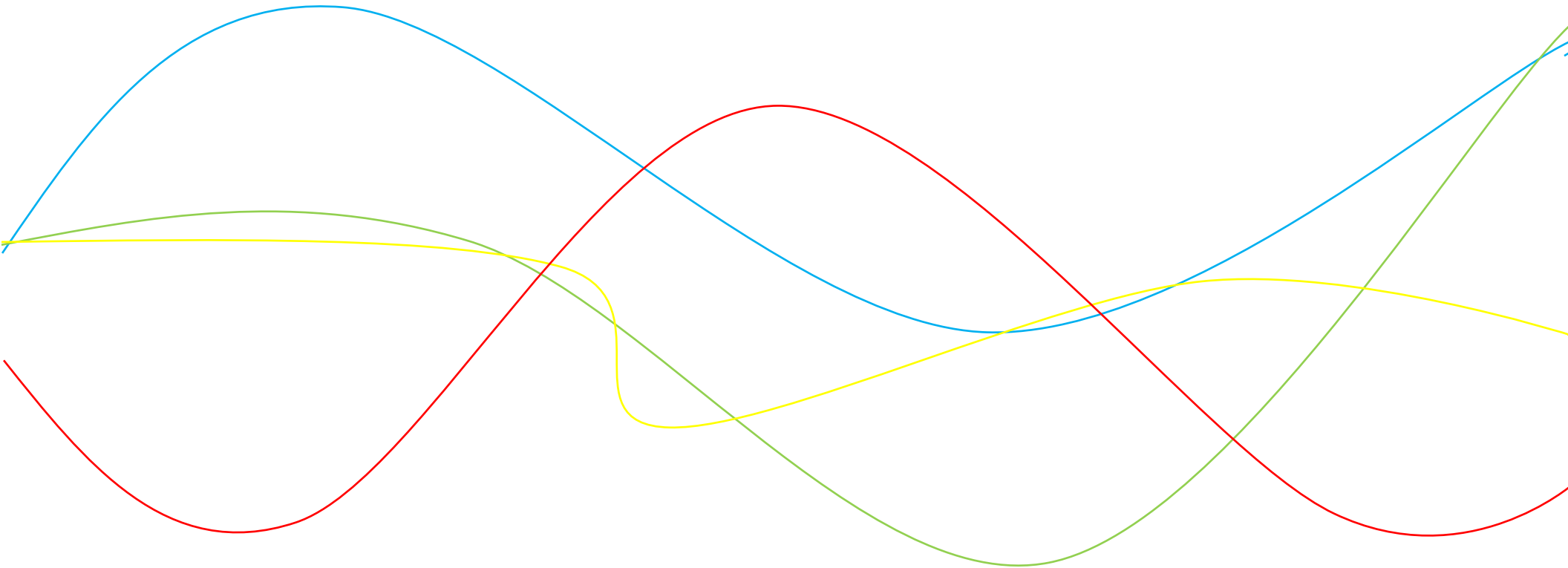


Report on infection source identification of  
The Positive cases– History of unknown source of infection on Day 'zero'  
June 2020



Department of Health & Family Welfare

Government of Kerala



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Acknowledgment

## **Report on source identification of COVID positive cases**

### **Executive summary**

WHO declared COVID19 virus infection threat of epidemic on 18<sup>th</sup> January 2020 . The Department of Health and Family Welfare set in motion all the actions such as developing health advisories for people, health staff and other line department staff from 19<sup>th</sup> Jan 2020 onwards. Subsequently, well planned strategy developed comprising of strong surveillance, quality quarantine, make every citizen partner in fighting COVID, testing all eligible persons, high quality care to COVID patients, proactive care of elderly and people with morbidity, focused advocacy, social mobilization and IEC campaign – Break the chain.

Out of these 7 strategies the most important is contact tracing, quarantine, testing and providing care to patients to ensure that there is no spread in the community. As on 30<sup>th</sup> June 2020 there were 4442 confirmed COVID 19 cases. Out of the total confirmed cases 11% infections are through local transmission since the first case detected.

The Department of Health and Family Welfare has done investigations of these cases through District Surveillance Units and Prevention of Epidemic and Infectious diseases Cells. Out of the total 166 cases declared unlinked on 'day zero', the source could be identified in 125 cases. In remaining 41 cases the investigations are going on. All these cases epidemiological study is being done by correlating the number of positives in that areas, socialization, time of symptoms detections, time of testing positive and overlapping of time of the known cases and unknown source cases etc. Based on the study the details of these 41 cases will be informed.

**Table1: District wise distribution of number of cases declared unknown source of infection on day zero**

<b>District</b>	<b>Number of cases declared unlinked on day ZERO</b>	<b>Source identified</b>	<b>Investigation ongoing</b>
TVM	15	12	3
KLM	13	11	2
ALP	2	0	2
PTA	1	1	0
IDK	7	2	5
KTM	7	3	4
EKM	8	8	0
TSR	21	20	1
PKD	24	20	4
MPM	33	17	16
KKD	10	8	2
WYD	7	7	0
KNR	10	8	2
KSD	8	8	0
<b>Total</b>	<b>166</b>	<b>125</b>	<b>41</b>

**DISTRICT WISE DETAILS**

**1. Thiruvananthapuram: Total 15 cases out of this possible source could be identified for 12 cases**

Sl.No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
1	TVM 01	M	68	Other		Inconclusive history of attending functions along with persons who had travel history. Infective status of these persons not proved yet	Further studies are being done.
2	TVM 02	M	50	Prisoner		Remanded prisoner	Possible contact with persons from Tamilnadu
3	TVM 03	M	40	Prisoner		Remanded prisoner	Possible contact with persons from Tamilnadu
4	TVM 04	F	52	HCW	Nursing Assistant	She has worked in COVID OP counter at MCH for one month. Breach in using PPE (gloves)	Possibility of getting the infection while handling op tickets of infected individuals.
5	TVM 05	M	67	Other		A known case of COPD was on treatment from GH. Was symptomatic and attended GH and MCH multiple times. Was found unresponsive at home after discharge from MCH	Further studies are being done
6	TVM 06	M	77	Other		Case of RTI. Was admitted in MCH and Peroorkada GH for more than a month	Possible contact with positive cases at MCH
7	TVM 07	M	48	Other		An accountant at AG office. Was admitted on evaluation for viral pneumonia was found positive	Further studies are being done
8	TVM 08	M	30	Prisoner		Remanded prisoner	Possible contact with persons from Tamilnadu
9	TVM 09	F	54	HCW	ASHA	Owens a tea shop where truck drivers frequently visit	Most probably contact with interstate truck drivers
10	TVM 10	M	40	Other	KSRTC Driver	KSRTC Driver-has taken interstate/international travellers	Might have come in contact with asymptomatic cases

Sl.No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
11	TVM 11	M	28	Other		He has travelled to Malappuram on 28th May and came back on June 1st. He went in car to Malappuram and came back by car till Ernakulam stayed there for two days and from there by bike thereafter	Might have come in contact with asymptomatic cases during his travel from Malappuram
12	TVM 12	M	52	Other	Auto driver	Manikandan gives history of transporting passengers from railway station and KSRTC Stand	He has history of transporting passengers without pass from Tamilnadu. Might have come in contact with asymptomatic cases
13	TVM 13	M	55	HCW	Security-MCH	Security at Medical College, Trivandrum	Possible contact with positive cases at MCH at that period
14	TVM 14	M	60	Other	VSSC	He was a technical officer in VSSC. He retired on May 31st. He was staying in home most of the times and went outside to buy groceries from nearby house and went to fish market Valiyathura. He developed symptoms on 18/6/2020. He had fever and cough. Consulted a private clinic in West fort street on 20/6/2020. Bought medicines from nearby medical shop in West fort. He developed vomiting and loose stools. He attended pre wedding day function in brother's house at Kulathoor on 23/6/2020. Again consulted same pvt clinic on 24/6/2020. He was referred from there. He was admitted in Ananthapuri hospital on 25/6/2020. Was in isolation ward. Swab positive in Ddrc. Shifted to MCH Tvpm on 25/6/2020. H/o dyslipidemia present.	Recent cluster of cases identified at Manacaud area and occasional chance of encountering with them. Police has identified tower locations where other cases have come close by within 100 metres distance. They might have shared a common space accidentally without knowing each other, could be tea shops, mobile recharge shops or a halting area during the rains. Further probing and cctv footages may be needed for establishing the same.

Sl.No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
15	TVM 15	M	41	Other	VSSC	Working at VSSC as technician.(on leave from 12 /06/2020).No travel history outside Kerala. Frequent travel to own house at Manacaud and wife's house at Killipalom.	Police has identified tower locations where other cases have come close by within 100 metres distance.

**2. Kollam: Total 13 cases out of this possible source could be identified for 11 cases.**

Sl.No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
1	KLM 01	M	81	Other		No history travel nor contacts with positive case	Further studies are being done
2	KLM 02	M	46	Other		Wife had travel history to Tamil Nadu and also had contact with relatives who had travelled to Tamil Nadu.	Most probably wife would have been asymptomatic positive and by the time she was tested would have become negative.
3	KLM 03	M	36	HCW	Pharmacist	Working at Kadackal PHC	Kaddakkal Cluster
4	KLM 04	M	42	Other		Fisherman in Kalluvathukkal area	Kalluvathukkal Cluster
5	KLM 05	M	9	Other		Son of Pharmacist at Paripally MCH, Visited Chathanoor FHC on 10th April	2 staff at FHC Chathanoor who turned positive for Covid late
6	KLM 06	F	24	Other(Ant enatal)		Tested for Covid when her baby turned positive on 5th day after birth which in turn turned positive	Her husband visited an ATM which was visited by two persons tested positive from Kalluvathuckal. Yet to be confirmed
7	KLM 07	F	47	HCW	ASHA	Part of Chathanoor and Kalluvathuckal cluster	Two staff in Chathanoor PHC who contracted illness from a staff nurse who returned from Jodhpur
8	KLM 08	F	40	HCW	Lab Technician	Working at Kadackal	Kaddakkal Cluster
9	KLM 09	M	65	Other		Brought dead	Further studies are being done
10	KLM 10	F	42	HCW	ASHA	Part of Kalluvathuckal cluster	Infection might have spread from Sindhu (Chathanoor cluster) who visited an ATM at Kalluvathuckal that was visited by Bindu as well
11	KLM 11	M	23	Other		He had gone home at Malapuram just before the lockdown and came	Possibly acquired the infection during travel from Malappuram

						back on 27th May 2020 on a bike with a friend. History of Rhinitis for a month.	
12	KLM 12	F	52	Other		Her husband is traveller but he was negative	Possibly she got infected from her husband who came from Tamilnadu who was an asymptomatic carrier
13	KLM 13	M	65	Other	Prisoner	He is running a stationary shop @ Punalur Municipality area along with his elder son. Weekly on all Saturdays, suppliers from Thenkasi &Puliyankudi Tamilnadu are visiting their shop for supplying the items. On 19.06.2020 he was remanded for selling tobacco products in school area. Was tested as part of prisoners screening	Possibility of contact with positive cases from Tamilnadu

### 3. Pathanamthitta:

S. No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
1	PTA 01	F	42	HCW	ASHA	Was involved in cleaning a CCC. But could not trace a positive case. None of her contacts turned positive	Her second sample was negative. Could not rule out possibility of false positivity as none of her contacts tested positive and there were no clustering of cases in that area.



**4. Alappuzha: Total 2 cases which are under investigation**

Sl. No	Name	Gender	Age (Yrs )	Category	Brief History	Remarks
1	ALP 01	M	65	Other	Attended Medicity hospital for renal calculi in 22nd June. Went back after consultation. Again presented with chest pain on 23rd and he was admitted there, shifted to ICU on the same day evening. On 26th he worsened with breathing difficulty, suspecting SARI his swab was sent on 27th. Living with daughter and son in law at Kayamkulam. Daughter and children symptomatic, swab sent.	Possibility of acquiring infection from son in law who owns a vegetable shop in Kayamkulam market where vendors from other states frequent. He owns 4 trucks that travel interstate. But he was tested inconclusive in the first sample. Around 20 of his family members and primary contacts tested positive. More than 200 samples are being tested from the market. Around 20 samples were tested and found negative from Aster Medicity where he went for treatment. Second sample result is awaited. Investigation with PEID cell of Alappuzha MCH is ongoing.
2	ALP 02	M	52	Other	Fish business. Used to go to Kayamkulam. Market to collect fish and sell near his house	Anticipating a hub in the market area., investigations are being carried out in association with the PEID cell of Alappuzha MCH.

**5. Kottayam: Total 7 cases out of this possible source could be identified for 3 cases.**

Sl.No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
1	KTM 01	M	37	Other		He has been working at the market and was engaged in unloading rice from Lorries. He had close interaction with his coworkers and lorry drivers coming from other states. He had close interaction with a driver from Andhra Pradesh, who came to unload sacks (plastic) of rice for more than 15 minutes and that he failed to wear a mask at the time.	Most probably he would have got from the interstate truck drivers with whom he had contact as even though he was wearing mask in between he used to remove it due to sweating and he did not have a habit of frequent hand washing. Also, in one instance he had close contact with one of the interstate truck drivers and he was not wearing mask at that time.

Sl.No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
2	KTM 02	F	33	HCW	Staff Nurse- RCC	Was working as staff nurse at RCC. But was on leave	Further studies are being done
3	KTM 03	M	53	Other		He visited Thalayolaparambu market, for stocking his bakery (Mariya Bakery). Also, he has interacted with his staff Mrs. Sajimol Pradeep, local vendors, suppliers and customers on a regular basis. Also, there is a history of contact with an international traveller, his sister Mrs. Annamma D'Souza and brother-in-law Mr. Francis D'Souza who returned from Ireland on 11.03.2020. The patient had received them at Nedumbaserry Airport and the travelled back to Thalayolaparambu in an AC car.	Most probably his sister and brother in law would have been asymptomatic positive and by the time they were tested would have become negative.
4	KTM 04	F	25	Other		She used to travel to college daily from home by private bus up to Kottayam and from there to university by vehicle of university. She did not go to college from 24th March onwards due to the lock down. The area she was staying was hotspot	Further studies are being done
5	KTM 05	M	43	Other		He used to go to market and Ettumanur – Perur Kavala on alternate days to collect vegetables. In that market interstate truck drivers used to come.	Most probably would have got infected from the interstate truck drivers.
6	KTM 06	M	31	HCW	Staff Nurse- S.K Hospital	Gives history of travel from Tvm to Kottayam. But there were no cases at Tvm at that time	Further studies are being done
7	KTM 07	F	32	Hospital staff	Cashier	Working as a cashier in a private hospital. Was tested positive after her FIL tested positive preoperatively. She was symptomatic	All her family contacts and one pharmacist in the hospital tested positive. Could not trace her index case. Investigation ongoing

**6. Idukki:**

Sl.No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
1	IDK 01	M	60	Other	Contact	He had duty at COVID Care Centre for delivering food packets for the inmates but there was no direct interaction. Also, food waste was handled and cleaning of the surroundings wearing gloves and mask. He had travelled to Kumily on 5 <sup>th</sup> April 2020 to meet son in law who works in resort there. His son stays in old Munnar and his children came to Mani's house. His son also often visits him. He is a lorry driver and the last trip was to Tamil Nadu in February and his wife is nurse at Devikulam.	Most probably from the COVID Care Center as he was handling the food waste and cleaning the surroundings. Also, his daughter in law is a nurse at PHC Devikulam
2	IDK 02	M	39	Other	Contact	He works at bakery shop which is located en route from Cumbamettu where many inter-state vehicles as well as vehicles of distributors stop for refreshments. Nearly 50 person visits his shop every day. He also receives supplies for the Bakery from other districts in Kerala. His close contacts are regular travellers to Tamil Nadu but they were tested negative.	Most probably from one of the interstate traveler who visited his shop.
3	IDK 03	M	23	Other	Contact	Works at ESAF, Nilambur. He came to Idukki on 24th March 2020. On 29th April started with symptoms. He had visited his uncle who is ambulance driver. He also had contact with a person working at Café Coffee day in Coimbatore and has a family member studying nursing at Mangalore but both of them were tested negative. A total of 74 contacts were tested and found negative.	Further studies are being done
4	IDK 04	M	56	Other	Contact	History of travel to various places in Idukki and Trivandrum. He has attended meetings, public functions, funerals and travelled by bus. Also, there is history of going to restaurants and on 12th March 2020 had gone to Tata High Range Hospital, Munnar.	Further studies are being done
5	IDK 05	M	65	Other		Tested positive during preoperative investigations for cataract	All his successive samples were negative. Around 52 samples of contacts were tested but found negative. investigation ongoing

6	IDK 06	F	43	HCW	ASHA	ASHA working at Kattappana TH. She gives no history of contact with positive cases	Was involved in RRT. Possibility of coming in contact with an asymptomatic positive case after quarantine. investigation ongoing
7	IDK 07	M	31	Section Officer	Vetenary dept	working at Thrissur University Vetenary Hospital as Section clerk. He was staying at Aluva Navy quarters and commuted daily from Aluva to Thrissur in KSRTC bus	All his contacts are in Thrissur district. Around 18 samples were tested but found negative. Investigation is ongoing to find out a possible link. investigation ongoing

**7. Ernakulam: Total 8 cases out of this possible source could be identified for all cases.**

Sl.No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
1	EKM 01	M	41	HCW	JHI	Taken Airport duty	Exposure to passenger who later turned positive
2	EKM 02	M	39	HCW	JHI	Taken Airport duty	Exposure to passenger who later turned positive
3	EKM 03	F	49	HCW	Security	Security staff at Rajagiri. Has taken duty while positive cases were admitted there	Possible exposure to positive cases
4	EKM 04	F	45	HCW	JPHN	JPHN, Kaladi Block PHC; She was involved in RRT. Have visited peopleunde quarantine	High chances of coming in contact with persons who were asymptomatic cases
5.	EKM 05	M	32	Police Officer		Police Officer at Kalmassery.Has done gyard duty at CCC-Rajagiri ,Xime and NUALS.	High possibility of coming in contact with positive cases as there were positive cases in all the centres
6	EKM 06	M	43	Mimickry Artist		Visited persons who had history of interstate travellers and was underquarantine .Also has handled luggages from outside Kerala.	The persons under quarantine were tested positive later on. He might have acquired the infection from them
7	EKM 07	F		HCW	JPHN	Chowara PHC. She was involved in RRT. Have visited peopleunde quarantine	High chances of coming in contact with persons who were asymptomatic cases
8	EKM 08	M	20	other		Thrissur native working at an electrical shop in Broadway market at Ernakulam, developed symptoms and was tested	Primary contact of a positive case who tested positive in Palakkad district.

8. Thrissur: Total 21 cases out of this possible source could be identified for 20 cases.

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
1	TSR 01	M	24	Other		History of inter district traveller (Palakkad)He used to go to a small market Karingarapully market at Chittoor road Palakkad for buying essentials especially vegetables and groceries. He might have had contact with sellers and shopkeepers.He used to have cash transactions with shopkeepers	Most probably he would have got infection from that market.Probability of transmission through fomites is high as he didn't use sanitizer. His use of mask was also not proper.
2	TSR 02	M	87	Other		He was confined to home since 1 to 1.5 years. So, his sons could have been the source of infection or it could be the ASHA and the homeo doctor who visited to distribute medicine.	Further studies are being done
3	TSR 03	M	28	HCW	Dentist-Private Clinic	He practices in Chavakad area where lots of gulf returnees are residing.	Most probably contact with asymptomatic positive case who had completed the quarantine period
4	TSR 04	F	20.0	HCW	RBSK Nurse	Had duty at Walayar Check post	Most probably got infection while doing duty at Walayar check post
5	TSR 05	F	51	HCW	JPHN		Most probably from son who is working at Apollo tyres where interstate truck drivers used to come.
6	TSR 06	F	40	Other		Husband had international travel history	Most probably his sister and brother in law would have been asymptomatic positive and by the time they were tested would have become negative.
7	TSR 07	M	35	HCW	Physiotherapist		Part of DH Palakkad Cluster
8	TSR 08	M	38	HCW	PRO	Had screening duty at Shakthan Stand where he had screened interstate truck drivers also	Most probably he would have got infected from the Shakthan Stand
9	TSR 09	M	47	Other		He had his shop opposite to Institutional Quarantine and has history of inter district travel and has mingled with lots of people	Most probably during his travel he would have come in contact with asymptomatic positive.
10	TSR 10	M	33	Prisoner		He had history of contact with positive case	History of contact with positive case.

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
11	TSR 11	M	37	HCW	Ambulance Driver	History of transporting Positive cases	Most probably there would have been breach in Infection Control
12	TSR 12	M	27	Volunteer		He was tested as part of Sentinel Surveillance in the category of volunteers. He was involved in disinfection of train (SHRAMIK) and ambulance. Also, he was posted at fish market and Shakthan Stand for temperature monitoring.	Most probably he would have got infection while performing his duty. He was not wearing full PPE while disinfecting vehicles.
13	TSR 13	M	32	Head load workers		These 5 were working as loading-unloading staff in the Supplyco warehouse at Kuriachira. They work in groups of 2-5 in all godowns according to the workload. They are getting loads daily from different states Those lorries without appointment have to wait for 1-2 days before unloading. A lorry contains a driver and a cleaner usually natives of other states. They stay in the same lorry till the unloading is over and spend most of the time in the premises during stay. When a load comes, the driver/cleaner hands over the bill to the loading staff and they take it to the corresponding section officer. Then the workers unload the load with the help of the lorry driver and cleaner especially for tying and untying the rope.	Loads are transported between workers every time. Lorry drivers & cleaners use the same single tap for washing and other needs which is the same water source for workers. All of them are having tea from the same tea seller every day. The driver and cleaner give unloading charge as liquid cash to loading staff directly to their hand. During the time of unloading the drivers and cleaners help the loading staff in sorting the load and most of the drivers and cleaners are not using the mask properly.
14	TSR 14	M	26	Head load workers			
15	TSR 15	M	25	Head load workers			
16	TSR 16	M	51	Head load workers			
17	TSR 17	M	30	Head load workers			
18	TSR 18	M	54	Corporation worker		They were tested as part of Sentinel Surveillance. All these patients have chances of getting the diseases as they were working in places where COVID patients were staying and also, they were working in crowded places with chances of infection.	Most probably with contact with positive case at Institutional Quarantine where they went for disinfection and give food.
19	TSR 19	M	26	Corporation worker			
20	TSR 20	M	36	Corporation worker			
21	TSR 21	M	48	Store owner-wholesale		He is working in a wholesale stationary shop in Ernakulam. He has contact with inter state truck drivers who come from Delhi, Maharashtra and Chennai.	Most probably from interstate truck drivers.

**9. Palakkad: Total 24 cases out of this possible source could be identified for 20 cases;**

Sl.No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
1	PKD01	F	5	Other		Father had history of interstate travel.	She is immunocompromised. Most probably from father who might have been asymptomatic positive.
2	PKD02	M	23	Other		Had contact with persons who had contact with Umrah returnees who did not turn positive. H/o contact with Uncle who returned from Bangalore with whom he traveled to Malappuram. (Uncle did not turn positive) His mother died of undiagnosed fever who turned to be COVID negative.	Most probably from the person who returned from the umrah who could have turned negative by the time the person was tested.
3	PKD03	F	22	HCW	RBSK	RBSK Nurse who was in Walayar duty and had contact with a positive case, Vishnu	Contact with Covid positive patients
4	PKD04	M	35	Prisoner			Further studies are being done
5	PKD05	M	58	Forest Dept Staff	Forest Watcher	Forest watcher who had duty in Walayar dam area	contact with positive cases while taking duty at the border areas
6	PKD06	M	40	Forest Dept Staff	Section Forest Officer	Works as section forest officer at Walayar and had checkpost duty and probably	contact with possible positive cases while taking duty at the border areas
7	PKD07	F	38	Other		No history of travel or contact with positive cases	Further studies are being done
8	PKD08	F	58	Other		Contact with Maharashtra returnee son who came on 23.05.2020 who turned negative on RTPCR. But she was symptomatic from 18.05.2020 and went to UPHC at Ottapalam Municipality area also	She could have got the infection from the son who would have turned negative by the time the he was tested.
9	PKD09	M	30	Other		He was a worker at a mango godown, Muthalamada and had contact with interstate truck drivers.	Contact with truck drivers from other states
10	PKD10	M	47	Other		Working as a contractor in demolishing houses with lot of travel. His shop has been in Koduvayur market where lot of interstate drivers used to come.	Information insufficient to pin point a source of infection
11	PKD11	M	28	Other		Assamese migrant who was working as a supplier in a hotel near Kanjikkode living PKD 100) with other 20 migrants who turned negative on tests. Probably had contact with interstate truck drivers/passengers which may be the source.	Contact with interstate truck drivers



Sl.No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
12	PKD12	M	38	Other		Had gone to Idukki for construction work (Highway) at Idukki.He was tested positive before starting of work	Further studies are being done
13	PKD13	M	39	HCW	Blood Bank Driver	Working as KSACS driver in DH Palakkad who went with his taxi to pick four Chennai returnees to Malappuram on 18.05.2020.Most probably this was the source of infection	H/o transporting passengers from Walayar check post
14	PKD14	F	34	HCW	Cleaning Staff	Contact with quarantine completed travellers at CHC Cherpullaserry	Most probably contact with asymptomatic positive.
15	PKD15	F	36	HCW	Staff Nurse	Staff nurse worked in Isolation ward at DH, Palakkad	Contact with COVID positive patients
16	PKD16	M	49	HCW	JHI	Working as JHI at PHC Sreekrishnapuram. Had visit to the houses of positive cases Narayanankutty (PKD 33), Rajeshwary (PKD48) and Renjith Raji (PKD 45) on 15.05.2020,21.05.2020,24.05.2020 and Remadevi(PKD 36) on 16.05.2020,24.05.2020 and 28.05.2020	Contact with positive case
17	PKD17	F	50	HCW	Hospital Attender	Working as Hospital attender at DH Palakkad.	Contact with positive cases
18	PKD18	M	38	Education Dept		Worked at Walayar check post	Most probably from potential cases he would have interacted at the check post
19	PKD19	F	32	HCW	Staff Nurse	Staff nurse worked in isolation ward	Contact with Covid positive patients
20	PKD20	M	18	Other		Migrant, came to Kerala in February 2020, livingwith other 8 migrants who tested negative. Had a visit to Kanjikkode market recently where it was very congested.	Visit to Kanjikkode market where truck drivers and other people from Tamil Nadu also come
21	PKD21	F	55	Other		Son works as lorry driver and was in quarantine. District is planning to test the son and the cleaner.	Most probably from son who would have been positive and turned negative by the time tested.
22	PKD22	M	26	Police Dept	Police Officer	Police officer working in Thrissur	He had contact with positive case while taking him for medical checkup.
23	PKD23	F	53	HCW	JPHN -CHC Parali	JPHN Parali CHC. She was on leave till 15th June. Husband died of Ca lung. Was on treatment at Amritha.	Investigation going on
24.	PKD24	F	37	Other	Flour Mill Accountant	She is working in a flour mill as accountant where interstate truck drivers come, mainly from Maharashtra.	Most probably from interstate truck drivers whom she had come in contact.

**10. Malappuram: Total 33 cases out of this possible source could be identified for 17 cases**

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
1	MLP01	M	70	Other		SARI	Son stayed as bystander for his wife at Medical College and at that time he had contact with many strangers. But was tested negative. Most probably his son would have been positive and by the time he got tested would have turned negative.
2	MLP02	M	26	Other		Sentinel surveillance	Possible contact with the positive cases in Thennal cluster. His shop is near Thennala PHC.
3	MLP03	F	39	HCW	ASHA	Sentinel surveillance	Part of Thennala cluster
4	MLP04	M	35	Other		Sentinel surveillance. Migrant labourer	Further studies are being done
5	MLP05	M	40	Other		Walked from Gudalloor	Possible contact from Tamil Nadu
6	MLP06	F	48	HCW	ASHA	Her husband work as hospital security. Member of RRT. One more person involved in the RRT turned positive later.	Most probably from unidentified asymptomatic positive in quarantine whom she visited during RRT.
7	MLP07	F	44	HCW	JHI	Thennal cluster	Possible contact with the positive cases in Thennala cluster.
8	MLP08	M	30	HCW	PRO	Used to collect lab samples from Manjeri Medical College	He was involved in collection of Non COVID samples from GMC, Manjeri. At that time positive cases were there so might have got infected from there.
9	MLP09	M	29	HCW	ECG Technician	Taken duty in isolation ward	Taken ECG of Covid patients and contact with two staff nurses who tested positive
10	MLP10	M	22			SARI, Migrant from Assam	He was working in Mubarak wood Mill. He would have got infection from there.
11	MLP11	M	80			Destitute.	Source could not be identified
12	MLP12	M	50			He was there to manage the passengers who came without notice in a KSRTC bus from Trivandrum.	One person in this bus was tested positive later
13	MLP13	F	30	HCW		Transported positive case Mr. Arashan	Contact with a positive case
14	MLP14	F	4 months	Other		H/o a positive case in their neighborhood	Further studies are being done

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
15	MLP15	M	30			Sentinel surveillance	Most probably from Valanchery market where interstate truck drivers used to come.
16	MLP16	M	27	HCW		Duty in Manjeri Covid ward	Contact with positive cases
17	MLP17	M	36	Other		Tested in Sentinel surveillance. He has fruit shop in National Highway near Thennala PHC. Travellers who take this route generally stop by his shop.	Part of Thennala Cluster
18	MLP18	M	41			Brother in law of Abdul Saleem	Possible contact with positive case
19	MLP19	M	36	HCW		Duty in Covid ward	Contact with positive cases and their fomites
20	MLP20	F	85			SARI	Most probably she would have got infected from the son who returned from Umrah. The son might be asymptomatic positive who by the time tested would have become negative.
21	MLP21	M	44	Other	Bank employee	Working in cooperative bank, had contact with father of blamy baby at his bank. But he was negative. Moreover, his wife is a staff nurse in Manjeri Medical College in non Covid area.	Investigation going on
22	MLP22	F	50	Other	Bank employee	Picked up in Sentinel Surveillance. Working at Federal bank edappal.	Edappal Cluster
23	MLP23	F	32	Other	Kudumbasree	Picked up in Sentinel Surveillance from Vattankulam, Kudumbasree worker.	Edappal Cluster
24	MLP24	M	39	Other	KSRTC Conductor	Picked up in Sentinel Surveillance (ARI); KSRTC conductor, ekm, tsralakkad route-guruvayoor depo	Investigation going on
25	MLP25	M	23	Other	Spray painter	Picked up in Sentinel Surveillance (ARI); Spray painter at BRD car workshop, Thrissur, Akkikkavu	Investigation going on
26	MLP26	F	33	Other		Picked up in Sentinel surveillance (ARI); Home maker, no travel or contact	Investigation going on
27	MLP27	M	61	HCW	Doctor	Sentinel surveillance; Doctor at Sukhapuram Hospital, Malappuram	Edappal Cluster

Sl. No	Name	Gender	Age (Yrs )	Category	Designation	Brief History	Remarks
28	MLP28	F	28	Other		Sentinel Surveillance; Nursing Assistant in Sukhapuram Hospital, Malappuram	Edappal Cluster
29	MLP29	F	54	Other		Sentinel Surveillance; Nursing Assistant in Sukhapuram Hospital, Malappuram	Edappal Cluster
30	MLP30	M	49	HCW	Doctor	Sentinel surveillance; Doctor at Edappal Hospital, Malappuram	Edappal Cluster
31	MLP31	F	32	HCW	Staff Nurse	Sentinel surveillance; Staff nurse at Edappal Hospital, Malappuram	Edappal Cluster
32	MLP32	M	26	Other	Vehicle sale	Khalasi, Vehicle sale, He was having symptoms so	Investigation going on
33	MLP33	M	39	Other	KSRTC Conductor	He is Conductor in Angamaly Depot	Investigation going on

**11. Kozhikode: Total 10 cases out of this possible source could be identified for 8 cases;**

Sl.No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
1	KZD01	F	31	HCW	Doctor	DNB Student at MIMS, Kozhikode. There was positive case at that time.	Most probably contact with positive case.
2	KZD02	M	5	Other		No history of contact with positive cases or travel	Further studies are going on
3	KZD03	M	39	HCW	JHI	Working in Sample Packing Section	Repeat Sample done at NIV Alappuzha was negative. So most probably false positive
4	KZD04	F	24	Other		Had contact with coworkers who had taken Vande Bharath duty Even though she had no flying history.	Contact with multiple coworkers who might have turned positive later
5	KZD05	F	24	Other		No history of contact with positive cases or travel	Repeat Sample done at NIV Alappuzha was negative. So most probably false positive
6	KZD06	M	84	Other		No history of contact with positive cases or travel. Case of Ca Oro pharynx	Only first swab was positive and all other swabs were negative and all his close contacts were tested negative so chance of false possibility.

Sl.No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
7	KZD07	F	53	HCW	Nursing Assistant	Taken isolation duty, but there were no positive cases	Repeat Sample done at NIV Alappuzha was negative. So most probably false positive
8	KZD08	F	48	HCW	Nursing Assistant	Taken isolation duty, but there were no positive cases	Repeat Sample done at NIV Alappuzha was negative. So most probably false positive
9	KZD09	M	26	Airport Staff		Taken airport duty	Possible contact with passengers who turned positive later
10	KZD10	F	30	Other(Antenatal)			Investigation going on

**12.Wayanad: Total 7 cases out of this possible source link could be identified for all 7 cases.**

Sl.No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Possible Source of Infection
1	WYD01	F	24	Other		Amrutha seven month antenatal who had placenta previa and visited hospital once in a week.On 27 <sup>th</sup> May 2020 she had fluid leak hence taken to CHC Meenangadi and referred to higher center. She got admitted to private hospital and on the next day was sent to MCH Kozhikode.Patient had IUD and expelled on 2/6/20.Her husband is an Auto driver (? contact with interstate drivers) and was tested negative later. Her primary contacts also tested negative including father in law and mother in law who had close contact with her.No significant travel history elicited.	Most probably husband who is an auto driver who had contact with interstate drivers. He could have got
2	WYD02	F	45	Other		Random secondary contacts of Thomas, lorry driver was tested and Anu was diagnosed positive. She is wife of accountant at Meenangadi agro shop where Thomas visited on 27.05.2020 a day after return from Koyambedu market, Chennai. Anu didn't have any contact with Thomas. Her husband primary contact of Thomas was tested negative on 4.05.20. She didn't have any significant travel history. She had history of allergic rhinitis and cough for some time in past. She used to wash the husband's clothes after work and had managed cash and things back from office(? Fomite)	Most probably fomite as she used to wash husband's clothes and had managed cash & things back from office.
3	WYD03	F	55	Other		She had son who came from Bangalore but his result was negative.She is a dialysis patient hence visit to hospital.	Most probably from Son who might be asymptomatic positive

Sl.No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Possible Source of Infection
4	WYD04	M	35	Migrant Worker		<p>Sentinel surveillance sample of 10 guest workers from Sulthan Bathery were taken on 28th May 2020. Out of which 4 became positive. Guest workers who came to Wayanad during the month of January and march and engaged in labour work at a construction site of Ladder resorts, Poolavayal, Sulthan Bathery. About 148 workers including different category workers(supervisors/plumbers/manual laborer's etc.) working at the site. Among the positive cases, 3 persons involved in construction work and one is in plumbing section. They are sharing common kitchen in the site and also using 20 toilets in the site. Two of the confirmed cases (Rabiul &amp; Nabirul) staying together, Naroath at construction site quarters and Saroj alias Sudhir at another house with fellow workers.</p>	<p>Most probable source of infection is from the interstate truck drivers getting materials at the construction site</p>
5	WYD05	M	29	Migrant Worker			
6	WYD06	M	41	Migrant Worker			
7	WYD07	M	30	Migrant Worker			



**13. Kannur: Total 10 cases out of which possible links could be identified for 8 cases;**

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
1	KNR01	M	23	News Reporter			Most probably he would have got infection from asymptomatic positive he would have come in contact as part of his work
2	KNR02	M	49	Prisoner		During the 2 months he absconded, the hideouts had been identified as Cherupuzha, Peringome Vayakkara and Kankol Alapadamba. As per the investigation team findings and information received from Jabbar's wife initially, he had been in and around Cherupuzha border areas adjacent to Karnataka, though he denied it.	He could have got the infection while staying in those areas. Also, there is a possibility of false positivity as all his high-risk primary contacts were tested negative
3	KNR03	F	55	HCW	Nursing Assistant	Taken isolation duty, but there were no positive cases	Repeat Sample done at NIV Alappuzha was negative. So most probably false positive
4	KNR04	F	50	HCW	Hospital Attendant	Hospital Attender, Grade II DH Kannur.	Repeat Sample done at NIV Alappuzha was negative. So most probably false positive
5	KNR05	M	41			He is a head load worker in Thalassery fish market was tested on 28.05.2020 as part of sentinel surveillance done in the market area. He was asymptomatic. His swab result came as positive on 30.5.2020. Rafeeq went to collect empty boxes of fish and had conversation with positive case Iqbal for few minutes. Iqbal didn't use mask while Rafeeq had covered nose and mouth. He had close interactions with interstate truck drivers (mainly Chennai and Maharashtra) during work at Thalayi ice plant and Thalassery fish market. Also, he met Mr. Ashraf and Mr. Iqbal at Thalassery fish market. None of them practiced physical distancing or mask.	Most probably Rafeeq would have got the infection either from interstate truck drivers/cleaners or from positive case Ashraf/Iqbal.

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
6	KNR06	M	33	Prisoner		He is a contractor and due to his job, he visited multiple work site and shops and hotels near it.He gives history of frequently visiting Payyannur which was once a hotspot. His contacts who have been tested so far have been found negative. He was asymptomatic and was tested before taking into remand.	Most probably while he visited various sites, Shops and hotels he might have contracted the disease or he might be false positive as he is asymptomatic and all his contacts who have been tested so far has been found negative.
7	KNR07	F	21			Anu was admitted in DH, Kannur from 12-20.5.2020. Till 19.5.2020 she was admitted in a ward with about 33antenatal and postnatal women. The ward has only 11 beds. At times 2 Pregnant ladies in early term share the same bed. Cardio tocography (a machine) is taken every day for 2 minutes for all admitted pregnant women in a common bed. Anu developed symptoms on the 7th day of admission (within the incubation period). It was found that all 33 women were negative. Anu developed symptoms suggestive of Influenza like illness on 19.5.2020. The swab taken on 20.5.2020 was positive but the swab taken on 21.5.2020 was negative. Breast milk of Anu taken on 23.5.2020 was also negative for Covid-19 Infection. Anu's nasopharyngeal swab taken on 24.5.20 and 26.5.2020 which was sent to NIV, Alappuzha and MCC, Thalasseri respectively have also come as negative. The 2 Health Care workers at DH, Kannur who tested positive for Covid-19 infection had taken duty only in the COVID isolation ward from 23.4.2020 to 4.5. 2020.Anu got admitted on 12.5.2020 at DH, Kannur.	A probability of the initial test being false-positive may be considered as all other sources of infection have been ruled out.
8	KNR08	F	62			Her sons Ashraf and Iqbal who turned positive later had contact with interstate truck drivers at Fish Market in Thalasserry. They didn't not wear mask or practiced social distancing	Her son Ashraf and Iqbal would have been the source of infection who in turn got from the interstate truck drivers with whom they had contact

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
9	KNR09	M	14	Other		Had gone to Mother and child hospital.Swab taken as SARI Surveillance.	Investigation going on
10	KNR10	M	28	Excise Dept	Excise Officer	Source could not be identified	Investigation going on

**14. Kasaragod: Total 8 cases out of which link could be identified for all 8 cases**

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
1	KSD01	M	28			Prior to developing symptom, he had visited District hospital, Kanhangad on 15 <sup>th</sup> May 2020 to show his wife who is antenatal. He had gone to GMC Pariyaram as bystander for his wife from 25 <sup>th</sup> June 2020 to 28 <sup>th</sup> May 2020. Also, he had gone to hair cutting saloon and Cherupuzha town to buy tarpaulin sheets from a person who came from Kannur and had gone for mason work to Narkaliakad 3 weeks back where he had contact with a person from Ernakulam district. During the visit to public places he was using cloth mask. According to him there is no contact with international/Interstate travellers and individuals with respiratory symptoms.	His repeat sample was negative. Most probably false positive.
2	KSD02	F	34	HCW	Dentist	While she developed symptoms, she was on COVID 19 sample collection duty. She has taken 33 positive patients' sample. According to the history given she was wearing PPE	Most probably there must be breach in Infection Control Practice.
3	KSD03	M	29		Other	He had come from Maharashtra one month back and finished his quarantine period. After that he had taken his father for treatment to GH Kasargod and that time positive patients were admitted there. Also he has gone to Mangalore to show his father but at that time there were no reported positive cases in that particular area.	Most probably he would have got from GH Kasargod.
4	KSD04	F	32	HCW	Staff Nurse	She had taken Swab collection duty. She had taken Swab of Covid-19 Suspects including one who later turned out to be positive for SARS-Cov-2. She had helped in setting of Covid isolation ICU and took part in cleaning activities also. She had worn triple layered mask and gloves during that time. She had worn PPE kit when there is a contact with Covid-19 Suspects.	Recall bias of patient regarding improper use of PPE, so there can be breach in infection control practice. There is also a chance of false positivity of the first test, as she tested negative in the next test.

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
5	KSD05	M	66		Other	He developed breathlessness on 11 <sup>th</sup> May 2020 and was tested and found positive. Before the onset of symptoms, he along with his wife went to Government Medical College, Manjeri for chronic breathlessness on 1 <sup>st</sup> March 2020. The doctors suggested them home quarantine as they had inter district travel, hence they along with his daughter and grand children were at room quarantine at their relative's house till 6 <sup>th</sup> May 2020. Thereafter they came back to their home on 7 <sup>th</sup> May 2020 by an ambulance. The same day he went to nearby chicken stall and nearby shop. Next day their neighbors visited their house and all of them used cloth mask at that time. There is no history of contact with international /interstate travellers nor contact with any symptomatic cases.	Most probably the unidentified contacts at the shop could have been the potential source of infection.
6	KSD06	M	20		Other	He developed fever on April 16 <sup>th</sup> 2020 and was tested on 24 <sup>th</sup> April 2020. Before developing symptoms he had visited multiple places during the lockdown period and for painting jobs at various places in the last week of March. He has history of using Ganja and in this regard has interacted with few persons. While tracing his contacts it was found that one of his friends had contact with a positive case Mr. Ajmal, but this friend was tested negative. There was no history of contact with interstate/international travellers.	All his contacts who were traced and tested were found negative and even his second sample tested was negative, even though his symptoms persisted. In this case scenario the chance of false positivity needs to be considered.
7	KSD07	M	43			An auto driver by profession presented with complaints of weakness of all four limbs following alleged history of jack fruit falling on head on 19 <sup>th</sup> May 2020. CT Scan was done and fracture C5 vertebra was diagnosed. He was posted for surgery and so tested for COVID 19 & found positive.	His repeat swab was negative. Most probably it is false positive.

Sl. No	Name	Gender	Age (Yrs)	Category	Designation	Brief History	Remarks
8	KSD08	F	28	HCW	Radiographer	She developed symptoms on 11.5.2020. Before this till 21st April 2020 she was taking COVID Duty. On 24th April she had gone to take X-Ray of a positive case. During that time she was wearing only N 95 mask.	Contact with positive case

## **Acknowledgement**

The Public Health division headed by Dr Meenakshy along with the State Surveillance Unit and Dr Indu State Nodal Officer Prevention of Epidemic and Infectious Diseases Cell along with the respective PEID Cells of Medical Colleges have done the detailed study of tracing the source. The teams are doing further investigations to identify the source of infection of the remaining cases. The epidemiological investigations will assist the Department and the field teams to take specific interventions. We earnestly appreciate their works.

Dr Rajan Khobragade  
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