Is India ready for unlocking lockdown?

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We are a group of scientists, actively working on various aspects of COVID-19 outbreak in the world including data-based adaptive classical and agent-based modeling. In recent past, the German chancellor, Frau. Angela Merkel and many of the German Federal states have made key political decisions based on our results and frequent updated inputs regarding the ongoing trend and probable usage of health-care system in Germany. Our opinion article of the Helmholtz Initiative, a collective effort from various research institutions in Germany based on epidemiological results (https://www.helmholtz.de/…/Helmholtz_COVID-19_opinion_EN.pdf), daily analysis of the present trend as well as future projections of the COVID-19 outbreak in all the Federal states in Germany (https://gitlab.com/simm/covid19/secir/-/wikis/Report: updated since April 10, 2020) and its load on healthcare capacity (https://www.medrxiv.org/content/10.1101/2020.04.04.20053637v1: an older version) have been major guiding factors in deciding the timeline for allowing ease of restrictions in Germany. We have been continuously supporting the political decisions of several German Federal States since March. Given the ongoing outbreak of the novel Coronavirus (COVID-19 or SARS-CoV2) in India, we are now modelling various aspects of it specific to India, in the level of the states as well as their hot spot districts.

India needs to take decisions based on projections of healthcare capacity:

India has recently started phased unlocking of the lockdown imposed on 24th of March due to COVID-19 outbreak in India, and over the next upcoming days, the prime minister of India, Shri. Narendra Modi and chief ministers of Indian states are going to take major decisions regarding future steps to tackle the COVID-19 epidemic in India whereas boosting up economic scenario of the country. One important aspect that takes the central place in formulating such a phased exit is to monitor the usage of healthcare system in treating the severely symptomatic infected patients, which depends on the timeline of phased unlocking and its criteria. In the past few weeks, most of the majorly affected Indian states have tried to increase their healthcare capacity to treat the COVID-19 patients. However, without a solid knowledge of the present trend of the outbreak and a plethora of dynamic factors that decide the future trend of the epidemic, it is difficult to access the future scenario, and hence, decisions taken sans verified projections, will likely to cause excessive demands on the healthcare system. It would also cause shortage of healthcare facilities for the individuals affected with other severe health conditions, thereby inducing collateral damage. The home-going of our fellow stranded guest workers to all diverse corners of the country, is likely to be followed with a surge of COVID-19 cases everywhere, and especially at the distant districts away from major cities, where healthcare facilities are already limited.

Untimely relaxation would jeopardize the achieved targets:

Despite of continuing to be on a rising epidemic curve with respect to the new daily cases, India is trying to ease restrictions as the placed lockdown is causing humongous amount of economic crisis as well as leading to deprivation of basic daily income for millions of its common people. But an ease of restrictions if untimely, may put millions of individuals at the risk of severe infection and death. Hence, incredibly cautious, and guided decisions based on adaptive projections are extremely necessary. Any future re-implementation of an extended lockdown while losing control on the outbreak due to untimely easing, would cause considerable amount of fatalities and further unprecedented economic loss. We aim to provide an evaluative perspective on the present trend of the COVID-19 epidemic in India from the standpoint of systemic immunology and epidemiology. The statements are intended to provide support from a relevant professional perspective for the upcoming decisions by several Indian states in the coming weeks regarding the extent to which measures to limit contacts in India should be kept, strengthened or eased. These suggestions are guided by the objectives of (1) not jeopardizing of the intermediate targets that have already been achieved, (2) losing control of the virus and (3) maintaining the economy, and based on analyses of epidemiological data currently available for India and its states conducted using a refined extension of our state-of-art SECIR model (appeared online on April 10th, 2020), specifically tuned for the Indian scenario and its states.

The present time-dependent reproduction of India projected from time-window of last 10 days and its significance in determining the future course of the outbreak:

Our results suggest that 521950 to 1021950 reported infections, and 17950 to 36450 deaths have been averted till 13th of May due to the placed restrictions. The trend of how the outbreak has evolved in India, is clearly demonstrated by the development of the time-dependent reproduction number (Rt), which depicts, over time, the average number of people infected by someone who can transmit the disease, and is determined by the characteristics of the infection processes. State specific results from our model analysis (taking into account the undetected cases and travel history of each reported case wherever available) till 31st of May for the majorly affected states (cumulative reported cases > 1500) have shown that there is a heterogeneous situation in terms of the present epidemic trend across several states:

(Category 1) Rt above 1.5 - Haryana: 3.36 (seeing a third wave of the epidemic), Telangana: 3.00, Jammu and Kashmir: 2.26, Delhi: 2.25 (came down to 1.25 earlier but now, it is on rise again), Andhra Pradesh: 2.10, West Bengal: 2.10, Karnataka: 1.82;

(Category 2) Rt in between 1 and 1.5 - Tamil Nadu: 1.49, Maharashtra: 1.25, Bihar: 1.25, Uttar Pradesh: 1.24, Odisha: 1.23, Rajasthan: 1.11; and

(Category 3) Rt less than 1 - Gujarat: 0.89, Madhya Pradesh: 0.88, Punjab: less than 0.5.

India, as a country have a value of around 1.43 for Rt, representative of the period of 22/05/20 to 31/05/20.

Relaxation now would accelerate the epidemic: Home-coming of fellow guest workers: Stricter restrictions needed in the receiving districts

The trend that we are seeing in the above analyses leads us to expect that Rt will continue to gradually increase if restriction measures are lifted. This statement is based on the trust on the available data. As India has recently allowed special trains to run, without the availability of the extensive travel history and date of arrival at a destination and lack of sufficient data regarding success of quarantining upon arrival of our fellow guest workers, the real scenario might deviate a bit, particularly for the states which are receiving back the guest workers from majorly affected states, for example, West Bengal. However, we are sure that the recent home-going of our fellow guest workers from the majorly affected places, will definitely cause a surge in the COVID-19 cases in the receiving districts, which calls for utmost urgency in placing them in proper quarantine facilities, extensive testing and an extremely strict implementation of lockdown in those receiving districts.

COVID-19 outbreak trend demands restrictions to be strengthened in all the red-zone districts, the orange-zone districts where the outbreak is scattered and not specific to a limited number of containment zones, and all the containment areas (if any) in the green-zones:

As can be seen from the results mentioned above, most of the majorly affected states in India desperately need strictest possible implementation of a well-planned lockdown (accompanied with extensive home-surveillance system, extensive testing and timely quarantining) for at least few more weeks (the exact timeline depends on how the situation evolves within next two weeks) and *not any relaxation by any means, especially for all the red-zone districts, the orange-zone districts where the outbreak is scattered and not specific to a limited number of containment zones, all the containment areas (if any) in the green-zones. This applies to all the states analyzed so far as well as for others. We should push the time-dependent reproduction number Rt to a value well below 1 to start unlocking lockdown.*

[For the details of various scenarios possible regarding Rt, one can have a look into our position paper with regards to Germany: https://www.helmholtz.de/…/Helmholtz_COVID-19_opinion_EN.pdf]

Category 1 states should refrain away from any thoughts on relaxing measures in the aforementioned zones, and rather strengthen restrictions in those places to achieve the target Rt of less than 1 (it would mean that one infected person is infecting less than one person on average, and hence, the outbreak can be contained) faster, thereby limiting the extended loss of working hours.

To prevent jeopardizing some of the already achieved success in limiting the outbreak, *category 2 states must ensure stricter restrictions to push the Rt value below 1 in near future. Gujarat and Madhya Pradesh of category 3, both having the latest Rt value a bit less than 1, must continue the measures* to *prevent a new wave of infections.* Strengthening the measures in the relevant zones will push Rt well below sooner, thus preventing collateral damage of economy.

For each of the states, we have carried out extensive analysis for the projected healthcare usage in the past days during the outbreak and predicted the future usage under different scenarios. If we trust the data available for Punjab, our analysis suggests that it is the lone state which is ready to relax measures except for the hot spots in the state. In addition, Odisha despite being in category 2 can relax measures in the state except the hot spots, as its healthcare system will not be overwhelmed in the next two months if the state continues to test-and-quarantine the COVID-19 positive individuals with the current efficiency. Healthcare system is also not likely to be overburdened in Bihar for the next 2 months despite relaxations in measures in non-COVID areas if the state manages the home-coming of the fellow guest-workers well by immediately quarantining them in quarantine facilities.

Projections for healthcare demand in India and the best scenario to opt for:

Trend (Values shown for end-July projections*)	ICU Occupancy	Specialized Ward Occupancy (only meant for severe cases)	Cumulative Deaths	Cumulative Reported Infected Cases
Present (Best)	28000	70000	57500	2100000
Present (Worst)	36000	87500	65000	2500000
Relaxed (Best)	500000	1000000	400000	15000000
Relaxed (Worst)	2250000	6000000	1600000	75000000
Stricter (Best)	2000	5000	20000	500000
Stricter (Worst)	12000	28000	36000	1150000

TABLE 1: Future projections for India

**It is important to understand that these numbers will adaptively change: Any long-term prediction is bound to change. Hence, we should take these numbers for preparatory scenarios and alter our decisions accordingly.*

This article is beyond the scope of putting state-specific results. However, we would like to say that most of the Indian states are likely to see a surge in health care system usage over the coming weeks based on the trend observed over past few days. The future trends are projected based on Table 2.

Trend	Contact dependent transmission	Hospitalization of severe cases
Present (Best)	Average of last 15 days (5 window-history)	Most probable value of the projected rates till now
Present (Worst)	Average of last 25 days (10-window-history)	Most probable value of the projected rates till now
Relaxed (Best)	30% reduction compared to transmission before lockdown	Average# value of the projected rates till now
Relaxed (Worst)	10% reduction compared to transmission before lockdown	Average# value of the projected rates till now
Stricter (Best)	50% reduction from the median of last 25 days	Most probable value of the projected rates till now
Stricter (Worst)	20% reduction from the median of last 25 days	Most probable value of the projected rates till now

TABLE 2. Methodological details of the trends, we consider for future projections described in TABLE 1.

#In relaxed scenarios when contact frequency rises, with the current efficiency of trace-test-treat, a greater number of people with mild symptoms would remain undetected, thereby proportion of the detected symptomatic cases who would require specialized care is likely to rise, and hence the average value of the projected rates till now is considered instead of the most probable value of the projected rates till now. This is a kind of conservative assumption (the actual proportion of the detected symptomatic cases who would require specialized care, might be higher).

Maintaining the present trend or more stricter measures till July would cause severe economic damage while relaxation of the measures now is likely to cause overwhelming situation for the healthcare system. It is also important to note that these projected numbers are based on conservative assumptions and only for the confirmed COVID-19 cases. There would be a significant number of suspected COVID-19 cases who would also require specialized hospitalized care/ICU admission. We should keep in mind that in the pre-COVID-19 era, *Indian healthcare system has often faced challenges in normal situation as well in terms of providing a specialized hospital bed or ICU for other health conditions. This, in conjunction with a probable surge of non-COVID-19 critical cases due to some level of neglected care to non-COVID-19 patients suffering from other major illnesses in lockdown phase, would mean that India should be prepared with* ***at least with these many extra numbers*** *of specialized hospital beds (meant to handle the severe cases) and ICUs based on which scenario, we opt for.*

The head of our Department of Systems Immunology, Prof. Michael Meyer-Hermann, in a socio-economic study from and epidemiological point of view (https://www.ifo.de/DocDL/sd-2020-digital-06-ifo-helmholtz-wirtschaft-gesundheit-corona_1.pdf) written together with the German economic institute (Ifo Institute) showed that a temporal reprouction number of around 0.75, is optimal in order to reduce the economic impact of the pandemic without endangering the healthcare system in the setting of Germany. India, being country with much younger population, could have certainly achived the goal with a higher temporal reproduction number if the per capita health care system capacity would have been equivalent to Germany. In the absence of that, India needs to push the time-dependent reproduction number to a value well below 1 as early as possible to minimize the extended loss of working hours.

In terms of normalizing the situation sooner, it is important to strengthen the measures and take the time to prepare the country, its office and public interaction premises and simultaneously increase the capacity of testing, boost up production for all basic and full PPE kits, strengthen the healthcare system with an eye towards building permanent hospitals for a post-lockdown era during this phase to better tackle the crisis. The best scenario would be to strengthen the measures in all the red-zone districts, the orange-zone districts where the outbreak is scattered and not specific to a limited number of containment zones, and all the containment areas (if any) in the green-zones.

Why 'Herd Immunity' by simple means is unlikely to be achieved without overwhelming the healthcare capacity in India?

Because of the nature of the disease and the ease of transmission (even from the asymptomatic cases), every country has a huge number of undetected cases despite their best efforts, for example, in Italy, it is predicted to be over 85 percent (our results). *Due to timely implementation of various measures and the lockdown, our results suggest that **at least** around 66 to 69 percent of the currently infectious population remain undetected in India. Our estimates suggest that **at least** around 900000 are infected till 31st of May including the currently exposed individuals.* Lifting the lockdown in the affected areas would make it difficult to trace people, and a greater number of people are likely to remain undetected and transmit the disease. In India, around 53.2 percent people live with older generation or high-risk candidates (*Prof. Dr. Moritz Kuhn@dw.com*), and most of the families share extremely limited living space among the family members of various generations (Prem et al, 2017, PLOS Computational Biology: https://doi.org/10.1371/journal.pcbi.1005697). Hence, isolating only the high-risk group and older generation, while allowing the young population to take the burden of the infection by relaxation of the measures in the hope of attaining herd immunity would cause a disaster. We also must remember that the average lifespan of an Indian is around 69.1 years, which is fairly shorter than the life expectancy of a human in the developed nation, for example, 81 years in UK as well as in Germany, 81.75 years in Canada, and 78.74 years in USA (https://www.worldbank.org/). Hence, a significant fraction of mid-age Indian population is likely to have underlying health conditions. This same age-group is probably considered to be a low risk group in the developed nations and is likely to show mild to moderate symptoms for COVID-19 infection. Hence, simple ways to attain herd immunity by allowing the infection to spread would cause overwhelming situation for the healthcare system in near future. Furthermore, the clinical knowledge regarding the long-term consequences of the disease and its role in developing any secondary health conditions later, have not yet started to unfold. Recent evidences suggest that the COVID-19 infection is more than the previously thought respiratory illness and, in its clinical course, can take unprecedented turns including affecting the blood vessels (https://innovationorigins.com/is-the-coronavirus-more-of-a-vascular-disease-than-a-respiratory-disease/) and cause significant amount of blood clots (https://www.nature.com/articles/d41586-020-01403-8). It may well leave individuals prone to develop blood clots. Considering the lack of knowledge on any such unknown adverse outcome(s), it is not a good decision to take the path of uncontrolled spread of the infection to achieve herd immunity. *Despite having so many undetected cases around, the effective reproduction number which, in a way, represents the extent of immunized population, has not seen almost any drop as compared to the basic reproduction number in the beginning of the outbreak.* It means that only a tiny fraction of the total Indian population has attained immunity following the infection, thereby implicating that with lockdown being lifted, we are likely to back to the pre-lockdown situation and all the efforts so far would likely to see a failure in that case. We would also like to emphasize that the government in all levels must emphasize on the fact that people having other diseases should get proper access to health care system in necessity while simultaneously managing the COVID-19 crisis.

Important to win the trust of our fellow guest workers to minimize the surge in number of undetected cases:

We hope that the Indian government is possibly trying its best to deal with the multi-fold and may be, some unprecedented crisis, such as the issue with millions of migrant workers. The home-going of the migrant workers to the diverse corners of the country, is likely to be followed with a surge of COVID-19 cases everywhere, and especially at the villages. We are concerned that a significant number of such cases may remain undetected and undocumented if the government authorities in all level (local-district-state-central) fail to win the trust of these fellow migrant workers. We are already seeing, many of them, are trying to escape the COVID-19 tests by pulling the chains to halt the trains in odd-locations. All possible efforts should be made to win the trust of our fellow migrant workers so that they cooperate with the government authorities.

Religious places must remain closed:

Furthermore, all religious places must remain closed now across the country and all large gatherings must be avoided. Most of the religious institutions are specially the hubs of infection transmission to the high-risk groups and to the family members living together with older generation.

How do we keep the economy moving?

1. Use young (<40 years) unemployed human resource on contract basis in the supply chain of essential commodities, e.g., delivery of essential items (food, medicines, groceries) to every household in bi-weekly basis and local transfer system of non-confidential duplicate copy of files related to official works to those who must work from work due to belonging to high-risk group. These measures would cause sharp decline in gatherings as well as will keep the economy running.

2. On contract basis, utilize the COVID-19 negative and recovered migrant workers who already reached their destination as local human resource to set up block/municipality/panchayat wise quarantine facilities in their respective locality.

3. The lock-down phase is also ideal to facilitate the developmental works of closed office premises, schools, colleges, institutions, and universities. Engage the local workforce (who do not need to travel from far) into these actions.

4. Engage the local workforce into development works at the tourist spots, for making roads, setting up new railway lines.

5. On contract basis, utilize fairly educated young unemployed human resource for home-to-home surveillance. Even, a portion of such fellow Indians with proper background can be quickly trained for sample-collection and can be utilized as mobile sample-collection teams.

6. Domestic flight, trains, and buses (intra-state, inter-state, intra-district, and inter-district) : As of now, based on the current dynamics of the disease-outbreak, we would strongly suggest to hold back these services for few more weeks specially when the services contain stoppage in red-zones and orange-zones with scattered outbreak in between. However, communication between green zones can be allowed. In orange-zones, only if, the disease outbreak pattern is concentrated to very few containment zones, these services can be started in between non-COVID-19 affected areas.

Selectively provide basic PPEs (Mask, Face-shield, Gloves) to all workers engaged in works mentioned in “1 – 4” and full PPE support to workers engaged in “5” who are living with at least one person of high-risk group at their place of stay. All allowed journeys should be done with basic PPEs.

Use home-surveillance to categorize families based on the number of high-risk members in family: Run economy using the members from low-risk quotient families:

Use extensive home-surveillance to mark families in four distinct categories: (i) All family members belong to high-risk group, (ii) Two or more family members belong to high-risk group, (iii) Only one family member belongs to high-risk group, (iv) None in the family belongs to high-risk group. *The categorical divisions of the families can do wonder for India as explained in later points.*

Issue:

Red cards: all persons living under category (i) and high-risk candidates living in category (ii) & (iii).

Orange cards: low-risk family members living under category (ii)

Purple cards: low-risk family members living under category (iii)

Green cards: all members living in category (iv)

- *Allow all activity for the green-card holders, and extensively utilize them as human-resource for running the economy.*

- *Impose hierarchical heavy fine system for not adhering to social distancing, nose-mouth protection, and hygiene measures, i.e., fine for red card holders> fine for orange card holders > fine for purple card holders > fine for green card holders.*

- *For families belonging to category (i), the government must start a channelized supply chain for essential items.*

Use work shifts based on the the risk quotient in the families of the working individuals:

Divide the official working time into three time-shifts and stagger the activity of the people based on the categories they belong to, e.g.,

Time-shift 1: Allow all green-card holders to move, come to work and commute (mask must).

Time-shift 2: All purple card holders to move come to work and commute (mask, face shield, gloves must).

Time-shift 3: Only those orange card holders who cannot really work from home because of the nature of the service they do, could be allowed to move, come to work and commute (mask, face shield, gloves must).

The red-card holders must stay at home, and others should be encouraged to support them. The office (for example, essential files or any such things) should reach to the red-card holders who work in government offices in important posts.

This kind of distribution will minimize the transmission to the high-risk group thereby minimizing the usage of the health care system, however, this sets practical problems in running the schools. Schools being a major hub of asymptomatic transmission should be kept closed for at least a month more, and then a timely decision regarding opening can be made based on the situation.

We note that a group of Indian scientists has independently developed (appeared online on 18th of April, 2020) a model, equivalent to a simpler variant of our model used for Germany (appeared online on 10th of April, 2020: https://gitlab.com/simm/covid19/secir/-/wikis/Report) to extensively study the impact of various kinds of

lockdown strategies and guide the government decisions based on that (https://indscicov.in/for-scientists-healthcare-professionals/mathematical-modelling/indscisim/).

Results from their study have shown that asynchronously placing one third of the workplace into lockdown periodically (staggered asynchronous lockdown) can be effective. On the other hand, *our initial results suggest that staggering the workforce considering the risk quotient in the families of the individuals as mentioned above and distribute them as staggered workforce into different time-shifts in a particular working day (with sufficient gap between these groups to prevent interaction among these groups) gives optimal results in terms of the health care usage and maximization of working hours.*

Such activities should now only be allowed in green-zones and to some extent, cautiously, in the orange zones having very clustered disease outbreak pattern. However, green-card holders may be allowed to participate in all activities outside the containment areas of the red-zones. *These, all together, will contribute to some level of herd immunity and minimize the transmission to high-risk group.*

Create distinct databases to aid modelling as well as patients:

To better help in modelling the disease outbreak, predicting the course of the disease as well as help people accessing the current update regarding health care usage, it is extremely important to maintain the quality of the data. Instead of providing the current total numbers, the authority should emphasize on building three different kind of database.

(A) One of which would provide details of each patient (starting from patient number 1 in India) mentioning: Sex, Age, State, District, Symptom onset date, Sample collective date, Reporting date, Travel history, Date of reaching in destination, Date of quarantine, Date of dedicated hospital admission (after being moderate to severely ill, Date of shifting to ICU, Date of shifting back to ward from ICU, Date of death (if died), Date of being stable (non-dependent on hospital care), Date of discharge.

(B) The second one would be providing daily status of the present situation including the previous history. It would contain three different sheets: (A) India, (B) State based data, (C) District based data, and should have the following information:

Date, Number of new reported cases, Number of deaths, Number of cases among the new cases that are exported from a different place (for India, it would be imported from abroad; for a state, it would be imported from a different state; for a district, it would be imported from a different district), Number of patients in isolation or quarantine facilities including those who are at home quarantine, Number of currently admitted patients who are admitted in ICU, Number of severely ill patients (excluding ICUs) who are in dedicated COVID hospitals, Number of mildly symptomatic patients who are admitted in COVID care centres, Number of discharged people.

(C) The third one is for helping people to find a suitable vacancy in dedicated hospital /ICU/COVID care centre/isolation facilities. It should be district wise and should mention the current availability of beds in specialized hospitals, COVID centres and isolation facilities.

Compulsory leave to those even with minimal symptoms including loss of taste/smell:

Given the fact that 80 percent of the people affected with Coronavirus might only develop mild symptoms (common symptoms of cold, cough, headache, low grade fever or chills, mild shortness of breath, recent diarrhoea, body and muscle ache and general feeling of being unwell) and that too very much similar to flu or common cold, and some of the asymptomatic patients may develop loss of taste/smell, it is extremely important

to ask each citizen of India to remain socially isolated for at least 14 days in case the person develops any such symptom. This will not be an easy task in a country like India if the government does not impose compulsory leave for those with any of these symptoms.

First prepare the office-premises for post-lockdown era:

All shops; receptions; public communication places in all offices, banks, post-offices etc; pharmacies; train compartments; and any other place wherever people interact closely by speaking louder should be considered for putting a glass shield to avoid transmission. Before reopening the office/public premises, utilize the lockdown phase to incorporate engineered changes in workplaces, such as, making cubicles for the employees in workplaces. Preventing people from speaking louder by placing soft-loud speakers would be helpful in lowering the transmission to considerable extent. In this regard, we would like to point out to the following article: https://www.cdc.gov/coronavirus/2019-ncov/community/office-buildings.html

We strongly request to consider the suggestions presented here for controlling the outbreak in India and to keep the economy moving . Furthermore, we request all the state governments to provide true data and not to hide any details. It is important to access the situation on daily basis and take timely decisions based on the trend and future forecasting of the disease outbreak. Altering the data by any means would fail to help in decision making. One of the major problems in India seems to be the lack of the awareness regarding distance measures and self-protection, and regarding taking the multifold-crisis caused by the viral outbreak seriously. We urge the politicians to make the common people aware of the real course of the outbreak with scientifically motivated statements: creation of panic as well as providing the people a false hope by hiding information, both of these should be avoided. Common people tend to be more cooperative by adhering to the measures if they are provided with thr real information. As we have said in our Helmholtz Initiative position paper, we would restate: *We also believe that easing the measures at this point and being forced to reintroduce them later on comes at a high risk: It would likely be more difficult to communicate the necessity of resuming the measures to the population later on than simply continuing them now.* To end with, we must emphasize that the authorities in all levels should make sure that nobody in the underpreviledged group of the Indian society is left aside from being provided with the economic aid, and nobody dies in hunger.

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References:

(1) **http://india.secir.theoretical-biology.de**

(2) **The summary of the suggested key political decisions:**
https://gitlab.com/simm/covid19/india.secir/raw/master/static/summary.pdf

(3) **Detailed presentation of our state specific data-based modeling work:**
https://gitlab.com/simm/covid19/india.secir/raw/master/static/modeling_work.pdf