

## ARTICLE

# Innovation and Transformation in the Response to Covid-19: Seven Areas Where Clinicians Need to Lead

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Drawing on a new institutional process aimed at redefining its management system with emphasis on accelerating innovation and decisions, leaders at a large multistate health care system have pivoted quickly to revise care delivery, specifically to address the Covid-19 crisis. The new model focuses on executing rapid and effective actions for clinical standards, capacity management, ethics, science, analytics, resilience, and communication. While a full assessment is not possible today, leaders already have seen a positive impact from their efforts in their response to Covid-19.

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At the time of this writing, a novel coronavirus (SARS-CoV-2) had reached [pandemic proportions](#), with more than 1 million confirmed cases worldwide and more than 53,000 deaths [more than 2 million confirmed cases and more than 132,00 deaths as of publication].<sup>1</sup> On March 27, 2020, the United States overtook China and Italy in the number of cases per country and became the new epicenter of the disease. This threat has created a large global health crisis that we have never experienced before.

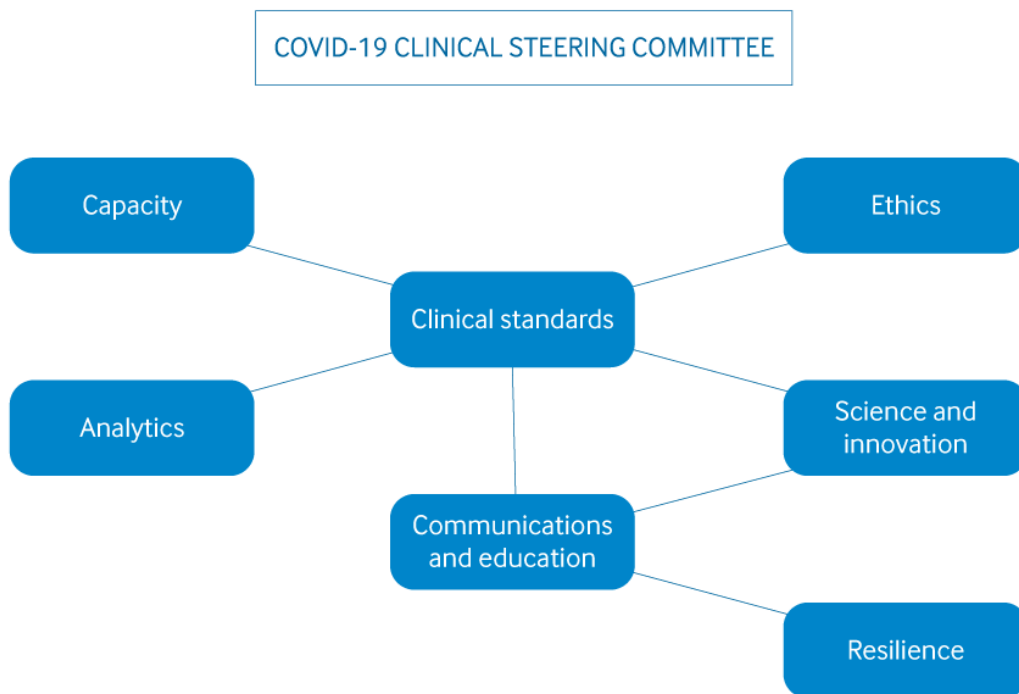
As health care systems face the unprecedented Covid-19 challenge, clinicians need to lead their teams and help create a coordinated effort against the impact of the disease. In this article, we describe a practical Covid-19 clinical management model that we have implemented at AdventHealth to make agile and informed decisions in our clinical response to the multiple facets of this rapidly evolving crisis. Specifically, we have defined seven core areas or *branches* under our clinical steering committee that are essential in managing the day-to-day challenges of the response to Covid-19 and that work in coordination with our clinical and administrative leadership; the branches are: clinical standards, capacity, ethics, science, analytics, resilience, and communication and education.

The AdventHealth system has more than 80,000 team members and 50 hospital campuses in nine states. The Central Florida Division (CFD) has more than 4,400 beds and 20 hospitals in the Central Florida area. AdventHealth Orlando provides quaternary care and is the flagship hospital of the organization. The size and complexity of CFD required a coordinated clinical response to ensure that we responded to Covid-19 across the division as one. Just months earlier, at the end of 2019, AdventHealth CFD had gone through a process of redefining our management system with emphasis on accelerating innovation and decisions. This new management system was influential in our thinking when designing the Covid-19 Seven Branches Clinical Management Model (Figure 1).

FIGURE 1

## COVID-19 Seven Branches Clinical Management Model

The connectors represent the most common interactions between the seven different areas under the Clinical Steering Committee.



Source: The authors

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Traditional leadership roles (administrators, CMO, CNO, hospital epidemiologists) are quickly being overwhelmed by the challenges of Covid-19 and they need support from physician and clinical leaders to dedicate part of their time in leading and working in coordination with these seven branches. In our case, we were able to leverage our Transformation Medical Directors under our Care Transformation and Waste Reduction Structure, but this model can be scaled to

any organization based on its size, staff, and time available to prepare. Here are the key elements behind the AdventHealth Transformation Medical Director concept:

Initiated in 2018 at AdventHealth CFD to engage doctors in care transformation work. Designed as an evolution of the old Unit Medical Director role that was focused on monitoring behavior to the Transformation Medical Director role (TMD) that focuses on four WISE concepts: (**W**aste Reduction, **I**nnovation, **S**tandardization, **E**xperience). Forty contracted TMDs across different specialties were organized on 14 Multidisciplinary Performance Review Committees (PRCs). Each TMD dedicates up to 20 hours per month to waste reduction projects and leadership training. There is participation from both employed and non-employed physicians. AdventHealth CFD provides project management and analytics support. Each PRC has participation from other clinical areas (e.g., nursing, pharmacy) and an AdventHealth administrator lead who works in a dyad with the TMD lead to help advance projects and remove operational and administrative barriers. TMDs and PRCs generate project ideas. Since 2018, more than 45 waste reduction projects have been completed in all major specialties with an estimated impact on increased quality, affordability, and waste reduction for more than 30,000 patients.

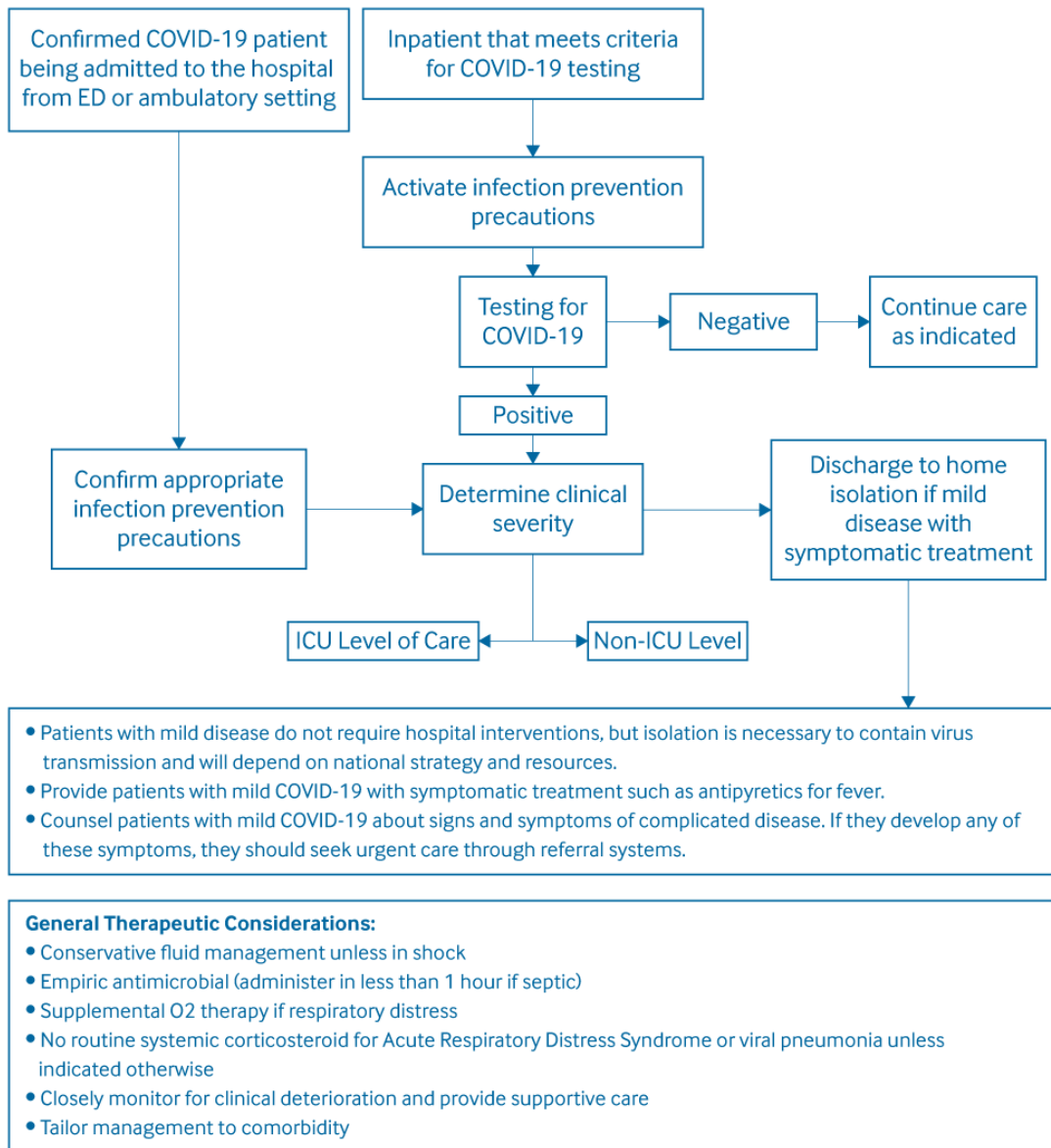
Here is how we have focused each of the components of the Covid-19 Seven Branches Clinical Management Model to address the pandemic locally.

## **Clinical Standards Branch**

While there is limited evidence on the clinical management of Covid-19, there is value on creating local summary guidelines to provide clinical teams with general guidance. In our case, we asked leaders from all specialties to review the literature and create summaries of best practices. Communications were by email. We emphasized the importance of visual aids, such as algorithms and charts including references for review, and to avoid the common practice of just sending a list of articles. This branch was able to work with 142 clinicians to create a comprehensive Covid-19 guidelines document in less than 72 hours (Figure 2a, Figure 2b) that was distributed to more than 4,000 members of our medical staff and has been downloaded more than 8,000 times after it was made available online through an internal intranet site and after some of our clinical leaders shared it on publicly accessible sites (e.g., LinkedIn).

FIGURE 2A

## COVID-19 Clinical Standards and Inpatient Algorithm



Source: The authors; <https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf>  
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## COVID-19 Clinical Standards and Inpatient Algorithm

Examples of COVID-19 Treatment Guidelines Developed by Clinical Standards Committee

### Treatment Guidelines

- Pediatric COVID-19 Clinical Management
- Pregnancy COVID-19 Clinical Management
- Gastroenterology COVID-19 Clinical Management
- Cardiology COVID-19 Clinical Management
- Imaging COVID-19 Clinical Management
- Procedural Best Practice Non-ICU Bronchoscopy, Endoscopy, Surgery, Labor & Delivery
- COVID-19 Safe Laboratory Handling
- (extracorporeal membrane oxygenation) ECMO Guidelines
- Critical Care Management Toolkit
- Post-Acute Care Facility Transfer

The purpose of this document is to provide general evidence-based guidelines for the management of patients with COVID-19. These recommendations are not intended to replace clinical judgment and are reflective of current best practices by specialty at the time of this writing. The team of subject matter experts that reviewed the literature and develop this document are included on each section.

Source: The authors

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The main challenge is the need to constantly update these documents as evidence continues to evolve; there also is potential for conflicting standards as major specialties start to release and update society guidelines. The Clinical Standards Branch needs to work in coordination with the Science Branch so that guidance on therapeutic options that appear promising are made available without delay.

“ *The main goal should be to build a repository and agile appraisal of the rapidly growing literature with emphasis on accelerating processes needed to take promising discoveries to the bedside.* ”

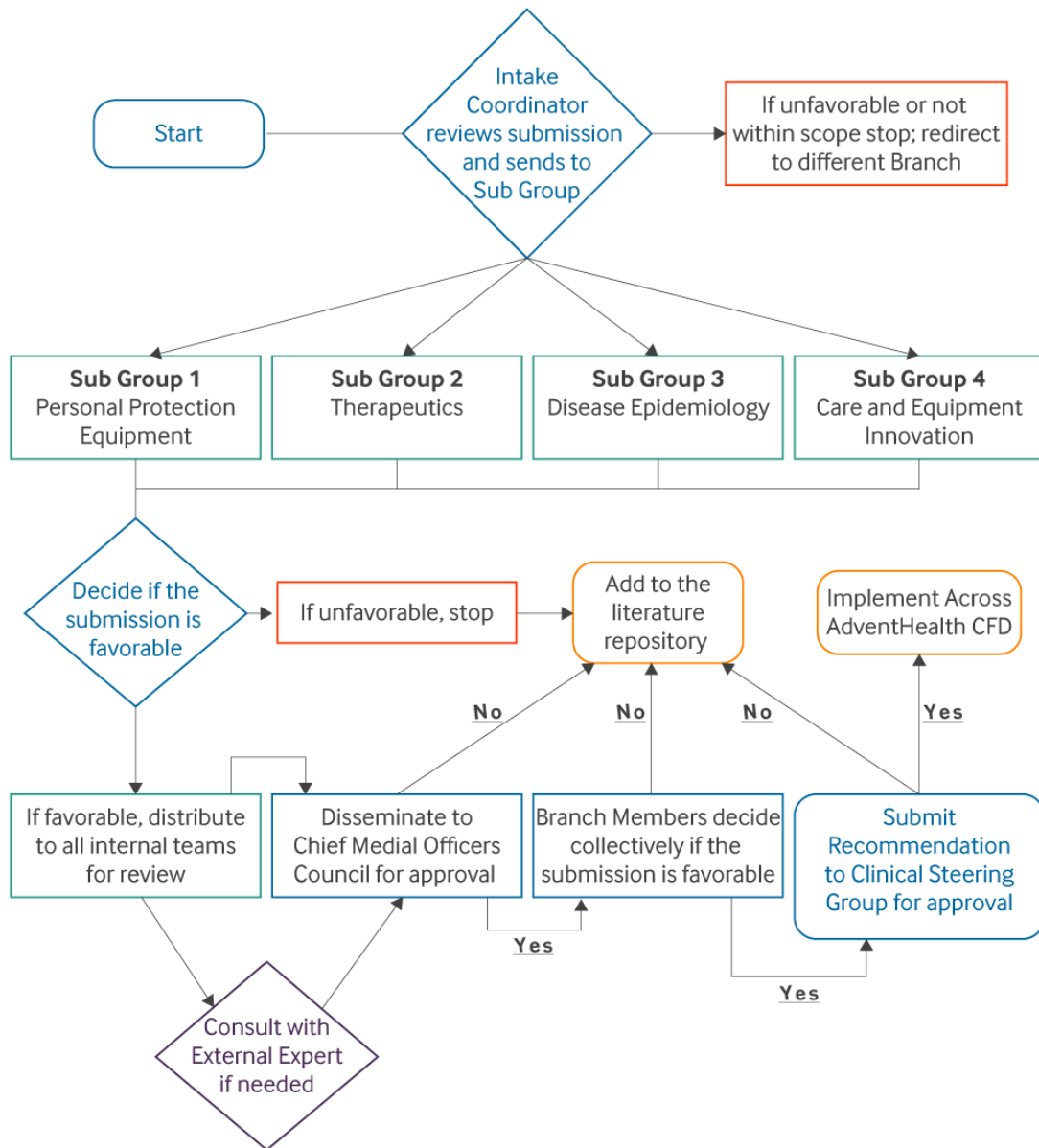
One of the main aspects of clinical standards is exploring considerations around testing. Effective testing for Covid-19 requires testing algorithms with the ability to flex in real time depending on changing testing criteria, availability of test kits, bed capacity, prevalence of disease, and what we considered the overarching principle during limited testing capability situations: testing first those for whom results will have the biggest impact on clinical management. These factors and populations of individuals who meet testing criteria can change by the minute. This branch needs to receive clear guidance from the Ethics and Science branches to complement their clinical knowledge. A “live” algorithm (Figure 2b) was developed and is adjusted almost daily to make sure tests go to those who need it the most, as testing capabilities continue to increase.

## Science and Innovation Branch

With the massive influx of information related to the epidemiology, pathophysiology, treatment, and prevention of Covid-19 — which ranges from well-designed studies to anecdotal experience and even social media rumors — clinical leaders will find themselves inundated with information sent by all areas of the organization with the expectation to opine and consider for incorporating into practice.<sup>2</sup> What was created initially for completeness quickly has become one of the most important branches. A rigorous and disciplined process with an open-minded intake process is necessary to process the available information and to make informed recommendations to senior clinical leadership (Figure 3).

FIGURE 3

## Science and Innovation Branch Review Process



Source: The authors

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The main goal should be to build a repository and agile appraisal of the rapidly growing literature with emphasis on accelerating processes needed to take promising discoveries to the bedside. We considered information from a variety of sources, with an emphasis on peer-reviewed journals. In less than 1 week, this branch was able to review and make recommendations to the system based on the scientific validity, efficacy, and safety of information from emerging literature for different topics, including:

- Therapeutic efficacy of Remdesivir to treat Covid-19
- Hydroxychloroquine and Azithromycin combination to treat Covid-19
- Use of ultraviolet light to decontaminate N95 respirator masks
- Use of convalescent plasma to treat severe Covid-19
- Hydroxychloroquine prophylaxis for the prevention of Covid-19
- Personal protective equipment standards to prevent Covid-19 transmission
- 3-D printing of surgical masks
- Extended IV tubing to preserve personal protective equipment
- Manipulating temperature and humidity levels to decrease risk of transmission of Covid-19

The main challenge is the volume of information that needs to be reviewed and the need to respond in almost real time. In parallel, the system should allow for rapid evaluation of low-risk innovation that can have a big impact, ideas like 3-D printing of masks, or using extended tubing for IVs to preserve protective equipment, or manipulating environments to change humidity levels to try to mitigate virus transmission.<sup>3</sup> The system needs a rapid vetting process to ensure that safety and efficacy standards are maintained. The use of existing technologies that can be expanded or used in a different way (e.g., inpatient telemedicine) needs the support of physician leaders to help define their role and provide guidance on acceptable standards of care.

## Capacity Branch

Considerations around hospitals transfers and capacity management are important as emerging evidence supports the concept of strategies like cohorting and dedicated units for both Covid-19 patients and patients under investigation. Development of a capacity management plan that adjusts to the different pandemic phases with clear thresholds for activation is necessary. This may include redefining settings where care is delivered through portable and field facilities and cohorts of patients to expand capacity while limiting exposure and personal protective equipment use.

“ *This branch has the demand of using innovative thinking to find ways to improve capacity to include things like tents for emergency room screenings to considering using settings like hotels to be turned in to post-acute care facilities.* ”

AdventHealth CFD uses an advanced Mission Control command center platform that opened in August 2019 to streamline clinical operations across the division.<sup>4</sup> The Capacity Branch worked



with our Mission Control in developing a model of care that creates visibility around bed availability across our division and allows the implementation of strategies, such as transferring all Covid-19 ICU admissions to a designated campus, and modifying in real time if needed. This branch has the demand of using innovative thinking to find ways to improve capacity to include things like tents for emergency room screenings to considering using settings like hotels to be turned in to post-acute care facilities.

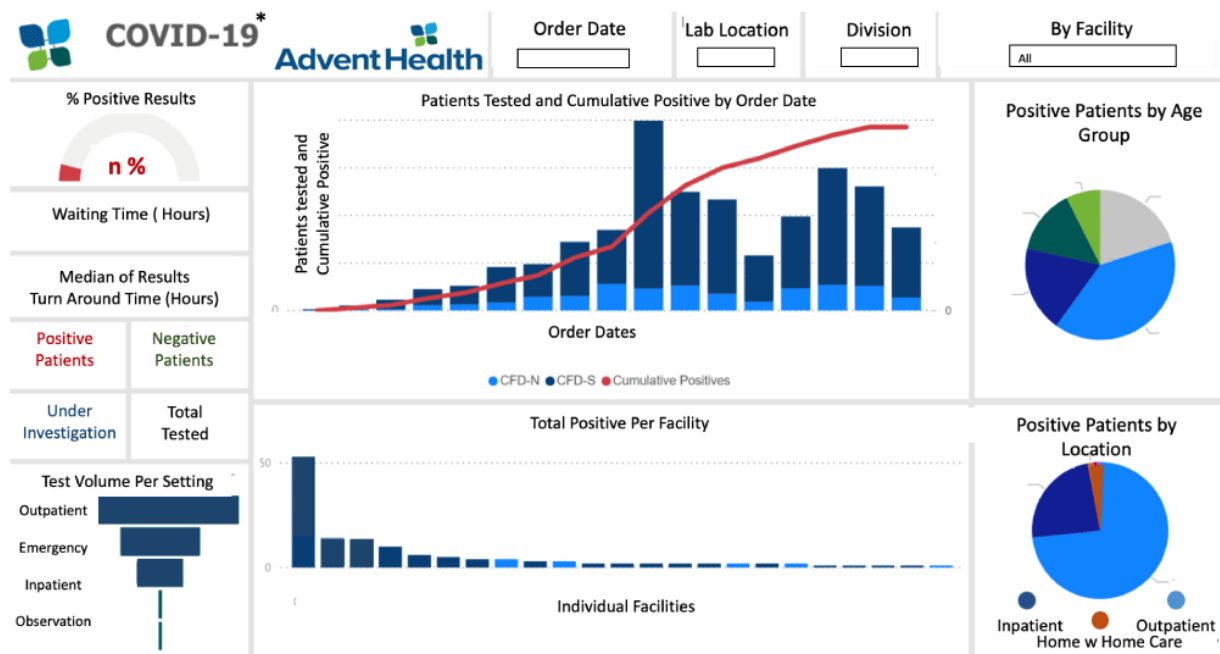
## Clinical Analytics Branch

It is important that clinical analysts work hand-in-hand with clinicians to collect and report data in a manner that is actionable and provides insight and predictive value that can support the clinical response to the disease. A system-wide dashboard was developed in our system that provides trends and real-time data (Figure 4). One of the main learnings was the need to complement the dashboard with a daily executive summary that can provide clinical leadership with key metrics for each day with emphasis on trends.

FIGURE 4

### AdventHealth COVID-19 System-wide Dashboard

This de-identified display shows the real-time information that is available to clinicians.



\*For Illustration Purposes. Not Intended to Represent Actual Data

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As a result of the multidisciplinary collaboration in this branch, the thinking has evolved to incorporate for Covid-19 populations — and to the patient level — scoring systems such as APACHE

(Acute Physiologic Assessment and Chronic Health Evaluation) that will give to the frontline clinicians actionable data with predictive value to use while treating patients.

## Ethics Branch

A rapid increase in patients presenting to all care settings — some of them requiring hospitalization and rapid escalation of care — can create a demand that quickly overwhelms the available clinical capacity. This, combined with personnel and supplies constraints, will certainly create difficult ethical challenges that go from who should be tested to more difficult situations like allocation of life-saving treatments. Similar considerations apply to the risks to health care workers and the use of personal protective equipment. The work of this group needs to focus on defining clear and practical guidelines that can be applied by the front lines when making clinical decisions. This advice needs to be based on solid ethical principles extracted from the available literature and following precedent and lessons learned from similar scenarios.<sup>5</sup>

The Ethics Branch is creating evidence-based documents to define the ethical standards of our clinical response, and they are distributed by the Communications Branch to all teams. The first standard developed was on testing prioritization. The document the Ethics Branch created helped clinical and laboratory teams quickly decide with confidence a testing order based on a system of priority rules. A similar framework is being followed to address more difficult scenarios, such as those related to life-saving treatments. It could be challenging to articulate a complex ethical rationale in a way that is condensed and practical, but this is extremely important to help the front lines apply the standards. Urgent ethical consultations may be needed but may be difficult to implement.

## Communication and Education Branch

Dissemination of important information generated by the other branches to the clinical staff is a critical function in the fight against Covid-19. While initially considered one of the functions we had the most experience with, we quickly learned that traditional methods we have relied on to disseminate information to clinical teams are of limited value in a situation where information frequently changes and key messages need to be delivered to large audiences. A total transformation of both the methods and the format used to communicate occurred in our system in a short period of time, challenging our past assumptions of whether messages get across even under normal circumstances. The work of this group redefined how we communicate with our clinical teams and has created a new standard that will likely be continued after the Covid-19 crisis.

“

*The do-it-all-and-no-rest approach during a crisis will be unsustainable with Covid-19. We will learn to trust more on the other members of the team.”*

Two virtual Continuing Medical Education (CME) activities with more than 500 participants each were done for the first time at our hospital and demonstrated that this technology had been

underutilized in the past. These two activities combined [have been replayed](#) more than 9,000 times in just 2 weeks.

The desire of clinical teams to have access to information on Covid-19 patients in their hospitals (number of positive cases, ICU cases, number of infected health care workers) creates the challenge of balancing compliance standards around information sharing and the need to support the *psychological safety* of the teams created by keeping the front lines informed. Based on our organizational values, AdventHealth has been committed to maintaining an environment of data transparency that is HIPAA compliant. In our experience, this is an approach that the frontline clinical teams value and appreciate.

## Resilience Branch

Thousands of clinicians around the world are experiencing stress and suffering on the front lines of the fight against Covid-19.<sup>6</sup> Recognizing the risk of associated consequences, including the potential for post-traumatic stress disorders, is important and should be combined with evidence-based interventions that seek to mitigate the effects of psychological distress in clinical teams. The work of the other groups in terms of clinical guidance based on solid ethical standards and science, in an environment of effective and transparent communication, contributes to the goal of this branch. The Resilience Branch has started a series of activities for all members, not just clinical, across all our hospitals and with a focus on stress-relief techniques, strategic rest plans, and remote-access group activities.

The Covid-19 Seven Branches Clinical Management Model is a practical approach to organize the clinical response to Covid-19 and allows the opportunity to leverage the leadership of physicians and all members of the clinical team during a time of crisis. The model can be scaled depending on what is practical or feasible for each system to implement. To be effective, good coordination with other clinical areas — in particular nursing and pharmacy leaders — is necessary. In addition, the branches need to operate in a management system with effective rules on decision rights, agility, and clarity on when escalation is necessary for action. In our model, decisions that need approval are taken to our Covid-19 Clinical Steering Committee, which meets twice daily. Physician leaders participating in this model have been committing 3 to 4 hours per week to complete the work. Each branch has between 5 to 20 members and all the branches are currently supported by three project managers and one analyst from our Performance Improvement Department.

## Accelerated Innovation and Transformation

Within this framework, we see several areas in health care that are most likely to experience accelerated innovation and transformation as a result of Covid-19:

- **Telemedicine:** Health care systems will invest in telemedicine and clinical teams and patients will get more comfortable using it; it will be used in new ways. Patient satisfaction will increase.

- **Remote Work and Collaboration:** Employers and employees will better understand advantages and limitations of remote work. The office space concept will be redefined and work from home will increase. We will be surprised at how much we can do remotely.
- **Agile Decision-Making:** Not an option, but a must at this time. We will all learn how to make decisions faster.
- **Communications with Clinical Teams:** The clinical newsletter will be reinvented both in format and in content. We will learn the *how* of communicating key messages.
- **Waste in Clinical Practice:** Clinicians will realize that we can do less and still provide the best care for our patients.
- **Teamwork:** The do-it-all-and-no-rest approach during a crisis will be unsustainable with Covid-19. We will learn to trust more on the other members of the team.
- **Continuous Medical Education:** Attending a room full of people for a CME event may become a thing of the past. Both speakers and audience will participate remotely, and asynchronous learning will become the preferred option.

The unparalleled health care crisis that Covid-19 has triggered around the world is stretching our thinking. We are not in this situation by choice, but out of necessity we will accelerate transformation and innovation in our systems in a way that we have never seen before. Things that we've heard cannot be accomplished *will* be done and we will reevaluate old practices.<sup>7</sup> This will go from changing the way we communicate and what we share, to leveraging technologies that will redefine the patient encounter. The pause on some wasteful clinical practices due to social distancing and limited supplies may have a lasting influence on clinicians as we realize that we can do less and still provide the best care to our patients.

Because we have no other option, we will experiment, we will learn, and we will transform.

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