May 2021

Preparedness for crisis response to the second wave of COVID-19 in India: policy brief

Policy Considerations & Recommendations

India successfully averted any significant mortality and morbidity due to COVID-19 in 2020 through institution of several measures. However, the ongoing surge of COVID-19 cases has significantly stretched health systems infrastructure in the country.

Key policy considerations are:

1. Estimates on the course of the pandemic as per the IHME model indicates that the second wave of COVID-19 will cause significant mortality and health system crunch in coming weeks to months with peak health systems burdening yet to be achieved in many states. There is an urgent need to rapidly act to prevent transmission and mount crisis response and state-wise estimates are provided. We however recommend using a multi-model approach, with the worst-case scenario being considered for planning and strategy development.
2. There is an urgent need to "flatten the curve" of transmission and contain the spread of COVID-19 infection by:
    a. Adoption of a graded public health response for movement restriction and scaling it up guided by multi-indicator technical criteria. We recommend the use of Ontario COVID-19 response framework (with suitable state-level adaption, if necessary) which mounts five colour coded grades of responses, based on epidemiological, health system capacity and public systems capacity indicators. A state-level dashboard which captures indicators guiding the graded public health response might be developed to ensure better decision making and build citizen trust in restriction measures.

What is a policy brief?

A policy brief provides a summary of global research on a particular topic **to inform decision-making contextualised to a particular setting**. This policy brief is based on evidence from multiple levels of evidence identified through of mulitple rapid evidence syntheses conducted in 5 days.

Why was this policy brief developed?

The policy brief was co-developed and on request from National Health Sysems Resource Centre, India.

Citation

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Evidence on different types of restriction measures is presented and other graded public health response frameworks is also presented.

b. A multi-component community-based intervention to remove barriers to access and promote mask usage consisting of the following components needs to be invested on and scaled up across India:
    i. Engaging community-based organisations to ensure availability of free surgical masks (free door-to-door distribution of surgical mask would be appropriate strategy after surge is over),
    ii. Offering information on mask usage and disposal with videos on tab, brochure in local languages and other community-based platforms,
    iii. Endorsement and advocacy by local community leaders – healthcare, social, political and cultural,
    iv. Periodic in-person monitoring of mask usage including providing reminders and distribution in public spaces,
    v. Development of protocols for disposal of masks in safe and environment friendly manner.

3. Ensuring health system preparedness for COVID-19 surge:
    a. Urgent investments to ensure scaling up of a crisis health system (for both COVID and non-COVID needs) is required. Evidence on several strategies (shelter hospital /alternate hospital sites; mobile field hospital, Biocontainment patient care units; recovery /rehabilitation units; deployment of hospital ships and planes; escalating ICU/HDU resources in ICU; community care facilities; hospital re-engineering; medical missions) used successfully in other countries for COVID-19 surge is presented. We recommend institution of all modalities, as relevant, considering the magnitude of crisis.
    b. Shortfalls in ventilator requirements, after purchase through routine supply chains and those received through aid, might be met by requesting support from organisations with capacity to manufacture open source ventilators. A resource on ranking of open source ventilator on several parameters is presented. Training for critical-care staff and accessories for ventilators including oxygen delivery need to be addressed.
    c. There is an urgent need to support people with COVID-19 who can undergo home care safely and scale up telemedicine provided by registered medical practitioners. Telemedicine facilities should be linked to transportation and hospital admission facilities such that severe patients can be optimally managed.
    d. The government needs to urgently develop and implement a fair, just and transparent triaging criterion for rationale allocation of beds, oxygen, and other critical care resources in consultation with bioethicists. Evidence on different triaging strategies is presented in the form of an inventory.

Background

COVID-19 which was first reported in China in December 2019 saw its first reported case in India on 27th January 2020. With cases increasing in March 2020 the Government of India declared a national lockdown which halted all movement except for essential services. The lockdown had a positive impact on COVID-19 and successfully containing the virus during first wave with no overburdening of health system happening anywhere. The lockdown bought time for state governments and other public health agencies to put in place an augmented health system in anticipation of expected surge in cases.

India is now facing the second wave of COVID-19 which has overwhelmed the health system. State governments have revised strategies to deal with the pandemic surge but there is a need for crisis preparedness response on the second wave of COVID-19 in India. The National Health Systems Resource Centre (NHSRC) requested the George Institute for Global Heath for rapid evidence synthesis for the purpose. The organisations collaborated, scanned key issues and jointly conducted a rapid evidence synthesis with the following objectives:

1. To understand the magnitude of the second wave of COVID-19 at a national and state level, together with resource requirements,
2. To synthesise evidence on interventions that can flatten the curve" of transmission and contain the spread of COVID-19 infection,
3. To identify strategies and synthesis evidence for rapidly scaling up health systems capacity during COVID-19 surges.

Methodology

Considering the width of the issue and the need for rapidity, we integrated multiple levels and types of evidence using a fit for purpose approach for different aspects of the crisis's preparedness plans. The review was conducted in a period of 5 days, inclusive of report writing.

Summary of approaches is presented below and corresponding search strategies, is presented in an online methodological appendix.

- We searched for existing modelling studies available on COVID-19 which could provide predictions on the magnitude of the current crisis as well as provide estimates on resources requirements which can inform planning. We used the modelling estimates of the Institute of Health Metrics and Evaluation[1]

fit for purpose and summarised the details of the same. To estimate human resource requirement, we used the 2020 Standards of the Indian Society of Critical Care Medicine[2] for optimal care at peak. We also calculated crisis requirement (sub-optimal care) during peak by relaxing the optimal care standard by half.

- We conducted extensive grey literature search to identify resources on graded public health responses and identify a suitable candidate for contextual adaption.
- We searched for contextually relevant evidence on interventions that can promote mask usage and global evidence on movement restrictions to inform decision making.
- We searched for strategies for rapidly scaling up health systems capacity during COVID-19 surges in PubMed.

We summarised and conducted evidence synthesis narratively or provide an inventory for further resource development by other stakeholders working in the space and necessary expertise.

The policy brief does not cover the issue of oxygen shortage which is beyond the technical capacity of the team. Issues around vaccination have been covered in a sister evidence synthesis which was conducted concurrently by the same organisations.

Results underpinning recommendations

Results are presented thematically, and a living approach has been taken wherein detailed extracted evidence presented online allowing decision makers to access any future evidence that might be added. The policy brief is based on synthesis of six public health graded response frameworks, 115 research studies on several aspects, two reviews, and presents one inventory of resources. We also present estimates from one model to inform magnitude and temporality of the pandemic which can inform planning.

Magnitude and resource requirement for COVID-19 surge in India.

We identified a rapid review[3] of predictive models for COVID-19 in India from 2020 and supplemented it with additional models identified through online surge. We present projections of the Institute for Health Metrics and Evaluation (IHME)[1], as it provides estimates at both national and state level (based on government reported

deaths data), available publicly and updated regularly. No model, however robust, can predict course of pandemic with precision. As such planning and strategic decision making should be through assessment of multiple models (which provide estimates for the same parameters as provided by IHME), and the worst-case projection used to prepare health systems.

The IHME projection (as on 29th April 2021) estimated that India will witness a cumulative total of 10,18,879 deaths due to COVID-19 by August 01, 2021. Daily deaths, which are the best indicator of the course of the pandemic, indicated that the peak of total deaths will be in mid to late May 2021 with an estimated total of 12,170 deaths. We conducted additional calculations based on the Indian Society of Critical Care Medicine ICU standards 2020 and estimated that during India's peak, about 68,894 critical care trained doctors and 1,72,235 critical care trained nurses will be required for COVID-19 management alone. Detailed state wise estimates for total deaths, daily deaths, peak all beds and ICU bed requirement , critical care staff requirement to inform state data is made available online. It is important to note that all models are based on assumptions and the IHME projections are based on the assumption that vaccine distribution will be scaled up over a period of 90 days, and that the variant B.1.1.7 would continue to spread in certain locations within the country.

Graded public health response to upscale and downscale movement restrictions and other public health measures

We identified six public health graded response for decision making around movement restrictions and public health measures through extensive grey literature search. They have been summarised online. Based on characteristics of the indicators mapped for decision making the user friendliness for citizen communication we recommend the use the Ontario COVID-19 response framework (with suitable state-level adaption, if necessary). The framework mounts a five colour coded grades of responses, based on epidemiological (multiple parameters: improving robustness in decision making), health system capacity (hospital and critical care capacity) and public health system capacity (adequacy of contact tracing). The Ontario graded public health framework is presented below and might be adopted with contextual modification to allow for a technical decision making on initiation and grading down of restriction measures.

Table 1 COVID-19 response framework: keeping Ontario safe and open

Green – Prevent	1. Epidemiology: Weekly, Incidence rate, Percent positivity, Effective reproduction number (Rt), Outbreak trends/ observations, Level of community transmission and non-epi linked cases. 2. Health system capacity: Adequacy of Hospital and Intensive Care Unit (ICU) capacity

	3. Public health system capacity - Adequacy of Case and contact follow-up within 24 hours
Yellow – Protect	1. Epidemiology: Weekly, Incidence rate, Percent positivity, Effective reproduction number (Rt), Repeated outbreaks in multiple sectors and settings or increasing number of large outbreaks, Level of community transmission and non-epi linked cases stable or increasing 2. Health system capacity: Hospital and ICU capacity adequate; 3. Public health system capacity: Adequacy of Case and contact follow-up within 24 hours
Orange – Restrict	1. Epidemiology: Weekly incidence rate, Percent positivity, Effective reproduction number (Rt), Repeated outbreaks in multiple sectors and settings, increasing number of large outbreaks, Level of community transmission and non-epi linked cases stable or increasing, 2. Health system capacity: Hospital and ICU capacity adequate or occupancy increasing. 3. Public health system capacity: Case and contact follow-up within 24 hours adequate or at risk of becoming overwhelmed.
Red – Control	1. Epidemiology: Weekly incidence rate, Percent positivity, Effective reproduction number, Repeated outbreaks in multiple sectors and settings, increasing number of large outbreaks, Level of community transmission and non-epi linked cases increasing. 2. Health system capacity: Hospital and ICU capacity at risk of being overwhelmed. 3. Public health system capacity: Public health unit capacity for case and contact management at risk or overwhelmed.
Grey – Lockdown	1. Epidemiology: Adverse trends after entering red – control, such as: Increasing weekly case incidence and/or test positivity; Increasing case incidence and/or test positivity among people aged 70 or over; Increasing outbreaks among vulnerable populations, such as long-term care residents and residents of other congregate settings. 2. Health system capacity: Hospital and ICU capacity at risk of being overwhelmed. 3. Public health system capacity: Public health unit capacity for case and contact management at risk or overwhelmed.

We also present evidence from 58 studies on impact of lockdowns and night curfews on covid-19 transmission. They are summarised online here.

Improving mask usage and physical distancing

We identified a multi-component community-based cluster randomised controlled trial conducted in Bangladesh (contextually similar) which aimed to removes barriers to access and promote mask improved mask usage three times, which was sustained for 10 weeks and found to be cost effective. The different components of the intervention are:

i. Engaging community-based organisations to ensure availability of free surgical mask (free door-to-door distribution of surgical mask would be appropriate strategy after surge is over),
ii. Offering information on mask usage and disposal with videos on tab, brochure in local languages and other community-based platforms,
iii. Endorsement and advocacy by local community leaders – social, healthcare, political and cultural,
iv. Periodic in-person monitoring of mask usage including providing reminders and distribution in public spaces,
v. Development of protocols for disposal of masks in safe and environment friendly manner.

More details on the intervention, including scaling up considerations has been made available online for early view by authors considering the COVID crisis in India and Nepal at https://tinyurl.com/Banglamask

Strategies for scaling up health system during covid-19 crisis

We identified 33 articles on the issue which provided evidence and learnings on different strategies for scaling up health systems response. A detailed summary of evidence is available online here. Key strategies for rapid scaling up health systems capacity identified are:

- shelter hospital /alternate hospital sites and community care facilities (for cases to be admitted and triaged on immediately on appearance of symptoms (decreases secondary infection within families thus decreasing health system burden),
- mobile field hospital (additional capacity in rural areas),
- recovery /rehabilitation units (for addressing post-acute care issues),
- deployment of hospital ships and planes / medical missions (additional crises capacity),
- escalating ICU/HDU resources in ICU (escalating critical care capacity),
- hospital re-engineering (hospital space escalation),
- biocontainment patient care units.

Open Source ventilators for rapid scaling up of capacity

We identified two existing reviews/ repositories[4,5] on open source ventilators whose designs are freely available in the internet for others to build and replicate. The second source contains a color-coded spreadsheet (https://cutt.ly/7bjoxxo) of available open source ventilator designs with assigned scores over parameters of

openness, buildability, community support, functional testing, reliability, COVID-19 suitability, and clinician friendliness amongst others.

Home care supported by telemedicine

The high burden of patients implies the need for some home care supported by telemedicine. An inventory of contextually relevant resources identified by grey literature search is presented online living document here.

Triaging for rationale allocation of beds, oxygen, and other critical care resources

We identified 22 articles on the same and the detailed summary of evidence is available online in an online living document here. Key issues around triaging identified is presented below.

- Triaging criteria are intrinsically tied to ethical and moral questions as well as questions around clinical prognosis and social utility. However, developing them provided clarity to people in crisis. A crisis standard of care, and training of specific triage teams is required.
- Implementation of a triage system requires careful coordination between clinicians, health systems, local and regional governments, and public, with transparency and trust.
- Triaging criteria need to be developed for non-COVID care too as the surge affects capacity for service delivery across the board.
- Anxiety and psychological distress in healthcare workers in making triage decisions for addressing scarce resources is s. They need adequate support and rest to be able to handle triaging decisions better and be able to reconcile with their personal moral frameworks.

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