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To
Preeti Sudan, IAS
Secretary, Department of Health and Family Welfare
Ministry of Health and Family Welfare
Government of India
Room No. 156, A-Wing, Nirman Bhavan, New Delhi 110011

19th May, 2020

Dear Madam

This is concerning your letter dated 17th May, 2020 to all Chief Secretaries of the states of the Union of India on the classification of Hot-Spots/Red/Orange/Green zones in their states. You have given the freedom to the states to design a multi-factorial metric which uses the following attributes (with desirable values):

1. Total active cases (zero in the last 21 days) and active cases per lakh.
2. Doubling rate (calculated over 7 days, >28 days).
3. Case fatality rate (%, <1%).
4. Testing rate per lakh (>200)
5. Sample positivity rate (%, <2%).

This is welcome since the states are constitutionally, as well as practically, better enabled to manage public health. However, there are some corrections and additions which I would like to suggest.

Firstly, since the zone label decides many of the restrictions issued by the Center, it has become an end in itself. For example, many district administrations and residents are reluctant to allow the return of migrants, even when there are very good quarantine arrangements, solely because it may move the district from green to orange or red. The zone classification also misses some important socio-economic and demographic determinants, for example, the density of the area, number of people in dwellings with 1 room or less, or the fraction of people using community toilets. As we know, much of the infection is spreading within such dense wards and slums. Such a metric will be an important guide to both long-term planning as well as indicate the limits to good behavior.

The second problem with this notation is that many people equate the Red-ness of a region with the need for lockdowns. In fact, some states have set themselves targets to "keep green zones green" and eventually make "red zones green", and to achieve this before the monsoons, perhaps with a few additional lockdowns. I think it is important that your ministry guides the states in setting realistic goals. They must understand that we must learn to live with the virus, as your colleague Mr. Lav Agarwal pointed out on May 8th, 2020. People must also understand that lockdowns are a small part of one particular strategy to manage

the virus. In fact, many countries have achieved a reasonable amount of control without the stringent and extended lockdowns that we have used.

I must also point out that certain key data already available with ICMR may be used to better indicate the severity and dynamics of the contagion. In the Specimen Referral Form (SRF) for the ICMR PCR-Test, there are 6 possible reasons why the test was recommended. These are:

1. Symptomatic international traveller in the last 14 days.
2. Symptomatic contact of lab-confirmed case.
3. Symptomatic healthcare (and now frontline) workers.
4. Hospitalized SARI (Severe Acute Respiratory Illness) patient.
5. A. Asymptomatic direct and high risk contact of a lab-confirmed case.
   B. Asymptomatic healthcare (and now frontline) worker in contact with a confirmed case without adequate protection.
6. Symptomatic Influenza Like Illness (ILI) patient in (hospital/ MoHFW)-identified clusters.

In the new guidelines of 18th May, 2020, the following have been added:

7. All hospitalised patients who develop ILI symptoms.
8. All symptomatic ILI among returnees and migrants within 7 days of illness.

Given this rich data and the number of positive (Y) and negative (N) cases, many useful indicators may be designed and evaluated for any area, every 14 days. For example, the fraction of cases which arise from SARI or ILI, i.e., $(Y4+Y6)/Y$ are essentially the unexplained cases and an important indicator of community transmission [1]. Moreover, $Y6/Y$ gives us a metric of the effectiveness of our containment zones. Similarly, $(Y2+Y5A)/(Y2+Y5A+N2+N5A)$ estimates the infectivity of the disease. If Reason 8 is modified to cover both symptomatic and asymptomatic cases, then $Y8/(Y8+N8)$ is the infectivity of the migrants[2].This, coupled with other quarantine data already included in the SRF, will give us the risk from migrants to the community at large. In any case, the number Y8, i.e., infected migrants, if suitably quarantined, must be subtracted from the total number of positive cases for that area/district, for they did not arise there and they are outside the infective load in the area.

In general, a sharper version of the SRF with better geographical and transmission links will yield many important insights.

The inclusion of migrants in the SRF is indeed welcome. Even more welcome is the setting up of a National Migrant Information System (NMIS) on the NDMA database. May we expect indices based on the fraction of migrants who have safely reached home and the state-wise status of those who haven't and the reasons for the same?

Finally, a primary focus of the states should be on prevention and to improve the preparedness in the villages and towns in concrete terms. An important metric which

incorporates preparedness is the number of beds, doctors and ambulances per 1000 and compares it with the active case rate. Any shortfalls of equipment or manpower may then be met in a structured manner, through the support and contributions of community organizations. Much of the preparedness data is already being submitted by the states in the central data portals such as covid19.nhp.gov.in. This may be supplemented by two core indicators, viz., the functioning of the PDS and availability of drinking water at the habitation level.

Coming to prevention, the importance of masks, distance and open ventilation is still not appreciated. A simple statistical metric is to measure the prevalence of masks. This can be done by installing cameras in suitable locations such as markets or bus stations and counting people with masks. Well-crafted metrics and standards will go a long way in sensitizing people and creating new professionals who will advise regional and city administrations, factories and institutions. For example, adapting residential and office buildings for better ventilation in the hallways, retro-fitting of elevators for better air replacement and their innovative scheduling, may bring substantial reduction in contact rates. Social distance measures are also amenable to indicators. For example, the fraction of buses which have installed a sheet between the driver and the passengers, or innovative ways of ticket vending should be recognized. Studies of contact rates in the usual socio-economic or institutional transactions should be done.

Much of mitigation and abatement requires social comprehension as well as local and regional solutions which need scientific studies and careful design. A key role of your ministry could be to coordinate these efforts and provide scientific inputs, perhaps through the leadership of the central institutions in their states. Designing good metrics and providing data for the same is an important step in that direction.

I thank you for your patience.

Best wishes and regards,

Milind Sohoni
Professor, IIT Bombay and IIT Goa.

Endnotes:
1. On 17th May 2020, of the 221 cases which were positive on that day in the city of Bengaluru, 24 were SARI/ILI, i.e., about 10.8% of the case. Covid-19: Primary contacts spread virus the most in Bengaluru | Bengaluru News. Times of India.
2. On 19th May, of a sample of 8337 migrants in Bihar, roughly 8% had the infection. Coronavirus in Bihar: 8% of migrants in Bihar test positive, state stares at big count | India News. Times of India.