Protecting the Healthcare System from Overloading Capacity through Load Balancing with Corona Care Centers

Background:

1. The current mathematical modelling we have taken as per Census 2011 assumes the following data for total citizens across three age groups with varying mortality rate as shown in the table below.

Age Group	**%**	**Citizens in lakhs**	**Covid Mortality Rate**	
Total population	100	330	under 50	0.3
Population under 50	76.35	251.955	50-80	4
50-80	21.92	72.336	above 80	15
above 80	1.62	5.346	Average	6.4

2. Without adequate testing kits, we are not able to estimate the total spread of Covid 19 in the state of Kerala. Thus, a mathematical modelling has been done to predict multiple scenarios from 1 person in 1 Lakh population being infected to the entire population being infected.

3. By following WHO guidelines, we estimate 50% of population to eventually catch the virus and this would mean that 165 Lakh people would get infected of which 81% or (133 Lakh) people need only stay at home. Following Chinese Infection Rates, we estimate 14% will require hospitalisation (23 Lakh) and 5% will require ICU treatment (8.25Lakh). This modelling is as seen below.

			Lockdown						**Realistic**				**Worst Case**
Infections	**Covid Infected Population**	1 in 100,000	1 in 10,000	1 / 100	10 /100	20 / 100	30 / 100	40 / 100	50 / 100	60 / 100	70 / 100	90/ 100	100/100
	Percentage of People	**0.0001**	**0.001**	**0.01**	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.9**	**1**
	Total Infected (In Lakhs)	0.033	0.33	**3.3**	**33**	**66**	**99**	**132**	**165**	**198**	**231**	**297**	**330**
Disease Severity	Total Infected (In Numbers)	**3300**	**33000**										
1. Stay At Home	81% are mild infections.	0.02673	0.2673	2.673	26.73	53.46	80.19	106.92	133.65	160.38	187.11	240.57	267.3
2. Require hospitalisation	14% are moderate infections	0.00462	0.0462	0.462	4.62	9.24	13.86	18.48	23.1	27.72	32.34	41.58	46.2
3. ICU	5% are critical infections.	0.00165	0.0165	0.165	1.65	3.3	4.95	6.6	8.25	9.9	11.55	14.85	16.5
Low risk	Population under 50	0.0251955	0.251955	2.51955	25.1955	50.391	75.5865	100.782	125.9775	151.173	176.3685	226.7595	251.955
Medium Risk	Population in 50-80	0.0072336	0.072336	0.72336	7.2336	14.4672	21.7008	28.9344	36.168	43.4016	50.6352	65.1024	72.336
High Risk	Population above 80	0.0005346	0.005346	0.05346	0.5346	1.0692	1.6038	2.1384	2.673	3.2076	3.7422	4.8114	5.346
Projected Deaths	Death under 50	8	76	756	7559	15117	22676	30235	37793	45352	52911	68028	75587
	Death under 50-80	29	289	2893	28934	57869	86803	115738	144672	173606	202541	260410	289344
	Death above 80	8	80	802	8019	16038	24057	32076	40095	48114	56133	72171	80190
	Total Deaths	**45**	**445**	**4451**	**44512**	**89024**	**1.33536**	**1.78049**	**2.2256**	**2.67072**	**3.11585**	**4.00609**	**4.45121**

3. If such a large number of population catches the virus, there would be large number of deaths in society as seen from ITALY and other countries and thus it would be prudent to enter into a lock-down for two reasons

A. Our Healthcare system will collapse if such a large patient load enters the system beyond its designed capacity
B. The earlier we lock-down, the slower we can get the virus to spread (also known as flattening the curve).

4. In order to remove the load from the Health Care system, it is planned to augment capacity of the 81% of population through Corona Care Centers which can be established at Educational Institutions such as Schools and Engineering Colleges and also pool in Hotel Beds, Hostels, Ayurveda Hospitals etc.

5. Efforts to setup model Corona Care Centers should be accelerated to war footing so that a Centralised System for Common Requirements can be setup which provides

1. Software Technology Backbone
2. Inventory Management
3. Food Management
4. Waste Disposal (Medical and Food)
5. Medical Oxygen Supply
6. Super Fab Labs to create critical Personal Protection Equipments
7. Training Module for Volunteers
8. Ambulance Network
9. Resource Mobilisation from NRK's

6. The Local Corona Care Centers would be run by a 50 people team across 10 Operational Roles such as a 1 Center Head from Health Department, 1 Public Relations Officer, 2 Doctors, 12 Nursing Staff, 10 Support Staff, 4 Data Engineers, 6 Counselling Staff, 1 Inventory Manager, 8 people for Logistics Management and 5 people as Reserve Strength.

7. Each Local Corona Care Center would also have clearly laid out processes for Volunteer Registrations,Patient Management, Integration with Public Elected Officials and tie-up with IMA for Waste Management.

8. All individual Corona Care Centers would be connected to a Central Corana Safe Network and would be able to call for facilities such as Ambulances to transport patients who fall critically ill at CCC to the nearest available hospital where there is vacant bed capacity/ICU capacity

9. An intelligent planning of the Corona Safe Network thus would ensure that the patients get the best possible treatment at the same time ensuring that the Health Care system of the state is protected from crashing due to overloading of capacity.

10. The date for the mock drill of the first Corona Care Center System has to be done by KSDMA so that all the human stakeholders involved are well prepared to ensure that the system can scale up when the demand so arises.