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Prioritization of COVID-19 Response by Vulnerability Mapping at State and District level in India

an evidence based approach for policy planners and program managers

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India is currently facing a second wave of COVID-19. The infection is known to be overdispersed with negative binomial distribution (1) marked with super spreading events. This is consistent with the pattern observed in India with approximately 80% of the caseload being seen in 27% of districts. Because of the overdispersion with multiple super spreading events marking the distribution of cases, a more targeted action with ring fences around identified mega-clusters would be warranted Compared with targeted closures, a prolonged large scale containment strategy is associated with adverse consequences to health, economy and society, as has been shown in the previous wave. State level restrictions on the other hand should be determined by the national distribution of cases. In particular there is emerging evidence that the present situation has resulted from a mutant virus with higher transmission characteristic (2). This makes it even more important to go for a robust cluster containment strategy.

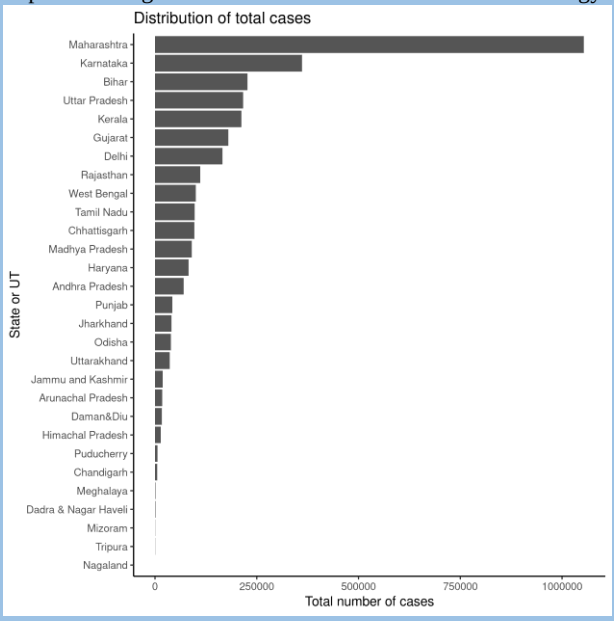

Fig. 1 Distribution of cases across States in India

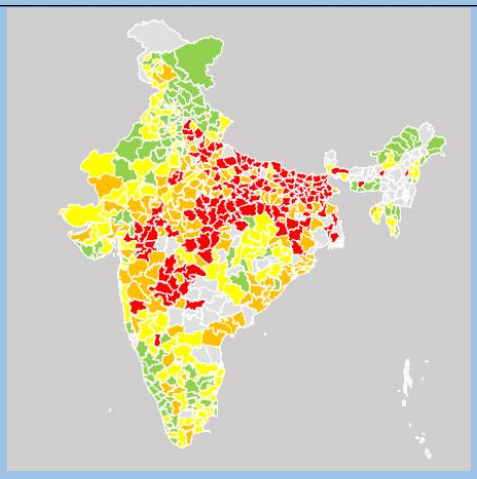

Fig. 2 COVID-19 Vulnerability across districts in India showing top 10 impacted tier II cites (black dots)

In the disaster risk reduction (DRR) framework, vulnerability is a function of exposure, sensitivity and adaptive capacity. In this study the authors have improvised upon a baseline vulnerability index for COVID-19 brought out during the first wave in India (3) and have added measures of cases (/100,000 population), case fatality rate and proportion of vaccinated population. These methods from DRR have been applied to the health sector in earlier exercises in the context of cyclones, floods and climate sensitive health outcomes such as heat stress (4,5,6). The district level maps clearly bring out areas of the country which will not be able to cope with the current case load and fatality of COVID-19 due to prior vulnerabilities and inadequate vaccination. Policy planners and program managers need to accord highest priority to these districts for containment measures, resource mobilization and the ongoing national vaccination drive.

The methodology, indicators, data sources and detailed State level vulnerability maps are given in the appendix (www.tinyurl.com/IndiaCOVID19Vulnerability)

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