Lessons from the Covid Care Centers in West Bengal

Patrick Agte
Princeton University

Abhijit Chowdhury
Liver Foundation

Jishnu Das
Centre for Policy Research, New Delhi and Georgetown University

Parthasarathi Mukherjee
Liver Foundation

Satyarup Siddhanta
Covid Care Network

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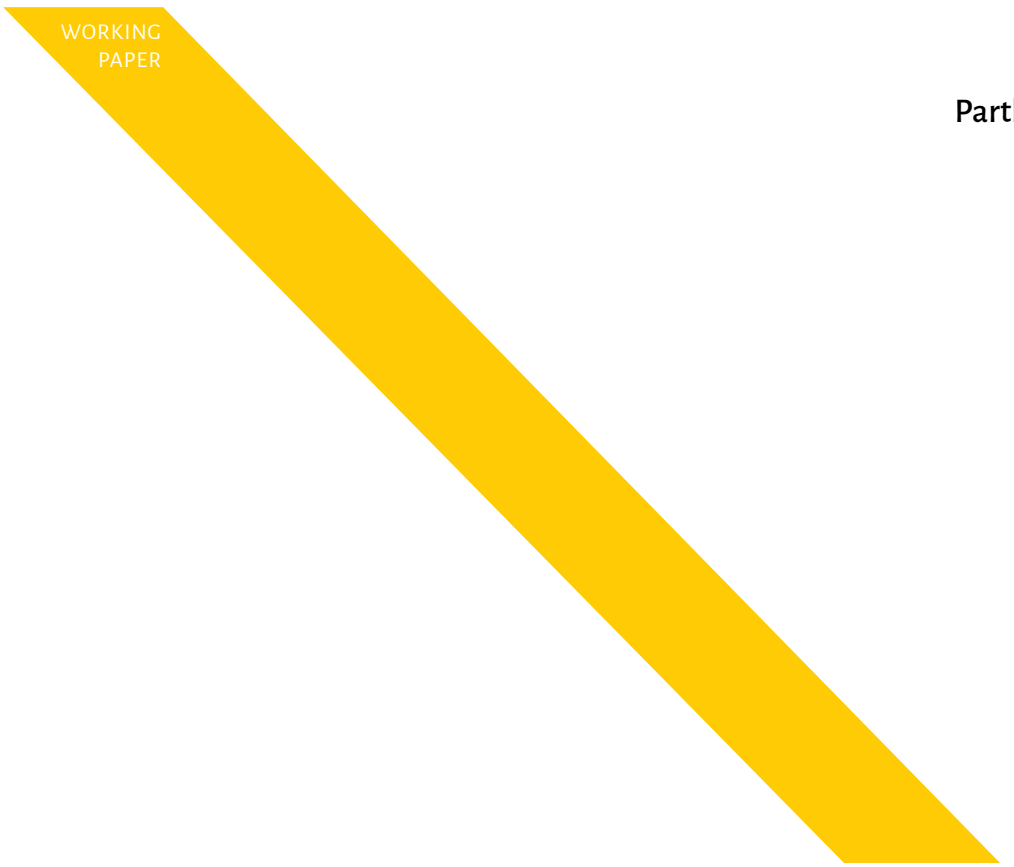

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SUMMARY

With the continuing emergence of Covid-19 variants, there is underlying concern in all countries, including India, that another surge will occur in the coming months. In case of a surge like that experienced with the Delta variant, a strategy that deserves further attention for the provision of care in rural areas is the use of off-hospital sites for patients who are not severely ill. We discuss one such effort from the state of West Bengal, the lessons from which may be relevant for the management of surge cases for generalized pandemic planning.

In March 2021, India experienced a large surge in Covid cases and the spike in patients led to a shortage of hospital beds and oxygen cylinders around the country. Following a notification by the Ministry of Health and Family Welfare that allowed organizations to set up care centers for the treatment of Covid-19 patients outside the hospital setting, the Liver Foundation and the Covid Care Network established eight Covid Care Centers in rural West Bengal. These centers were operational between May 2021 and September 2021, which coincided with the post-peak phase of the second Covid-19 wave in India. This report describes the project, summarizes the performance of the centers, and discusses the challenges faced during the project. We conclude that temporary facilities like the Covid Care Centers can be a viable option to provide urgent care during health emergencies.

INTRODUCTION

India was hit by a devastating second Covid wave in March 2021 and in West Bengal, official daily infections peaked at 20,846 on May 14. Shortfalls in hospitals and oxygen cylinders in West Bengal and other regions led the the Ministry of Health and Family Welfare to issue an order on May 8 that allowed the establishment of temporary healthcare facilities called Covid Care Centers.[1] Covid Care Centers could offer care to patients with milder forms of Covid-19 outside the hospital setting.

Based on this order, the Liver Foundation and Covid Care Network established eight Covid Care Centers in peripheral regions of West Bengal in May and June 2021 to increase accessibility and provide care to Covid-19 patients in the rural areas of the state.[2] The aim was to provide a center for care that acted as a bridge between care at home and care at the hospital. If these centers could improve the management of the illness at earlier stages, it would decrease the demand for hospital beds, which can then be reserved for those who need it the most. On the other hand, by providing a higher level of monitoring and care than what is available at home for most patients, these centers could stabilize moderately infected patients, with the possibility of triage to a central facility if necessary.

While we understand that similar models were used throughout the country (for instance, in Delhi, oxygen was being provided to patients by Gurudwaras), there is little systematic data currently available that allow public health experts and governments to understand (a) the programmatic and operational details of such a model and (b) if the model presents a viable option in the case of emergencies. Using the exceptional data that the Liver Foundation maintained on every patient who was brought to one of the Covid-care centers, this report summarizes the lessons learned from the first two months of operation of the Covid Care Centers. It is based on the anonymized records of 113 patients who were admitted during this time and their ultimate outcomes. As we will show, a key insight of this project is that the management of many patients can be shifted to providers with basic training and infrastructure outside the hospital setting.

Operational Details: STAFFING AND INFRASTRUCTURE

The eight Covid Care Centers that we examined were located in six districts of West Bengal. Locations were identified based on an initial assessment study in which the Liver Foundation identified need based on the number of active Covid-19 cases, the number of oxygen-equipped beds at the government hospital, and the distance to the government hospital. Four centers were located in towns since most Covid-19 cases occurred in urban areas. Four additional centers were set up in rural areas that are located more than 10 kilometers away from the nearest PHCs to ensure that remote communities also have access to necessary care. Appropriate buildings were found with the help of local authorities.

Each center was operational 24/7 and consisted of an average of 20 hospital beds. The facilities were stocked with a minimum level of lifesaving drugs (see Appendix 2). Oxygen supply was ensured through the use of concentrators bought from a private company. B- and D-type medical oxygen cylinders were also bought from a private company. The clearance to operate the centers was obtained from the Chief Medical Officer of Health of each district.

[1] The shortfalls in hospitals and oxygen cylinders in West Bengal are documented in several newspaper articles, including Yengkhom, S. (2021, April 27). Covid-19 in West Bengal: More beds freed but fall short of demand spike, Times of India. Hyperlink; Yengkhom, S. (2021, April 27). West Bengal: Control room to infuse life into oxygen supply to hosps. Times of India. Hyperlink; Das, M. (2021, May 17). Bengal 'yet to touch Covid peak' but Kolkata is already running out of hospital beds. ThePrint. Hyperlink.

[2] See Appendix 1 for more details on the implementing organizations. The project was funded by the Association for India's Development, BSE Limited Bandhan, the SBI Foundation, the West Bengal Industrial Development Corporation, Oak Foundation and Friends of Liver Foundation, West Bengal.

A DM Pulmonologist acts as the nodal medical officer and oversees all Covid Care Centers. Each center is then led by a registered MBBS doctor. He is assisted by a technical health worker who is drawn from the local informal healthcare sector and who assists with the handling of the oxygen. The rest of the staff typically consists of two nurses (preferably one male and one female), one housekeeper, and a floor manager per shift. A shift is between 8 to 12 hours long. The staff was hired through personal connections with the support of the local health administration. The salary structure is based on the local market rate and 40 hours of work per week.

The floor manager is responsible for registering new patients. A positive Covid test result is required for admission. If the patient has not taken a Covid test, he is stabilized and then referred to the nearest testing facility. Since the centers are designed to handle moderately infected patients, patients with oxygen saturation below 90 at arrival are not encouraged. However, doctors have the discretion to accept patients that do not meet these criteria in special situations. After registration, a bed ticket is issued and a bed is assigned to the patient. All services are provided free of charge.

All staff members attended a one-day training to learn about protocols. The training was led by the MBBS doctor in charge of the center and covered multiple topics, including patient admission, waste disposal systems, and housekeeping. An important component of the training was designed to help the support staff overcome the stigma of handling Covid patients. Since most nurses and technical health workers were already experienced and knew how to handle patients in general, the one-day training was sufficient to ensure that they can provide the necessary care to Covid patients with mild symptoms. As a concrete example, it requires less than 15 minutes of training to learn how to use oxygen concentrators that can deliver low-flow oxygen to critical patients.

Awareness of the Covid Care Centers was spread through word of mouth, including social media. The local administration and volunteers knew about the facilities. Most patients come directly to the centers after experiencing symptoms and having a positive Covid test.

PERFORMANCE

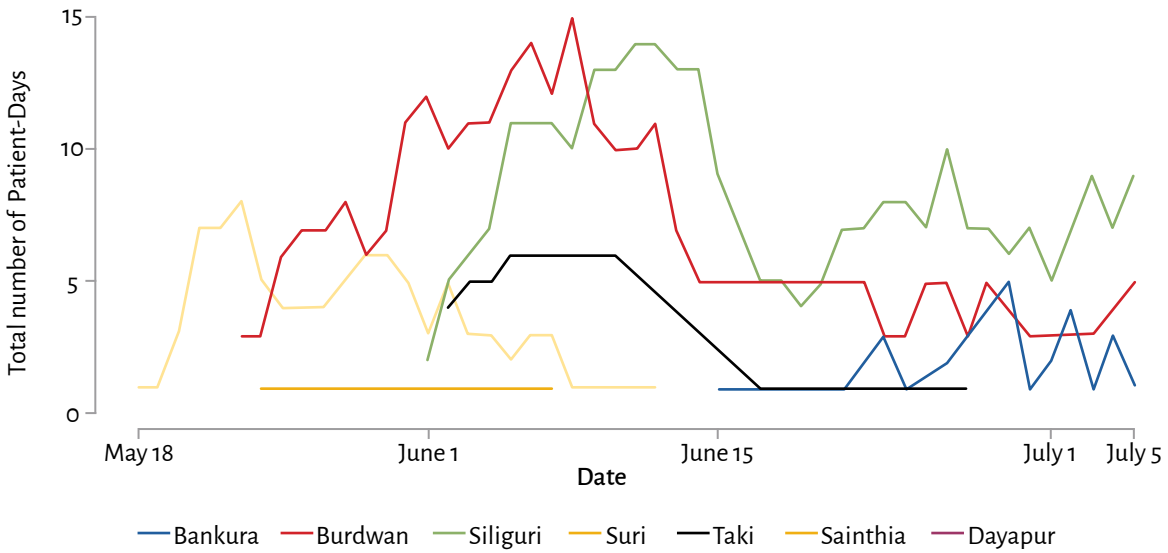
The eight Covid Care Centers admitted a total of 113 patients between 18th May and 5th July 2021. The Liver Foundation digitized discharge information for 92 of them. 9 patients were still in care as of July 5. Discharge information for 12 patients is missing.[3] Among the 92 patients with discharge information, we have the full (daily) patient history for 79% of patients and at least 80% of the patient history for 97% of patients.

Most of the patients were treated by the centers in Siliguri (40) and Burdwan (35). The center in Dayapur only saw one patient and the center in Labhpur admitted none. Both of these centers were set up late and there was no demand when the facilities became operational. Their staff was then ordered to be on standby in case the number of Covid cases was increasing again. Figure 1 shows the number of patients per day for each Covid Care Center. The number of cases peaked at the beginning of June. The highest number of patients in a center was 15.

58% of the patients were female and the average age was 54 years. The patients came from 28 different PIN codes, showing that the centers had large catchment areas and did not just attract nearby patients. At admission, the most common pre-existing conditions were diabetes (9%) and hypertension (7%). 13 patients arrived with critically low SpO2 levels (<90%).

[3] We confirmed with the field staff that none of the patients with missing information has died.

FIGURE 1: Number of Patients per Day by Covid care Center

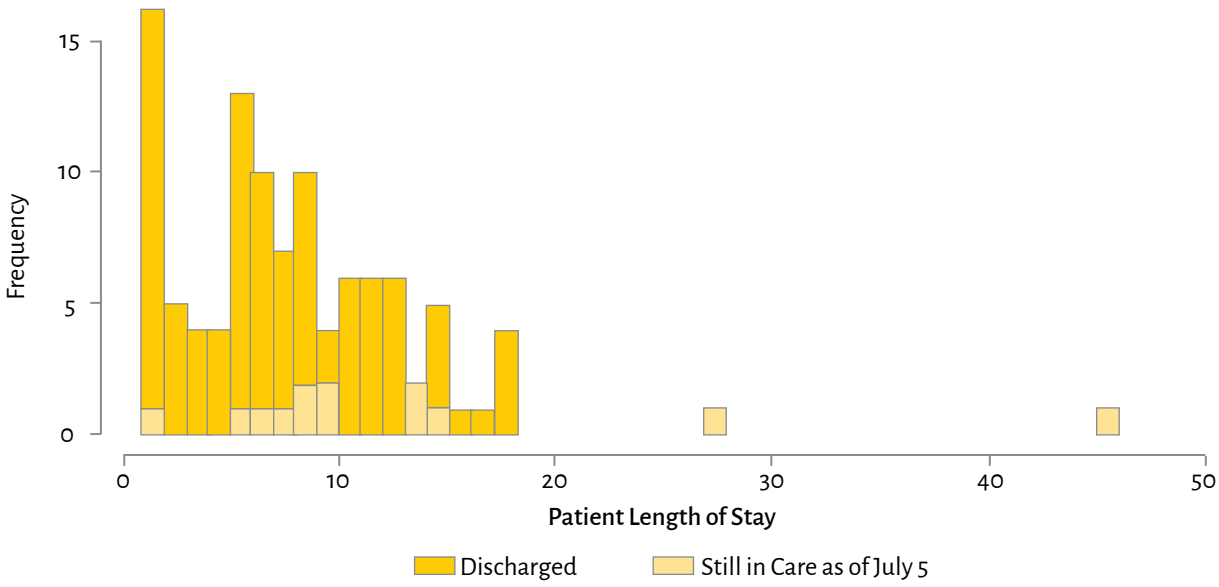


Notes:Each line corresponds to one Covid Care Center. Labhpur is not shown since the facility admitted no patients. The data only includes patient-days for which we have complete information.

The average length of stay was 7 days (see Figure 2 for the full distribution). The vast majority of patients (82%) were normally discharged, showing that the Covid Care Centers can be effective in providing care to patients with mild symptoms. The remaining patients were either referred (16%) or made self arrangements (2%). We do not observe any patient deaths. Out of the 13 patients that arrived with critically low SpO2 levels, 8 could be stabilized at the Covid Care Centers and discharged in good condition. The remaining 5 patients were referred to other facilities.

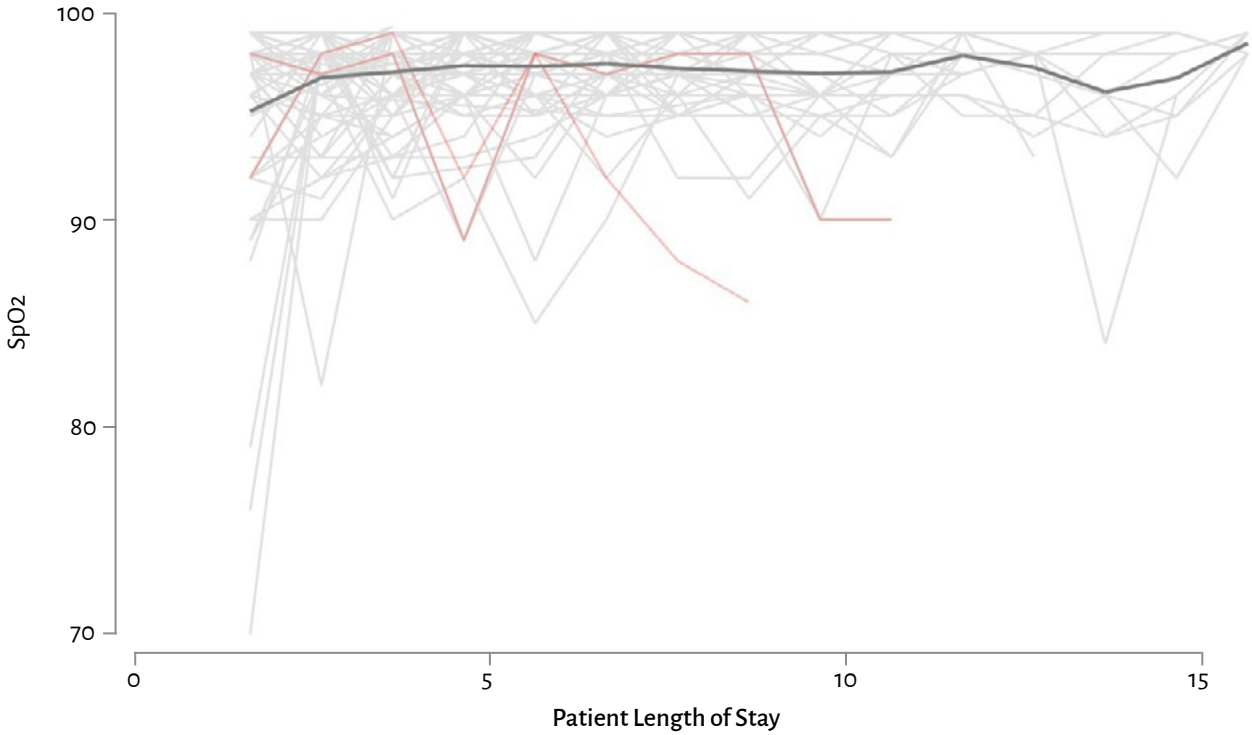
Figure 3 shows SpO2 levels over the patient's length of stay. Each line corresponds to the trajectory of one patient. The thick grey line shows the average. Day 1 represents SpO2 levels at admission. For the other days, SpO2 levels were measured while the patient was connected to the oxygen concentrators. The figure shows that the Covid Care Centers managed to even stabilize patients with low levels of oxygen at admission. When two patients experienced deteriorating health (shown in red), they were referred to other facilities.

FIGURE 2: Histogram of Patient Length of Stay



NOTES:Figure excludes patients with missing discharge information that were not still in hospital care as of July 5.

FIGURE 3: SpO2 Levels over Patient Length of Stay



NOTES: Each line represents the trajectory of one patient. The thick grey line shows the average. Three patients with SpO2 levels below 80 at admission were treated. They were stabilized and discharged in good condition after 8, 12, and 14 days, respectively. Two patients experienced declining SpO2 levels during their stay (shown in red). One of them was referred to the North Bengal Medical College & Hospital and the other patient was discharged and recommended to receive chest physiotherapy and to use an Incentive Spirometer.

Even though the centers were not designed to treat patients who were severely ill, in some cases there were few alternate options. Two case studies that illustrate that type of care that could be provided are as follows.

- **CASE-REPORT 1:** A 70-year old woman was admitted to Bankura Covid Care Center with a positive Covid diagnosis and mild fever for 5 days. Apart from this, the patient was vomiting multiple times. At admission, the patient had a pulse of 80 beats per minute, a SpO2 level of 94% in room air, and a body temperature of 100°F. The primary challenge was that the patient was disoriented and had low levels of Na+ (113) and K+ (1.63) in her blood. The doctor diagnosed her with Covid pneumonia with electrolyte imbalance. The patient was managed with a 3% NaCl injection, a KCl injection, a potklor syrup, and common salt for her electrolyte imbalance. After five days, the patient was discharged in clinically good condition, including a correction of her electrolyte imbalance.

- **CASE-REPORT 2:** A 62-year old woman with a positive Covid diagnosis was admitted in critical condition in Birbhum Covid Care Center. She was undernourished and diabetic. At admission, the patient had a pulse of 95 beats per minute and an SpO2 level of 94% in room air. She was provided with saline, soluble insulin, glargine, multivitamin, Co-amoxycla, budesonide, Ivermetrol, and oxygen support. After ten days, the patient was discharged in stable condition with an SpO2 level of 99% without oxygen support.

CHALLENGES

One of the primary challenges that the Liver Foundation experienced was the time that it took – 7-12 days after a location had been identified – to set up the Covid Care Centers during the midst of the second Covid wave. Finding appropriate staff and equipment, including hospital beds, was one of the main reasons for delays. An overall shortage of equipment, including hospital beds, led to a surge in prices, making the installations more costly. Due to the delays, some of the facilities only became operational after the second Covid-19 wave had abated. These experiences emphasize the importance of creating sufficient capacity before an outbreak to ensure that the healthcare system is not overwhelmed. For this reason, the Covid Care Centers remained operational despite low caseloads between July and September to ensure that the facilities are prepared in the event of another outbreak.

Another challenge that was frequently mentioned by field staff was the lack of advanced medical equipment at the Covid Care Centers. While the care at the facilities ascribed to the highest ethical standards and scientific knowledge, it is important to acknowledge that these will never become institutions that can provide top-of-the-line care. They are only designed to provide relief for moderately infected cases and more severe patients need to be referred to higher-level facilities. These limitations can be frustrating at times for field staff but the Liver Foundation's approach, which we endorse, was that it is important to keep the focus on basic healthcare services to ensure a sustainable operation of the facilities.

A final challenge was the collection of real-time monitoring data. Each Covid Care Center maintains patient charts on paper. An example of a patient chart form is included in Appendix 3. The form collects information on general patient characteristics as well as daily health measures, including SpO2 levels. The field staff was then asked to digitize the updated information on the patient charts daily using google forms. While we managed to digitize most of the patient data in the end, lack of internet and technical expertise led to delays in collecting real-time digital data. During peak times, alternative approaches to digitizing data might be preferable. For example, field staff could send a photo of the patient chart form once it is completed to a central staff member that is responsible for digitizing the information. This information could be supplemented with daily aggregate information on the daily occupancy rate of each facility through the floor manager.

CONCERNS

In this section, we address potential concerns about the efficacy of the Covid Care Centers.

1. Should patients not go to a government hospital instead?

As mentioned above, the centers were strategically placed in locations that were far away from existing government hospitals. Proximity to patients was important to ensure that patients receive urgent care. Our performance data also show that moderately infected cases can be handled at temporary health facilities without adverse health outcomes since they mostly require routine procedures.

The Covid Care Centers also acted as a backup option in case of capacity constraints at government hospitals. For example, there was an instance in which a nearby government hospital that relied on an oxygen plant referred patients to our Covid Care Centers after facing technical issues with their plant. We believe that close cooperation between government hospitals and any temporary facilities is important to ensure optimal levels of care for patients.

2. Should the staff and oxygen not be allocated to a government hospital instead?

Staff was hired with the support of the local administration and local organizations. The Liver Foundation took care that we did not take away existing staff from government hospitals. Most government hospitals in West Bengal did not experience staff shortages at the time and there were enough excess healthcare workers to choose from.

Oxygen was obtained from the private market. Unlike other places in India, West Bengal experienced a shortage in oxygen cylinders but not an overall shortage of oxygen during the second Covid-19 wave. We addressed this problem by using concentrators instead of cylinders to ensure oxygen supply. Government hospitals also had sufficient storage of oxygen (excluding technical issues as mentioned above).

3. How to avoid mission creep?

Mission creep is defined as the graduated expansion of an intervention beyond its original scope. The Liver Foundation tried to avoid this problem by keeping a strict focus on the health care services that are offered at the Covid Care Centers. When seriously ill patients arrived and demanded e.g. antifungal medicines, the staff referred them outside instead of trying to solve these problems themselves. Treating these conditions would have meant that the centers needed to significantly expand their capabilities. The Liver Foundation experienced situations in which it thought about adding blood tests, X-rays, or CT scans to its healthcare services, but decided against that in the end to keep the focus on routine Covid-19 services.

The Liver Foundation was also committed to only operate the Covid Care Centers on a temporary basis. On 1st October 2021, the staff was released and the oxygen cylinders returned. At the point of writing, the Liver Foundation proposed that the remaining infrastructure of the centers will be kept to provide care in emergency situations (e.g. during cyclones). Alternatively, the remaining infrastructure and equipment will be donated to PHCs and charity hospitals. For two centers, it was also requested that the government converts them into permanent PHCs since they are 15-20km away from any existing public facility. These PHCs could either be run by the local government or with the support of the Liver Foundation.

COST ANALYSIS

Appendix 4 shows the expenses for two typical patient trajectories. Expenses vary based on the severeness of the patient's condition. Average daily costs per patient range in these examples between Rs. 1,423 and Rs. 1,621, excluding room rent. The main cost factors are medicines, oxygen provision, laboratory costs, and staff charges. By comparison, the hospital rate per day of admission for a Covid patient with moderate sickness in a non-NABH accredited hospital in Delhi is Rs. 8,000, including bed, food, and doctor visits.[4] While we acknowledge the limitations of these cost comparisons, we treat them as suggestive evidence that the Covid Care Centers are a cost-effective approach to provide care to moderately infected patients.

[4] Nair, S. (2020, July 22). COVID-19 treatment: From affordable public hospitals to expensive private care, what it costs to treat a patient in India. Firstpost. Hyperlink.

CONCLUSION

This report summarizes the preliminary performance of eight Covid Care Centers in West Bengal. We interpret the results as evidence that temporary facilities can successfully contribute to the fight against the Covid pandemic. Our data suggests that these facilities are a cost-effective approach to handle moderately infected patients. The Covid Care Center in Bankura even received 25 direct referrals from government facilities after the reporting period, showing that the centers do not work in isolation but are complements to the existing healthcare system. Guidelines and funding for the establishment of similar facilities in other locations across India can help ensure that our healthcare systems are prepared for the next health emergency.

APPENDIX 1:

Implementing Organizations

The Liver Foundation, West Bengal - LFWB (www.liverfoundation.in) is a not-for-profit organization working in public health and broad human development areas since 2006. It was conceptualized by clinicians, researchers, activists, and academicians who felt the need of raising awareness regarding liver and gastrointestinal health in the rural and urban communities. In the last 15 years, LFWB has devoted itself to community health awareness, clinical and public health research, healthcare-related infrastructure and skill development, and social support. It has been a Department of Scientific and Industrial Research (DSIR) recognized Scientific and Industrial Organization (SIRO). It has strengthened the capacity of the rural healthcare system by setting up primary healthcare centers in rural areas like Massanjore in Dumka, Nagari in Birbhum, and Purulia as well as by training rural informal healthcare providers, the backbone of the rural healthcare system. This work ensures that rural communities receive better primary and referral care. It has developed the first single specialty tertiary care hospital in Eastern India for liver and GI health – Indian Institute of Liver and Digestive Sciences (www.iilds.in) - through a philanthropic donation in 2016 and initiated a nursing training institute – Chandrakant Institute of Nursing & Health Science - in 2020. IILDS is a Covid care facility now.

The Covid Care Network (CCN, www.covidcarenetwork.org), is another non-profit organization that carries out community-linked services, a helpline, supplies, and almost every potential area that serves people with Covid.

APPENDIX 2: List Of Essential Medicines

SL NO	PRODUCT NAME
1	SYRINGE 10ML
2	SYRINGE 5ML
3	SYRINGE 2ML
4	EXAMINATION GLOVES
5	NASAL CANNULA
6	I.V SET
7	THERMOMETER
8	NEBULIZER MACHINE
9	B.P MACHINE
10	INTRACATH 20 NO
11	INTRACATH 22NO
12	GLUCOMETER(CBG MACHINE)
13	CBG TEST STRIP (100)
14	CBG NEEDLE
15	LEVOLIN RESPULES 0.63
16	BUDECORT 0.5 RESPULES
17	D 25% 100ml
18	IV. PARACETAMOL 100ML
19	INJ TAZOFIC 4.5(PIPERACI+TAZOBACTUM)
20	TAB IVERFIC 12MG
21	TAB. VIATRAN-CZ
22	TAB. AZITHRAL 500MG
23	FACE SHIELD MASK
24	INJ DEXAMETHASONE
25	MICROSHIELD HANDRUB 100ML
26	NS 500ML
27	D 5% 500ML
28	COTTON 400GM
29	PPE KIT
30	FARO ACE SR-300 TABS(FAROPENAM)
31	DOXTICIA-LB CAPSULE
32	Cutenox 40mg Injection
33	ORNOF(Ofloxacin (200mg) + Ornidazole (500mg))
34	DELETUS D PLUS SYRUP

SL NO	PRODUCT NAME
35	MONTAIR LC TAB
36	P 650MG TABLET(PARACETAMOL)
37	ZINCOVIT TABLET
38	STAMLO 5 TAB
39	PACIFIC - VITAMIN C
40	MEDROL 4MG TABLET(Methylprednisolone)
41	PANPLUS 40MG TABLET(Pantoprazole)
42	ZINC 50MG TABLET(ZINC ACETATE)
43	EMESET 4 TABLET
44	MICROGEN HANS WASH 4% 500ML
45	FEMALE CAP
46	OXYGEN MASK (ADULT)
47	NEBULIZER MASK
48	N 95 MASK
49	EXAMINATION GLOVES (MEDIUM)
50	DECMAX 4MG TABLET(Dexamethasone)
51	FACE SHIELD MASK
52	FACE MASK
53	ONDEM 2ML
54	GLANDPAN(PANTOPRAZOLE)
55	XONE 1GM INJECTION(CETRIAXONE)
56	ULTRAMASK(NRBM)
57	INJ NORAD
58	INJ. SUCCICORT 100MG(HYDROCORTISONE)
59	ATROPIN SULPHATE INJ
60	FRUSEMIDE 2ML INJ
61	ADREBEST 1ML INJECTION(ADRENALINE)
62	TAB. TELMA 20
63	TESRAN-40MG TABLET
64	DR.CLEAN 400ML
65	ECG GEL
66	LEUCOPLAST
67	MICROPORE
68	TOURNQUATE
69	LOX JELLY

APPENDIX 3: Patient Chart

Facility Name:		Patient ID:		Patient Name:		Identification Type: ☐ Aadhar ☐ Voter ID ☐ Ration Card ☐ Other: Identification Number:	
Age:		Date of Birth:		Address:		PIN code:	
Gender:	☐ Male ☐ Female	Referred by:		Phone Number:		Emergency Number:	
Religion:		Admission Date:		Conditions	☐ Diabetic ☐ Hypertension ☐ COPD ☐ Cancer ☐ Heart Problem ☐ Others:.....	Patient Type:	☐ Inpatient ☐ Outpatient (OPD)

Day	Date	Pulse Rate	SPO2	Blood Pressure	Blood Suger	Patient Condition	Medicines	Treating Doctor	Comments
1:						☐ Improving ☐ Stable ☐ Worsening			
2						☐ Improving ☐ Stable ☐ Worsening			
3:						☐ Improving ☐ Stable ☐ Worsening			
4						☐ Improving ☐ Stable ☐ Worsening			
5						☐ Improving ☐ Stable ☐ Worsening			
6						☐ Improving ☐ Stable ☐ Worsening			
7						☐ Improving ☐ Stable ☐ Worsening			
8						☐ Improving ☐ Stable ☐ Worsening			
9						☐ Improving ☐ Stable ☐ Worsening			
10						☐ Improving ☐ Stable ☐ Worsening			
11						☐ Improving ☐ Stable ☐ Worsening			
12						☐ Improving ☐ Stable ☐ Worsening			

Descharge Date		Descharge Type	☐ Home isolation(OPD) ☐ Descharge ☐ Dead ☐ Self arreangement ☐ Referred:

APPENDIX 4: Cost Examples

Day	Medicine & Surgical Cost	O2 Cost (Oxygen)	Laboratory Cost	Doctor Charge	Nursing Charge	Others Monitoring Staff	Fooding Charge	Ambu-lance (Oil) And Driver
DAY-1	1656	260		200	100	85	180	1200
DAY-2	450	180	700	200	100	85	180	
DAY-3	380		60	200	100	85	180	
DAY-4	420		60	200	100	85	180	
DAY-5	790	130	460	200	100	85	180	
DAY-6	420	130	60	200	100	85	180	
DAY-7	420		60	200	100	85	180	
DAY-8	420			200	100	85	180	
DAY-9	150			200	100	85	180	
DAY-10	950			200	100	85	180	1200
	6056	700	1400	2000	1000	850	1800	2400
							ALL TOTAL	16206

Day	Medicine & Surgical Cost	O2 Cost (Oxygen)	Laboratory Cost	Doctor Charge	Nursing charge	Others Monitoring Staff	Fooding Charge	Ambu-lance (Oil) And Driver
DAY-1	120	260		200	100	85	180	
DAY-2	135	260	1450	200	100	85	180	
DAY-3	110	180	60	200	100	85	180	
	365	700	1510	600	300	255	540	
							ALL TOTAL	4270

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