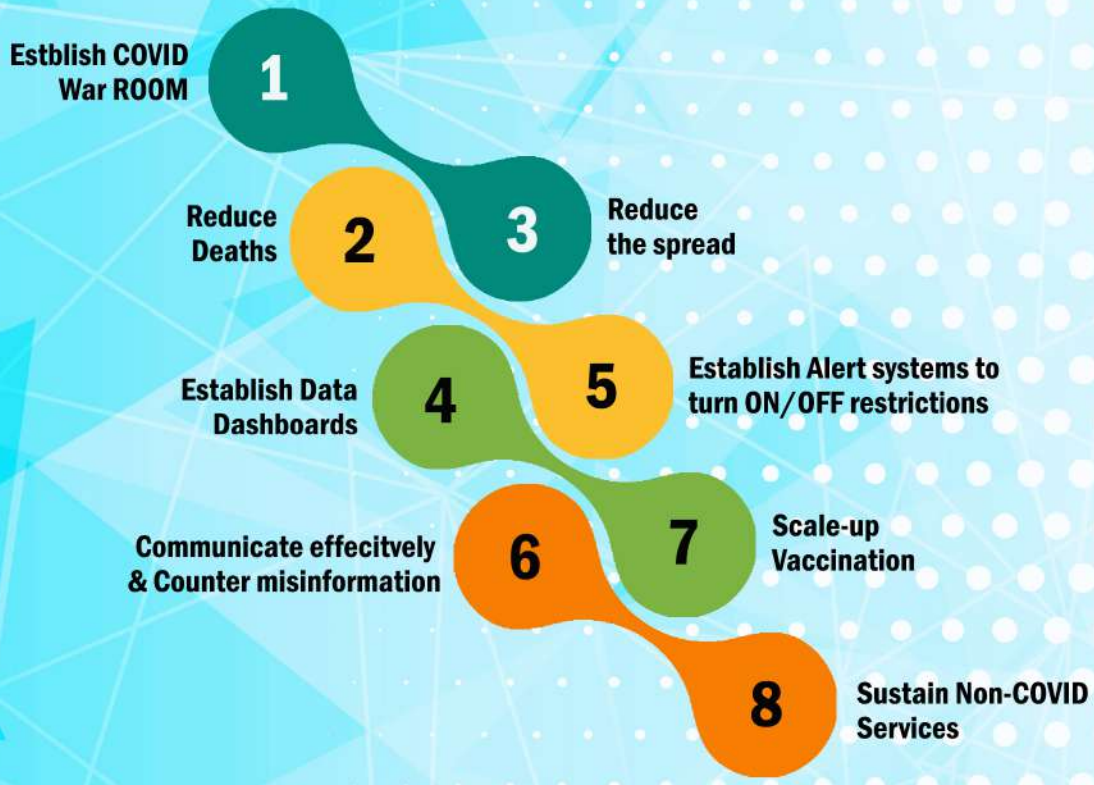
COVID-19 SECOND WAVE

CONTROL STRATEGIES



ICMR - National Institute of Epidemiology

Department of Health Research, Ministry of Health & Family Welfare,
Goverment of India

COVID-19 SECOND WAVE

CONTROL STRATEGIES

15.05.2021

Indian Council of Medical Research
National Institute of Epidemiology
Chennai, India

Table of Contents

1. Executive Summary 1
2. Control Strategies 4
   - 2.1. **Establish COVID Management Center (War Room)** 4
     - A. Information & Planning division 4
     - B. Operations division 4
     - C. Logistics division 5
     - D. Finance and administration 6
   - 2.2. **Reduce Deaths** 7
     - A. Triaging center 7
     - B. Increase oxygen beds 7
     - C. Increase ICU/ Ventilator beds 8
     - D. Evidence based clinical care 9
     - E. Ambulances & patient transport 9
     - F. Human resources 9
   - 2.3. **Reduce the spread** 13
     - A. Community centric approach 13
     - B. Surveillance 13
     - C. Increase testing 14
     - D. Source Identification 14
     - E. Contact tracing 14
     - F. Isolation and Quarantine 15
     - G. Workplace Management 15
   - 2.4. **Establish Data Dashboards** 16
   - 2.5. **Establish Alert systems to turn on & off physical distancing measures** 17
     - A. Identify the high-risk settings based on certain criteria 17
     - B. Develop alert levels to turn on and off the restrictions & physical distancing measures 18
   - 2.6. **Communicate effectively & counter misinformation** 20
   - 2.7. **Scale-up Vaccination** 21
   - 2.8. **Sustain Non-COVID services** 22
3. Annexure 23
   - 3.1. Sample Triaging Protocol 23
   - 3.2. Evidence-based review of therapeutic options for COVID 19 24
   - 3.3. Case Management Protocol developed by Government of Tamil Nadu 25
   - 3.4. ICMR Guidelines for Home isolation & care for COVID-19 26

THIS PAGE IS INTENTIONALLY LEFT BLANK

1. Executive Summary

Currently, the COVID-19 pandemic in India has surpassed the peak of 2020 and continues to grow exponentially at a rapid pace. The reported daily number of COVID-19 deaths in India has reached about 4000 every day (May 13, 2021), translating into three COVID deaths every minute. Many states already have high occupancy of oxygen and ICU/Ventilator beds. Without prompt public health interventions, the states are likely to follow the same trend in the number of cases and deaths in Maharashtra and Delhi. However, with tight state-level restrictions and scaling up hospital-based and public health interventions, we can slow down the transmission.

We are in a war against the virus, and unfortunately, the virus is ahead of us due to several unfavorable factors. These factors include new variants of the virus, poor compliance to COVID appropriate behavior, and low vaccination coverage. This has led to the overwhelmed health care system and put an immense burden on health care workers. We need to ramp up our strategies to overcome the second wave rapidly.

The states have been implementing several effective strategies which helped in overcoming the first wave of COVID-19. Several of these successful strategies can be replicated and scaled in the current situation. In addition, we need to add newer strategies to cope with the extremely high number of active cases. This document summarizes the successful models from the first wave and proposes newer, community-centric, patient-friendly, evidence-based, scalable, and feasible approaches. This document has been prepared based on the field experience gained in Tamil Nadu state.

The immediate priority is to reduce the COVID-19 deaths. Simultaneous mitigation efforts will help in reducing the spread of COVID within few weeks. We have categorized the strategies into eight major areas.

1. **Establish COVID Management Center:** A COVID Management Center at the state/district level will act as a nodal point for all organized efforts to mitigate the crisis. This war room will operate through multiple divisions, coordinating the planning, operations, logistics, finance, and administration required for COVID19 response. A district-level Bed Allocation System and a centralized Ambulance Management System will help allocate beds and ambulances to the needy on a priority basis. Oxygen war room under the logistics should help coordinate the demand and supply for oxygen promptly.
2. **Reduce Deaths:** The key to reducing COVID deaths is identifying the high-risk patients who need urgent hospital admission (Triaging) and shifting them to the hospital-based bed availability at the earliest (continuous ambulance and transport support). We need to double up the oxygen and ICU/Ventilator beds to provide oxygen support to the severe patients. This can be achieved by converting non-covid beds to COVID beds in both Government and private hospitals and medical colleges initially and adding beds over the next few weeks. The

Government may fix a reasonable rate depending on the level of facilities to reduce the economic impact on patients. We will also need to project the oxygen requirement for the next month and stockpile at least three times the current need.

Evidence suggests using steroids as a low-cost treatment option for reducing deaths and the requirement for mechanical ventilation. All these life-saving measures require adequate human resources to execute them efficiently. We will need doctors, nurses, lab technicians, field volunteers, and drivers with a good backup of each cadre. Incentivizing the workforce appropriately, such as permanent positions and priority for Post-graduate (PG) admissions, would attract the workforce.

3. **Reduce the spread:** Strategies to reduce the spread should be community-centric through a Community COVID Committee by involving the local bodies in enforcing COVID appropriate behaviors, supporting the patients in the community (home isolation & quarantine), and, most importantly, promoting vaccination. Strengthening the surveillance will help us identify the COVID cases through fever camps, private hospitals, laboratories, and CT scan centers. Increase the testing by bringing testing centers closer to the community and establishing dedicated sample collection centers. Identifying the contacts and testing them appropriately will vastly reduce the spread of the virus.

   We must investigate clusters in the peak phase and every case once the cases decline to identify the source, which would help us detect commonplaces of infection spread. Encourage use of the covid care centers for mild illness, monitor the patients with pulse oximetry, and if saturation declines, provide oxygen until hospital beds become available. Monitor and support the patients in home isolation involving community volunteers and telemedicine. Provide transport with oxygen if the patient's condition worsens over time. Specific mitigation measures such as surveillance to identify symptomatically and testing as required should be in place at workplaces, factories, and markets to control the spread of infection.

4. **Establish Data Dashboards:** A Data management system with dashboards at the district and state level, with key indicators such as incidence, case trend, number of tests, test positivity, bed occupancy, should guide the decisions. Village & street-level analysis helps in immediately identifying hotspots and preventing significant outbreaks.

5. **Establish Alert system to turn on and off physical distancing measures**: As the risk for the spread of COVID is not the same in all settings, strategies for reducing interpersonal contact should consider the ventilation, duration of exposure, and activity area. Physical distancing, universal marking, and improving ventilation should be encouraged in all settings. Mass gathering can lead to super spreader events and hence should be avoided.

   A four-level alert system based on three epidemiological indicators can be considered to turn on and off physical distancing measures. The indicators are

test positivity, change in cases measured by percentage growth by week, and oxygen/ICU bed occupancy. A complete lockdown should be implemented in the current scenario where oxygen and ICU bed occupancy has surpassed the 80% threshold. The measures can be de-escalated based on epidemiological indicators. During lockdown and restrictions, adequate social and financial support to be provided to vulnerable groups such as low-income households, daily wage workers, employees in the informal sector, and migrants

6. **Communicate effectively & counter misinformation:** An effective risk communication strategy is needed to reduce panic and build trust in the health system. Mass media campaigns involving celebrities and experts in mass media can enhance compliance to COVID appropriate behavior and counter misinformation.
7. **Scale-up Vaccination:** A vaccination drive to cover the population above 18 years should be based on a thoroughly prepared micro plan with more vaccination sites and a dedicated workforce. Community outreach vaccination drive can be considered at hotspots identified by street-level analysis. Vaccination of all the workers engaged in covid response needs to be ensured.
8. **Sustain Non-COVID services:** COVID 19 control activities will have to be sustained for the next few years. We have to, therefore, maintain non-covid services without stretching the health system and the existing workforce. A dedicated health team, which is not involved in COVID-related work, should ensure that National programs of public health importance and routine clinical services are continued. We must ensure Noncommunicable Disease patients are issued medication for at least two months closer to home.

Effective implementation of the above-suggested strategies in the short term and medium term will certainly reduce deaths, the spread of disease and prepare the health system for future outbreaks. The current situation calls for all stakeholders' strong involvement, including the community, to work in synchrony to win this war against COVID-19.

2. Control Strategies

2.1. Establish COVID Management Center (War Room)

During this ongoing pandemic, there is an urgent need to set up a "war room," an incident management system at the state and district levels. This war room can be the nodal point for all organized efforts to mitigate the crisis. The war room should have a Commander-in-chief who will lead the system with a selected set of Deputy Commanders. The war room may function under four named divisions led by Executive Chiefs. Team leads shall guide the specific tasks mentioned under each division with multiple teams and sub-teams.

A. Information & Planning division

Plan activities & resources

a. **Need assessment team** – The team can assess the requirements such as beds, oxygen, drugs, and transport daily, and human resources every week.

b. **Data analysis team** – The team can compile, analyze, and interpret the vital epidemiological indicators (explained below) daily for every district.

c. **Monitoring Team** – The team could monitor if the proposed activities planned for the day have been achieved. An effective feedback loop can be set to overcome any challenges.

B. Operations division

Unified command of operations

This division will be the command of all operations and will coordinate the various COVID control activities listed below:

a. **Public health team**: The task of this team will be to identify the positives among the population through effective surveillance, testing, and contact tracing.

b. **Triaging team:**

1. **Tele-triaging:** This team can categorize the patients depending on the severity using a telemedicine platform, thereby reducing the burden on triaging centers and hospitals.

2. **Field level triaging:** This team establishes and operationalizes triaging centers at least 1-2 per zone/block depending on the patient load. Patients are to be categorized in these centers based on their disease severity.

3. **Hospital level triaging:** This team supports and operationalizes a high-resource triaging center (Kiosk Model) for patients referred to hospitals from the field.

c. **Central Bed Allocation System:** A district-level centralized bed allocation system in coordination with the triaging centers at every district can be authorized to allot COVID-19 beds both in Government and Private hospitals, based on the availability and COVID disease category of the patient (based on the triaging algorithm attached as an appendix). The team should have real-time monitoring of the availability of Oxygen and ICU beds in the

hospitals and should allot beds for positives on a priority basis. For example, Mumbai Municipal Corporation successfully implemented this system and is now considered a model to be replicated across the country.

c. **Centralized Ambulance Management System:** This transit management system shall be the sole operator of all the ambulances or any other pre-arranged vehicle, which will help shift patients who are positive for COVID-19 from triaging center COVID Care Centers or to COVID Hospital and vice versa. Different modes of transport like autorickshaws, vans, mini-buses, cars can be used for patient transport with oxygen cylinders and PPE for the driver and other staff.

d. **Monitoring patients under home isolation:** This could be done through a WhatsApp-based Chatbot where either a patient or a volunteer can raise an SOS when the patient's condition at home isolation worsens (e.g., drop in oxygen saturation <94%). This system would aid us to appropriately route the necessary calls to a doctor to assess the patient's condition. In addition, we can establish district-level helpline numbers for patients under home isolation. Medical, Nursing & Para-medical students could be a part of this Home Isolation Helpline support.

e. **Vaccination Team** - Micro planning & mobilization of resources to conduct vaccination at the specific centers and outreach camps.

C. Logistics division

Procure and allocate resources based on needs.

a. **Oxygen supply team:** Maintaining adequate stock of oxygen in all health facilities is the need of the hour. This teams' sole objective will be to arrange the logistics for oxygen in a timely and efficient manner. Some key recommendations will be:

- Maintain a **Centralised Oxygen Demand Helpline number** through which hospitals and other covid facilities can communicate their requirement for oxygen.
- Maintain a **hospital-wise allocation plan** which can be updated daily based on the latest projections.
- The list of operators for **cryogenic tankers** available in the district or the zone needs to be made. They can be brought on board to transfer the allocated oxygen to its destination sites.
- A list of authorized **oxygen cylinder** dealers needs to be prepared and maintained at the War room. Definitive criteria for purchasing oxygen cylinders should be defined and enforced for all oxygen cylinder supplying vendors. This will ensure effective resource utilization and prevent black marketing.
- The oxygen war room can maintain a separate **Citizen Oxygen Helpline**. People in need can directly contact the war room and get verified links to procure quality oxygen to fight the disease.

b. **Supply chain team** – Ensure end-to-end stocks of medical equipment (like pulse oximeter, ventilators), essential drugs, test kits, and PPE kits.

Adequate forecasting of the needs to be performed considering delays in placing the order and in transport.

c. **Biomedical Engineering team** – The team can provide the necessary support to hospitals and field teams for equipment management.

D. Finance and administration

Administrative support

a. This division can take care of all the administrative and financial procedures to accelerate the procurements, workforce recruitment, and logistics.

b. Voluntary sector and CSR contributions in cash & kind should be pooled and judiciously allocated.

2.2. Reduce Deaths

A. Triaging center

- 1-2 triaging centers per zone (in corporations) or per block (in districts) depending on the active cases. Chennai corporation has established 15 triaging centers and successfully implemented this initiative for the past year. This model can be scaled and replicated in other districts.
- Location – Any spacious and well-ventilated place like school, college, etc., can be converted to triaging center.
- Task: The doctor and the nurse elicit clinical history, measure the oxygen saturation and vitals. The patient shall be triaged according to a suggested sample protocol (Annexure 1). This can be modified in consultation with various experts and stakeholders.
- **Tele triaging center** – A team of doctors who connect by video call to a field team to help in triaging positive cases at their residence at the field level. Paramedics can triage patients below 60 years. If they have any doubts, they can contact the doctor through telemedicine.
- The **tele-triaging field team** shall include a volunteer/ field worker equipped with a pulse oximeter and essential drugs (Tab. Paracetamol 500 mg & ORS sachet etc.)
  - Human resources: Paramedic/Field Worker can be between 20 -30 years. If volunteers are recruited, they can be students or graduates in any subject, preferably residing in the same area and have a smartphone.
  - Task: Visit COVID19 positive patient's home connect with the doctor through telemedicine, measure their oxygen saturation, and do the needful based on doctor's advice.

B. Increase oxygen beds

- **Bed requirements need to be projected** based on real-time, up-to-date data from all health facilities. Revisit the projections every week based on that week's data.
- **Fifteen oxygen beds are required per 100 active cases** based on the available data. This assumption can be revisited based on real-time data.
- **High flow Nasal oxygen:** All COVID hospitals should have adequate infrastructure to provide high flow oxygen therapy, which effectively saves lives.
- Oxygen beds can be added by:
  - Converting a few Medical Colleges & Private hospitals into COVID only hospitals,
  - Converting non-covid beds to oxygen beds for COVID and SARI cases in government and private hospitals,
  - Add additional oxygen beds in the COVID Care Centers.

- **Oxygen concentrators** for mild to moderate cases shall be placed in Covid Care Center where oxygen supply through liquid oxygen may not be feasible.
  - Place oxygen concentrators in the COVID Care Centers if oxygen saturation suddenly drops, or bed allocation in COVID Hospital is delayed.
  - Place oxygen concentrators in the **community level COVID isolation facilities like the community hall in the rural areas** or **common hall in a residential complex** for patients waiting for admission. These facilities can also be used for patients who are recovering and need to be discharged but continue to require oxygen
- Hospitals can **plan and store Oxygen cylinders as a backup** if any undue events like a technical failure or delay transport oxygen.
- Each hospital can **update bed status** to the operations team in the COVID war room with specific details on oxygen stock, oxygen & ICU bed vacancies.
- Postpone all elective procedures to reduce oxygen consumption by these patients and reserve these beds for COVID-19 patients.
- Involve IMA and Private hospital associations to increase oxygen beds in the private sector.
- The Government may fix a reasonable rate depending on the level of facilities to reduce the economic impact on patients.

C. Increase ICU/ Ventilator beds

- Requirement: **Two ICU/ ventilators per 100 active cases** based on the available data. The assumptions can be revisited based on updated information from the hospitals.
- **Tele ICU**: A panel of doctors trained in critical care who are willing to volunteer their time can be brought on to a panel and connected to ICUs in smaller hospitals with limited expertise. Hub and spoke model could be explored where a panel of 4-5 doctors may support 4-5 small ICUs based on patients and time.
- Super-specialty hospitals which have suspended elective procedures but have good ICU facilities can be converted into COVID ICUs.
- The hospital administration should ensure a continuous power supply maintained for machines in the ICU setup.
- Hospitals can **plan and store Oxygen cylinders as a backup** if any undue events like a technical failure or delayed oxygen transport.
- The Government may fix a reasonable rate for ICU and ventilator beds depending on the level of facilities to reduce the economic impact on patients.

D. Evidence-based clinical care

- The clinical decision in selecting the therapeutic options to treat covid patients should be based on scientific evidence.
- The use of Steroids is a low-cost treatment option shown to reduce deaths and mechanical ventilation requirements. Availability of steroids should be ensured in all the health facilities treating COVID patients.
- An evidence-based review of therapeutic options for COVID 19 has been attached in annexure 2. A protocol from Govt of Tamil Nadu to be used in all health facilities except tertiary care hospitals is enclosed (Annexure 3).

E. Ambulances & patient transport

- We require approximately three ambulances for every 100 newly detected cases (assuming seven trips per ambulance and 25% requiring hospitalization).
- A Centralised Ambulance Management System at the district or zone level (for corporations) described in the War room section needs to be in place. The existing 108 ambulance control room could be used for the same.
- Pooling the ambulance from government and private sectors to transfer patients to Government and private hospitals needs to be done first.
- Aggregate cab providers and autorickshaws can facilitate the transport of patients in an emergency when there is a shortfall of ambulances. Oxygen cylinders can be provided in these vehicles.
- The Ambulance Management system & the driver team should keep the bed vacancy in real-time to plan the transfers accordingly.
- Adequate ambulances at every district/block to transport patients from
  - triaging center to COVID Care Center or COVID Hospital
  - severely ill patients from home to COVID Hospital
  - COVID Care Center to COVID Hospital, whenever necessary.
- All ambulances should be equipped with oxygen cylinders.
- Additional transport support for non-emergencies – Autorickshaws, Private taxis, Tempo Travellers, etc., to support patients for screening, testing, covid care center, and discharges.
- Special attention to be given to vaccinate all the ambulance/ vehicle drivers handling COVID patients with the available COVID-19 vaccine.

F. Human resources

- The human resource requirements have been summarised as below
- Human resources should be added proportionately to the cases to ensure efficient service delivery and protect health care workers from overwork and burnout. We have outlined the tentative requirements based on the field experience in Tamil Nadu and recommended staff structure in various tertiary care institutions.

Focus Area	Human Resource Needed
Triaging Team (tentative)	
Triaging Facility	• One Doctor + Two Nurse + One Laboratory Technician + One Data Entry Operator (DEO) + One supporting staff per shift
Triage Back up team	• Three teams per district consisting of one doctor, one nurse, and one laboratory technician will be kept as a backup if the primary team is compromised.
Tele-triaging team	• Maximum possible number of Doctors who are willing to provide support for the patients through video calls initiated with the help of field volunteers or by the patient themselves.
Field team for tele-triaging	• One volunteer per village & 5 per ward
Clinical Management Team (tentative)	
Oxygen Bed	• Two doctors + Four nurses for every 30 beds • Posted at 8-hour shifts (3 shifts per day) • Adequate support staff for patient shifting & transport
ICU & Ventilator beds	• Two doctors + Two nurses for every ten beds • Posted at 8-hour shifts (Three shifts per day) • Adequate support staff for patient shifting & transport
Backup team	• A team (doctors, nurse, and supporting staff) which amounts to 20% of the total staff strength of the facility • To be activated if any of the health staff on duty gets exposed to COVID-19 or fall sick during the period
Points to note	• Prolonged working hours in PPE can reduce working efficiency and can lead to judgment errors. Therefore, adequate rest and rotation need to be provided to the posted staff. • An excellent technical support team should help the ICU posted staff from outside in getting the necessary drugs, food, and other required materials for the staff and patients.
Tele-ICU	• Trained critical care doctors are scarce. It is, therefore, not possible to place trained essential physicians of care in all the smaller towns and nursing homes. Tele ICU consisting of trained critical care physicians can provide technical guidance in establishing ICU and consultations for patient management.

- The following strategies can be explored to scale the human resources rapidly:

  a) Doctors:

  - Final year undergraduate medical students can help in triaging, handling patients' queries in home isolation, and supporting other field-level public health activities.
  - Medical post-graduates can be posted in the COVID wards and ICUs in both private & public hospitals.
  - Doctors pursuing super-specialty courses (MCh, DM, and Fellowships) may be trained and deployed to handle patients in the ICU and ventilator setups.
  - AYUSH and dental doctors can assist in various public health activities and call centers.

  b) Nurses:

  - Final year nursing graduate and all post-graduate students can be posted in the COVID wards and ICUs.
  - Additional nurses should be recruited for exclusive COVID-related activities.

  c) Laboratory technicians

  - MLT course trainees can be posted in labs and fields for scaling testing.

- INCENTIVES:
  - Incentives such as permanent positions and priority for PG admissions would attract the workforce.

- PROTECTION OF THE HUMAN RESOURCE

  As the saying goes, beds & oxygen alone cannot save the life of a patient. The State's health workforce needs to be treated as the most precious resource during a pandemic. The following critical areas require urgent attention:

  - **Vaccination for the newly appointed Health Care Workers:** All the newly recruited and any unvaccinated individuals in the existing system should be vaccinated for COVID-19 at the earliest.
  - **Timely Salary/Incentives:** The health workforce should be paid their salary promptly. The salary of the contractual staff should be appropriate for the qualification and working hours.
  - **Personal Protective Measures:** The health workforce should be offered adequate and appropriate Personal Protective Gears, including mask, gloves, coverall, head cap, face shield, hand sanitizer, etc. The logistics division of the COVID war room can ensure an adequate supply of the same.
  - **Quarantine Accommodation:** Suitable residential facilities should be provided for the hospital staff during quarantine periods.

- **Security:** Considering the incidents of violence against health care workers from different parts of the country, protection should be provided in all health care facilities.
- **Drugs & Oxygen availability:** Ensuring adequate drug and oxygen supply in the hospitals will aid in better treatment outcomes and reduce conflict between the public and the hospital staff.

2.3. Reduce the spread

A. Community centric approach

- Establish a **corona control committee** involving local bodies in every village and ward involving voluntary organizations, self-help group leaders, religious leaders, health inspectors, village health nurses, teachers, Anganwadi workers.
- This committee will make a weekly work plan and pool resources to carry out various activities mentioned below:
  - **Promoting hand hygiene & mask compliance** through mask distribution, education & monitoring
  - Markings for **physical distancing** in all the crowded places - PDS shops, temples, markets, etc
  - **Monitor patients under home isolation** - provide support and supplies.
  - Make adequate available **pulse oximeters** with committee members and familiar places such as Anganwadi, Schools, places of worship, PDS shops - where symptomatic can check their oxygen saturation.
  - Encourage **testing of symptomatic** individuals in the community.
- **Create COVID Care Centers** at the community level (schools, community halls, etc.) for patients who do not have facilities for home isolation.
- The committee can be authorized to impose a fine on violators of home isolation, quarantine, and lack of compliance to COVID appropriate behaviors.
- The committee can conduct meetings and campaigns to **promote vaccination.** They can mobilize the eligible beneficiaries to the vaccination center and conduct outreach vaccination camps at the village/community level.

B. Surveillance

- **Fever camps** were one of the most successful strategies for early detection of symptomatic and testing. This strategy should be scaled and replicated throughout the State. The fever camps should have adequate facilities for sample collection.
- Establish **24 x 7 additional sample collection centers** closer to the community in open ventilated spaces - schools, colleges, community centers. Chennai Corporation has established 31 centers, and this strategy has been very successful in making testing accessible to the citizens.
- **Identify hot spots** based on street/village wise analysis and conduct fever camps in the workplaces, factories, residential areas.
- Test people with any of the following symptoms - Fever OR Cough OR Sore throat OR loss of smell/taste OR Breathlessness.
- Given rising cases, consider introducing **Rapid Antigen Testing (RAT)** to identify cases **in the hotspots** - especially in the rural areas where RT PCR testing may lead to delay in treatment.

- The surveillance system should also include symptomatic patients reporting to private practitioners and CT scan centers. Daily line list of symptomatic and Chest CT should be collected from private clinics, hospitals, and scan centers by the Health Inspectors.

C. Increase testing

- Ensure **rapid turn-around time of RT PCR,** ideally 24 hrs to a maximum of 48 hours. Provide additional human resources and consumables to reduce the turn-around time to less than 24 hrs. Delayed test result leads to transmission, and delay in initiating treatment.
- Increase testing - **For every new case, at least five contacts need to be tested**. In addition, all symptomatic individuals should also be tested. Therefore, testing should be increased to a minimum of 8 times the newly detected cases per day. For example, on May 2, 2021, 20768 cases are reported. Therefore, we need to increase the testing to 1,66,144 tests every day. **Dedicated sample collection centers close to the community** will help in encouraging testing.
- Testing should be increased in the districts where the test positivity is more than 5%.
- **Testing strategy for High-risk setting** (likelihood of super spreaders): In high-risk settings such as markets, migrant worker setting (group accommodation), hotel workers, hostels & vendor groups - fixed number tests should be done every week covering the whole population over few weeks. This will enable early detection of new infections among asymptomatic people with mild symptoms to prevent super-spreader events such as the Koyembedu market.
- Establish a "**Genomic surveillance laboratory**" in the State. Five percent of the samples should be tested for variants/mutants every week (genomic sequencing).

D. Source Identification

- Conduct a detailed investigation of clusters in the peak phase and every case once the cases decline to identify the probable source of infection. The inquiry will provide information regarding familiar places where the disease is spreading.

E. Contact tracing

- Volunteers at every village and every community of the urban area must be identified and trained for conducting contact tracing.
- **One volunteer for ten newly detected cases**. Volunteers should be young, healthy adults in the age group of 18 - 30 years and can be paid an incentive of Rs. 300-500 per day.
- Increase the number of **health inspectors - One per 5000 population.** Trained workforce already available, which can be rapidly recruited.
- All family contacts to be tested on the day of notification of the new case.

- Extended contacts can be tested on the same day if symptomatic and tested on the 5th day if asymptomatic. The contacts should be in quarantine until the test results become available.

F. Isolation and Quarantine

- **Tele-consultation for patients under home isolation**. A dedicated teleconsultation center can be set up at the district level. Details of the same are discussed on page number 7.
- Transport home isolation patients to hospital or COVID Care Center if saturation drops (SpO_2 below 94%) or symptoms worsen.
- **Monitor home isolation patients** using a pulse oximeter.
- **Provide social support** (food, groceries, vegetables, medicine supply) to the isolated and quarantined individuals and their family members.
- Admit the patients with mild symptoms with an inadequate home environment to COVID Care Centers at the village or community level.
- The ICMR guidelines for home isolation and care for COVID-19 have been attached in annexure 4.

G. Workplace Management

- Employers can **encourage work from home** options whenever and wherever possible. If not, **offices can function with a reduced strength** to enable social distancing.
- A **cohort approach** can be followed so that only the same set of people meet each other when they come to the workplace. This approach helps in faster contact tracing, while the other cohorts can continue the work as planned.
- All small group meetings and gatherings (of people more than 10) should be postponed or conducted virtually.
- The dining area and the common meeting areas like the lobby should be under constant surveillance to **avoid eating together and gatherings**.
- **Universal mask use** to be ensured within the workplace campus. Fine should be imposed on violators.
- Employees should be **encouraged to test if they develop symptoms**. If any of the employees is positive for COVID-19, extensive testing should be done for all contacts.
- **Testing all the employees at regular intervals,** irrespective of the symptoms, may be done at high-risk settings such as big stores, crowded markets, and factories employing much staff. Several industries may find it challenging to ensure physical distancing in their day-to-day activities. The periodic testing will ensure the early detection of clusters in such settings.
- Factories/ Units with **more than 500 workers can set up their quarantine facilities.** These Quarantine Centers should have all basic amenities, including a transport facility to shift the sick employee to a dedicated COVID hospital or vice versa. This is being implemented in Maharashtra.

2.4. Establish Data Dashboards

- Currently, this is one of the weakest components in the COVID response.
- **District and state-level dashboards** with the key indicators mentioned below may be updated daily.
- **Street/village level analysis** can be done to identify hot spots and plan fever camps.
- Count all deaths (irrespective of the cause) by district every week. Analyze the data by age/ gender/rural/urban, and update the same on the dashboard.
- **Key indicators** to be calculated regularly for effective monitoring of the situation:
  - Daily bed occupancy rate - Overall, Oxygen, ICUs (if it reaches 70% - escalate the restrictions)
  - Daily Test Positivity (if it exceeds 5%, increase the testing)
  - Incidence of cases per million every 14 days - by age/ district/ zone
  - Deaths per million every 14 days - by age/district/ zone
  - Number of tests per million population by district/zone
  - Weekly percentage change in incidence per district/zone
  - Weekly percentage change in deaths per district/zone
  - Case fatality ratio by district/ zone
  - Vaccination coverage
  - Distribution of source of infection - by district/zone
  - The median number of contacts traced per case
  - % Cases arising from contacts under quarantine
  - % Using mask appropriately - in an indoor and outdoor setting (like series of three surveys done in Chennai city by ICMR-NIE)
- **State COVID Registry** - All the confirmed cases in Government and Private sector should be documented using a set of standardized variables in the "**State COVID registry.**"
- **Death audit** – Every death should be audited to identify gaps in surveillance, testing, diagnosis, transport, and treatment. This will help us identify preventable causes of death at the community and hospital levels.

2.5. Establish Alert systems to turn on & off physical distancing measures

A. Identify the high-risk settings based on certain criteria

- The risk for COVID spread is not equal in all settings. Risk increases in the following situations:
  - Closed spaces are riskier than open spaces. Few examples are closed workplaces, worship places, party halls, theatres, bars & recreation clubs
  - Poorly ventilated areas are at higher risk than well-ventilated spaces.
  - Prolonged duration of exposure (beyond 15 minutes) increases the risk of spread.
  - Activities such as singing and speaking loud in closed settings such as concerts, religious gatherings, and meetings increase the spread of viruses.
  - The absence of masking, especially in closed spaces, increases transmission.

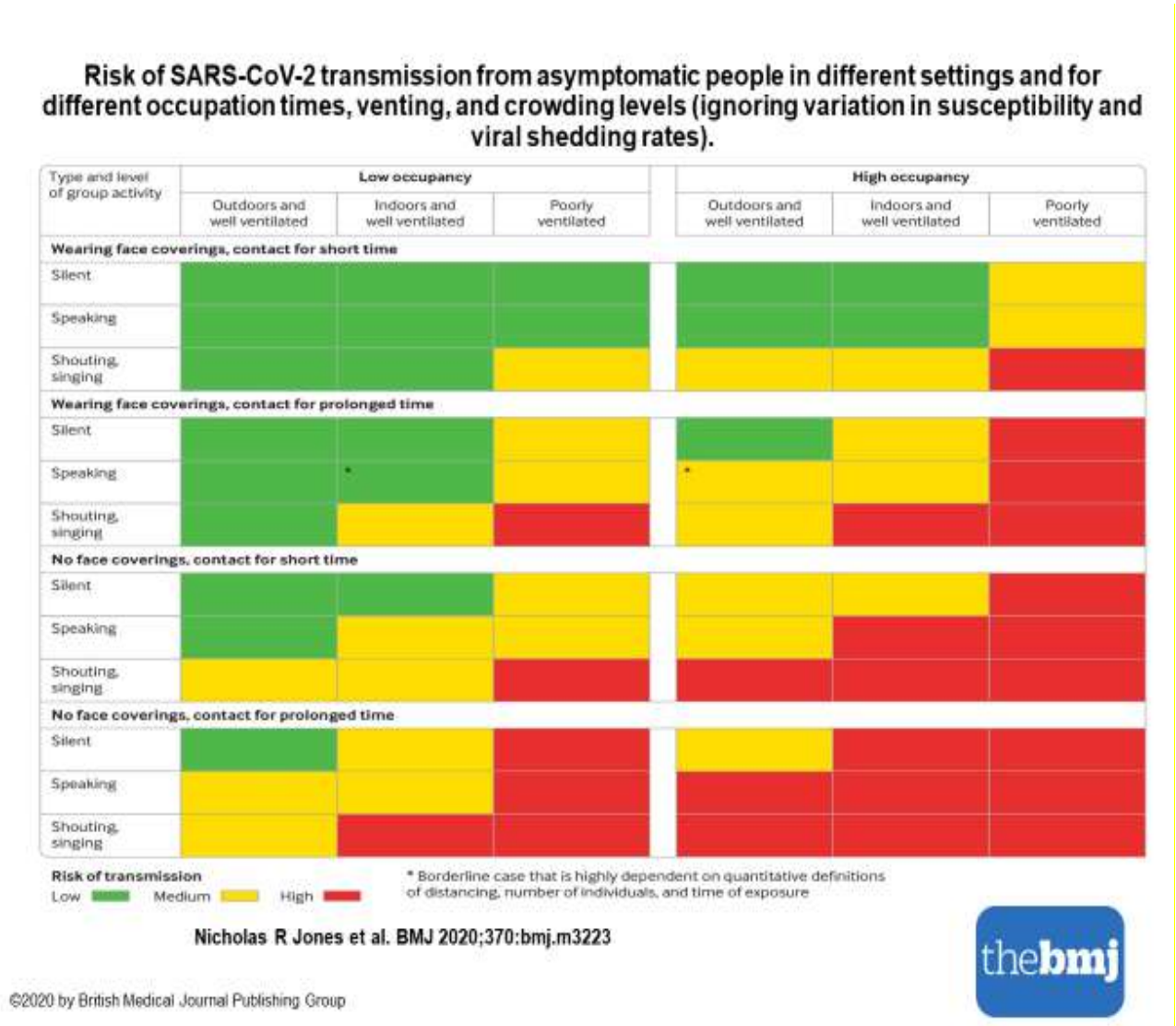


Fig 1: Diagram showing the risk for COVID-19 infection at various settings published in the BMJ 2020 created by Nicholas R Jones et al.

- The restrictions should be enforced in settings (as mentioned above) that have a high risk of transmission.
- **Physical Distancing:** Reducing the number of people and providing at least 6 feet distance between people with good ventilation reduces the risk of spread of the virus.
- **Avoiding Mass Gatherings:** Large gatherings increase the risk of super spreader events where one person can transmit the disease to several hundreds of people in a short duration.
- **Universal Masking**: Strict enforcement of mask usage is needed, especially in indoor settings. Random verification at indoor places such as shops, workplaces, worship places by the designated authorities would help increase the compliance to mask usage
- **Improve ventilation**: Improving ventilation in all settings such as workplaces, places of worship, markets, large stores, restaurants, etc., can reduce transmission.

B. Develop alert levels to turn on and off the restrictions & physical distancing measures

An alert system based on objective indicators can be a powerful tool that district and state-level managers can use to implement restrictions as and when applicable. The system also builds the trust of communities and helps in gaining their support in implementing mitigation measures. Proposed indicators include:

- **Test positivity**
- **Change in cases based on % change by the week**
- **Oxygen and ICU bed occupancy**

It is important to note that the physical distancing measures do not have an immediate impact and need to be in place for at least two weeks to break the chain of transmission. Within this period, if the bed occupancy reaches a critical level or there are major super spreader events, it is appropriate to move to higher alert levels; however, the alert level should not be reduced.

If lockdown and restrictions are to be implemented, adequate social and financial support to be provided to vulnerable groups such as low-income households, daily wage workers, employees in the informal sector, and migrants.

The proposed alert level for district-level control measures				
	Level 1	**Level 2**	**Level 3**	**Level 4**
	Fully open with masks and physical distancing	**Restrictions to be initiated**	**Restrictions to be escalated**	**Full Lockdown**
Indicators	All criteria should be met	Anyone criteria	Anyone criteria	Bed occupancy should be the primary criteria
	Test positivity below 5% for at least two weeks	Test positivity 5-10%	Test positivity above 10%	Not applicable
	% change in cases should be negative for at least four weeks	% change shows an increasing upward trend in the recent week compared to the previous week	The persistent upward trend for more than 2-3 weeks	Not applicable
	Oxygen and ICU bed occupancy below 50% and non-Covid health services are fully functional	Oxygen and ICU bed occupancy between 50-60%	Oxygen and ICU bed occupancy between 60-75%	Oxygen and ICU bed occupancy exceeds 75%
Restrictions to be imposed (Examples)				
	Level 1	**Level 2**	**Level 3**	**Level 4**
	Fully open with masks and physical distancing	**Restrictions to be initiated**	**Restrictions to be escalated on non-essential activities**	**Full Lockdown – Only essential services permitted**
Gatherings	Allow gathering with masks and physical distancing	Ban gatherings above 100	Ban all gatherings	Ban all gatherings
Schools and colleges	Open	Restrict the number of students per class	Online/ Remote	Online/ Remote
Indoor settings- Cinemas, Gyms, etc.	Open	Open with 50% occupancy	Close	Close
Restaurants	Open with distancing and masks	Open with 50% occupancy	No indoor dining / Only takeaways	No indoor dining / Only takeaways
Offices	Open with distancing	Open with enhanced surveillance – avoid group meetings/ crowds	Offices at 33%-50% staff	Close all except essential services
Markets/ shops	Open with distancing	Open with 50% occupancy enhanced surveillance	Close large poorly ventilated stores and essential shops to open with reduced occupancy	Close all except essential shops
Intra district transport	Open with masks	Open with masks and Avoid crowding	Open with 50% occupancy	Close all except transport for essential workers
Interdistrict transport	Open with masks	Open with masks and Avoid crowding	Open with 50% occupancy	Close except emergency travel
Factories	Open with masks	Open with masks, enhanced surveillance, and distancing measures	Open with 50% staff and enhanced surveillance	Only essential factories to stay open
Places of worship	Open with masks	Open for the public but avoid gatherings/ events	Close for public	Close all

2.6. Communicate effectively & counter misinformation

- Risk Communication is one of the most effective tools during a crisis to help **reduce panic among the public** and communicate the correct and validated information.
- There should be a **synergistic relationship between the health system and the media** to communicate accurately, verified, and authentic information.
- **Public dashboard portal:** A public dashboard at the state and district level regarding key indicators (suggested on page no 16), bed availability, helpline numbers should be maintained and updated daily. The same should be published in all social, television, and print media at regular intervals.
- Sharing of key indicators with real data used for decision-making for COVID control in the public space will enhance people's trust in the health system. This will avoid panic and will make people more receptive to the restrictions.
- **Mass Media Campaigns** involving celebrities and experts in mass media communication can be conducted to enhance compliance to COVID appropriate behavior and counter the misinformation.
- **Countering the Infodemic:** Queries and misinformation regarding vaccines, drugs, practices during home isolation & quarantine, treatment, and various other aspects of COVID should be addressed through multiple channels of communication which include newspaper, television, radio, social media platforms like YouTube, Twitter, Facebook, Telegram and WhatsApp.
- Encouraging **community leaders to follow COVID appropriate behavior** will encourage their followers to do the same.

2.7. Scale-up Vaccination

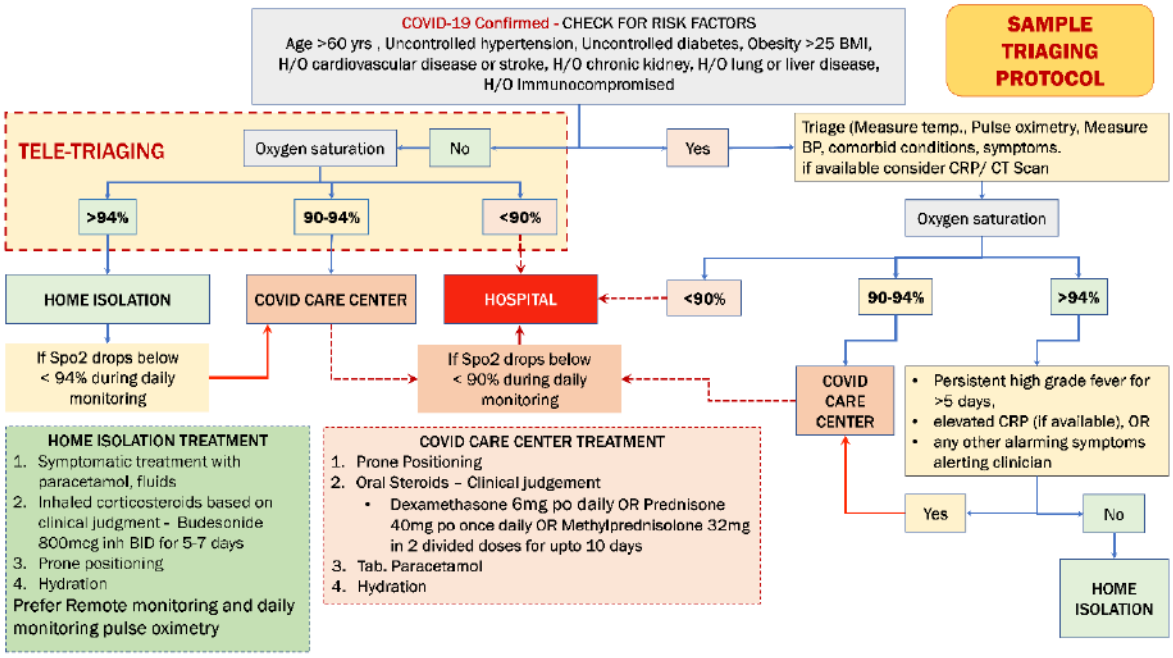
- **Estimate vaccination requirement** (beneficiaries) by village and urban ward based on the family register maintained by the VHN. Prepare village level/ ward level **micro plan** to achieve the beneficiaries' complete coverage (two doses).
- Engage **multiple manufacturers** across the globe who plan to manufacture and supply India (As per the approval of MOHFW). We may require multiple vaccines to achieve high coverage among individuals aged 18 years and above. For example, the vaccination should not restrict their services to one kind of vaccine alone. Covishield and Covaxin can be made available in the same center to avoid delay in population vaccine coverage.
- Establish **more vaccination sites** to administer vaccines to a minimum of 200 people per day. (current average vaccines per site is less than 50).
- **Dedicated workforce:** A total of more than six crore people need to be vaccinated over one year in the State. This is possible only if a dedicated workforce is allotted this task.
- **Community Vaccination Outreach activities** - based on the street-wise analysis of the hot spots identified to cover the vulnerable population in the high transmission areas.
- Special attention to be given to **vaccinate all the workers** involved in the COVID response activities, including **ambulance drivers, field volunteers, front line workers, and data management team** with the available COVID-19 vaccine at the earliest.

2.8. Sustain Non-COVID services

- Covid-19 control activities need to be sustained for the next few years. Therefore, we need to strategize to sustain non-covid services without stretching the health system and the existing workforce.
- A **dedicated health team** should be constituted (who are not involved in the covid work) to carry out routine non-covid services. Priority non-covid services implemented at various levels of care include **National programs of public health importance and routine clinical services**.
- The priority public health services include:
  - Maternal health
  - Childhood immunization
  - Tuberculosis & HIV
  - Dengue & other vector-borne diseases
  - Noncommunicable Diseases - at least issue 2 months of drugs at the sub-center level for patients with diabetes and hypertension. Encourage teleconsultation to this group of patients for titrating the therapy. These individuals are at a higher risk of COVID-related illness as well.

3. Annexure

3.1. Sample Triaging Protocol



3.2. Evidence-based review of therapeutic options for COVID 19

COVID19 THERAPEUTIC OPTIONS

Based on latest evidence *
As on 7 May 2021

Drugs shown utility

	Strong Evidence	Weak Evidence
Reduces mortality	Corticosteroids Colchicine	
Reduces need of mechanical ventilation	Corticosteroids IL6 inhibitors JAK inhibitors	Remdesivir JAK inhibitors *
Reduces hospital stay		Corticosteroids IL6 inhibitors Colchicine

* Reduces the duration of mechanical ventilation

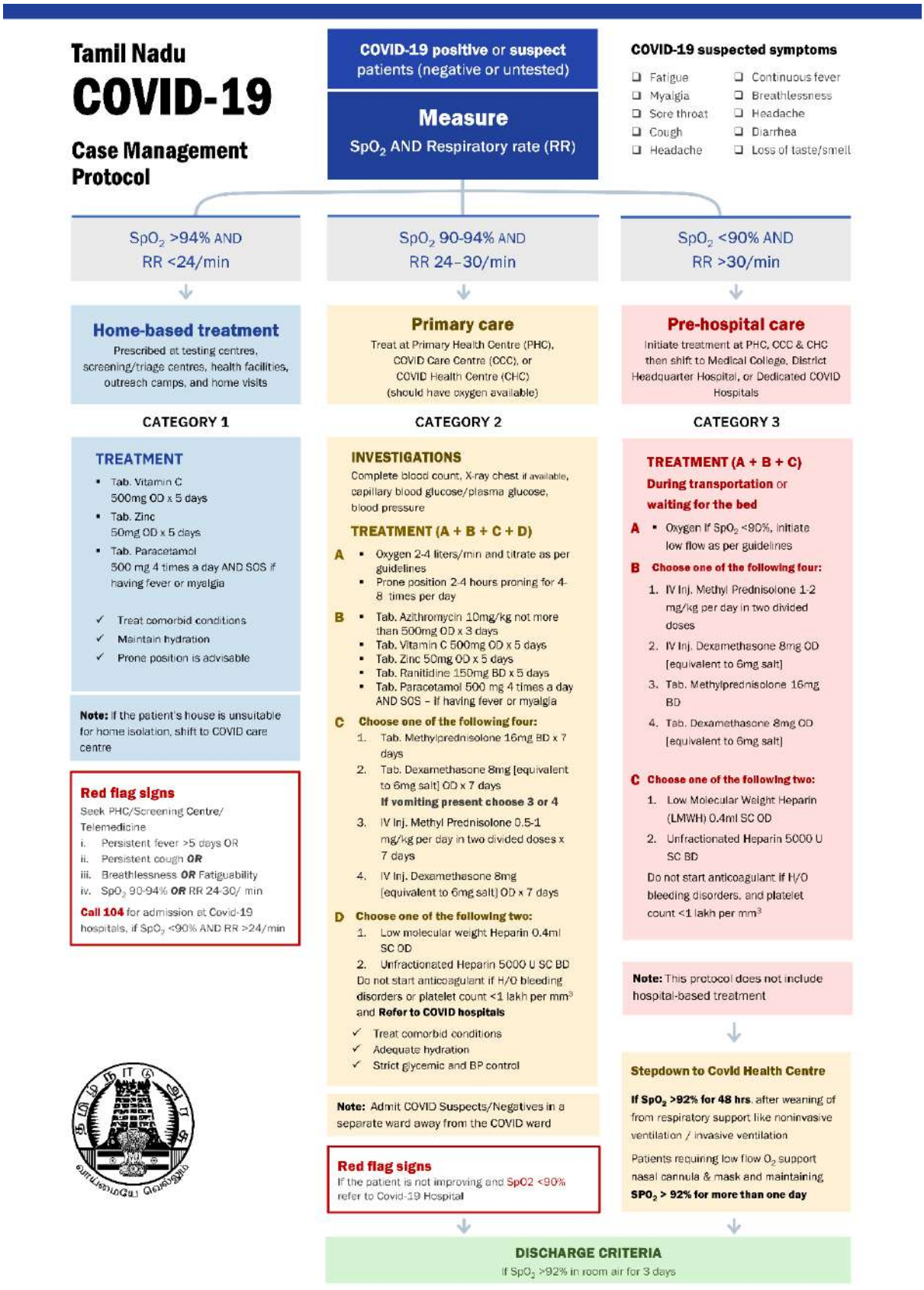
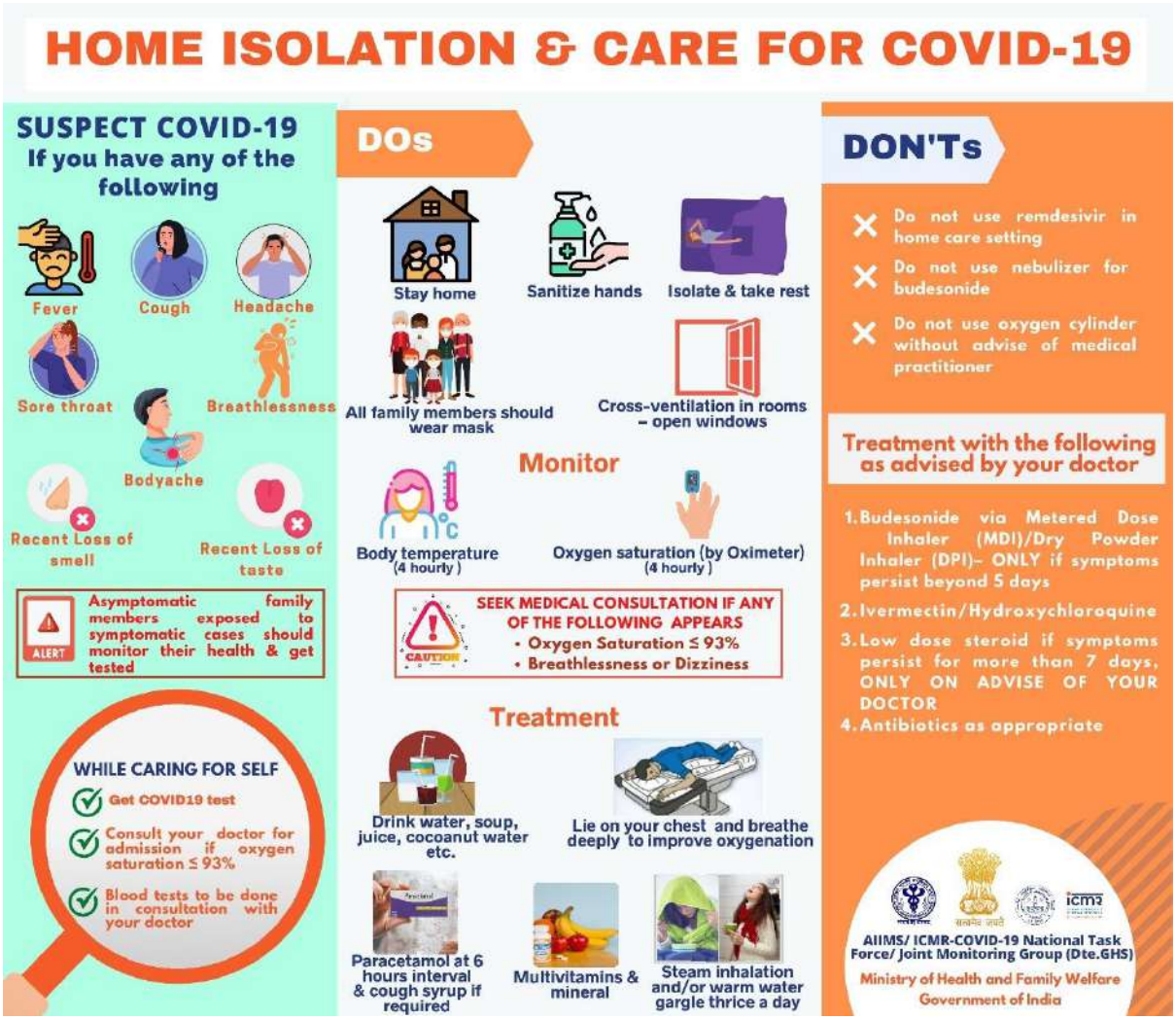
Drugs not shown utility

- Doxycycline
- Azithromycin
- Favipravir
- HCQ
- Interferon beta
- Interferon gamma
- Ivermectin
- Nitazoxanide
- Vitamin C
- Vitamin D
- ACE inhibitors/ARBs
- Convalescent plasma

References

1. Rochwerg B, Siemieniuk R A, Agoritsas T, Lamontagne F, Askie L, Lytvyn L et al. A living WHO guideline on drugs for covid 19 *BMJ* 2020; 370 :m3379 doi:10.1136/bmj.m3379
2. Siemieniuk R A, Bartoszko J J, Ge L, Zeraatkar D, Izcovich A, Kum E et al. Drug treatments for covid-19: living systematic review and network meta-analysis *BMJ* 2020; 370 :m2980 doi:10.1136/bmj.m2980

3.3. Case Management Protocol developed by Government of Tamil Nadu



3.4. ICMR Guidelines for Home isolation & care for COVID-19