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Analysing the impact of
the joint intervention of
Pune Municipal Corporation (PMC) and
Bharatiya Jain Sanghatana (BJS)
in the fight against
COVID-19 in Pune City –

Mobile Dispensary SEVA (MDS)

Analysing the impact of the joint intervention of Pune Municipal Corporation (PMC) and Bharatiya Jain Sanghatana (BJS) in the fight against COVID-19 in Pune City – **Mobile Dispensary SEVA (MDS)**

Summary: This report looks at the health intervention data from MDS to assess the extent of the impact that extensive screening and testing has had on the control of COVID-19 in Pune. It analyses data on the screenings, suspected, and positive cases detected by MDS to look at the effect of their targeted interventions. Within this, it specifically looks at the effects of casting a wider testing net, early detection of cases, and the effect of this on the deaths due to COVID.

1. Background

India touched 4.4 lakh COVID-19 case on 23rd June 2020. Pune city had the 6th highest number with 12,686 cases, 4,496 active cases, and 518 deaths.
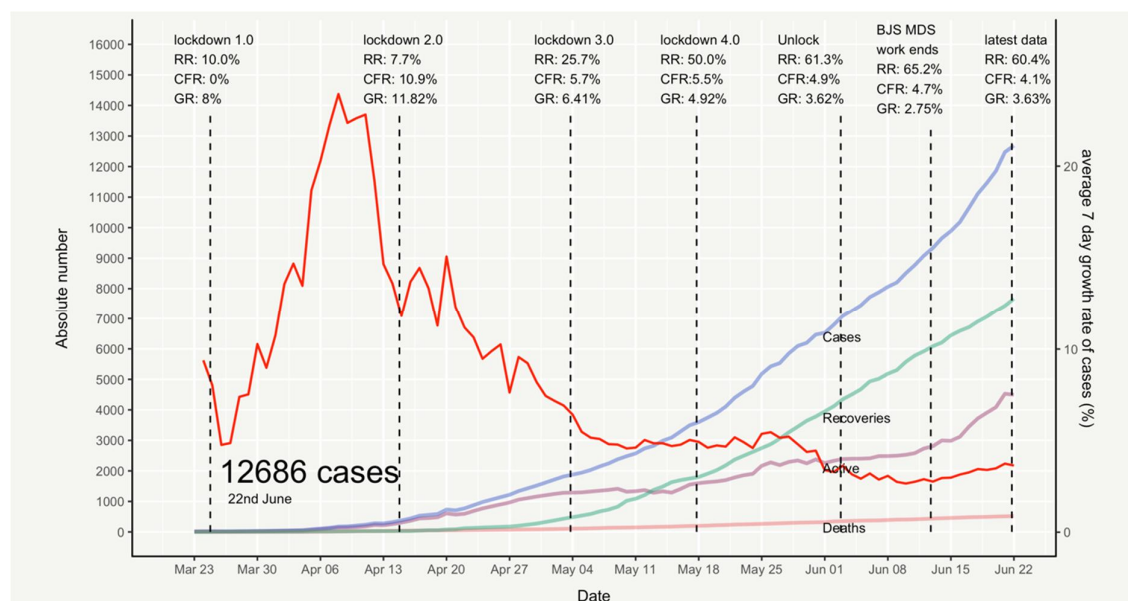
The huge impact that the pandemic has had on the health and economy is evidently clear and becoming increasingly severe. To save lives and recover economically, it is crucial to get the spread of cases under control. Governments around the world have been working on this extensively. Experience from around the world has shown that best-practice COVID response needs a multi-pronged strategy that includes intensive screening, testing, isolation and contact tracing.

The World Health Organization (WHO) recommends that health systems need to be able to "detect, test, isolate and treat every case and trace every contact" in order to get disease transmission under control.[i] WHO also observes that the 'hotspots' specifically need to be managed. In Indian cities, slum settlements with a large density and poor WASH infrastructure have emerged as the major hotspots. Kerala had handled its first phase through an arduous, but time tested method of extensive screening, isolation, testing and contact tracing.[ii]

CPC Analytics through this report aims to understand the intervention of grassroots pandemic response teams that focus on the process and maximizes the coverage of the screening net. It aims to understand if this helps control the spread of disease and if early detection prevents avoidable deaths.

Figure 1: Number of active cases, cured and deaths in Pune city as of 22nd June (total of 12,686 cases)- Source: PMC[1]

12,686 cases consist of 4,496 active cases, 7,672 recoveries/discharged and 518 deaths. **Red line** shows the 7-day average growth rate of cases. In the figure below, RR refers to the recovery rate, CFR refers to the case fatality rate and GR refers to the 7-day growth rate. The vertical lines show various phases of the lockdown and the end of MDS work in Pune (13th June).

Source: Pune Mayor Twitter Handle

Date	Cases in PMC- Source PMC				
	Total cases	Active	Recovered	Deaths	7 day Growth rate of cases
25th March- lockdown 1.0	20	18	2	0	8%
15th April- Lockdown 2.0	377	307	29	41	11.82%
4th May- Lockdown 3.0	1,878	1,288	483	107	6.41%
18th May- Lockdown 4.0	3,598	1,599	1,800	199	4.92%
3rd June- Unlock 1.0	7,089	2,389	4,348	352	3.62%
13th June- End of BJS MDS work	9,336	6,087	2,810	439	2.75%
22nd June	12,686	4,496	7,672	518	3.63%

[1] Twitter Handle of Pune Mayor Murlidhar Mohol- https://twitter.com/mohol_murlidhar
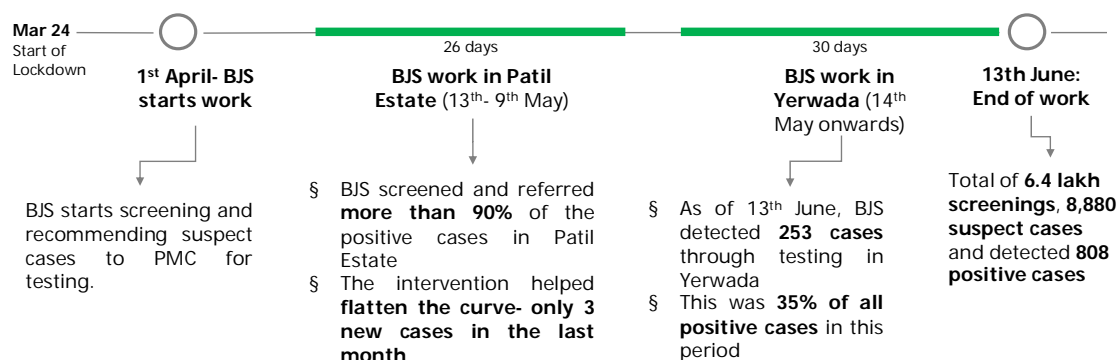
Methodology

To understand the impact of MDS interventions, we looked at data on testing, screening, detection of positive cases.

The central questions were to understand-

- What is the impact of early and aggressive screening, followed by testing and isolation on the number and spread of cases?
- What is the impact of these methods especially in hotspot areas such as slum settlements?
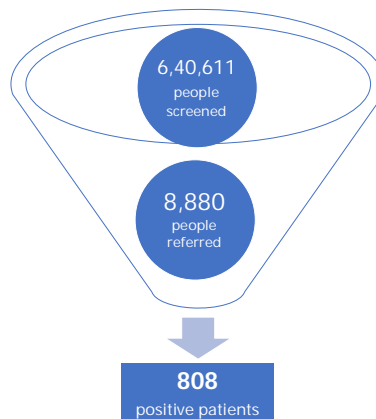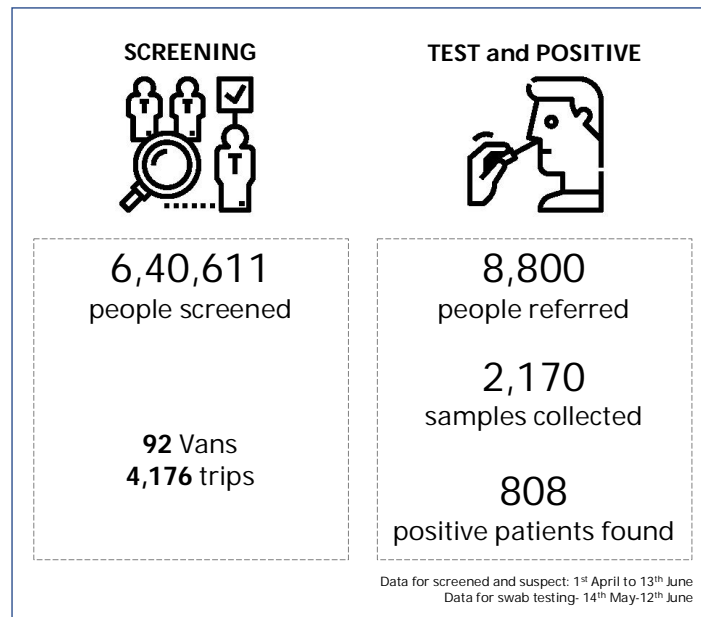- What is the age distribution of positive and deceased patients with early screening and testing ?

2. Overview of PMC-BJS initiative in Pune city

Timeline of events

Mar 24 Start of Lockdown	**1st April- BJS starts work**	26 days **BJS work in Patil Estate** (13th- 9th May)	30 days **BJS work in Yerwada** (14th May onwards)	**13th June: End of work**
	BJS starts screening and recommending suspect cases to PMC for testing.	§ BJS screened and referred **more than 90%** of the positive cases in Patil Estate § The intervention helped **flatten the curve- only 3 new cases in the last month**	§ As of 13th June, BJS detected **253 cases** through testing in Yerwada § This was **35% of all positive cases** in this period	Total of **6.4 lakh screenings, 8,880 suspect cases** and detected **808 positive cases**

On 1st April, MDS started screening in Pune City using the Mobile Dispensary Seva (MDS) Vans. Through the vans, they screened 6,40,611 people, found 8,880 suspect cases, out of which 483 people were found positive. Additionally, they conducted 2,170 swab tests through which 325 positive cases were found. **In total, MDS found 808 positive cases in Pune**. Their intervention targeted hotspots in the cities and areas with large number of cases.
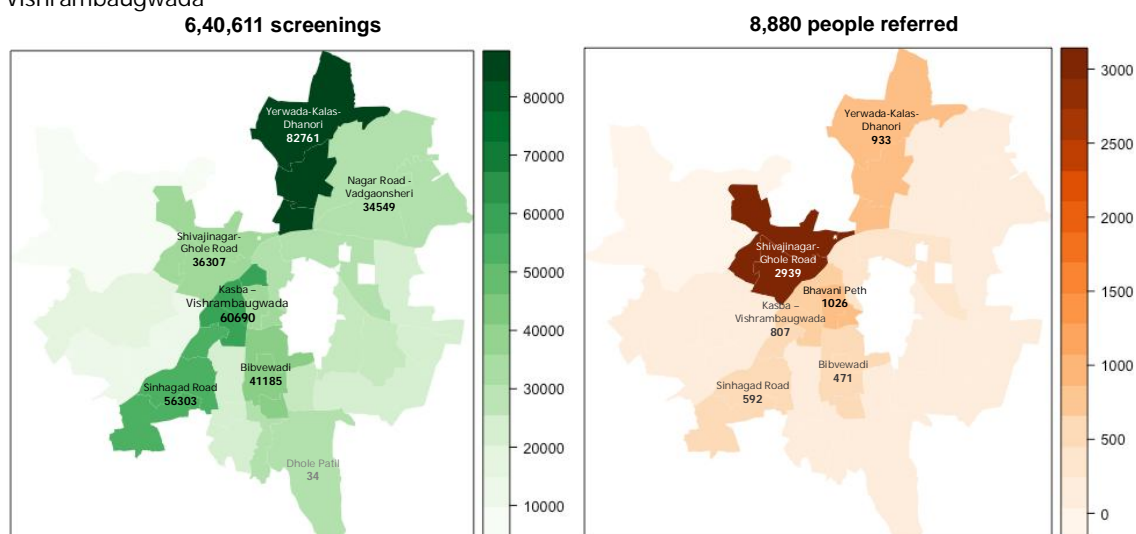
Summary of work done by BJS

SCREENING	TEST and POSITIVE
6,40,611 people screened	**8,800** people referred
	2,170 samples collected
92 Vans **4,176** trips	**808** positive patients found

Data for screened and suspect: 1st April to 13th June
Data for swab testing- 14th May-12th June

- 6,40,611 people screened
- 8,880 people referred
- **808** positive patients

Geographical spread of MDS interventions

Figure 2: Ward wise number of screening, referred patients, positive and swab tests conducted by MDS (As of 13th June 2020)
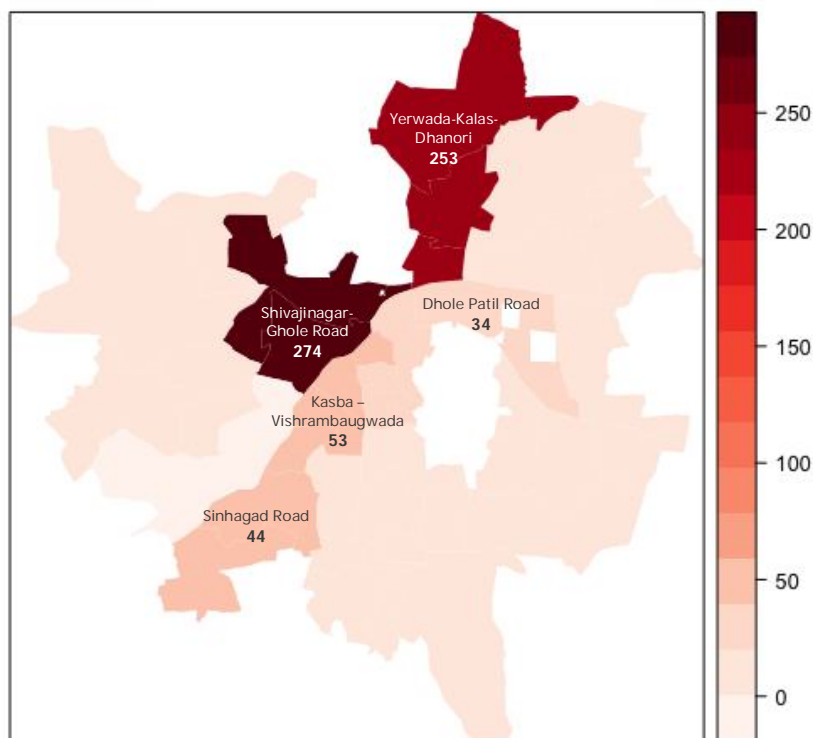
Map 2.1. shows the total number of screenings done ward wise by MDS. Maximum screenings were done in Yerwada-Kalas Dhanori, followed by Kasba Vishrambaugwada and Sinhagad road

Map 2.2. shows the total number of referrals for testing made in each ward by MDS. Maximum suspect cases were found in Shivajinagar-Ghole Road, followed by Bhavani Peth and Kasba Vishrambaugwada

Map 2.3. shows the total number of patients who were detected as COVID positive. Maximum positive cases were found in Shivajinagar-Ghole Road (274), followed by Yerwada-Kalas-Dhanori (253) and Kasba Vishrambaugwada

3. Impact of BJS Mobile Dispensary Seva Vans

Mobile Dispensary Seva (MDS) Vans were deployed in Pune to do extensive door-to-door screenings and find positive cases in communities. MDS vans screened people and referred suspect cases to the PMC for isolation and testing. Through this, cases could be found and isolated in early stages and help prevent community transmission.

To understand the proportion of all the MDS work in Pune done by BJS, the data of 8th June was considered[2]. As of 8th June, in the whole of Pune city, 6.92 lakh people were screened, 9,092 people referred, out of which 484 were found to be COVID positive. Out of this, BJS was responsible for screening 6.25 lakh people and referring 8300 people.
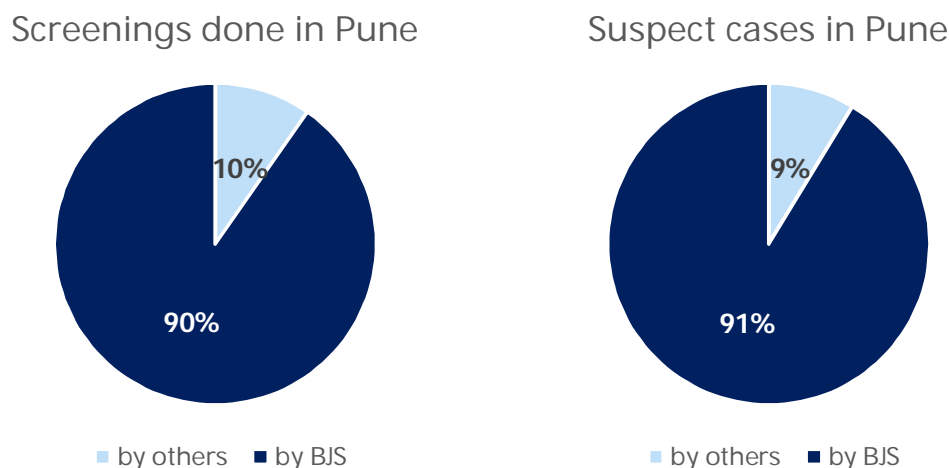
Thus, through MDS vans, BJS did 90.3% of the screenings and referred 91.2% of the suspect cases.

Image below is from PMC COVID-19 Response War Room dashboard report of 9th June 2020 (data in the report was till 8th June)

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[2] 8th June was selected because PMC war room dashboard data that showed the city wide data for Pune was available for 8th June. All BJS figures were also taken till 8th June for enabling comparision

Figure 3: MDS data- percentage of screenings, suspect referrals and positives found by BJS

Screenings done in Pune

Suspect cases in Pune

Parameter	i. By BJS MDS (8th June)	ii. By Others through MDS (8th June)	Total in PMC (i+ii) (8th June)
Screenings	6.25 lakh	67,000	6.92 lakh
Number of suspect cases	8,300	792	9,092

This was done with the joint effort of BJS, PMC and the PCB (Pune Cantonment Board) and KCB. Out of 2,938 doctor trips in Pune city, 2116 had doctors sponsored by BJS (71.3%), 714 by PMC (24.5%) and 103 by PCB (3.4%).

4. Impact of early and extensive screening

Early and aggressive screening, followed by testing and isolation plays a vital role in limiting the number of cases and the spread of the virus. If early detection does not happen, the infected person could spread the disease more and it could increase the chance of death due to late treatment[3]. Whether the intervention by MDS was effective or not in "breaking the chain" can be understood by tracking the number of cases in a selected location.

To analyse this, cases in wards with maximum positive cases was considered (see Figure 2)- Shivajinagar-Ghole Road was selected because they had 2,939 referrals out of which 274

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[3] Data from Mumbai tells that **60% of people who die, die within 4 days of being diagnosed or identified**, because lack of oxygen has already affected for enough time to affect organs. People detected early have a much higher chance of recovery
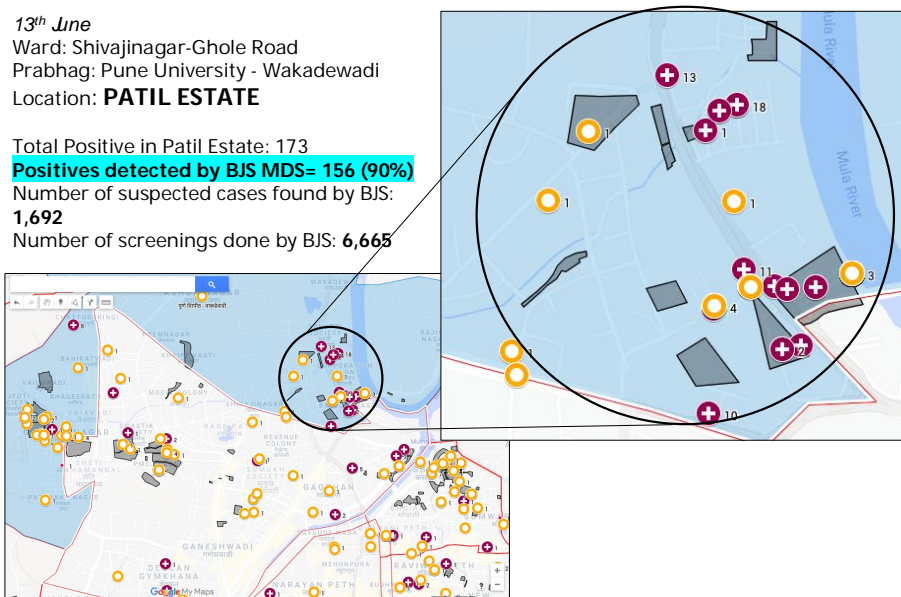
were positive). Within this, the case study of Patil Estate was selected for three reasons- (i). The large number of screenings done and positives found by MDS in this location[4] (ii). It had the maximum cases at the beginning of the analysis[5] (iii). It has slum settlements where the control of the disease is tough

BJS MDV worked in Patil Estate from 13th April to 9th May. Figure 3 shows the spread of cases within Patil Estate. As can be observed in the map, several of the cases were detected in gullys and lanes of the slum settlements which have highly congested living conditions and poor access to WASH infrastructure.

Figure 4: Analysis of interventions in Patil Estate
Map shows Patil Estate and cases in that area
Grey polygons show **slums**, red points show the location of positive cases, yellow points show suspect cases

13th June
Ward: Shivajinagar-Ghole Road
Prabhag: Pune University - Wakadewadi
Location: **PATIL ESTATE**

Total Positive in Patil Estate: 173
Positives detected by BJS MDS= 156 (90%)
Number of suspected cases found by BJS: **1,692**
Number of screenings done by BJS: **6,665**
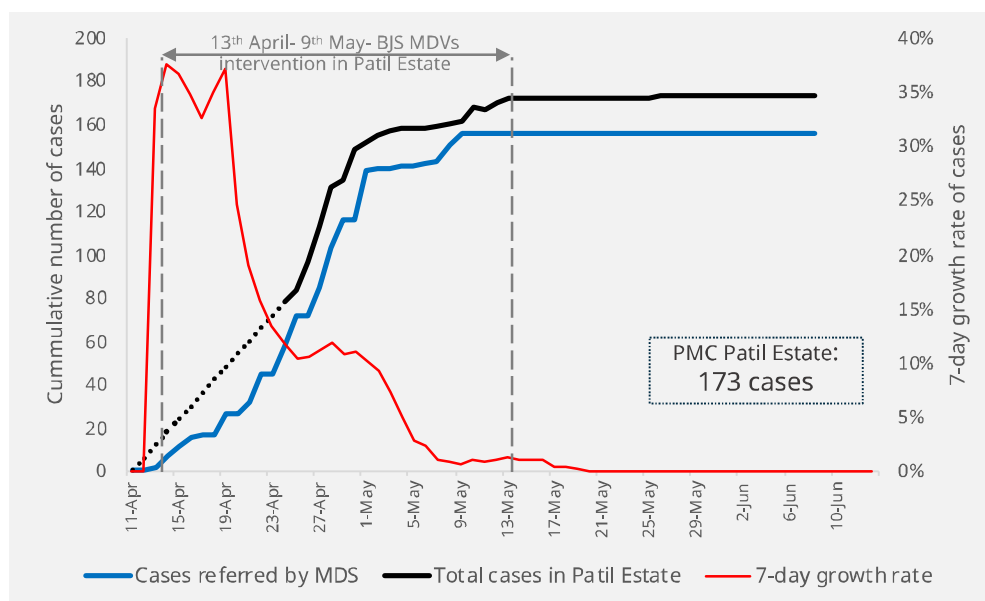
Source for slum shapefiles: Mundhe, N, 2019.
Figure 5 (below) shows that 90% of positive cases detected in Patil Estate were found by BJS MDS. They helped drastic reduction in growth rate from 37% to nearly 0%.

Figure 5: Observing the trend of cases in Patil Estate
Black line shows the total number of cases in Patil estate, **Blue line** shows the total number of patients referred by BJS MDS who were detected as COVID positive | **Red Line** shows the seven day average growth rate of cases | Graph shows that patients screened and referred by BJS MDS formed more than 90% of the total positive cases from Patil Estate | Graph also shows that the number of cases in flattened after 9th May

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[4] BJS did a total of 6665 screenings, found 1692 suspects and detected 156 out of the 173 (90%) of the positives in the locality
[5] At one point, Patil Estate had 63.2% of the cases in Shivajinagar-Ghole Road ward [on 25th April, the ward had 133 cases out of which 84 was from Patil Estate. 25th April is selected because it is the earliest observation available for Patil Estate]

Source for PMC data on Patil Estate: Twitter handle @SidShirole[6]
Data for Patil Estate was not available from 11th Apr to 23rd Apr- average values were taken (dotted line)

Date	Positive cases in Patil Estate as per PMC data	Positive cases found by BJS MDS in Patil Estate	% of positive cases found by MDS	Average 7-dat growth rate
25-Apr	84	72	86%	11%
1-May	152	139	91%	10%
7-May	159	143	90%	1%
14-May	172	156	91%	1%
21-May	172	156	91%	0%
28-May	173	156	90%	0%
4-Jun	173	156	90%	0%
9-Jun	173	156	90%	0%
13-Jun	173	156	90%	0%

Findings

At the beginning of the pandemic, Patil Estate was one of the biggest and fast-growing hotspots for COVID in Pune, contributing to over 62% of the ward's cases. Figure 4 shows that new cases started reducing from the first week of May, average growth rate of cases **reduced from 37% to ~0%**, and Patil Estate **flattened the curve**. In the **last one month (between 13th May and 13th June), only 1 new case was detected.** The intervention was hence been extremely effective in **breaking the chain and limiting the spread of COVID.**

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[6] Data for 25th April- https://twitter.com/SidShirole/status/1253985606365036554
Data for 13th June- https://twitter.com/SidShirole/status/1271828412248686592

The intervention by BJS MDS helped flatten the curve in an area that had many cases and slum settlements. The extensive screening and referral method helped early detection, isolation and breaking the chain.

5. Assessing testing data in Yerwada

Till 13th June, 8,880 people were referred as suspect patients after screening, and 808 people tested positive through MDS. Figure 2 shows that a large number of positive cases detected by BJS 253 cases were found in Yerwada-Kalas Dhanori ward.

As per PMC data[7], Yerwada ward has the **second highest number of cases in Pune** and within it, Yerwada prabhag has the second highest cases[8]. Hence, Yerwada ward was chosen for analysis.

BJS did extensive work in Yerwada between 14th May and 13th June. Figure 5 shows the distribution of cases (red points) within Yerwada prabhag. As can be observed in the map (Figure 6), most of the testing was done in the slum settlements in the prabhag (grey polygons are slum settlements)
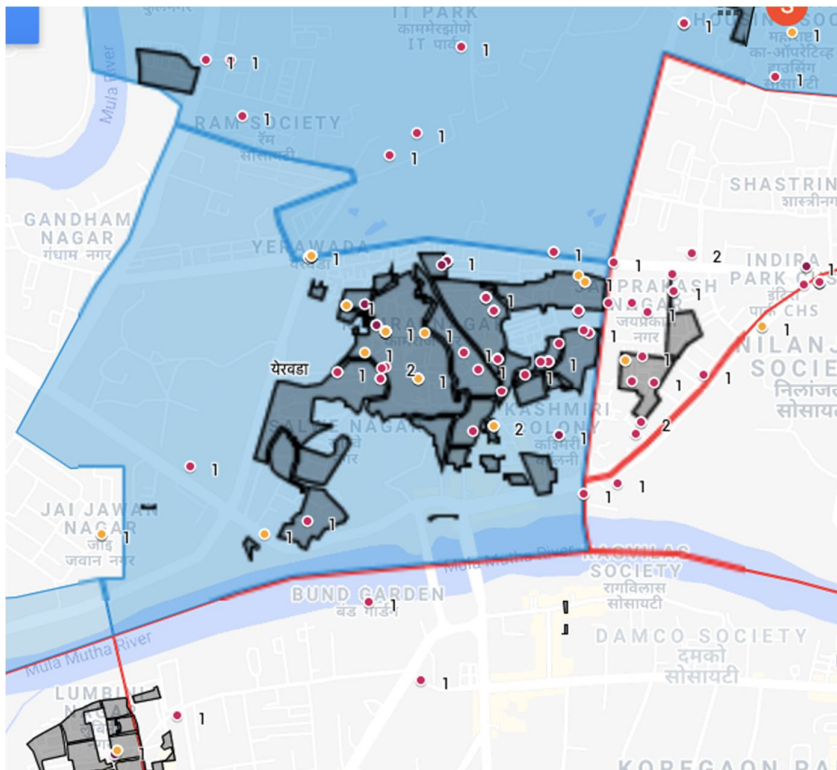
Figure 6: Analysis of positive cases in Yerwada
Map shows spread of suspect and positive cases in Yerwada
Grey polygons show **slums**, red points show the location of positive cases, yellow points show suspect cases

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[7] Twitter Handle of Pune Mayor - https://twitter.com/mohol_murlidhar
[8] 13th June source PMC: Yerwada ward had 1075 cases (second only to Dhole Patil Road- 1706 cases). Yerwada prabhag had 834 cases (second only to Tadiwala Road - Sassoon Hospital prabhag- 1168 cases)
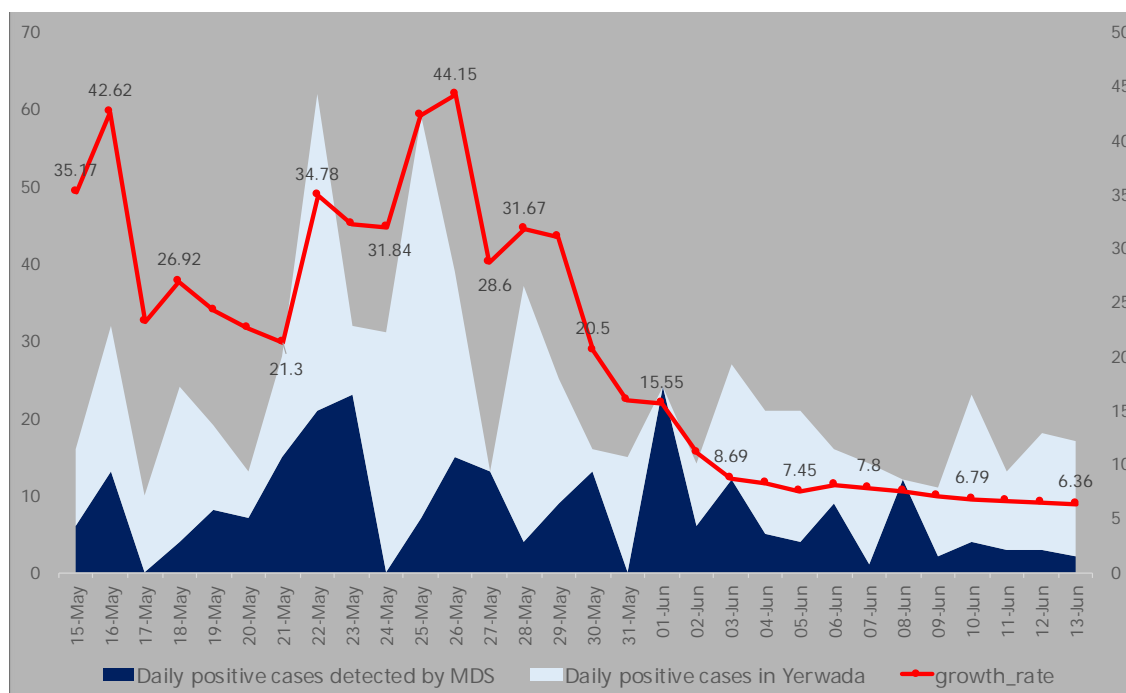
Source for slum shapefiles: Mundhe, N, 2019.

Further analysing the daily new cases detected in the ward, it can be observed that **35% of the positive cases** in this period were found through the efforts of MDS (Figure 7). The growth rate of cases also decreased in this period.

Figure 7: Observing the trend of daily positive cases detected in Yerwada ward from 15th May to 13th June
Light blue area shows the daily new positive cases in Yerwada, **Dark blue area** shows the daily new positive cases detected by MDS, **Red line** shows the 5-day growth rate of cases (in secondary axis)| Graph shows that **35%** of the positive cases in Yerwada (between 15-May and 13-June) were detected by MDS | Graph shows that growth rate of new cases detected has reduced from 42.6% in the start to 6.36% on 13th June

Source for data: PMC and BJS.

Findings

The growth rate of cases in Yerwada has decreased in the last month. Increased and targeted testing is particularly required in hotspot wards. Looking at the data, it is found that-

- Yerwada has the second highest number of cases in Pune city (1,113 cases) and was growing fast at ~40% at the start of the intervention.
- **35% of the positive cases** detected in the ward between 15th May and 13th June was detected by MDS
- MDS testing was targeted towards the slum settlements in the prabhag to ensure early identification of cases and reducing transmission
- Two weeks after MDS started intensive work the number of daily new cases has reduced. The 5-day growth rate of cases has reduced from a high of over 40% in the start to 15% on 1st June and 6.36% on 13th June. The new positive cases in Yerwada **has flattened over time.**

Early testing and early detection of positive cases enables early isolation, breaking-the-chain and lowering the number of deaths. **Testing and detection of positive cases through MDS in Yerwada has reduced the growth rate of cases and the ward shows early signs of flattening the curve.**

6. Mapping the age groups and gender of positive and deceased patients in PMC
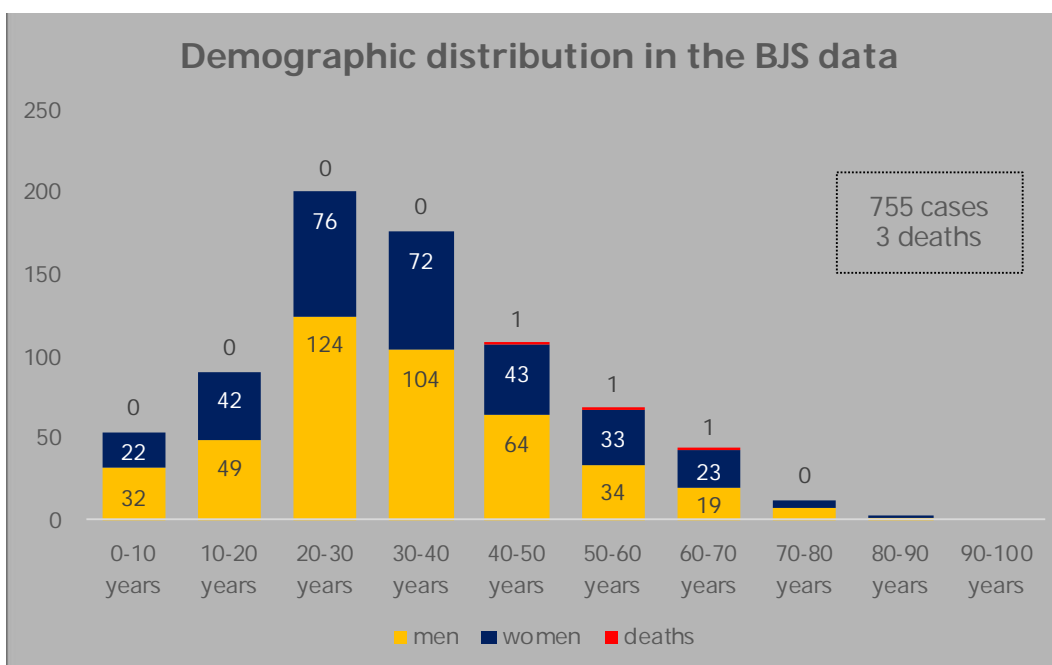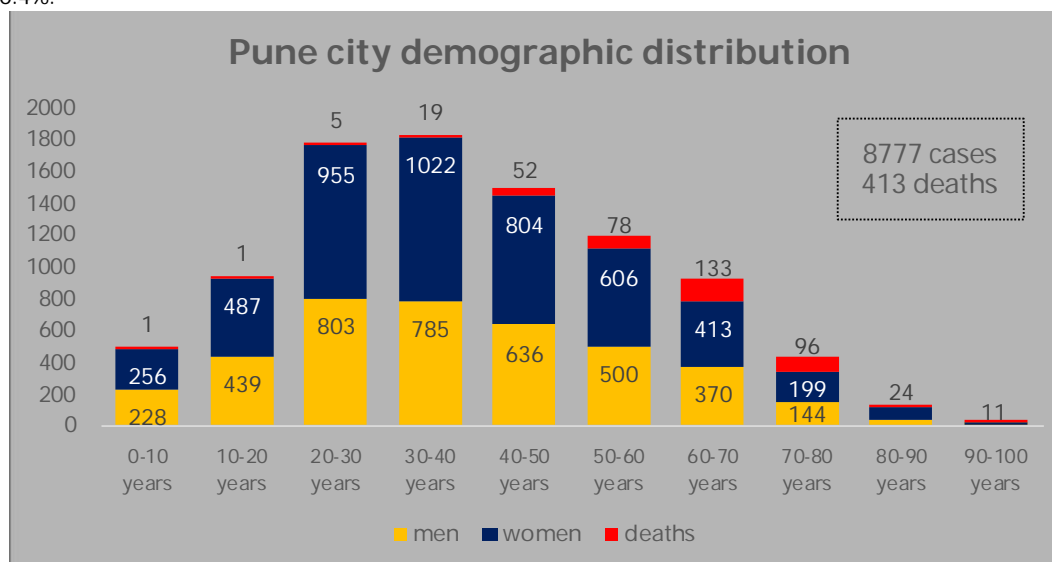
Comparing the age and gender of COVID positive and deceased patients, it can be observed that

Figure 8: Observing the gender and age of positive and deceased patients in PMC data and BJS data

Graph 7.1 shows the distribution for **PMC:** 45% men, 55% women

Graph 7.2 shows the distribution for **BJS:** 58% men, 42% women for 755 positive cases (data for 755 out of 808 positive cases was available)

Graphs show that while the age distribution of both are roughly the same, the gender distribution in both is different. Additionally, PMC cases show a case fatality ratio (CFR) of 4.6% whereas BJS data shows a CFR of 0.4%.

Age group	PMC data – 12th June			MDS data		
	Male	Female	Deaths	Male	Female	Deaths
0-10 years	228	256	1	32	22	0
10-20 years	439	487	1	49	42	0
20-30 years	803	955	5	124	76	0

30-40 years	785	1,022	19	104	72	0
40-50 years	636	804	52	64	43	1
50-60 years	500	606	78	34	33	1
60-70 years	370	413	133	19	23	1
70-80 years	144	199	96	7	5	0
80-90 years	38	70	24	2	1	0
90-100 years	11	9	4	0	0	0
TOTAL	3,954	4,821	413	435	317	3

The data on age and gender shows that BJS has identified more men whereas PMC has identified more women. The Case Fatality Ratio (CFR) for PMC is higher, but more data is needed to establish the reason for it. PMC data shows a CFR of 4% for age group 40-50, 7% for 50-60, 15% for 60-70, 21% for 70-80, 20% for 80-90 and 19% for 90-100.

7. Conclusion

The work done by BJS in Pune in targeted locations has significantly aided the fight against COVID-19. Specifically
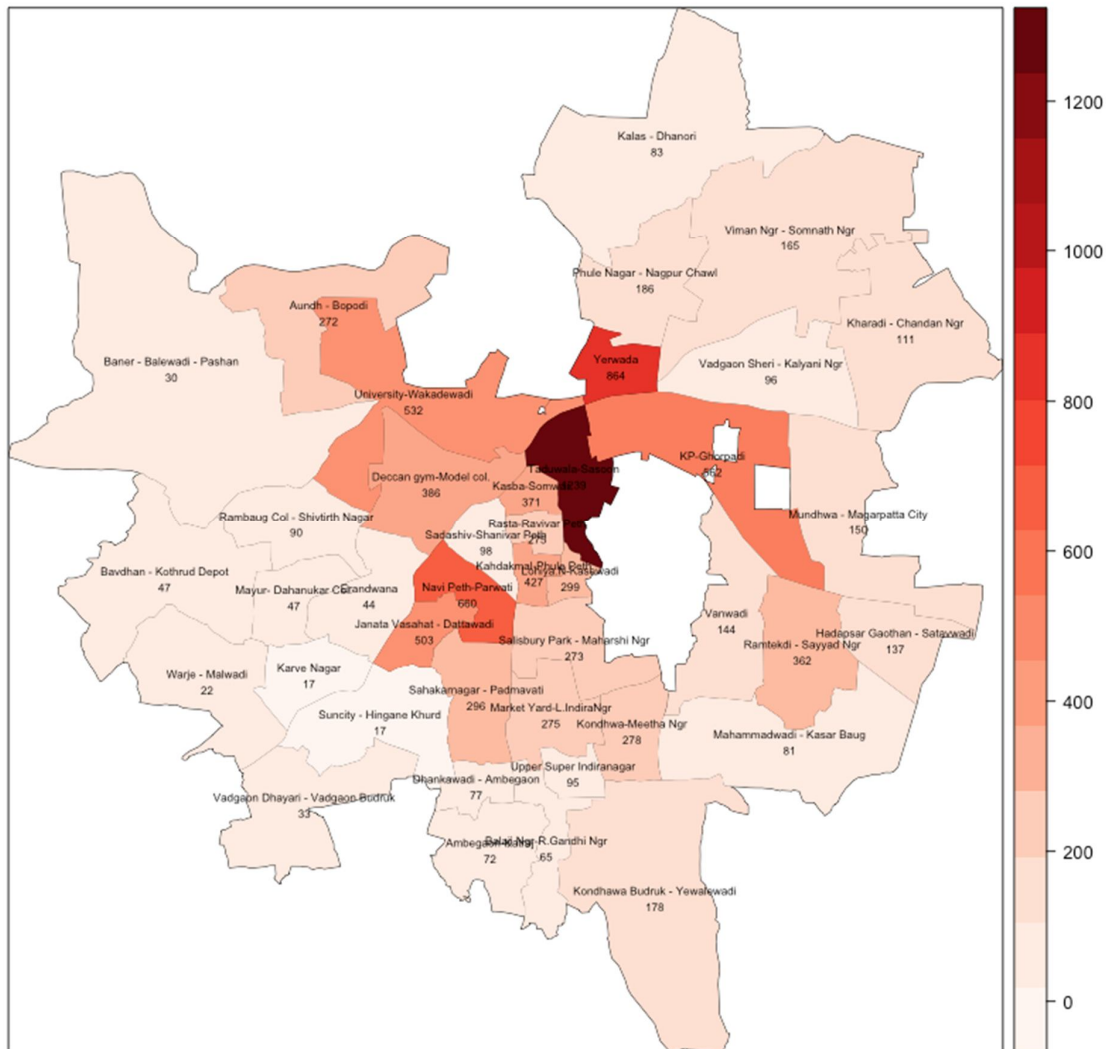
- Total of **6.4 lakh screenings**, **8,880 referrals** and helped detect **808 positive cases**
- Of all the screenings, suspects and positive cases found through the Mobile Dispensary Seva Vans in PMC, BJS MDS did 90.3% of the screenings and referred 91.2% of the suspect cases and found 99.7% of positive cases in Pune
- BJS-MDS interventions have focussed on slum clusters that have emerged as hotspots due to high density and inadequate WASH infrastructure. They have helped in early identification of cases in slums which has helped flatten the curve
  - o BJS screened and referred **more than 90%** of the positive cases in Patil Estate
  - o The work helped reduce the average growth rate of cases from 37% to 0%.
  - o The extensive screening helped **flatten the curve** in the Patil Estate hotspot- **only 1 new case in the last month** (from 13th May to 13th June)
- Till 13th June, BJS collected 2,253 samples and identified 325 positive cases. Out of this, maximum were in Yerwada ward. Yerwada had the second highest number of cases in Pune, and BJS work here is another example of how screening and testing resulting in reducing the number of cases.
  - o BJS detected **253 cases** in Yerwada ward.
  - o This was **35% of all positive cases** in this period.
  - o The efforts in Yerwada have reduced the average growth rate of cases from 40% to 6.3% and shows early signs of flattening the curve in Yerwada.
- The CFR of positive patients detected by BJS is considerably lower than the CFR of all positive patients in PMC. This could be due to early detection of cases.

Overall, the extensive screening and referral method helped early detection, isolation and breaking the chain. The early detection of positive cases has helped control transmission and would also reduce the number of deaths.
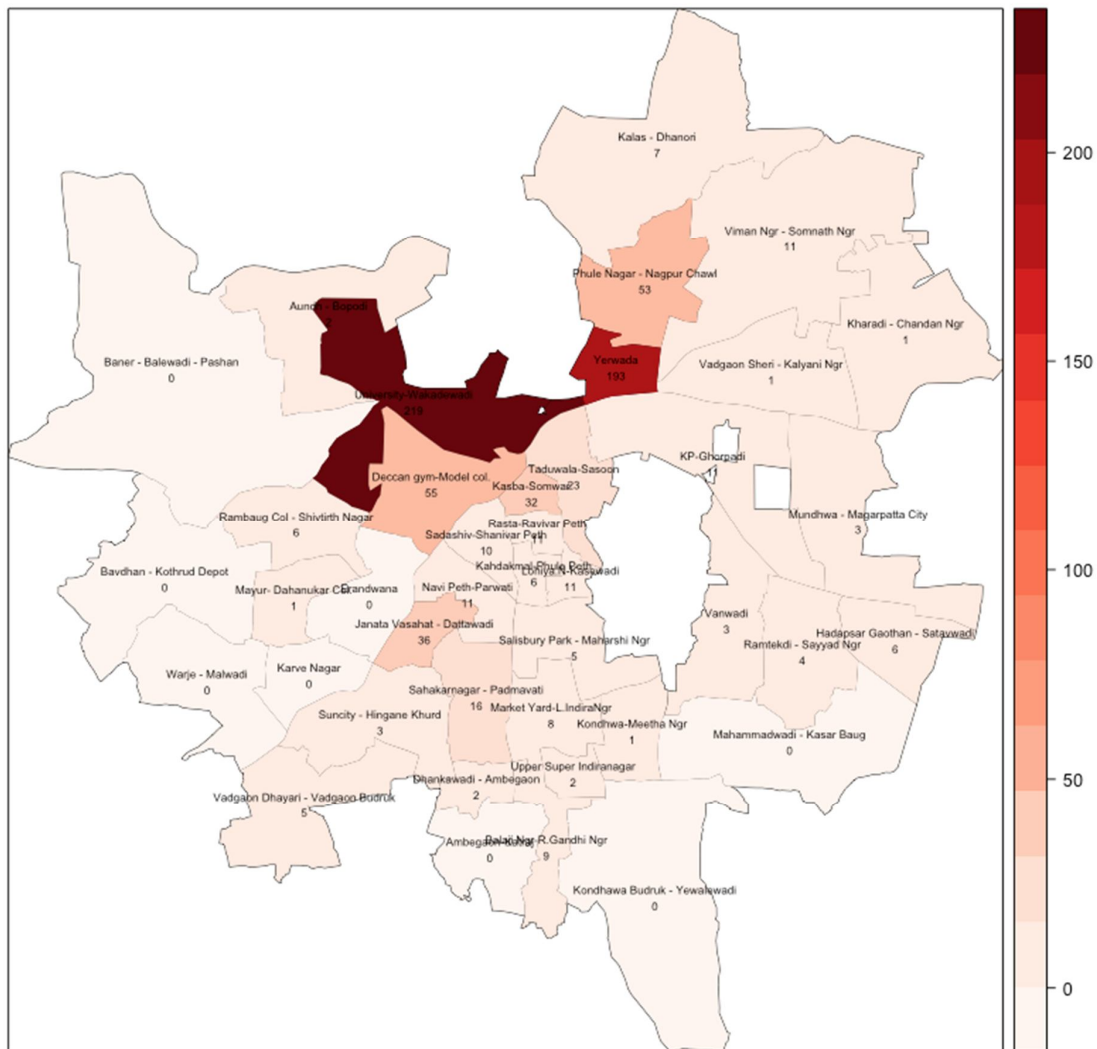
Prabhag wise positive cases found by BJS. First map shows cases in Pune prabhags on 18th June (source Twitter, MurlidharMohol). Second map shows positive patients detected by BJS

10043 positive cases in Pune- PMC- 18th June

805 positive cases in Pune

[i] https://www.npr.org/sections/goatsandsoda/2020/04/15/834021103/who-sets-6-conditions-for-ending-a-coronavirus-lockdown

[ii] https://www.theguardian.com/commentisfree/2020/apr/21/kerala-indian-state-flattened-coronavirus-curve