

Part 1: Urgent Problems to be Solved with State Telehealth Platform

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1. How to implement mass testing without spreading the infection

Telehealth: People who want to be tested must be triaged through the telehealth system for appropriateness and have an appointment in a designated site to ensure load management across testing sites

- Begin by requiring a simple audio/video transaction.
- Can be manned by call center staff; does not use scarce clinician resources.
- Add information on waiting time at alternative locations.
- Allows reassurance of people and likely reduces the number of unnecessary tests.
- Takes pressure off 911 and other local government numbers, and lowers risk of potential panic.

Timeline: **3 days for a basic functioning system**

2. How to prevent hospitals from becoming infected

Telehealth: Access to emergency room ONLY with an appointment after triage for appropriateness and verification (including potential testing) of COVID status; no walk ins.

- Heart attacks, strokes, etc. can receive permission immediately from remote physician but will require rapid COVID test (essential to obtain 20-minute test kits; deploy in ambulances; THIS IS VERY IMPORTANT; there must be no interruption in emergency medical service).
- People want to talk with a medical professional, this is much more reassuring.
- All medical professionals can participate in triage, even when in quarantine or at home.
- Direct any potentially infected people AWAY from most hospitals, and towards dedicated testing sites.
- Avoids confrontations or potential violence at entrance to emergency room.

Timeline: **4 days for a basic functioning system**

3. What to do with thousands of mild case infections

Telehealth: Provide medical attention while these people recover AWAY from hospitals and clinics.

- Reassure people every day that they are fine.
- Care management combines remote support as well as patient self-monitoring.
- Allows people to be brought into a hospital when they need higher level care, but before they become critically ill.

Timeline: **6 days for a basic functioning system**

4. How to prevent disastrous cluster of infections exceeding ICU capacity

Telehealth: Provide remote routine medical attention and support to nursing homes, assisted care, and high-risk individual in their homes

- Instruct all high-risk individuals to consult with a doctor through telehealth, not office visit.
- Bring their regular doctors on-board as soon as possible.
- Use platform to ensure easy delivery of all food and pharmacy products to every high-risk person.

Timeline: **6 days for basic functioning system**

Immediate action requires utilization of all available SURGE TELEHEALTH CAPACITY – telehealth companies, major hospital systems, anyone else. Convene one meeting for all those stakeholders, create ONE SURGE TELEHEALTH TEAM and put it in the state command center.

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Part 2: Using Telehealth to Prevent Hospital System Crash and Maximize Effective Resources

This document describes an emergency operational strategy that leverages telehealth technology and extensive analytics to enable system-level operational design and execution that could allow the state to manage the coming COVID-19 outbreak, with minimal fatalities and while preserving the sustainable operation of state health systems. The plan includes imperatives that, if not followed, create a very high risk of following the path of countries like Italy.

Operational Goals

- 1) Sustaining critical hospital capacity, particularly, Emergency Dept., ICU (beds, ventilators, etc.) and medical staff.
- 2) Minimizing fatalities.

Assumptions:

- 1) We have sufficient number of test kits and lab capacity to rapidly (maximum of a few hours per test) perform the required number of tests per day.
- 2) Execution of the proposed strategy requires the engagement of multiple industry partners including at least: health systems (large and small), telehealth companies (potentially more than one), pharmacies, delivery & logistics and law enforcement.
- 3) The proposed plan requires proactive coordination and leadership of the state government including legislative & budgetary support, operational planning & coordination, setting protocols and communicating to the public.
- 4) The proposed plan is focused on direct patient management and does not include (at this stage) other important complementing aspects, such as ensuring critical medical equipment support.
- 5) Each one of the core system elements and enablers described below will require detail planning with the involvement of the stakeholders (or subset of them) mentioned above.

Operational Imperatives

- 1) Control the volume and pace of critically ill patients who require extensive hospital care.
- 2) Divert as much testing, triage, and care management activities from hospitals and clinics to people's homes and alternative locations, to minimize load on hospital-based clinical teams and risk of infection exposure.
- 3) Maximize and make flexible capacity, and deploy dynamically across regions as per risk assessment.
- 4) Protect any access to hospital areas without pre-verification of medical necessity and COVID status (particularly, not allowing walk-ins to emergency rooms!)

Core System Elements

I. High Risk Patients

Goal: Identify high risk sites (e.g., nursing home and assistant living facilities) and individuals, extensively test them, and ensure their isolation, care, and wellbeing (e.g., general medical care food, prescription drugs, etc).

How to identify high risk sites & patients?

- Identifying high risk sites and the respective number of patients in each site can be done from publicly available data (already completed by the MIT team).
- Identifying (most) individual high risk patients could be done based on state owned data (Medicaid insures) and by requiring each health systems to promptly identify the high risk patients it cares for and their home addresses.

Supporting services for high risk sites

- High risk sites should be allocated with ad hoc testing capacity and will be required to follow strict infection control processes applied to all staff personnel, patients and any external suppliers.
- The sites will likely need support re infection control practices as well as clinical care to decrease any patient transfer outside the facility to a hospital system. These services should be provided by designated teams through telehealth infrastructure.

Supporting services for high risk patients at home

- High risk patients at home will need to be provided with extensive support system to prevent any reason to leave their home. This includes clinical care management, food & pharmacy delivery and social support.
- All services should be provided as much as possible on virtual platforms.
- There are multiple options to implement clinical support:
 - Option 1: Rely on the patient's personal PCP & care team (if exists). The advantage is that this will guarantee continuity of care and likely to be trusted by the patient. The downside is that this is harder to implement technically (see subsequent discussion on telehealth platform).
 - Option 2: In contrast, having a general pool of clinical personnel will allow easier implementation at scale, but runs the risk of suboptimal clinical care.
 - Option 3: Hybrid options exists in which Option 2 is implemented with the ability to engage/consult personal care team as per need.
- Clinical triage protocols will have to be determined and clearly communicated.
- Other services will require the involvement of online pharmacy & retail including delivery to the home (Amazon and CVS are possible partners to implement).

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II. Testing & Triage

Goal: Develop a testing and triage strategy that relies on systems that are independent of hospital facilities, location and personnel. (This is fundamentally different than the current approach in which each hospital system develops its own approach.)

Key operational decisions:

- State level testing management organization should be formed and respective protocols and procedures should developed. This includes pre-test triage (who should be tested, when and where) and post-test triage (where to send infected patients).
- Testing sites (capacity, roads, transportation, etc) should be identified.
- The state triage unit will rely on a central pool of professionals and will be done via telehealth, considering the available testing and other resources, as well as the location of the patient.
- Some testing activities should be done at the patient site (facility or home for high risk patients), which will require use of mobile testing resources (ambulances?)

III. Care management of mild cases

Goal: Manage mild cases of COVID-19 outside hospital systems.

Operational decisions:

- There are multiple options to manage mild COVID-19 cases outside hospitals including dedicated facilities and the patients' homes. (Many countries are setting up dedicated facilities, based on existing hotels and other sites.)
- Setting dedicated sites requires detail design of processes and procedures as well as related logistics, supply chain and security.
- All options will require clinical support and management of the patients that should be based on a combination of telehealth and self-care by patients (e.g., self-measurement of oxygen saturation).

IV. Hospital Capacity Management

Goal: Ensuring hospital capacity (including beds, and personnel) is utilized to the maximum.

Creating flexibility

There are two important dimensions of flexibility. The first is to be able to use capacity, particularly scarce one (e.g., intensivists or infection control specialists) across regions as per demand, which is likely to evolve over time and not be uniform across the state.

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As the system will be increasingly utilized, it is likely that the system will have to staff clinical tasks with workforce that is not trained in the same way as the one being used under normal conditions. This will require the utilization of hierarchical models in which the less trained workforce will be supported by centralized pools of expertise that will be remote.

Additionally, all indications suggest that there is a likely scenario in which significant fraction of the workforce has to be quarantined and is not able to deliver in person care. The ability to utilize quarantined medical professionals will be critical to maintain sufficient capacity.

Sustaining functionality

One of the key threats to the hospital clinical personnel is exposure to unidentified COVID patients. To minimize this risk, it is recommended to create a robust access management system to hospitals, including Emergency Departments (EDs), specifically, that each visit to the ED will be pre-authorized to ensure the appropriateness of the visit and verify the COVID status of the patient. (This means that patient ED walk-ins will not be allowed!)

Operational enablers

I. **Telehealth services integrated on a state platform**

Various telehealth services will be critical to implement the various core system elements described above and the respective processes. In general, there are three types of telehealth functionality that will be needed:

- I. Triage & general clinical support – In these scenarios the goal is to virtually connect large number of patients (with potentially several classes) to a large pool of professionals (with potentially several classes). The emphasis in this scenario is on scale and speed, and there are relatively small number of patient-to-provider assignment rules (mostly at the class level). (Use case shown in attached slide: COVID Triage & Support, Online Pharmacy, General Hospital Triage)
- II. Professional-to-professional: In this scenario telehealth services facilitates a connection between physicians of other medical staff. This can be used to enable remote support, consultation, training and guidance. (Use cases shown in attached slide: High Risk Site Support and Physician-to-Physician support)
- III. Direct Physician-to-patient: In this scenario a specific care team uses telehealth to care for patients that ‘belong’ to the team (e.g., PCP caring for patients on her panel).

Technical & Logistics Challenges

- From a technical perspective the first scenario is readily available and can be deployed in a matter of a few days.
- The second scenario is also mature and can be deployed relatively quickly.
- The third scenario is perhaps the most challenging and could require a great level of customization. It is likely that there are creative workarounds that will require minimal modifications to existing systems (e.g., patient leaves a message to the clinical team in a call center and the clinical team initiates a remote appointment). This functionality already exists in some of the hospital systems in the state, and the challenge will mostly be to expand this capability to smaller systems.
- Enrolling physicians and patients to the system is expected to require extensive efforts and will require robust training and support system.
- Additionally, it is likely that the needed processes will deviate from the norm in steady state and will require emergency state level directives (e.g., cross system care, level of care by nurses, required integration with existing EMRs)

II. State Data System

To be able to effectively manage the outbreak crisis and the corresponding complex operations it will be critical to create and maintain a state level data system that will enable advanced analytics and will inform the command center as well as the various operational teams.

The data system should include at least the following elements:

- High risk patients and sites.
- Current cases based on testing data.
- Existing capacity (beds, staff, supply, equipment, etc) and its utilization (at least on a daily basis).
- Detailed patient status (could be obtained through the telehealth platform).

Additional data elements that could be informative are:

- Dynamic Site utilization.
- Traffic.
- Weather.

Infrastructure and processes

- The implementation of the data system will require technical infrastructure that allows application of robust analytics, visualization, and reporting. There are multiple technical solutions that could be considered. (There is a strong incentive to use a cloud based system – it's easy to scale up and access from anywhere.)
- For some of the data elements there will need to be defined reporting procedures and standards.

Rules and regulations around privacy, commercial proprietary data, and any other topics that could slow down deployment of this system will have to be waived aggressively and promptly by the state.

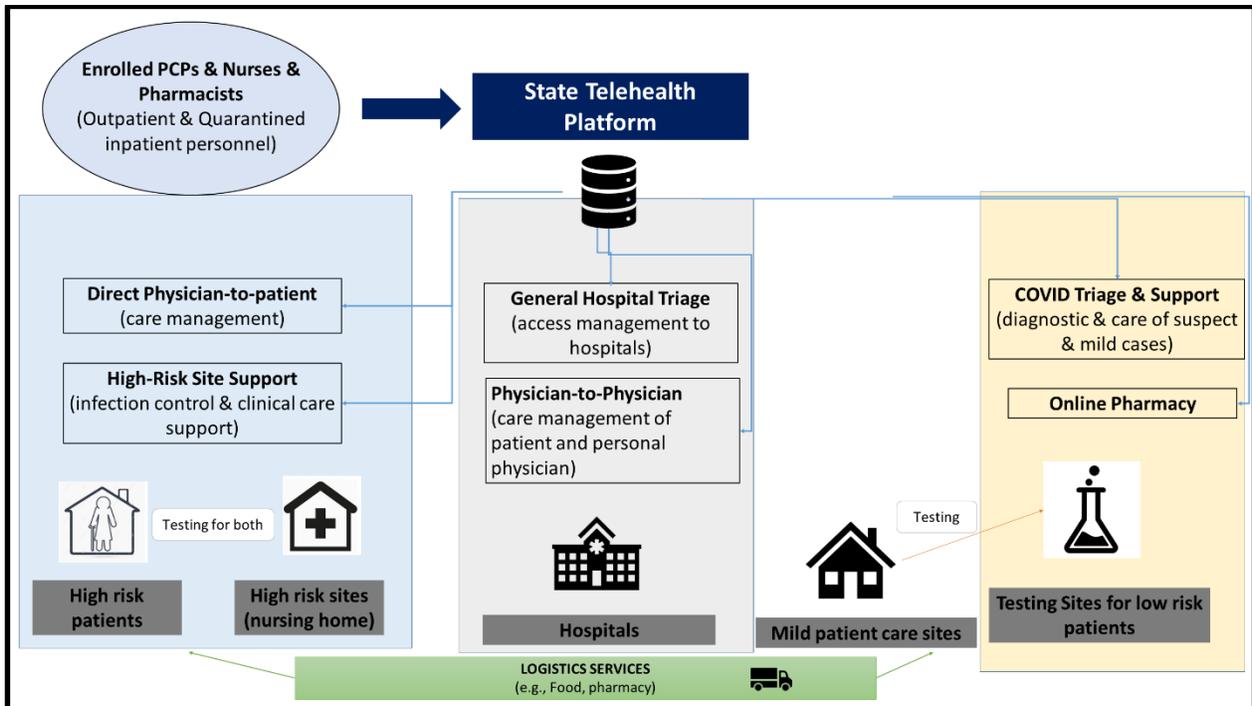


FIGURE 1. Operational Diagram for the State Telehealth Platform

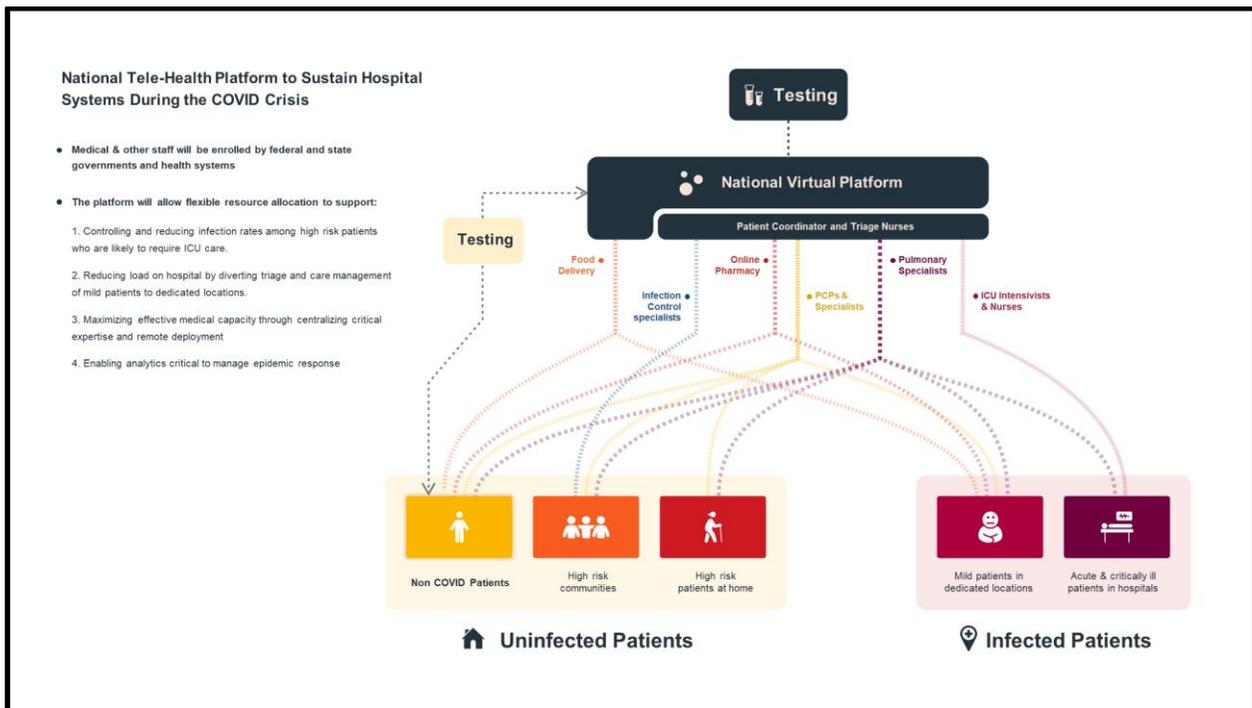


FIGURE 2. Telehealth Platform Overview