Spread of Covid-19 in India: The Fourth Report [5.4.20; 12 mid-night]

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The cut-off time for our Third Report was 2nd April mid-night. Our Fourth Report focuses on the stock of Novel Coronavirus infections in India starting from that point in time up to mid-night of April 5. There have been 1983 new afflictions in this 72-hour period – less than 1% of these cases have been primary cases, and the disease has spread to at least 60 new districts (that include 16 new districts in UP, 6 new districts in Assam and in Rajasthan, 5 new districts in Gujarat and in Punjab and in Tamil Nadu, and 4 new districts in Haryana and in Orissa). Thus, Covid-19 in India has *spread significantly across space and over time* during April 2-5. We present the data for the 72-hours of our study in Table 4 below (with the new districts underlined).

There are still significant parts of India that are free of the disease – at the very least, 413 districts of the 736 districts in India are still disease-free (and these 413 districts contain about 50% of India's population). The major metro areas of India still carry a significant fraction of the country's disease load, and the states of Maharashtra, Tamil Nadu, Telangana, and Delhi are still some of the most disease-ridden states. [In the current round, we do not have district level data for Jammu and Kashmir and Telangana, and are thus forced to report aggregate numbers. Data for the different districts of West Bengal are also sketchy; so we have reported aggregates for Darjeeling and Kalimpong (North Bengal), and for Kolkata, the north and South 24 Parganas, Purba and Paschim Medinipur, Howrah, Hoogly, and Nadia (South Bengal).]

At mid-night on 5th April, the 323 Covid-affected districts contained a total of 4218 cases, which implies an average case-load of 13 per affected district. We use that information as follows to categorize the affected districts into four clusters of differential disease penetration – heavily-affected districts with more than 5 times the average case-load (i.e., greater than 65 cases in a district), significantly-affected districts with 2.5 to 5 times the average (i.e., between 32 and 64 cases in a district), moderately-affected ones with 1 to 2.5 times the average (i.e., between 14 and 31 cases in a district),, and mildly-affected districts with no more than the average number of cases (i.e., no more than 13 cases in a district).
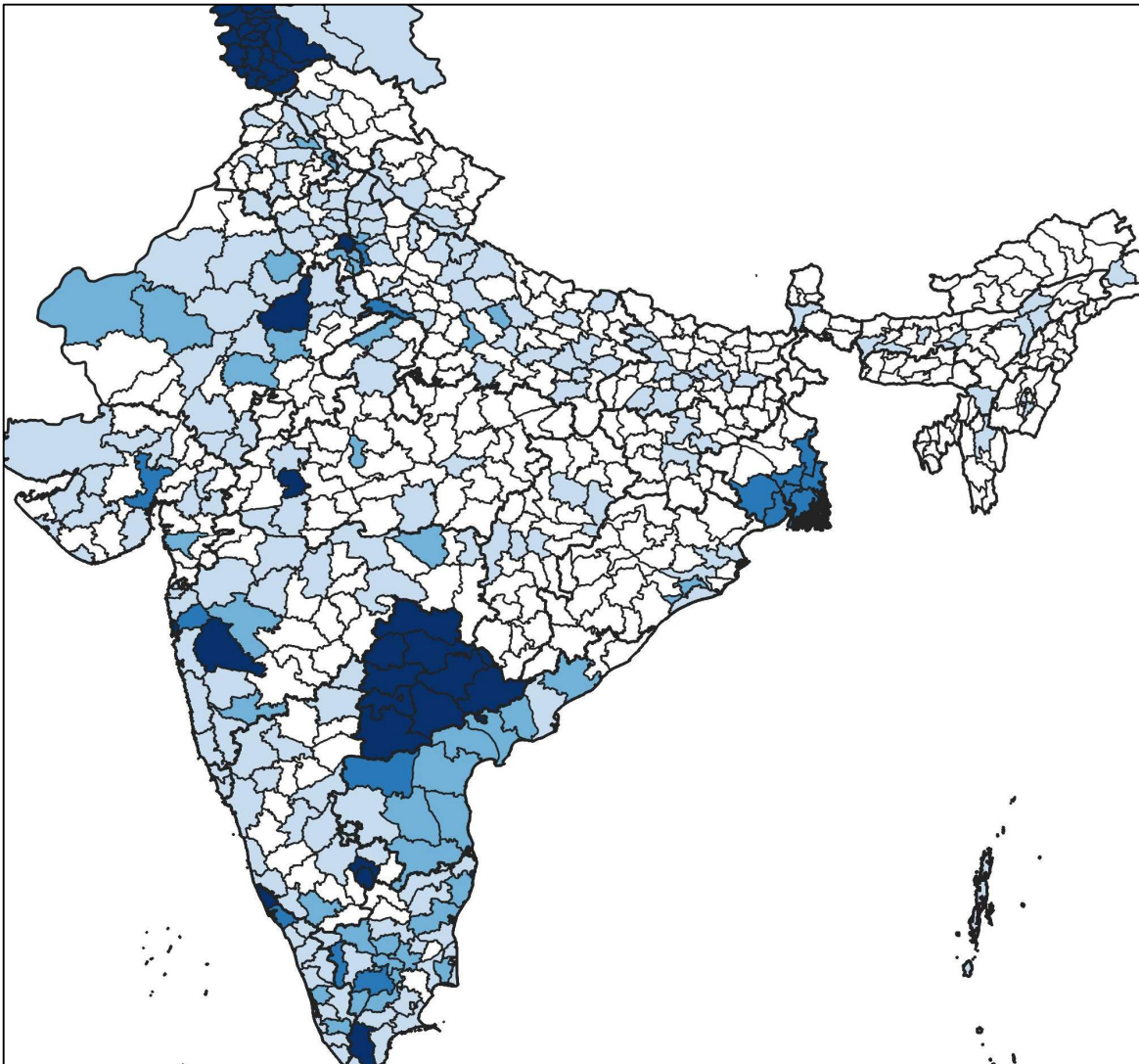
Table 4 categorizes all the affected districts into the above-mentioned categories. Note that the heavily-affected districts include the metro areas of Delhi, Mumbai, Indore, Jaipur, Chennai, and Pune; most of the districts of Jammu and Kashmir and Telangana are also heavily-affected by Covid-19 by our measure. The twenty significantly-affected districts include Agra, Ahmedabad, Bangalore, Coimbatore, and Thane. There are 42 other districts that were moderately-affected, and 188 other districts that were mildly-affected. These four categories of districts are depicted in Figure 4 overleaf.

How is the temporal and spatial spread of Covid-19 evolving in India? Much faster and more haphazardly than before. Our sense is that three factors – the *N*-transmissions, secondary and tertiary transmissions arising from the original *N*-transmissions, and transmissions induced by the significant movement of migrant workers across India that was induced by the 21-day lock-down announcement, have played important roles in the nature and speed of Covid-propagation in the recent past. [Currently, we neither have the necessary detailed data, nor the time to conduct

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Figure 4   The four categories of affected districts

☐ := mildly; ☐ := moderately; ☐ := significantly, ■ := highly

rigorous econometric analysis, to test our hypotheses. In fact, we are badly falling behind in our basic analysis, as incoming primary data is becoming harder and harder to sort and interpret in meaningful ways. We fear that we will soon be overwhelmed in our attempts to make sense of the incoming data. If that does happen, we will still make every effort to record the incoming data in tabular form – as we have been doing in Tables 1 through 4 – so that we preserve the ability to do some *ex post* analysis – if the *post* ever happens to become *ex*!].

In concluding this brief report, we want to mention the following issues.

[1] While we have categorized the affected districts primarily on the basis of the stock of cases (s) as recorded on April 5 mid-night, we have also looked at district-level data on the total number of people who had contact-transmission (c) from primary carriers (predominantly Indians returning from disease-burdened foreign countries), as well the average increase (i) in the number of infected

people in every 24-hour period over the past week. As it turns out, the correlation between *s* and *c* and the correlation between *s* and *i* are both very high – greater than 0.9. Thus, our categorizations seem to be reasonably robust. Further, we also determined the average values of *s*, *c*, and *i* for the different penetration categories that we have defined:

Categories of affected districts	Average value of *s*	Average value of *c*	Average value of *i*
heavily-affected	210	176	22
significantly-affected	52	41	5
moderately-affected	21	17	2
mildly-affected	4	3	0.4

[2] The above information again highlights the persisting unevenness in the spatial spread of Covid-19; the table clearly shows that in terms of the variables *s*, *c*, and *i*, the country's disease-load is quite skewed towards the more-affected districts. The unevenness in disease spread across India is also evident from the fact that Jammu and Kashmir, Telangana, and an additional 16% of all the districts in the rest of India contained 86% of all Covid cases in the country at mid-night on April 5th.

[3] Having said that, we feel that the narrative of the precise nature of disease spread *via* different district clusters certainly needs to be updated. Indian health experts and the government are now focusing on "hot-spots" of disease transmission that are areas much smaller than districts (and even towns). Whether the new disease spread can be contained in these hot-spots or (God forbid!) will spread across hot-spots and thus "link them up" remains to be seen.

Table 4

STATE / Affected District	Increase in total cases	Increase in transmitted cases	Stock of Total Cases	Stock of Transmit Cases	Average 24 hr increase	District penetration category	*T*(4)	Change in *T* [*T*(4)–*T*(3)]
ANDAMAN NICOBAR								
N & M Andaman	0	0	1	0	0.00	Mild	0.00	0.00
South Andaman	0	0	9	8	0.14	Mild	0.89	0.00
ANDHRA PRADESH								
Anantpur	1	1	3	3	0.39	Mild	1.00	0.00
Chittoor	8	8	17	16	2.21	Moderate	0.94	0.05
East Godavari	2	2	11	9	1.47	Mild	0.82	0.04
Guntur	6	6	26	25	3.19	Moderate	0.96	0.01
Krishna	9	9	31	27	3.96	Moderate	0.87	0.05
Kurnool	52	52	54	53	5.89	Significant	0.98	0.48
Prakasam	4	4	24	23	3.06	Moderate	0.96	0.01
SPS Nellore	10	10	31	30	4.43	Moderate	0.97	0.02
Visakhapatnam	4	4	16	14	1.59	Moderate	0.88	0.04
West Godavari	0	0	15	15	2.50	Moderate	1.00	0.00

STATE / Affected District	Increase in total cases	Increase in transmitted cases	Stock of Total Cases	Stock of Transmit Cases	Average 24 hr increase	District penetration category	T(4)	Change in T [T(4)–T(3)]
YSR	5	5	23	23	3.55	Moderate	1.00	0.00
ARUNACHAL								
Lohit	0	0	1	1	0.17	Mild	1.00	
ASSAM								
Cachar	0	0	1	0	0.14	Mild	0.00	0.00
Goalpara	0	0	3	3	0.50	Mild	1.00	0.00
Golaghat	1	1	1	1	0.11	Mild	1.00	
Jorhat	0	0	8	8	1.33	Mild	1.00	0.00
Kamrup M	2	2	6	6	0.89	Mild	1.00	0.00
Lakhimpur	1	1	1	1	0.11	Mild	1.00	
Mancachar	1	1	1	1	0.11	Mild	1.00	
Morigaon	1	1	1	1	0.11	Mild	1.00	
Nalbari	3	3	3	3	0.33	Mild	1.00	
BIHAR								
Begusarai	0	0	1	1	0.17	Mild	1.00	0.00
Bhagalpur	1	0	7	6	0.67	Mild	0.86	-0.14
Gaya	1	0	5	3	0.75	Mild	0.60	-0.15
Gopalgunj	0	0	3	0	0.47	Mild	0.00	0.00
Munger	0	0	3	2	0.00	Mild	0.67	0.00
Nalanda	0	0	2	1	0.17	Mild	0.50	0.00
Patna	0	0	4	2	0.00	Mild	0.50	0.00
Saran	0	0	1	0	0.17	Mild	0.00	0.00
Siwan	1	0	6	0	0.67	Mild	0.00	0.00
CHANDIGARH								
Chandigarh	0	0	18	13	1.48	Moderate	0.72	0.00
CHATTISGARH								
Bilaspur	0	0	1	0	0.00	Mild	0.00	0.00
Durg	0	0	1	0	0.00	Mild	0.00	0.00
Korba	1	1	2	1	0.25	Mild	0.50	0.50
Raipur	0	0	5	1	0.14	Mild	0.20	0.00
Rajnandgaon	0	0	1	0	0.00	Mild	0.00	0.00
DELHI								
Delhi	210	210	503	488	61.87	High	0.97	0.02
GOA								
Goa	2	0	7	1	0.50	Mild	0.14	-0.06
GUJARAT								
Ahmedabad	22	21	53	43	4.17	Significant	0.81	0.10
Bhavnagar	6	6	13	13	1.53	Mild	1.00	0.00
Bhuj	1	1	1	1	0.11	Mild	1.00	

STATE / Affected District	Increase in total cases	Increase in transmitted cases	Stock of Total Cases	Stock of Transmit Cases	Average 24 hr increase	District penetration category	T(4)	Change in T [T(4)−T(3)]
Chhota Udaipur	1	1	1	1	0.11	Mild	1.00	
Gandhinagar	2	2	11	9	0.22	Mild	0.82	0.04
Gir Somnath	0	0	2	2	0.28	Mild	1.00	0.00
Jamnagar	1	1	1	1	0.11	Mild	1.00	
Kutch	0	0	1	0	0.00	Mild	0.00	0.00
Mehsana	0	0	1	0	0.00	Mild	0.00	0.00
Morbi	1	1	1	1	0.11	Mild	1.00	
Panchmahal	0	0	1	1	0.17	Mild	1.00	0.00
Patan	1	1	1	1	0.11	Mild	1.00	
Porbandar	0	0	3	3	0.47	Mild	1.00	0.00
Rajkot	0	0	9	6	0.14	Mild	0.67	0.00
Surat	4	4	15	13	1.33	Moderate	0.87	0.05
Vadodara	1	1	10	6	0.11	Mild	0.60	0.04
HARYANA								
Ambala	0	0	3	2	0.33	Mild	0.67	0.00
Bhiwani	2	2	2	2	0.22	Mild	1.00	
Faridabad	8	8	14	13	1.30	Moderate	0.93	0.10
Gurgaon	8	8	32	16	0.88	Moderate	0.50	0.17
Hissar	0	0	1	1	0.14	Mild	1.00	0.00
Kaithal	1	1	1	1	0.11	Mild	1.00	
Karnal	1	1	1	1	0.11	Mild	1.00	
Nuh	8	8	8	8	0.88	Mild	1.00	
Palwal	13	13	17	16	1.93	Moderate	0.94	0.19
Panchkula	0	0	2	2	0.14	Mild	1.00	0.00
Panipat	0	0	4	3	0.00	Mild	0.75	0.00
Rohtak	0	0	1	1	0.17	Mild	1.00	0.00
Sirsa	0	0	3	3	0.42	Mild	1.00	0.00
Sonipat	0	0	1	0	0.00	Mild	0.00	0.00
HIMACHAL								
Kangra	7	7	10	7	0.77	Mild	0.70	0.70
Una	0	0	3	3	0.50	Mild	1.00	0.00
JAMMU KASHMIR**								
Jammu & Kashmir	36	33	106	95	8.84	High	0.90	
JHARKHAND								
Bokaro	1	0	1	0	0.11	Mild	0.00	
Hazaribag	0	0	1	1	0.17	Mild	1.00	0.00
Ranchi	0	0	1	0	0.14	Mild	0.00	0.00
KARNATAKA								
Bagalkote	1	1	1	1	0.11	Mild	1.00	
Bangalore	7	3	54	16	1.83	Significant	0.30	0.02
Belagavi	4	4	4	4	0.44	Mild	1.00	
Bellary	2	2	6	6	0.81	Mild	1.00	0.00

STATE / Affected District	Increase in total cases	Increase in transmitted cases	Stock of Total Cases	Stock of Transmit Cases	Average 24 hr increase	District penetration category	T(4)	Change in T [T(4)–T(3)]
Bidar	0	0	10	10	1.67	Mild	1.00	0.00
Chikkaballapur	0	0	10	6	0.14	Mild	0.60	0.00
Chitradurga	0	0	1	0	0.00	Mild	0.00	0.00
Dakshina Kannada	2	2	10	3	0.53	Mild	0.30	0.18
Davanagere	0	0	2	1	0.00	Mild	0.50	0.00
Dharwad	0	0	1	0	0.00	Mild	0.00	0.00
Kalaburagi	0	0	5	4	0.31	Mild	0.80	0.00
Kodagu	0	0	1	0	0.00	Mild	0.00	0.00
Mysuru	7	7	28	26	2.78	Moderate	0.93	0.02
Tumakuru	0	0	2	1	0.14	Mild	0.50	0.00
Udupi	1	0	4	1	0.39	Mild	0.25	-0.08
Uttara Kannada	0	0	9	4	0.14	Mild	0.44	0.00
KERALA								
Alappuzha	1	1	3	1	0.11	Mild	0.33	0.33
Ernakulam	1	1	24	9	0.75	Moderate	0.38	0.03
Idukki	0	0	10	8	1.11	Mild	0.80	0.00
Kannur	3	3	51	16	3.63	Significant	0.31	0.04
Kasaragod	14	14	143	67	8.51	High	0.47	0.06
Kollam	1	1	6	4	0.58	Mild	0.67	0.07
Kottayam	0	0	3	3	0.00	Mild	1.00	0.00
Kozhikode	5	4	12	6	0.72	Mild	0.50	0.21
Malappuram	0	0	13	4	0.64	Mild	0.31	0.00
Palakkad	1	1	7	3	0.42	Mild	0.43	0.10
Pathanamthitta	1	1	14	8	0.28	Moderate	0.57	0.03
Thiruvananthapuram	0	0	13	6	0.92	Mild	0.46	0.00
Thrissur	1	1	12	9	0.89	Mild	0.75	0.02
Wayanad	0	0	3	2	0.28	Mild	0.67	0.00
LADAKH								
Kargil	1	1	3	2	0.11	Mild	0.67	0.17
Leh	0	0	11	7	0.00	Mild	0.64	0.00
MADHYA PRADESH								
Barwani	3	3	4	3	0.44	Mild	0.75	
Bhopal	10	10	21	19	2.32	Moderate	0.90	0.00
Chindwara	2	2	4	3	0.50	Mild	0.75	
Gwalior	0	0	3	1	0.25	Mild	0.33	-0.17
Indore	26	26	118	100	13.26	High	0.85	-0.14
Jabalpur	0	0	9	2	0.11	Mild	0.22	-0.03
Khargone	4	4	6	5	0.72	Mild	0.83	-0.17
Morena	15	15	18	17	2.09	Moderate	0.94	-0.06
Shivpuri	0	0	3	0	0.11	Mild	0.00	0.00
Ujjain	0	0	7	5	0.42	Mild	0.71	-0.12
MAHARASHTRA								
Ahmednagar	4	4	25	22	3.36	Moderate	0.88	-0.02

STATE / Affected District	Increase in total cases	Increase in transmitted cases	Stock of Total Cases	Stock of Transmit Cases	Average 24 hr increase	District penetration category	T(4)	Change in T [T(4)–T(3)]
Amravati	1	1	2	1	0.22	Mild	0.50	
Aurangabad	2	2	4	2	0.33	Mild	0.50	0.50
Buldana	0	0	7	6	1.00	Mild	0.86	-0.14
Gondia	0	0	2	0	0.11	Mild	0.00	0.00
Jalgaon	0	0	2	0	0.11	Mild	0.00	0.00
Kolhapur	0	0	3	1	0.25	Mild	0.33	-0.17
Mumbai	152	152	401	366	41.87	High	0.91	0.03
Nagpur	0	0	17	14	0.67	Moderate	0.82	-0.05
Nasik	0	0	2	1	0.25	Mild	0.50	-0.50
Palghar	0	0	3	2	0.11	Mild	0.67	-0.33
Pune	24	24	87	71	6.60	High	0.82	0.06
Raigad	0	0	2	0	0.11	Mild	0.00	0.00
Ratnagiri	0	0	2	0	0.11	Mild	0.00	0.00
Sangli	0	0	26	21	0.11	Moderate	0.81	-0.03
Satara	0	0	3	1	0.11	Mild	0.33	-0.17
Sindhudurg	0	0	2	1	0.11	Mild	0.50	-0.50
Thane	20	20	63	60	6.08	Significant	0.95	0.00
Yavatmal	0	0	5	0	0.11	Mild	0.00	0.00
MANIPUR								
Imphal West	0	0	1	0	0.00	Mild	0.00	0.00
Thoubal	0	0	1	1	0.17	Mild	1.00	0.00
MIZORAM								
Aizawl	0	0	1	0	0.00	Mild	0.00	0.00
ODISHA								
Bhadrak	2	2	3	2	0.36	Mild	0.67	0.67
Bhubaneshwar	28	27	28	27	3.08	Moderate	0.96	
Cuttack	2	1	2	1	0.22	Mild	0.50	
Jajapur	1	1	1	1	0.11	Mild	1.00	
Khordha	4	4	8	6	0.61	Mild	0.75	0.25
Puri	1	1	1	1	0.11	Mild	1.00	
PUDUCHERRY								
Puducherry	0	0	3	2	0.33	Mild	0.67	0.00
PUNJAB								
Amritsar	6	6	8	6	0.66	Mild	0.75	0.75
Barnala	1	1	1	1	0.11	Mild	1.00	
Faridkot	1	1	1	1	0.11	Mild	1.00	
Hoshiarpur	0	0	7	7	0.17	Mild	1.00	0.00
Jalandhar	1	1	6	5	0.11	Mild	0.83	0.03
Ludhiana	2	2	4	3	0.39	Mild	0.75	0.25
Mansa	3	3	3	3	0.33	Mild	1.00	
Pathankot	1	1	1	1	0.11	Mild	1.00	
Rupnagar	1	1	1	1	0.11	Mild	1.00	

STATE / Affected District	Increase in total cases	Increase in transmitted cases	Stock of Total Cases	Stock of Transmit Cases	Average 24 hr increase	District penetration category	T(4)	Change in T [T(4)–T(3)]
Ajit Singh Nagar	4	4	14	12	1.08	Moderate	0.86	0.06
Bhagat Singh Nagar	0	0	19	16	0.00	Moderate	0.84	0.00
RAJASTHAN								
Ajmer	0	0	5	4	0.56	Mild	0.80	0.00
Alwar	3	3	4	3	0.47	Mild	0.75	0.75
Banswara	2	2	2	2	0.22	Mild	1.00	
Bharatpur	4	4	5	5	0.61	Mild	1.00	
Bhilwara	1	1	27	27	0.25	Moderate	1.00	0.00
Bikaner	10	10	10	10	1.10	Mild	1.00	
Churu	2	2	10	10	1.39	Mild	1.00	0.00
Dausa	3	3	3	3	0.33	Mild	1.00	1.00
Dungarpur	0	0	3	3	0.14	Mild	1.00	0.00
Jaipur	55	53	102	88	11.58	High	0.86	0.01
Jaisalmer	4	1	14	1	1.84	Moderate	0.07	0.07
Jhunjhunu	8	7	17	10	1.19	Moderate	0.59	0.25
Jodhpur	13	1	32	7	3.38	Moderate	0.22	-0.10
Nagaur	1	1	1	1	0.11	Mild	1.00	
Pali	1	1	2	2	0.11	Mild	1.00	0.00
Pratapgarh	0	0	2	2	0.00	Mild	1.00	0.00
Sikar	0	0	1	1	0.00	Mild	1.00	0.00
Tonk	13	13	17	17	2.10	Moderate	1.00	0.00
Udaipur	3	3	3	3	0.33	Mild	1.00	
TAMIL NADU								
Nilgiris	4	4	4	4	0.44	Mild	1.00	
Chengalpattu	3	3	17	17	2.66	Moderate	1.00	0.00
Chennai	49	48	99	87	10.29	High	0.88	0.10
Coimbatore	29	29	62	61	8.42	Significant	0.98	0.01
Cuddalore	10	10	10	10	1.10	Mild	1.00	
Dindigul	28	28	45	45	5.91	Significant	1.00	0.00
Erode	0	0	27	25	3.29	Moderate	0.93	0.00
Kallakurich	2	2	2	2	0.22	Mild	1.00	
Kanchipuram	2	2	5	4	0.55	Mild	0.80	0.13
Kanyakumari	1	1	6	6	0.81	Mild	1.00	0.00
Karur	5	5	22	21	3.36	Moderate	0.95	0.01
Madurai	4	4	19	18	2.36	Moderate	0.95	0.01
Nagapatinam	11	11	11	11	1.21	Mild	1.00	
Namakkal	7	7	25	25	3.29	Moderate	1.00	0.00
Perambalur	1	1	1	1	0.11	Mild	1.00	
Ramnathpuram	0	0	2	2	0.33	Mild	1.00	0.00
Ranipet	20	20	24	24	2.87	Moderate	1.00	0.00
Salem	6	6	12	8	0.66	Mild	0.67	0.33
Sivaganga	0	0	5	5	0.83	Mild	1.00	0.00
Thanjavur	4	4	5	4	0.44	Mild	0.80	0.80
Theni	4	4	24	24	3.77	Moderate	1.00	0.00
Thirupattur	0	0	10	10	1.67	Mild	1.00	0.00

STATE / Affected District	Increase in total cases	Increase in transmitted cases	Stock of Total Cases	Stock of Transmit Cases	Average 24 hr increase	District penetration category	T(4)	Change in T [T(4)−T(3)]
Thiruvallur	11	11	12	12	1.38	Mild	1.00	0.00
Thiruvannamalai	0	0	2	2	0.31	Mild	1.00	0.00
Thiruvarur	7	7	14	14	1.94	Moderate	1.00	0.00
Thoothukkudi	6	6	11	11	1.47	Mild	1.00	0.00
Tiruchirappalli	17	17	18	17	1.87	Moderate	0.94	0.94
Tirunelveli	8	8	38	37	5.13	Significant	0.97	0.01
Tirupur	2	2	3	2	0.22	Mild	0.67	0.67
Vellore	4	4	6	4	0.44	Mild	0.67	0.67
Viluppuram	16	16	19	19	2.18	Moderate	1.00	0.00
Virudhunagar	1	1	11	11	1.61	Mild	1.00	0.00
TELANGANA**								
Telangana	179	104	328	217	32.69	High	0.66	
UTTAR PRADESH								
Agra	30	30	45	45	4.13	Significant	1.00	0.00
Auraya	1	1	1	1	0.11	Mild	1.00	
Azamgarh	3	3	3	3	0.33	Mild	1.00	
Bagpat	1	1	2	1	0.11	Mild	0.50	0.50
Banda	2	2	2	2	0.22	Mild	1.00	
Barabanki	1	1	1	1	0.11	Mild	1.00	
Barelli	0	0	6	5	0.84	Mild	0.83	0.00
Basti	2	2	6	6	0.89	Mild	1.00	0.00
Bulandshahar	0	0	2	2	0.33	Mild	1.00	0.00
Firozabad	4	4	4	4	0.44	Mild	1.00	
Gautam Buddh Nagar	10	10	52	46	3.55	Significant	0.88	0.03
Ghaziabad	14	14	20	18	1.71	Moderate	0.90	0.23
Ghazipur	5	5	5	5	0.55	Mild	1.00	
Hapur	3	3	3	3	0.33	Mild	1.00	
Hardoi	1	1	1	1	0.11	Mild	1.00	
Hathras	4	4	4	4	0.44	Mild	1.00	
Jaunpur	0	0	3	2	0.33	Mild	0.67	0.00
Kanpur Nagar	14	14	15	14	1.54	Moderate	0.93	0.93
Lakhimpur Kheri	3	3	4	4	0.33	Mild	1.00	0.00
Lucknow	7	7	16	12	0.94	Moderate	0.75	0.19
Maharajgunj	6	6	6	6	0.66	Mild	1.00	
Meerut	5	5	11	10	0.72	Mild	0.91	0.08
Mirzapur	2	2	2	2	0.22	Mild	1.00	
Moradabad	0	0	1	0	0.00	Mild	0.00	0.00
Muzaffarnagar	0	0	2	2	0.00	Mild	1.00	0.00
Pilibhit	0	0	2	1	0.00	Mild	0.50	0.00
Pratapgarh	3	3	3	3	0.33	Mild	1.00	
Rai Barelli	2	2	2	2	0.22	Mild	1.00	
saharanpur	13	13	13	13	1.43	Mild	1.00	
Shajhanapur	1	1	1	1	0.11	Mild	1.00	
Shamli	8	8	8	8	0.88	Mild	1.00	
Varanasi	5	5	7	6	0.55	Mild	0.86	0.36

STATE / Affected District	Increase in total cases	Increase in transmitted cases	Stock of Total Cases	Stock of Transmit Cases	Average 24 hr increase	District penetration category	$T(4)$	Change in T $[T(4)-T(3)]$
UTTARAKHAND								
Dehradun	8	8	12	9	1.02	Mild	0.75	0.50
Haridwar	1	1	1	1	0.11	Mild	1.00	
Naini Tal	6	6	6	6	0.66	Mild	1.00	
Pauri Garhwal	0	0	2	0	0.00	Mild	0.00	0.00
Udham Singh Nagar	1	1	4	4	0.61	Mild	1.00	0.00
WEST BENGAL[0]								
North Bengal [0]	0	0	11	10	1.4	Mild	0.90	
South Bengal [0]	0	0	50	38	4.62	Significant	0.76	

** In the current round, we do not have district level data for Jammu and Kashmir and Telangana, and are thus forced to report aggregate numbers. [0] Data for the different districts of West Bengal are also sketchy; so we have reported aggregates for Darjeeling and Kalimpong (North Bengal), and for Kolkata, the north and South 24 Parganas, Purba and Paschim Medinipur, Howrah, Hoogly, and Nadia (South Bengal).