowledge gained, is giving us leads to take various interventions to control the pandemic.

I am happy to note that the Department of Health and Family Welfare has published the third volume of Sentinel Surveillance Report for the period of June-July.

The report will give guidance to take further actions to strengthen the response. I have also noted the unique 'Octopus Model of Sentinel Surveillance' to give insights to the teams regarding various aspects such as clusters formation, category of population getting infected, places where the infection percentage are on higher side, etc for strengthening the interventions to control the pandemic.

I wish you all success in the fight against COVID.

K K Shailaja Teacher
Minister Health & Family Welfare,
Social Justice,
Woman and Child Welfare
Govt of Kerala

1. Background

The Department of Health and Family Welfare has been taking all initiatives based on scientific knowledge available regarding COVID19. Sentinel surveillance system with an objective to look for infections spread in the state has been set up on April 19th 2020 onwards. The report of sentinel surveillance of first six weeks has been published and is available in the public domain.

With the influx of expatriates after lifting lock down, the state has broadened its testing strategy. The state has decided to further strengthen the sentinel surveillance system which will also help in providing early warning signals and epidemiological information about the next phase of the pandemic in the state. Also, a special surveillance including expatriates was conceived and implemented. RTPCR tests has been used for surveillance. Surveillance using RTPCR based tests also provided early warning signals regarding clusters with active transmission facilitating timely interventions.

The department has got good scientific response to the methodology of sentinel surveillance adopted in the state from various scientific bodies including World Health Organization. World Health Organization, Country Office, India has formally reviewed the first report on sentinel surveillance published by Department of Health and Family welfare and recommended the sentinel surveillance model adopted by Kerala as a replicable method that could be encouraged in other states. WHO Office also gave scientific inputs in further improving the sentinel surveillance system.

The objective of this report is to
  ➢ To explain the process followed to strengthen the sentinel surveillance and its execution in Kerala
  ➢ To disseminate the results of sentinel surveillance and expatriate surveillance for June, July 2020

2. Summary of methodology

The detailed methodology is described in Volume 1 and 2 of Sentinel Surveillance Report published by Department of Health and Family Welfare.

Table 1: Groups for sentinel surveillance

Group	Sub Group	Description
Group 1	1	Patients in general population with Acute Respiratory Infection (ARI)/Influenza like Illness but NOT a COVID suspect
Group 2	2a	Hospitals (Doctors, Nurses, Paramedics)
	2b	General Practitioners
	2c	Ambulance Drivers
	2d	Others
Group 3	3a	Food delivery persons
	3b	Community Volunteers (ASHA, LSG volunteer)
	3c	Provisions shop vendors
	3d	Ration Shop
	3e	wholesale fruits or vegetable vendors
	3f	Police Personnel
	3g	Media Personnel
	3h	Health Staff at Field (JHI, JPHN etc)
Group 4	4a	Head load workers
	4b	Vendors in market places
	4c	Street vendors
	4d	Warehouse- in- charges
	4e	People at Vehicle Transit Camps
	4f	FSW& MSM
Group 5	5	Guest Workers
Group 6	6	Epidemiological Samples
Group 7	7a	Passengers travelled in Aeroplan/ship cabin
	7b	Person with travel history from red zone districts (outside Kerala)
	7c	Persons with travel history outside Kerala not belonging to above two sub-categories

Group-7: Samples of **Asymptomatic Expatriates**: These include samples of people who arrived in Kerala after May 7th 2020 from outside country / state. The sample were taken between 5th and 14th day of arrival in Kerala.

Preference were given to selection of samples in Group 7 as:
   a) Passengers who are not direct or high-risk contacts but travelled in aeroplane/ship cabin along with an individual who turned positive on testing (40%)
   b) Person with travel history from red zone districts outside the state (40%)
   c) Persons with travel history outside Kerala not belonging to above categories (20%)

Generally, samples from symptomatic persons were preferred to asymptomatic persons. From all symptomatic persons, samples were planned to be collected within 7 days of onset of symptoms.

Table. 2. Groups Identified for Sentinel Surveillance.

Group number	Description:	Setting	Symptom status
1	Patients in general population with **Acute Respiratory Infection (ARI)** but **NOT** a COVID suspect	Non- COVID Hospital	Symptomatic*
2	Health Care Workers in **Non-COVID** settings**	Non- COVID Hospital	Symptomatic* or Asymptomatic
3	Persons with high **social exposure****	Community	Symptomatic* or Asymptomatic

4	People with high probability of contact with **Interstate Truck drivers****	Community	Symptomatic * or asymptomatic
5	**Guest workers****	Community	Symptomatic* or Asymptomatic
6	**Epidemiological Samples****	Community/ Hospitals	Symptomatic* or Asymptomatic
7	Samples of **Asymptomatic Expatriates**	Community/ COVID Care Centres	Asymptomatic

Selection of samples

- Number of samples to be collected in Gr 1-6 per district per week has been decided proportionate to the number of active cases. The details of samples to be collected from each district vary from time to time and redefined every fortnight.
- List of Local Self Governments from where samples need to be collected has been shared in a predetermined manner for Group 1-3. LSGs has been selected based on (1) LSGs with maximum active cases (50%), (2) LSGs with maximum people under quarantine (30%), (3) LSGs with cases in the past & High proportion of elderly (10%), (4) LSGs without any active cases & with high proportion of elderly (10%). Sample size and nature of samples were pre-fixed for every LSG so as to achieve the desired sample size. The LSGs were reselected every two weeks.
- District Surveillance Officer has decided on the site for Group 4. These were markets/ halting stations of trucks/ Targeted Groups under State AIDS Control Society Project.

- District Surveillance Officer has decided on the camp site for Group 5 (Guest workers). A maximum of 10 samples were permitted to be collected per campsite per day.
- Samples required for Group 6- Epidemiological samples were informed to DSOs based on feedbacks from investigators conducting epidemiological studies.
- Samples for Group 7 has been allotted proportionate to the number of expatriates/people with recent travel history in each district.

Days of Sample Collection: Sample in Group Numbers 1-6 was collected on every Tuesday, Thursday, Saturday where as Samples in Group 7 was collected on every Monday, Wednesday and Friday. This arrangement was for two logistic reasons- easiness in collecting samples and for pooling samples at laboratories.

Sample Collection Team: The DSO constituted a sample collection team consisting of Medical Officer (1), Nurse/Laboratory technician (1) and Driver (1) for the process of sample collection. The team had been provided mobility support and PPE kits for the purpose of sample collection by the DSO. The route map for each day's sampling site have been identified and visited accordingly. Prior intimation was provided to the sampling sites.

Sample collection and Transportation: Nasal/ Oropharyngeal swabs were collected from the subjects in each group and sent for testing using RT-PCR in the designated laboratory. All infection prevention measures including PPE was ensured. The samples were collected as per the existing guidelines. The samples collected in Viral Transport Media (VTM), packed separately as **"surveillance samples"** and transported to the designated laboratory in the cold chain.

The team collected the person's/patient details as per the surveillance form**.**

Training and Retraining to the District Surveillance Team
All district Surveillance teams were trained and re-trained through an online platform regarding sentinel surveillance methodology with a presentation and discussions. Systems were put in place to timely clarify doubts from the field and ensure timely recording and reporting.

Functions of Laboratories

A total of 14 Laboratories approved by ICMR were selected for the purpose of the surveillance samples testing. The Lab in charge was briefed about the process and the samples were distributed depending upon the capacity of the laboratory to process the samples. Training for laboratories on Pooled sample testing was conducted online by the National Institute of Virology, Alappuzha. Advisory on pooled sample testing was released (Attached as Annexure). The samples were received at the laboratory and standard operating procedures for processing the samples were followed.

Reporting of labs

The Laboratories were provided with an online platform for the real time reporting of results so that action can be taken at the field level. The Laboratories entered all the details of the sample received including the test result.

Epidemiological Analysis

Whenever a positive case is obtained, detailed epidemiological investigation was undertaken by special teams. Epidemiological samples were collected as 25 per week from the neighborhood areas where a positive sample were obtained for consecutive two weeks. Further decisions were taken based on the investigation and results of epidemiological samples.

Fig 1. Summary of Sentinel Surveillance Process

Sample Collection Teams moves to selected places on fixed days

Community   **Hospital**

Subjects for sample collection will be identified from Community and Hospitals

All Samples from field reaches District Surveillance Unit and further transported to Laboratory

Samples Processed at Laboratories

Real Time Data transfer of Results to State and Districts

Clinical Management, Isolation and Public Health Actions at Field Level

Epidemiological Investigation of positive cases, Further drill down in that area with 25 samples each for consecutive 2 weeks

Results

Total samples received for Sentinel Surveillance between June and July 2020 were as follows.

Table 3: Persons from whom Samples tested based on Surveillance Groups

Groups	Numbers of sample collected during June 2020	Number of Samples collected July 2020
Gr 1: Patients in general population with **Acute Respiratory Infection (ARI)/Influenza like Illness** but **NOT** a COVID suspect	3810	7806
Gr 2: Health Care Workers in **Non-COVID** settings**	4117	8446
Gr 3: Persons with high **social exposure** **	6177	12706
Gr 4: People with high probability of contact with **Interstate Truck drivers** **	1639	3340
Gr 5: Guest workers **	1336	2740
Gr 7: Samples of **Asymptomatic Expatriates**	20342	41730
Total	**37361**	**76768**

Table 4: Details of samples tested (June, July) for Sentinel Surveillance

Group	Sub Group	Description	Number of samples tested- June	Number of samples tested - July
Group 1	1	Patients in general population with Acute Respiratory Infection (ARI)/Influenza like Illness but NOT a COVID suspect	3810	7806
Group 2	2a	Hospitals (Doctors, Nurses, Paramedics)	2898	5945
	2b	General Practitioners	690	1416
	2c	Ambulance Drivers	164	336
	2d	Others	365	749
Group 3	3a	Food delivery persons	629	1294
	3b	Community Volunteers (ASHA, LSG volunteer)	1834	3773
	3c	Provisions shop vendors	267	549
	3d	Ration Shop	295	607
	3e	wholesale fruits or vegetable vendors	1102	2267
	3f	Police Personnel	986	2028
	3g	Media Personnel	342	703
	3h	Health Staff at Field (JHI, JPHN etc)	722	1485
Group 4	4a	Head load workers	746	1530
	4b	Vendors in market places	198	423
	4c	Street vendors	229	477
	4d	Warehouse- in- charges	313	648
	4e	People at Vehicle Transit Camps	96	206
	4f	FSW& MSM	57	56
Group 5	5	Guest Workers	1336	2740
Group 7	7a	Passengers travelled in Aeroplan/ship cabin	9141	15917

	7b	Person with travel history from red zone districts (outside Kerala)	7759	18752
	7c	Persons with travel history outside Kerala not belonging to above two sub-categories	3442	7061

Table 5: Demographic Characteristics of the people tested

Characteristics	Categories	Number (%) Groups 1-5	Number (%) Group 7
Age Group			
	< 5 years	365 (0.7%)	1366 (2.2%)
	6-15 years	4638(8.9%)	3724 (6%)
	16-25 years	6463 (12.4%)	16387 (26.4%)
	26-35 years	12039 (23.1%)	21539(34.7%)
	36-45 years	12404 (23.8%)	11235 (18.1%)
	46-55 years	11362 (21.8%)	1924 (3.1%)
	56-65 years	3544 (6.8%)	4035 (6.5%)
	>= 65 years	1303 (2.5%)	1862 (3%)
Gender			
	Male	33042 (63.4%)	41526 (66.9%)
	Female	19075 (36.6%)	20546 (33.1%)

Fig 2: Distribution of Persons from whom samples were collected based on Symptoms [Group 1-5] (N= 52117)
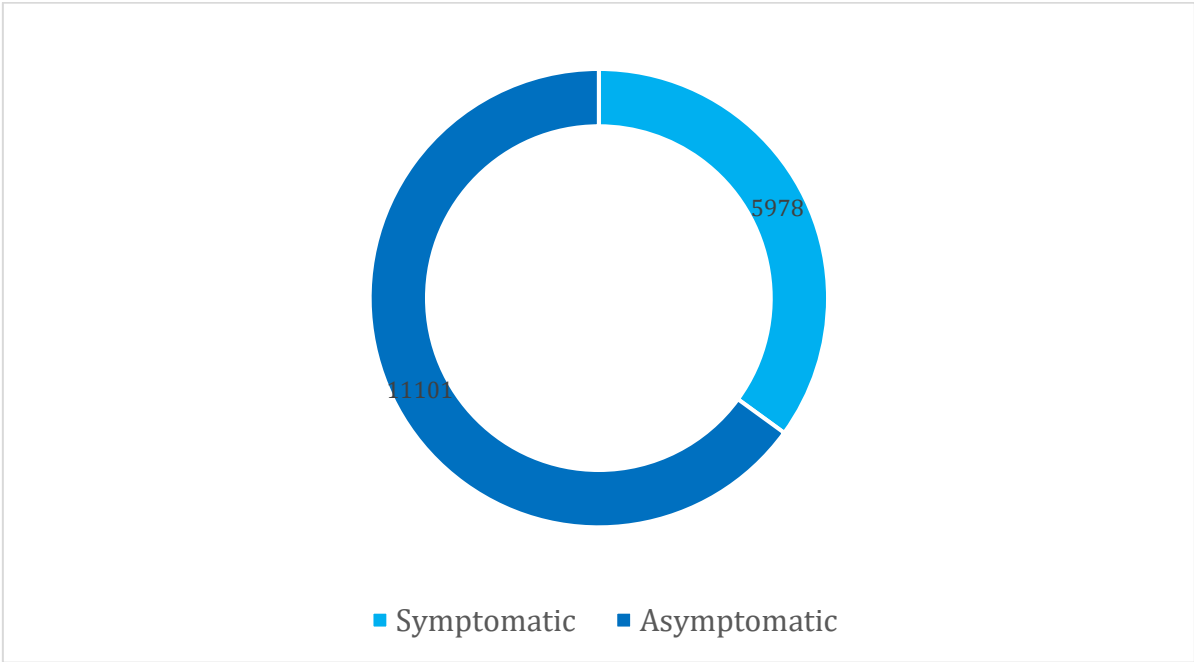
Among those tested, 35% were symptomatic in group 1-5

Table 6: Summary of sentinel surveillance (Group 1-5)- June 2020

	Tested	Positive	% Positivity
Influenza Like Illness	3810	5*	0.13
Health Care Workers	4117	15	0.36
Person with High Social Exposure	6177	11	0.18
Persons with High exposure to Truck drivers	1639	6	0.37
Guest Workers	1336	1	0.07
Total	17079	38	0.22

*out of 5 positive cases obtained among influenza like illness (Gr 1), all were from same place (Ponnani Taluk).

Table 7. Summary of sentinel surveillance (Group 1-5)- July 2020

	Tested	Positive	% Positivity
Influenza Like Illness	7806	6	0.08
Health Care Workers	8446	54	0.64
Person with High Social Exposure	12706	98	0.77
Persons with High exposure to Truck drivers	3340	43	1.29
Guest Workers	2740	4	0.15
Total	35038	205	0.59

Fig 3. Map showing Positive Cases Identified through Sentinel Surveillance (Gr 1-5)- June & July

Sentinel Surveillance – June 1-30th – Positive Samples

Thrissur	15
Malappuram	16
Palakkad	3
Ernakulam	2
Pathanamthitta	1
Thiruvananthapuram	1

08-07-2020
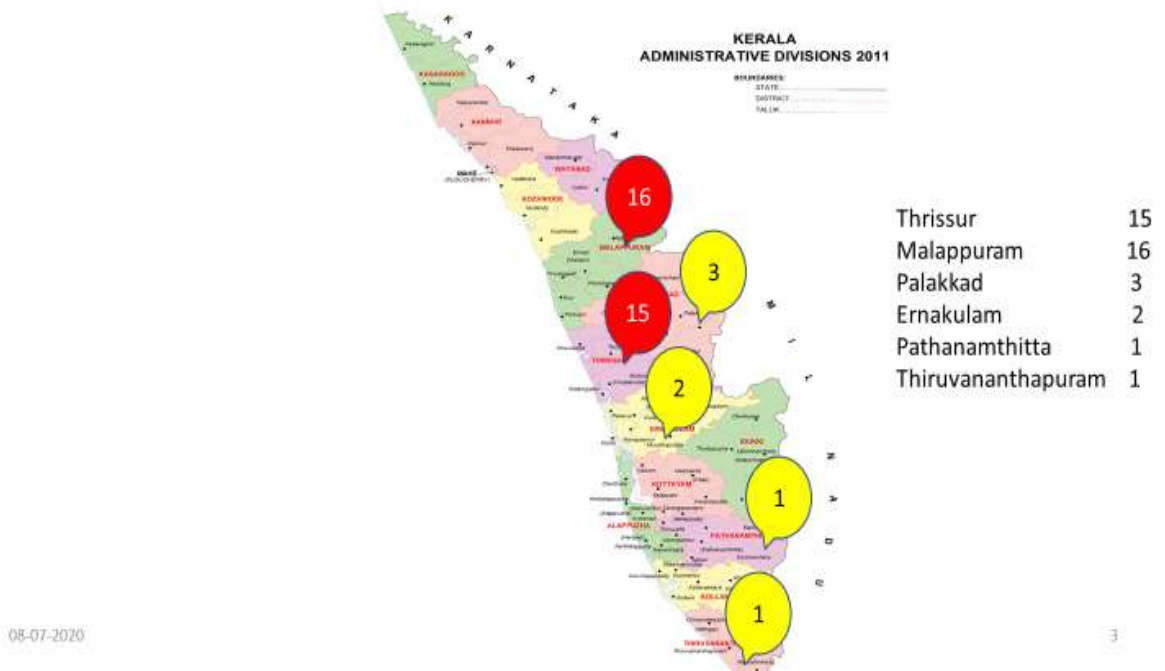
Sentinel Surveillance- July 1-31st - Positive Samples
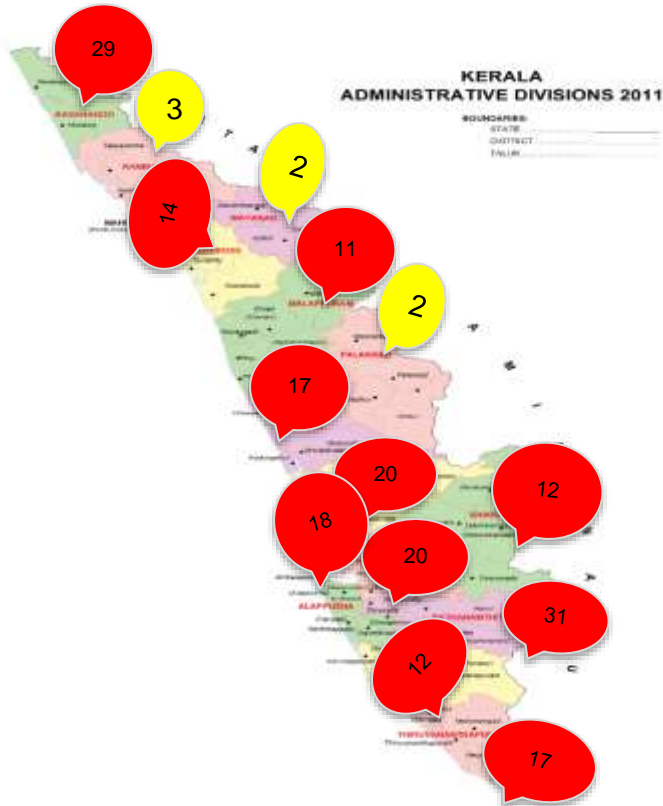
Fig 4. Graphical Representation of Weekly Number of Tests (Primary axis) and Positive cases (secondary axis) in sentinel surveillance samples from April 19th to July 31st)
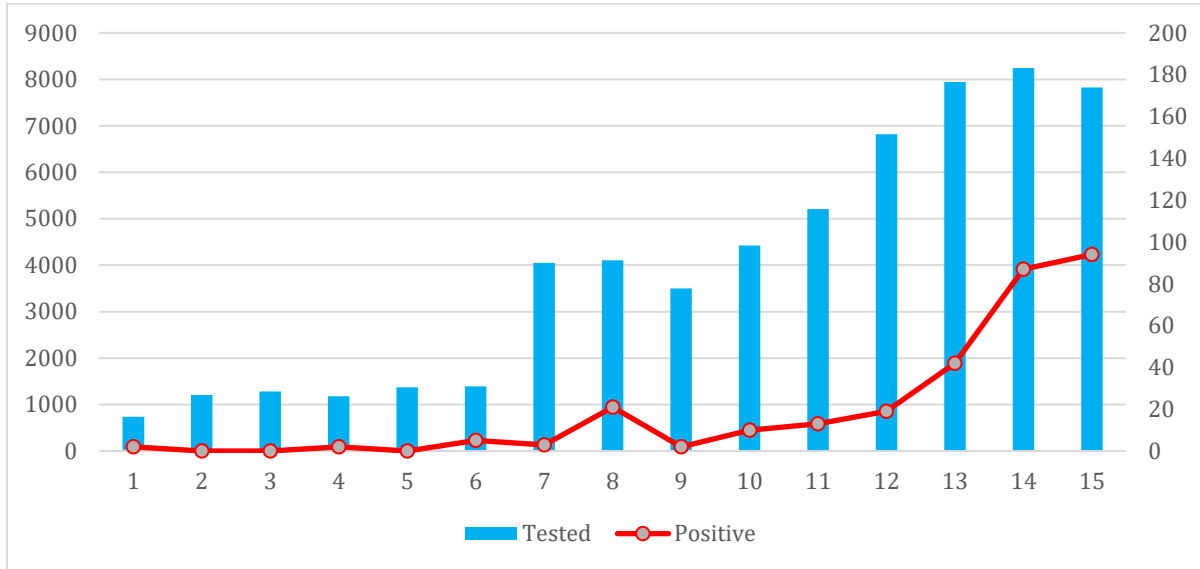
Tests (Primary Y axis), Number of cases (Secondary Y axis), Week Number (X axis)

Summary of Sentinel Surveillance (Group 1-5) from April-June

	April	May	June	July	Total
Tested	1944	5221	17079	35038	59272
Positive	2	7	38	208	266
Positivity Rate	0.10	0.13	0.22	0.59	0.45

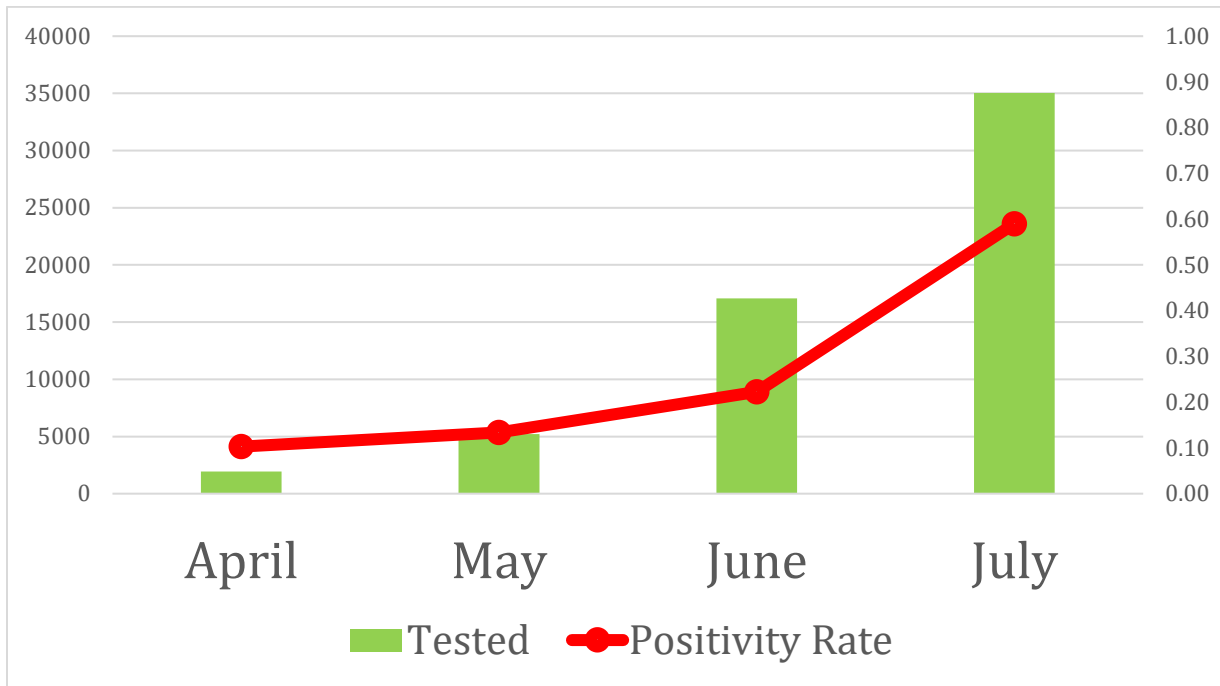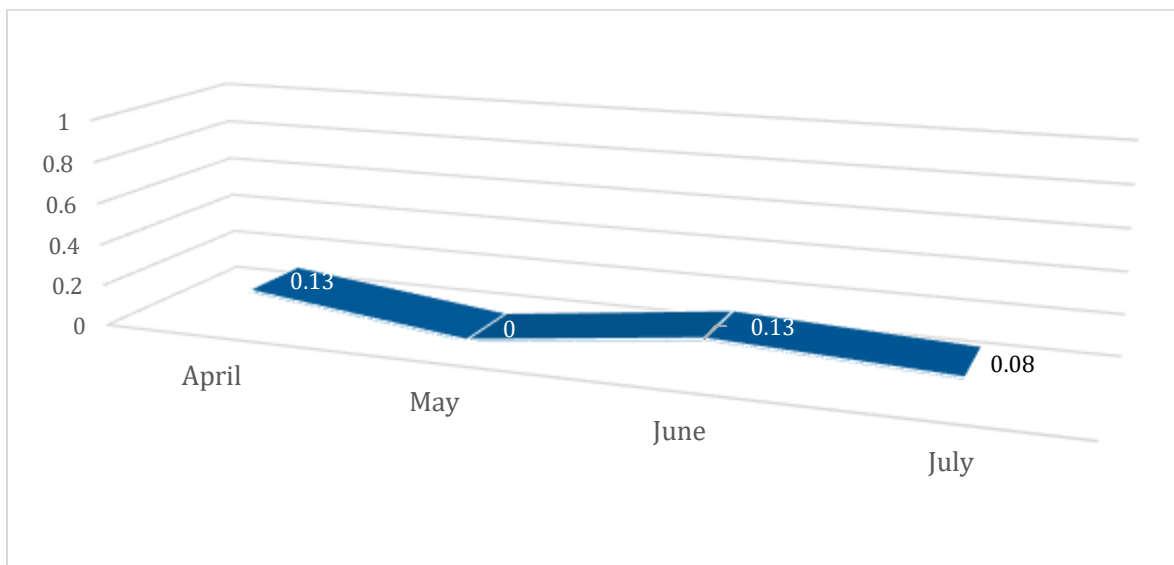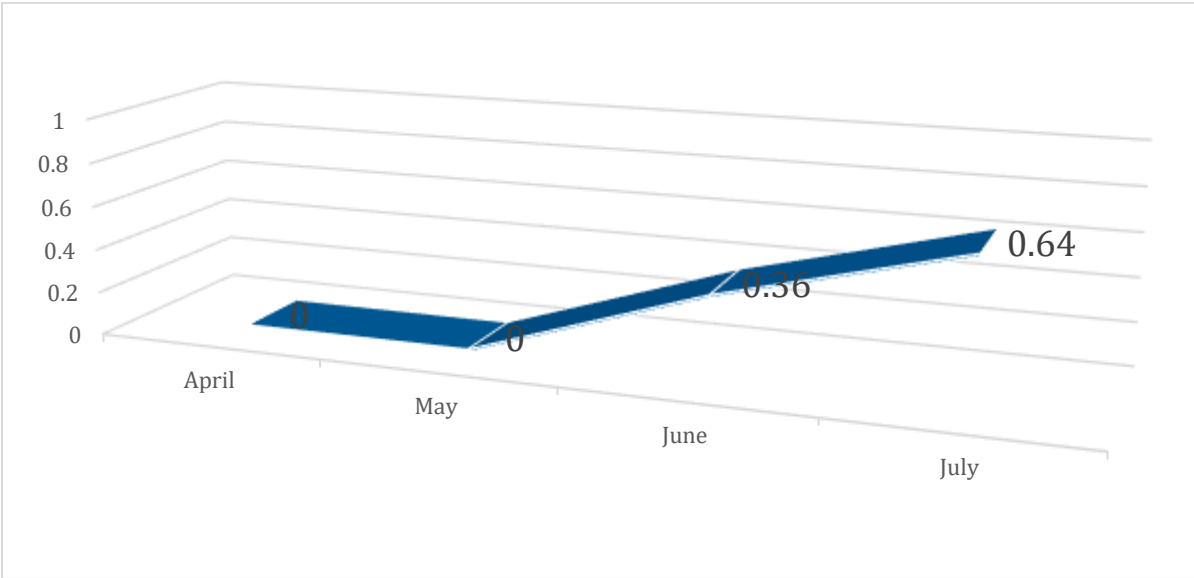**Fig 5: Summary of sentinel surveillance (April-June) in Kerala (Gr 1-5)**

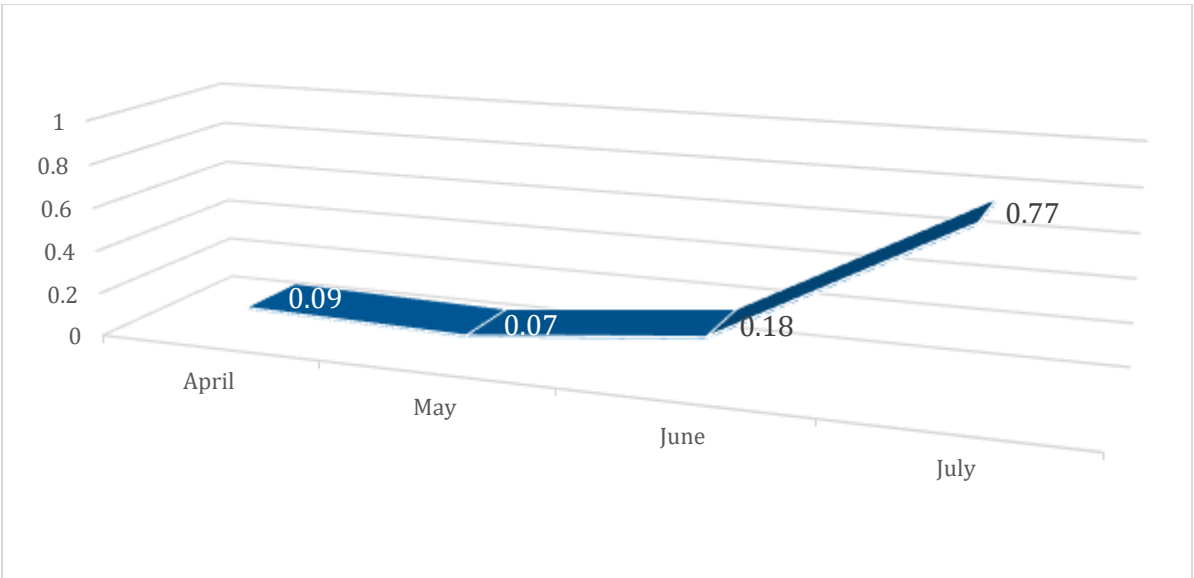**Fig 7: Group wise Trend of Positivity Rate**

Gr 1: Patients in general population with **Acute Respiratory Infection (ARI)/Influenza like Illness** but **NOT** a COVID suspect
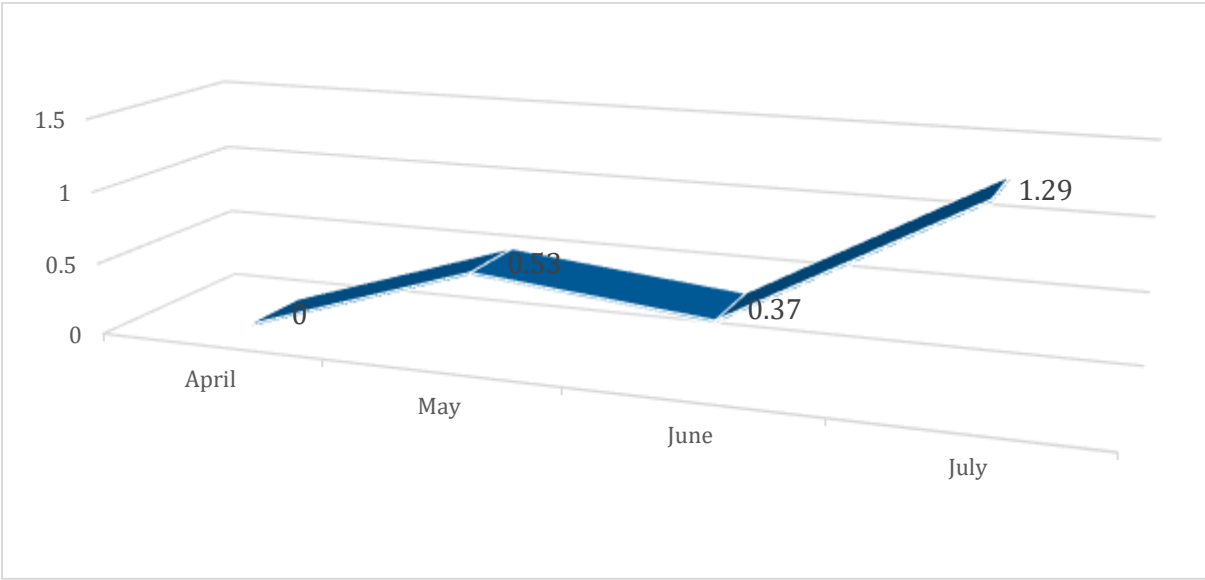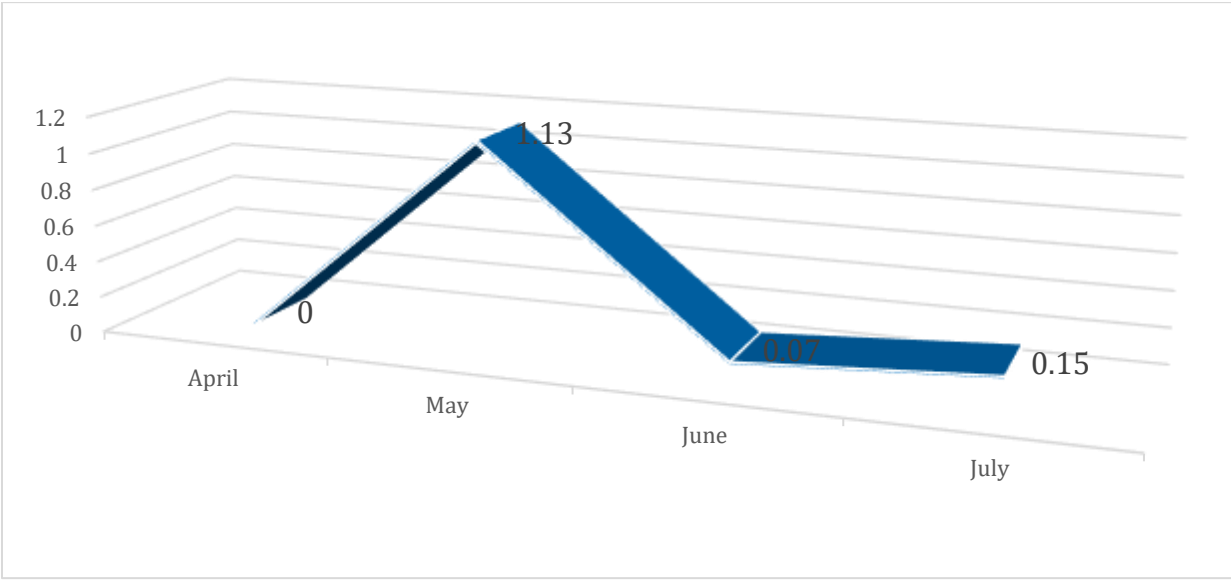
Gr 2: Health Care Workers in Non-COVID settings

Gr 3: Persons with high social exposure

Gr 4: People with high probability of contact with Interstate Truck drivers

Gr 5: Guest workers

Sentinel Surveillance and early identification of Clusters

Sentinel surveillance mechanisms led to early identification of many clusters. Chathanoor cluster, Kollam was the first one identified in April month itself while doing epidemiological investigation of a health worker contracted COVID who was identified through sentinel surveillance.

People who were contacts of Interstate truck drivers were identified as a special group for surveillance and that led to identification of many market clusters. Person tested positive through sentinel surveillance in May 1st week at Wayanad led to tracing the source to Koyembedu market at Chennai and further investigation and rigorous contact tracing helped to prevent a super spread. Kottayam market, Kumbazha Market and Kuttappuzha markets in Pathanamthitta, Aluva and Broadway markets in Ernakulam, Vadakara market in Kozhikode, Chavakkad Market in Thrissur, Dharmadom market in Kannur were a few among the market clusters identified through sentinel surveillance. Markets were identified as potential places of transmission facilitating the outbreaks and rigorous containment measures were put in place across all markets.
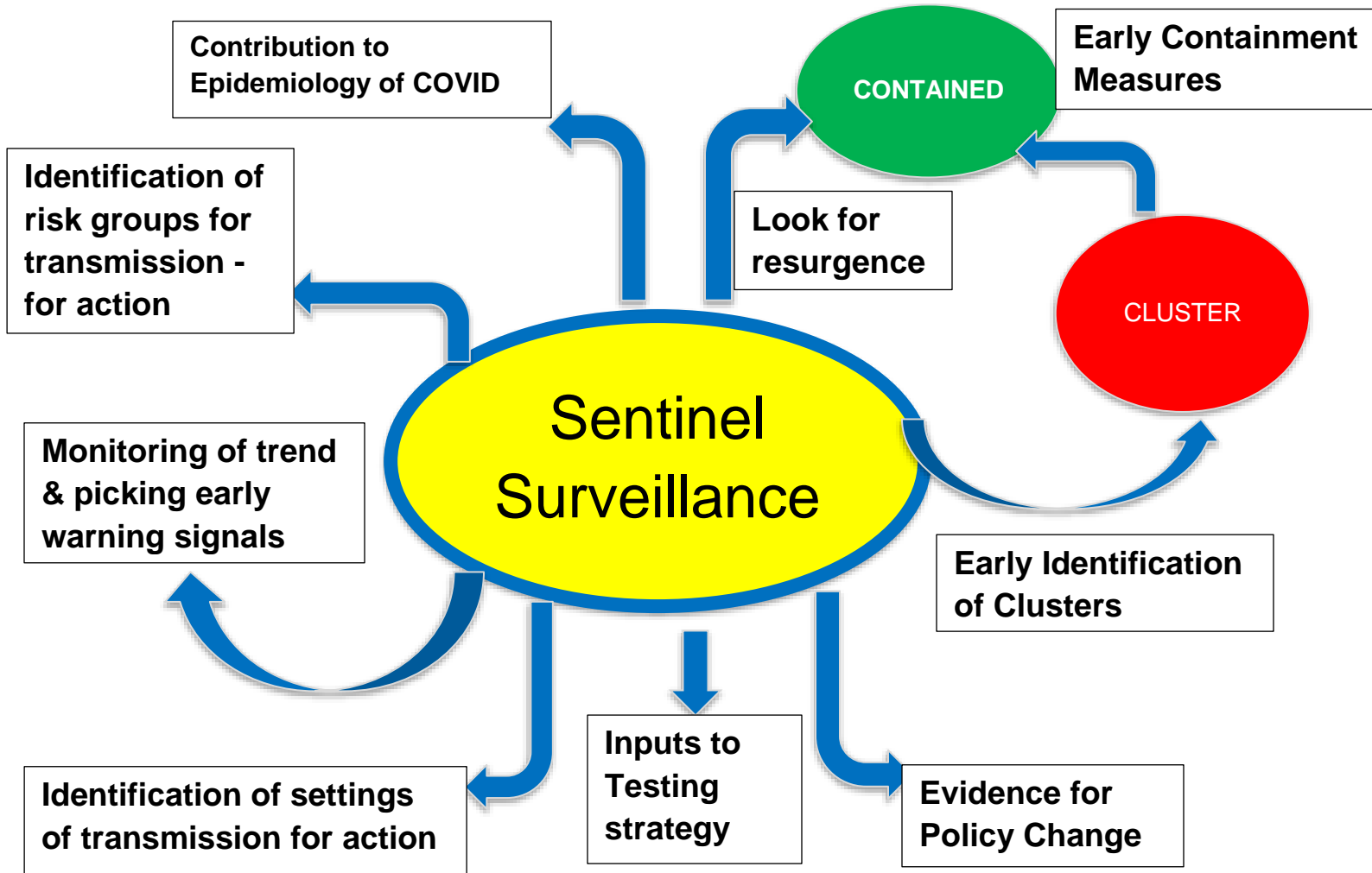
In Wayanad in May last week there were 4 guest workers at a camp site in Sulthan Batheri identified through sentinel surveillance. This led to timely actions and preventing further spread in that closed community. Many other closed community clusters including AR Police camp in Pathanamthitta, CISF camp, Kerala Police Academy, BSC in Kannur, ITDP at Alappuzha etc were identified through sentinel surveillance.

Many institutional clusters including Taluk Hospitals Chalakkuy, Government Medical College Thiruvananthapuram, many private hospitals across state, GH Adoor etc were identified as clusters through sentinel surveillance. This led to early identification and prevent shutting down of hospitals.

5 cases with Influenza Like Illness have been found through sentinel surveillance in Vattamkulam Panchayat, Malappuram. Another five positive health care workers turned positive from two private hospitals nearby through sentinel surveillance. This led to identification of the entire Ponnani Taluk as a cluster followed by rigorous and successful containment.

Many community clusters like Athirampuzha, Ettumanoor, Parathodu, Chirakkada, Payippadu, Changanassery in Kottayam, Valiyangadi, Tuneri in Kozhikode, Tribal clusters like Pulachikuni colony and Begoor in Wayanad were identified timely through sentinel surveillance and contained.

Fig 8: Octopus Model of Sentinel Surveillance

Contribution to Epidemiology of COVID

Early Containment Measures

CONTAINED

Identification of risk groups for transmission - for action

Look for resurgence

CLUSTER

Monitoring of trend & picking early warning signals

Sentinel Surveillance

Early Identification of Clusters

Identification of settings of transmission for action

Inputs to Testing strategy

Evidence for Policy Change

Expatriate Surveillance

Random samples from asymptomatic expatriates were tested. Summary of expatriate surveillance (June 1-30th) were as shown below

Groups	Total Tested	Tested Positive	% Positivity
Asymptomatic International who travelled in aeroplane/ship with a confirmed case	9141	508	5.6%
Asymptomatic travellers from Hotspot district	7759	164	2.1%
Other travellers not fitting to above two categories	3442	0	0.0%
Total	20342	672	3.3%

All samples in Group 7 were from asymptomatic individuals.
Summary of expatriate surveillance (July 1-31st) were as shown below

Groups	Total Tested	Tested Positive	% Positivity
Asymptomatic International who travelled in aeroplane/ship with a confirmed case	8752	490	5.6 %
Asymptomatic travellers from Hotspot district	25917	811	3.1 %
Other travellers not fitting to above two categories	7061	12	0.17%
Total	41730	1313	3.15 %

Summary and Conclusions

- Test positivity rate identified through the sentinel surveillance – Gr 1-5- in April, May, June, July were 0.1%, 0,13%, 0.22% and 0.59%

- Test positivity among people with Influenza like illness remained less than 0.1%. [All 5 in Group 1 (Influenza like illness) in the month of June were from Ponnai Cluster].

- Test positivity among persons with contact with interstate truck drivers, persons with high social exposure, health care workers shows an increasing trend.

- Like Ponnani, most of the clusters in the state were identified timely through sentinel surveillance. Sentinel surveillance has played a major role in early identification and ensuring timely containment measures preventing exponential increase in number of cases as predicted till date.

- Sentinel surveillance has led to policy implications including identifying high risk groups for testing and identifying high risk areas for focused actions.

- In expatriate surveillance among asymptomatic, test positive remains same among passengers travelled in aeroplane with a confirmed case (no direct or high-risk contact) whereas percentage among people coming from red zone districts has increased.

- **It is evident that cases and positivity are more at clusters as evidenced by test results at clusters (refer cluster report published on Aug 8th), whereas in general population, the positivity still remains low**.

- The sentinel surveillance data iterates that early identification of clusters and containment could be the best strategy.

Way Forward

The RT PCR testing has helped to pick up acute cases at earlier stages and early identification of clusters. However, it is resource intensive. Rapid Antigen tests is available now, which can give results within 30 minutes. State has strengthened sentinel surveillance replacing RTPCR with Rapid Antigen tests. Influenza Like Illness has now been part of testing strategy. Within clusters, all vulnerable and elderly are being tested.

With new testing strategy and surveillance including
1) ILI Surveillance and
2) SARI surveillance and
3) Special surveillance in coastal, tribal, slum areas, sentinel surveillance will be reorganized.

Rapid antigen tests for early identification of clusters and IgG based antibody tests for monitoring trend will be incorporated.

Annexure 1: 2 Epidemiological Investigations have been attached as model

EPIDEMIOLOGICAL CASE STUDY

Case number 8: MLP 248

Serial No: MLP 248

1.   Case: MLP 248
2.   Age: 36 years
3.   Address: Thennala, Pookiparamba.
4.   Occupation: Wholesale fruits vendor
5.   Location of job : Fruits and bakery shops, Pookiparamba (both are located on the side of NH , 250m apart and around 2.5 kms from PHC Thennala).
6.   Residence: Pookiparamba
7.   Mode of Diagnosis with date of sample collection: Sentinel surveillance, Sample collected on 04/06/2020 (throat swab).
8.   Test including Date of result : RT PCR result Positive on 11/06/2020
9.   Symptom presentation: Asymptomatic
10.   Presumed date of exposure based on sample positivity:
20/05/2020 to 03/06/2020.
11.   Sources of information :
a.   Epidemiologist (IDSP, Malappuram)
b.   Patient (In depth interview)
c.   ASHA workers:
d.   Medical officer
e.   JHI
f.   Visit to the site in progress to elicit detailed information.

12.   Category of exposure : High risk occupational exposure
13.   Probable Source /points of exposure: (based on epidemiological investigation)
A.   Religious site
B.   PHC Thennala
C.   Funeral site
D.   Private hospital
E.   dental clinic
F.   Market ?
14.   Exposure source if any from home town: Thennala has 7 confirmed cases in the period of exposure.
15.   Contact with any International traveler (past 14 days) – excluded

1. Contact with Interstate traveler – cannot be excluded as he is a whole sale Fruit dealer.

16. Primary contacts of this case: 15 contacts traced . RTPCR tested ,result awaiting .

Detailed information on the Case:

is a 36 years old male, wholesale fruits vendor. He is married and living with his wife and 3 children. His brother along with his family is residing with 3 children (one new born). He works at KLM fruits, Pookiparamba.

His sample was collected on 04/06/2020 by sentinel surveillance from PHC Thennala. He was asymptomatic without any comorbidity. His result came as positive on 11/06/2020 (RT PCR).

He routinely goes to Kottakkal for purchasing fruits in his own auto rikshaw. He spends time with shop owner (to be tested) for one hour. Loads fruits to his own vehicle and drive by himself. Had minimal contact with other persons. He had a habit of wearing single layer cloth masks, using sanitizer.

After reaching the shop he routinely hand over the materials to (to be tested for rapid antibody) an auto driver who is supplying the fruits to retailer shops as per previous phone order. Minimal direct sale from the shop. Hand sanitizer available at the shop.

Usually at noon he goes to his brother's shop (bakery and fruits) situated at Pookiparambu. Spends some time there. There is a possible contact with customers. Then he goes to home at noon and will be back in the afternoon to wholesale shop and close the shop by 5-6 pm. Occasional visit to pookiparamba religious place for prayers-single. No mass gathering.

All the days except the below mentioned dates he was engaged with his routine activities at the shop.

On 24/05/2020 Sunday –on the day of religious festival, he was at home, no other activity. None visited their family.

On 26/05/2020: He visited his maternal uncle, working in a college, valanchery died DUE TO? Malignancy. He attended the funeral. Funeral site yet to be ascertained. No mass gathering. Worn mask.

On 29/05/2020, he visited Private dental clinic Changuvetty and consulted Doctor, from there he did tooth extraction. Doctor was in PPE. 4 other persons were waiting at dental clinic (details of these persons in the process of collection).

On 29/05/2020: He visited a relative (co brother's father in law) in a private hospital, Kottakkal . He was a 75 year old hypertensive and CVA patient who expired on the same day. There were 4-5 persons in that room, possible fomite

transmission from the hospital. No history of COVID19 symptoms in both expired persons.

On 03/06/2020: he went to PHC Thennala for sanitation certificate, spend 15 minutes there and met JHI. Did not have contact with patients. He was told to come on next day for blood testing and swab collection.
On 04/06/2020: swab taken by sentinel surveillance. No h/o interaction with pets, no h/o ILI in his family, no history of contact with COVID suspects/ confirmed cases. No h/o mass gathering at home/at work place or nearby. Shop attender had h/o head ache and body pain. He was tested and result came as negative. His younger brother's wife admitted in GMC Manjeri for delivery. She delivered on 20/06/2020. She was tested and came as negative. All the quarantined International travelers were from ward 15 and 16.
The ASHA who was later positive was handling 2 wards. There was only telephonic conversation with people on quarantine. Sometimes ASHA's used to wear masks supplied from PHC and rest of the time they have used only hand kerchief.

Patient's perspective –something went wrong in his tooth extraction -the throat swab may be False positive. JHI and ASHA worker: were not using masks properly.

Case 2: **E.1.3.3. Mr. X , 36 years**

Mr. X is working in Thrissur Corporation as Sanitary worker (daily wage). He used to drive vehicles in Corporation as and when needed. He lives with wife and three children.

E.1.3.3.1. Nature of Exposure in work: He has worked in Community Kitchen up to May 6th 2020. He used to buy groceries for kitchen. After then he has worked in corporation office and had involved in routine cleaning works of Jaihind Market, Thrissur.

He was posted in cleaning of a lodge in Thrissur for preparing institutional quarantine on 31st May 2020. He along with his colleague visited there and cleaned. As per history he used N95 mask and gloves while cleaning. He said it was a white mask taken from corporation written as N95. The persons from outside India started reaching around 9.30 pm on the same day and lasted for 3hours. He directed them to the room key which was kept on the table. There were elderly persons who had difficulty in carry their luggage and Mr X helped them by carrying their luggage to their room and kept outside the room.

On June 3rd 2020, he had to go to collect waste from the same institution. 3 baskets were provided to the returnees, one for putting food waste, one for papers and the third one for mask and gloves. But all waste was mixed up in the baskets. He was with a colleague. They took the waste to the vehicle for disposal. He used cloth mask and gloves at that time. His colleague, was posted in that tourist home on days 1st,3rd,5th and 7th of June . He used to give food the persons in quarantine. He kept the food packets outside and took waste. He has handled the luggage of a family who has children and had difficulty in handling luggage. He used cloth mask and gloves while doing his work. It was informed that some of the person who came from Nigeria was residing in the lodge was found to be positive. He had duty in Railway station on 4th, 5th and 7th June for giving training to volunteers on how to disinfect by spraying hypochlorite solution on the bags of the passengers coming in train. They gave training before the arrival of the train. The volunteers did the disinfection after donning PPE. While spraying he left the area and was sitting in the Vehicle as he had to

drive that.

E.1.3.3.2.Clinical details: He is asymptomatic. He was tested as part of sentinel surveillance on 09.06.2020. He was tested positive and shifted to Medical College, on 11.06.2020

E.1.3.3.3.**Epidemiological possibilities**

1. As he had handled luggage on 31st May of the non-resident Indians the possibility of fomite spread is there.
2. He had also contact with waste of the residents on 3rd June. He used gloves and mask proper use is doubtful. He used cloth mask while handling waste.
3. As his colleague worked and had more contact with the inmates of institutional quarantine, Mr X had contracted the infection from his colleague as a remote possibility as his colleague tested positive on 09/06/2020 and his symptoms had started on 11/06/2020

E.1.3.3.4.**Conclusion:**

1. Most possible link is handling of luggage of the persons coming from outside India, from whom one tested positive later. There is a chance of fomite transmission.
2. Another link is handling of waste of the persons in institutional quarantine. He used cloth mask at that time
3. Proper personal equipment should be provided to the sanitary workers who were posted in institutions where persons are put in quarantine.
4. Ensure the segregation of waste by the persons in quarantine at the institution so that handling will not be a threat to the workers.

No.31/F2/2020/Health- 1 – 12th May 2020

ADVISORY ON RT-PCR POOLED TESTING FOR COVID-19

REF: ICMR Advisory on Pooled testing dated 13th April 2020

Background:

As the Government of India has given permission for people to return to their home state post lock down relaxation, the number of people are coming back from vulnerable areas and hots spots abroad and from within the country. This has necessitated to have a proper COVID19 screening and confirmed detection mechanism. The COVID 19 pandemic has resulted in international supply chain break down. Therefore, in order to use the available resources optimally, it is decided to conduct RT-PCR pooled sample testing strategy.

Indian Council of Medical Research (ICMR) has recommended the use of pooled testing based on the feasibility study conducted at DHR/ICMR Virus Research & Diagnostic Laboratory (VRDL) at King George's Medical University (KGMU), Lucknow (annexure-1).

This advisory stipulates the concept of pooled sample technique. The field teams may select the category of patients and the number from each category as per the Sentinel Surveillance Advisory issued from time to time.

Objective:

The objective of the pooled sample testing strategy is to enable screening of wider and larger number of persons at risk for COVID-19.

The **District Surveillance Officer (DSO)** for COVID-19 shall be in charge of the process of implementing the collection and management of samples for pooled testing. Directions and follow up shall be done by the DSO to ensure the proper implementation of the pooled sample testing strategy at the district level.

Eligible persons or samples for pooled sample testing are as follows:

1. Samples of persons selected under sentinel surveillance as per the Advisory regarding Sentinel Surveillance.
2. Samples taken from persons who have come from outside Kerala by Air, surface or Sea route from 7th May 2020 onward. The details shall be provided in the Sentinel surveillance advisory.

Biological material to be collected:

Nasopharyngeal or Oropharyngeal secretions.

Each individual's sample is to be collected in the modified Viral Transport Media (mVTM) 0.5 ml provided. The samples are to be collected individually in the VTM. The samples shall **NOT** to be pooled at the point of collection.

Modified Viral Transport Media (mVTM):

The samples eligible for pooled sample testing should be collected **ONLY** using the **modified VTM of 0.5 ml**. These modified VTMs shall be provided to all the districts for the purpose of pooled sample testing.

Methodology on pooled testing by Laboratories:

1. The tests are to be conducted as pooled test; maximum of five samples in each pool.

2. 50 μl from each of the five samples is to be taken and pooled.
3. From this 250 μl of pooled sample, RNA should be extracted using the required volume specified in the RNA Extraction Kit protocol
4. Do real time PCR.
5. Report all individual samples in a negative pool as negative.
6. If the pool is positive, do RNA extraction from individual VTM and do real time PCR individually.
7. Report each sample individually.

Sample package and transportation:

The sample packing and transportation procedures are the same as per the existing guidelines on sample testing, collection and transport for laboratory diagnosis of COVID-19.

Labelling of samples:

All samples collected under the pooled testing strategy should be labelled as **"pooled testing".**

Designated Laboratories:

The designated laboratories for Sentinel Surveillance samples shall also be the designated laboratories for the pooled sample testing.

The lab in charge shall conduct the RT-PCR pooled tests on the samples labelled as **"pooled test"** as per the methodology for pooled sample testing. The reporting of results shall also be done accordingly on the digital platform provided.

Principal Secretary

Annexure

INDIAN COUNCIL OF MEDICAL RESEARCH
DEPARTMENT OF HEALTH RESEARCH

Date: 13/04/2020
Advisory on feasibility of using pooled samples for molecular testing of COVID-19

Background: Number of COVID-19 cases in India is rising exponentially. In view of this, it is critical to increase the numbers of tests conducted by laboratories. Positivity rate in cases is still low. Hence, it may help to use the pooled samples for screening. A pooled testing algorithm involves the PCR screening of a specimen pool comprising multiple individual patient specimens, followed by individual testing (pool de-convolution) only if a pool screens positive. As all individual samples in a negative pool are regarded as negative, it results in substantial cost savings when a large proportion of pools tests negative.

Objectives: To increase capacity of the laboratories to screen increased numbers of samples using molecular testing for COVID-19 for the purpose of surveillance.

Methods & Results: A feasibility study was conducted at DHR/ICMR Virus Research & Diagnostic Laboratory (VRDL) at King George's Medical University (KGMU), Lucknow. It has been demonstrated that performing real-time PCR for COVID-19 by pooling 5 samples of TS/NS (200 ul/sample) is feasible when the prevalence rates of infection are low. All individual samples in a negative pool to be regarded as negative. Deconvoluted testing is recommended if any of the pool is positive. Pooling of more than 5 samples is not recommended to avoid the effect of dilution leading to false negatives.

Recommendations for sample pooling for real-time RT-PCR screening for COVID-19 are as follows (based on the KGMU study):

1. Use only in areas with low prevalence of COVID-19 (initially using proxy of low positivity of <2% from the existing data. Still a watch should be kept on increasing positivity in such areas
2. In areas with positivity of 2-5%, sample pooling for PCR screening may be considered only in community survey or surveillance among asymptomatic individuals, strictly excluding pooling samples of individuals with known contact with confirmed cases, Health Care Workers (in direct contact with care of COVID-19 patients). Sample from such individuals should be directly tested without pooling
3. Pooling of sample is not recommended in areas or population with positivity rates of >5% for COVID-19

Preferable number of samples to be pooled is five, though more than two samples can be pooled, but considering higher possibility of missing positive samples with low viral load, it strongly discouraged to pool more than 5 samples, except in research mode.

Contributors:

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- Dr. Kiran Rade, WHO-India

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The Sentinel Surveillance is like a beacon of light telling us the various aspects related to a disease. The State has understood the importance of the same from the experience of HIV sentinel surveillance right at the beginning of the COVID pandemic.

The Department of Health and Family Welfare is going forward taking various initiatives by giving prime importance to establish a good sentinel surveillance system. The first two volumes have covered the strategy and the situation of the epidemic during that specific time period. The third volume of the report has covered the June-July period. The District Surveillance Teams and state surveillance teams deserves appreciation as they have been doing the surveillance activities continuously since mid-April 2020.

The management team Dr Tony Lawrence and Dr Rakesh Bhat handling the Sentinel surveillance deserves the special appreciation. The 'Octopus model of Sentinel Surveillance' shows to a reader the creative way of informing the usefulness of the Sentinel Surveillance to identify the vulnerable segments of people as well as the areas. As suggested in the model, the various information so analysed is guiding the field teams to take interventions at the field level as well as to the state team to take various policy initiatives.

We sincerely appreciate the works of one and all.

Dr Rajan Khobragade
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