

The Daily COVID-19 Literature Surveillance Summary

September 16, 2020



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COVID-19 Daily Literature Surveillance

COVID19LST



Bringing you real time, distilled information for guiding best practices during the COVID-19 pandemic

LEVEL OF EVIDENCE

Oxford Centre for Evidence-Based Medicine 2011 Levels of Evidence

Question	Step 1 (Level 1*)	Step 2 (Level 2*)	Step 3 (Level 3*)	Step 4 (Level 4*)	Step 5 (Level 5)
How common is the problem?	Local and current random sample surveys (or censuses)	Systematic review of surveys that allow matching to local circumstances**	Local non-random sample**	Case-series**	n/a
Is this diagnostic or monitoring test accurate? (Diagnosis)	Systematic review of cross sectional studies with consistently applied reference standard and blinding	Individual cross sectional studies with consistently applied reference standard and blinding	Non-consecutive studies, or studies without consistently applied reference standards**	Case-control studies, or "poor or non-independent reference standard"**	Mechanism-based reasoning
What will happen if we do not add a therapy? (Prognosis)	Systematic review of inception cohort studies	Inception cohort studies	Cohort study or control arm of randomized trial*	Case-series or case-control studies, or poor quality prognostic cohort study**	n/a
Does this intervention help? (Treatment Benefits)	Systematic review of randomized trials or n-of-1 trials	Randomized trial or observational study with dramatic effect	Non-randomized controlled cohort/follow-up study**	Case-series, case-control studies, or historically controlled studies**	Mechanism-based reasoning
What are the COMMON harms? (Treatment Harms)	Systematic review of randomized trials, systematic review of nested case-control studies, n-of-1 trial with the patient you are raising the question about, or observational study with dramatic effect	Individual randomized trial or (exceptionally) observational study with dramatic effect	Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient.)*	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning
What are the RARE harms? (Treatment Harms)	Systematic review of randomized trials or n-of-1 trial	Randomized trial or (exceptionally) observational study with dramatic effect			
Is this (early detection) test worthwhile? (Screening)	Systematic review of randomized trials	Randomized trial	Non-randomized controlled cohort/follow-up study**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning

* Level may be graded down on the basis of study quality, imprecision, indirectness (study PICO does not match questions PICO), because of inconsistency between studies, or because the absolute effect size is very small; Level may be graded up if there is a large or very large effect size.

** As always, a systematic review is generally better than an individual study.

How to cite the Levels of Evidence Table

OCEBM Levels of Evidence Working Group*. "The Oxford 2011 Levels of Evidence". Oxford Centre for Evidence-Based Medicine. <http://www.cebm.net/index.aspx?o=5653>

* OCEBM Table of Evidence Working Group = Jeremy Howick, Iain Chalmers (James Lind Library), Paul Glasziou, Trish Greenhalgh, Carl Heneghan, Alessandro Liberati, Ivan Moschetti, Bob Phillips, Hazel Thornton, Olive Goddard and Mary Hodgkinson

EXECUTIVE SUMMARY

Climate

- Emergency medicine physicians at Massachusetts General Hospital (U.S.) describe the [challenges posed by increasing natural disasters due to climate change in the context of COVID-19](#), specifically an increased need for hospitals during heat waves and natural disasters, and the need for virus transmission mitigation efforts during evacuations due to fires and hurricanes. The authors propose short-term solutions to these issues, such as the need to modify sheltering in response to natural disasters, and long-term solutions, such as increasing state and national funding for climate mitigation and public health disaster plans.
- Members of global health departments in the US and India call attention to the [accelerated timelines of vaccine development for COVID-19 and highlight the critical need for active safety surveillance](#), especially in low-and-middle income countries, to establish capacity for primary data collection in addition to delineating real adverse reactions to ensure proper understanding and awareness of the benefit-risk profile of an imminent COVID-19 vaccine.

Transmission & Prevention

- The systems director of Laboratory Services at Houston Methodist Healthcare System in Texas presents a [description of the effectiveness of an Incident Command System \(ICS\)](#) implemented in their organization at the very beginning of the COVID-19 outbreak. The author highlights the role of ICS in organizing the staff and patients, in addition to analyzing, planning, and implementing strategies to manage the pandemic and alleviate anxiety through communicating reliable information, indicating the importance of an ICS in organizations for constructive disaster management in the future.

Management

- A single-center retrospective cohort study of 205 patients with confirmed COVID-19 pneumonia with acute hypoxic respiratory failure (AHRF) and 60 patients treated with corticosteroids at the physician's discretion found that [patients treated with corticosteroids exhibited lower risk of ICU transfer, intubation, and death](#) in addition to greater SpO₂/FiO₂ improvement when compared to controls. These results suggest that usage of corticosteroids for non-intubated patients with COVID-19 pneumonia complicated by AHRF may lead to decreased mortality and complications.

Adjusting Practice During COVID-19

- Physicians, ethicists, and public health experts in San Diego County, California present the systems and protocols they developed for [county-wide, population-based crisis management of COVID-19](#). The team developed healthcare community coalitions, teams to triage scarce resources, systems to transmit information across multiple facilities, virtual tabletop exercises for disaster preparedness, and committees responsible for transparent communication with the public.

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CLIMATE

THE CLIMATE CRISIS AND COVID-19 - A MAJOR THREAT TO THE PANDEMIC RESPONSE

Salas RN, Shultz JM, Solomon CG.. N Engl J Med. 2020 Sep 10;383(11):e70. doi: 10.1056/NEJMmp2022011. Epub 2020 Jul 15.
Level of Evidence: Other - Expert Opinion

BLUF

A professional opinion piece written by emergency medicine physicians at Massachusetts General Hospital (U.S.) describes the challenges posed by increasing natural disasters due to climate change in the context of COVID-19. Specifically, the authors cite an increased need for hospitals during heat waves and other natural disasters as well as a need for virus transmission mitigation efforts during evacuations due to fires and hurricanes. The authors propose short-term solutions to these issues (Table), such as the need to modify sheltering in response to natural disasters, and long-term solutions, such as increasing state and national funding for climate mitigation and public health disaster plans.

FIGURES

Short-Term Strategies for Managing Climate-Related Extreme Events during the Covid-19 Pandemic.	
Extreme events (e.g., hurricanes, wildfires): evacuation and sheltering	Communicate clearly to the public that the Covid-19 pandemic does not change the imperative to evacuate, given the substantial risks of remaining in place during extreme climate-driven hazards. Use existing community pandemic-communication channels to disseminate critical information. Increase the number of available shelter sites, with lower occupancy per site, more separated spaces within sites, and more space per shelter resident (e.g., using smaller "noncongregate shelters," hotels). Use standard shelter-registration information (name, contact phone number) for all persons entering, to facilitate contact tracing in case Covid-19 is diagnosed in persons who used the shelter. Implement shelter protocols for infection control, including daily symptom checks, isolation of symptomatic persons, mandatory wearing of face masks, ample supplies of hand sanitizer, hand-washing stations, and meals provided in disposable containers. Adapt guidance for minimizing Covid-19 viral transmission in mass care settings for use with in-home sheltering — because many evacuees shelter with family and friends.
Extreme heat: remaining at home and cooling locations	Provide electricity subsidies and extend moratoriums to prevent electricity and water shutoffs for people with pandemic-related unemployment and economic hardships to allow them to remain in their homes. Ensure effective alternatives to minimize heat exposure if designated cooling centers or popular indoor, air-conditioned venues are closed. Ensure that cooling centers follow guidelines similar to best-practice guidelines noted above. Minimize transmission risks by limiting occupancy and providing or requiring masks and hand sanitizer in air-conditioned venues open to the public, such as malls or movie theaters. Use phone text messages, as used for pandemic communication, for heat-health notifications.

Table. Short-Term Strategies for Managing Climate-Related Extreme Events during the Covid-19 Pandemic.

GLOBAL

PLANNING FOR COVID-19 VACCINES SAFETY SURVEILLANCE

Kochhar S, Salmon DA.. Vaccine. 2020 Sep 11;38(40):6194-6198. doi: 10.1016/j.vaccine.2020.07.013. Epub 2020 Jul 10.
Level of Evidence: Other - Guidelines and Recommendations

BLUF

A commentary conducted by members of global health departments in the US and India call attention to the accelerated timelines of vaccine development for COVID-19 (Table 1) and highlight the critical need for active safety surveillance, especially in low-and-middle income countries, to establish capacity for primary data collection in addition to delineating real adverse reactions to ensure proper understanding and awareness of the benefit-risk profile of an imminent COVID-19 vaccine.

FIGURES

Table 1
COVID-19 Vaccine Candidates in Clinical Development (21 as of June 29, 2020).

Vaccine Candidate	Platform	Phase of Clinical Development	Developer
ChAdOx1-S expressing S protein	Non Replicating Viral Vector	Phase 3	University of Oxford, AstraZeneca
Adenovirus Type 5 Vector expressing S protein	Non Replicating Viral Vector	Phase 2	CanSino Biological Inc., Beijing
Lipid nanoparticle (LNP) encapsulated mRNA encoding S protein	RNA	Phase 2	Institute of Biotechnology
Inactivated	Inactivated	Phase 1/2	Moderna, NIAID
Inactivated	Inactivated	Phase 1/2	Beijing Institute of Biological Products, Sinopharm
Inactivated with alum	Inactivated	Phase 1/2	Wuhan Institute of Biological Products, Sinopharm
Full length recombinant SARS-CoV-2 glycoprotein nanoparticle vaccine adjuvanted with Matrix M	Protein Subunit	Phase 1/2	Sinovac
3 LNP-mRNAs	RNA	Phase 1/2	Novavax
Inactivated	Inactivated	Phase 1/2	
Adeno-based	Non Replicating Viral Vector	Phase 1	BioNTech, Fosun Pharma, Pfizer
DNA plasmid encoding S protein delivered by electroporation	DNA	Phase 1	Institute of Medical Biology, Chinese Academy of Medical Sciences
DNA Vaccine (GX-19)	DNA	Phase 1	Gamaleya Research Institute
LNP-nCoVsRNA	Self-amplifying RNA	Phase 1	Inovio Pharmaceuticals
mRNA	RNA	Phase 1	Genexine Consortium
mRNA	RNA	Phase 1	Imperial College London
S-Trimer subunit vaccine adjuvanted	Protein Subunit	Phase 1	Curevac
Adjuvanted recombinant protein (RBD Dimer)	Protein Subunit	Phase 1	People's Liberation Army (PLA)
Autologous Dendritic Cells with SARS-CoV-2 antigens, administered with granulocyte-macrophage colony-stimulating factor (GM-CSF)	Dendritic cell vaccine	Phase 1	Academy of Military Sciences, Walvax Biotech
Dendritic cells (DC) modified with lentivirus vector, expressing synthetic minigenes based on domains of selected viral proteins, administered with antigen specific cytotoxic T lymphocytes (CTLs)	Modified DC	Phase 1	Clover Biopharmaceuticals, GSK, Dynavax
Artificial antigen-presenting cells (aAPCs) modified with lentiviral vector, expressing synthetic minigene based on domains of selected proteins	Modified APCs	Phase 1	Anhui Zhifei Longcom Biopharmaceutical, Institute of Microbiology, Chinese Academy of Sciences
bac-TRL Spike, orally delivered	Live Bifidobacterium longum to deliver plasmids of synthetic DNA encoding SARS-CoV-2 spike protein	Phase 1	Aivita Biomedical
			Shenzhen Geno-Immune Medical Institute
			Shenzhen Geno-Immune Medical Institute
			Symvivo

Source- ClinicalTrials.gov, London School of Hygiene and Tropical Medicine [4], WHO [5].

Table 1: COVID-19 Vaccine Candidates in Clinical Development (21 as of June 29, 2020)

UNDERSTANDING THE PATHOLOGY

IDENTIFICATION OF IMMUNODOMINANT LINEAR EPITOPIES FROM SARS-COV-2 PATIENT PLASMA

Farrera-Soler L, Daguer JP, Barluenga S, Vadas O, Cohen P, Pagano S, Yerly S, Kaiser L, Vuilleumier N, Winssinger N.. PLoS One. 2020 Sep 9;15(9):e0238089. doi: 10.1371/journal.pone.0238089. eCollection 2020.

Level of Evidence: 5 - Mechanism-based reasoning

BLUF

Interdisciplinary researchers from University of Geneva, Switzerland utilized their developed peptide microarray for mapping the antibody response to linear epitopes of SARS-CoV-2 spike protein from the plasma of 12 COVID-19 patients and 6 healthy controls. Based on their results (illustrated below), the authors suggests that antibodies towards epitopes 655-672 may diminish the antibody-dependent enhancement (ADE) of SARS-CoV-2, stopping viral entry into host cells.

SUMMARY

The results of this study are summarized below:

- Three "immunodominant linear epitopes" were identified from the researchers developed peptide array: epitope 655-672 in 66% of COVID-19 patients, epitope 782-798/811-822 in 40% of COVID-19 patients, and epitope 1147-1158 in 58% of COVID-19 patients (Figure 3).
- Epitope 655-672 and epitope 782-798/811-822 were associated with significant proteolytic sites S1/S2 and S2' on the spike protein, respectively (Figure 4). The authors highlight that these sites have previously been demonstrated to be important in SARS-CoV-2 entry, infection, and evolution.
- After conducting a proteolytic experiment with furin with the plasma from a patient positive for epitope 655-672, the results showed full protection against furin-proteolysis, while plasma from a patient negative for this epitope did not (Figure 8).

ABSTRACT

A novel severe acute respiratory syndrome coronavirus (SARS-CoV-2) is the source of a current pandemic (COVID-19) with devastating consequences in public health and economic stability. Using a peptide array to map the antibody response of plasma from healing patients (12) and healthy patients (6), we identified three immunodominant linear epitopes, two of which correspond to key proteolytic sites on the spike protein (S1/S2 and S2') known to be critical for cellular entry. We show biochemical evidence that plasma positive for the epitope adjacent to the S1/S2 cleavage site inhibits furin-mediated proteolysis of spike.

FIGURES

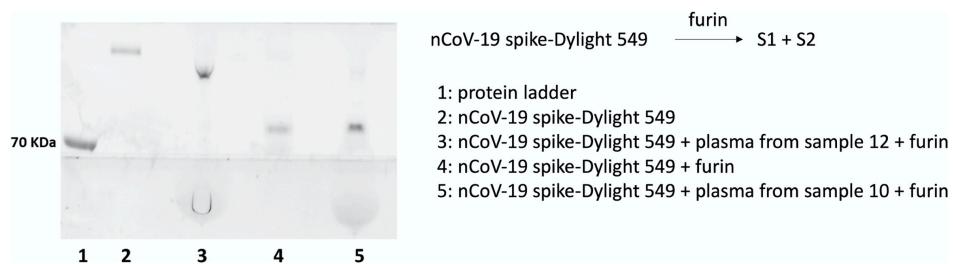


Figure 3. A) Localization of the three selected epitopes on the crystal structure of SARS-CoV-2 Spike protein (PDBID:6ZGE): red(epitope 655-672), green(epitope 782-798/811-822) and orange (epitope 1147-1158, the structure is undefined in the PDB). B) Expanded view of the 3 selected epitopes, N-linked glycan shown in purple.

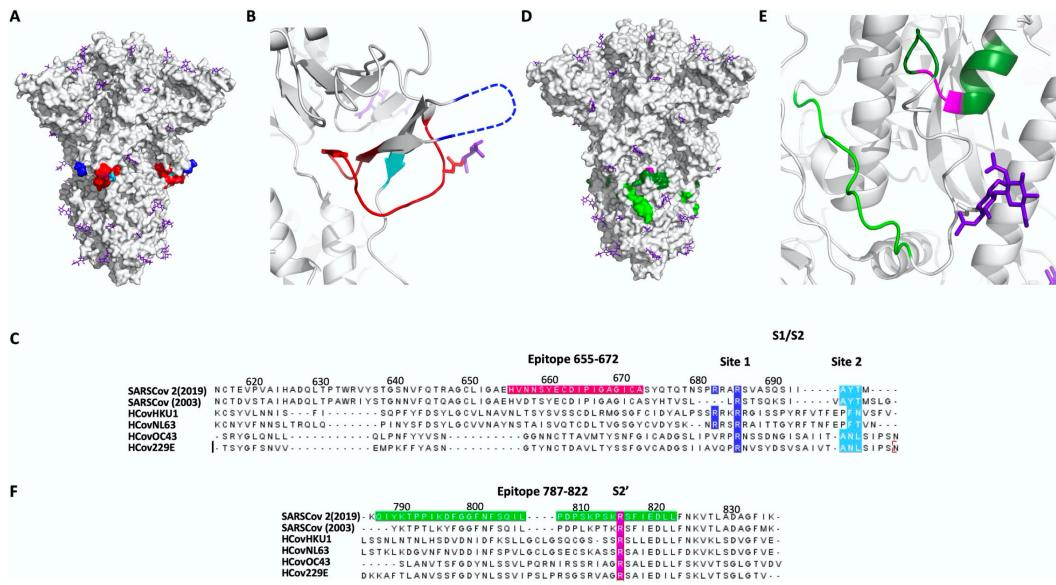


Figure 4. Selected epitopes localization in relation to the protease cleavage site of the spike protein. A-B) The 655–672 epitope (red) and the two reported protease cleavage sites S1/S2: site 1 (685–686: blue) and site 2 (695–696: cyan). C) Sequence alignment of the S1/S2 cleavage sites for five different coronaviruses SARS-CoV2 (2019), SARS-CoV (2003), HCovHKU1, HCovNL63, HCOVOC43 and HCov229E. D-E) The 787–822 epitope (green) and the S2' cleavage site (815–816: magenta). F) Sequence alignment of the S2' cleavage site. Figure generated from pdb ID: 6ZGE.

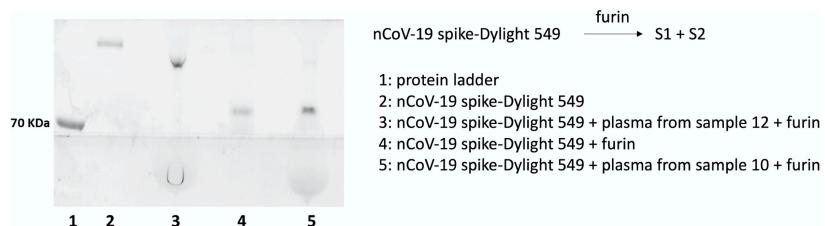


Figure 8. Inhibition of furin-mediated proteolysis of spike. Fluorescent scan of a SDS-PAGE with Dylight 549-labeled spike protein (lane 2) and treated with furin (lane 4). The same experiment was performed with the addition of plasma from patient 10 (negative for the epitope adjacent to the cleavage site, lane 5) and patient 12 (positive for the epitope adjacent to the cleavage site (lane 3). Lane 1 is a molecule weight marker.

TRANSMISSION & PREVENTION

PREVENTION IN THE HOSPITAL

INCIDENT COMMAND IN THE TIME OF COVID-19

Cook J.. Lab Med. 2020 Sep 10:lmaa073. doi: 10.1093/labmed/lmaa073. Online ahead of print.

Level of Evidence: Other - Guidelines and Recommendations

BLUF

Jim Cook, associated with Houston Methodist Healthcare System in Texas, presents a description of the effectiveness of an Incident Command System (ICS) implemented in their organization at the very beginning of the COVID-19 outbreak. The ICS enables effective management and risk reduction in many disasters based on 7 principles and 5 objectives. The author highlights the role of ICS in organizing the staff and patients, in addition to analyzing, planning, and implementing strategies to manage the pandemic and alleviate anxiety through communicating reliable information (Figures 1, 2), indicating the importance of an ICS in organizations for constructive disaster management in the future.

SUMMARY

Incident Command System (ICS) was first developed in 1970 by U.S firefighting agencies. It has since been rooted in many organizations and medical specialties for efficacious management of disasters like hurricanes. Hospital emergency preparedness and planning is implemented through the Hospital Emergency Incident Command System (HEICS).

- The ICS was implemented in the Houston Methodist organization in the very early stages of the COVID-19 outbreak, when only 17 confirmed cases were reported in Houston.
- ICS works on 7 principles: "standardization, functional specificity, a manageable span of control, unit integrity, unified command, management by objectives, and comprehensive resource management".
- The 5 major objectives include: "command, operations, planning, logistics, finance and administration".
- ICS has contributed to the reduction of anxiety through effective communication strategies with reliable and accurate information (Figure 2). Figure 1 shows the COVID-19 ICS structure.

ABSTRACT

The SARS-CoV-2 virus was initially contained in China but rapidly spread across the globe. The grave threat was not apparent until it was already in our midst. Our organization implemented an Incident Command System (ICS), based on previous experience, to respond to the COVID-19 pandemic in a comprehensive and effective manner. This well-known management and response framework is used by many specialties and organizations in disasters of different complexity and size. Our ICS was able to assemble the appropriate people, assess the situation, and develop and implement plans to deal with the COVID-19 crisis. The effectiveness of the ICS structure and its execution was instrumental in getting in front of the virus and managing regional activities. The ICS is an effective tool to improve safety and mitigate risk when dealing with large-scale disasters and should be implemented and practiced before the need arises. Our organization implemented a formal Incident Command System (ICS) very early as a response to the COVID-19 pandemic. Although it recently disbanded, we are maintaining its core functionality and communication as we continue to deal with COVID-19 into the future. The author has observed the ICS being used at hospitals through hurricanes, blizzards, and riots but never saw it work as well as it did during the initial weeks of the pandemic. This group deftly navigated through uncharted waters by leveraging the spirit and structure of Incident Command.

FIGURES

- Incident Commander
 - Administrative Fellow
 - Public Information Officer
 - Key leaders
 - Chief Quality Officers, ED, ICU, Anesthesia, Infectious Disease, OB, Ambulatory, Pharmacy, Chief Nursing Officers
 - Physician Executive
 - Infection Prevention
 - Epidemiologist
- Operations Executive
 - Ethics committee
 - ED/screening & planning
 - Infectious Disease Unit
 - Supply Chain
 - HR/Employee Health
 - Education
 - Ambulatory/Physician Organization
 - Telemedicine
 - City/Regional Public Health Liaison
- Entity Incident Commanders for each separate facility/entity

Figure 1: COVID incident command structure.

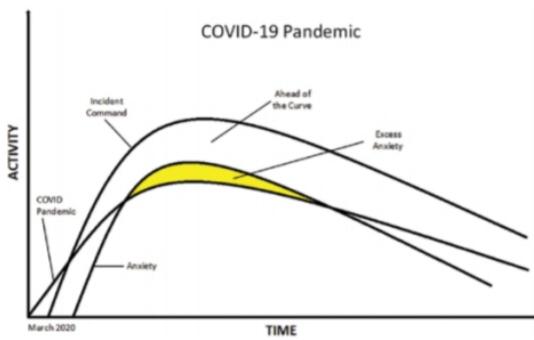


Figure 2: COVID pandemic trajectory.

MANAGEMENT

ACUTE CARE

EFFICACY OF CORTICOSTEROIDS IN NON-INTENSIVE CARE UNIT PATIENTS WITH COVID-19 PNEUMONIA FROM THE NEW YORK METROPOLITAN REGION

Majmundar M, Kansara T, Lenik JM, Park H, Ghosh K, Doshi R, Shah P, Kumar A, Amin H, Chaudhari S, Habtes I.. PLoS One. 2020 Sep 9;15(9):e0238827. doi: 10.1371/journal.pone.0238827. eCollection 2020.

Level of Evidence: 3 - Non-randomized controlled cohort/follow-up study

BLUF

A single-center retrospective cohort study (n=205 patients with confirmed COVID-19 pneumonia with acute hypoxemic respiratory failure (AHRF), 60 patients treated with corticosteroids at the physician's discretion) by internists at the Metropolitan Hospital Center, NYC from Mar 16 - May 10, 2020 found that patients treated with corticosteroids exhibited lower risk of ICU transfer, intubation, and death** (Figure 1, Table 3) in addition to greater SpO₂/FiO₂ improvement when compared to controls (Figure 2). These results suggest that usage of corticosteroids for non-intubated patients with COVID-19 pneumonia complicated by AHRF may lead to decreased mortality and complications.

SUMMARY

** The authors report the following adjusted hazard ratios as development of the composite primary outcome of ICU transfer, intubation, and death (0.15 [95% CI, 0.07-0.33; p<0.001]):

- ICU transfer (0.16 [95% CI, 0.07-0.34; p<0.001])
- Intubation (0.31 [95% CI, 0.14-0.70; p=0.005])
- Death (0.53 [95% CI, 0.22-1.31; p=0.172])

ABSTRACT

INTRODUCTION: The role of systemic corticosteroid as a therapeutic agent for patients with COVID-19 pneumonia is controversial. **OBJECTIVE:** The purpose of this study was to evaluate the effect of corticosteroids in non-intensive care unit (ICU) patients with COVID-19 pneumonia complicated by acute hypoxemic respiratory failure (AHRF). **METHODS:** This was a single-center retrospective cohort study, from 16th March, 2020 to 30th April, 2020; final follow-up on 10th May, 2020. 265 patients consecutively admitted to the non-ICU wards with laboratory-confirmed COVID-19 pneumonia were screened for inclusion. 205 patients who developed AHRF (SpO₂/FiO₂ ≤ 440 or PaO₂/FiO₂ ≤ 300) were only included in the final study. Direct admission to the Intensive care unit (ICU), patients developing composite primary outcome within 24 hours of admission, and patients who never became hypoxic during their stay in the hospital were excluded. Patients were divided into two cohorts based on corticosteroid. The primary outcome was a composite of ICU transfer, intubation, or in-hospital mortality. Secondary outcomes were ICU transfer, intubation, in-hospital mortality, discharge, length of stay, and daily trend of SpO₂/FiO₂ (SF) ratio from the index date. Cox-proportional hazard regression was implemented to analyze the time to event outcomes. **RESULT:** Among 205 patients, 60 (29.27%) were treated with corticosteroid. The mean age was ~57 years, and ~75% were men. Thirteen patients (22.41%) developed a primary composite outcome in the corticosteroid cohort vs. 54 (37.5%) patients in the non-corticosteroid cohort (P = 0.039). The adjusted hazard ratio (HR) for the development of the composite primary outcome was 0.15 (95% CI, 0.07-0.33; P <0.001). The adjusted hazard ratio for ICU transfer was 0.16 (95% CI, 0.07 to 0.34; P < 0.001), intubation was 0.31 (95% CI, 0.14 to 0.70; P- 0.005), death was 0.53 (95% CI, 0.22 to 1.31; P- 0.172), composite of death or intubation was 0.31 (95% CI, 0.15 to 0.66; P- 0.002) and discharge was 3.65 (95% CI, 2.20 to 6.06; P<0.001). The corticosteroid cohort had increasing SpO₂/FiO₂ over time compared to the non-corticosteroid cohort who experience decreasing SpO₂/FiO₂ over time. **CONCLUSION:** Among non-ICU patients hospitalized with COVID-19 pneumonia complicated by AHRF, treatment with corticosteroid was associated with a significantly lower risk of the primary composite outcome of ICU transfer, intubation, or in-hospital death, composite of intubation or death and individual components of the primary outcome.

FIGURES

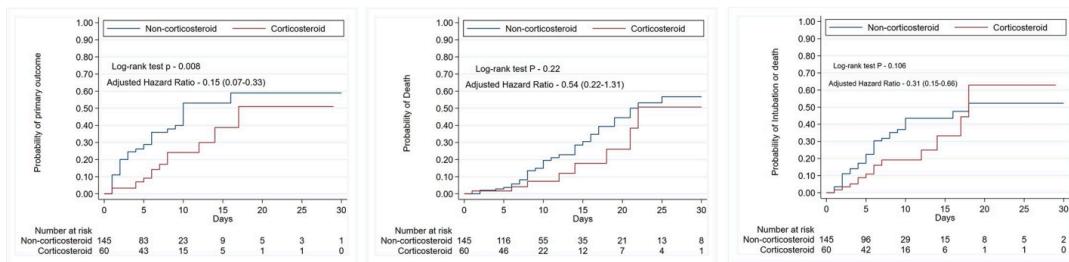


Fig 1. Kaplan-Meier curve of patients with non-severe COVID-19 pneumonia who received and did not receive corticosteroids. Panel (A) Primary Outcome. Primary outcome is a composite of ICU transfer, intubation or death. Panel (B) In-hospital Mortality. Panel (C) Composite of intubation or death.

Figure 1: Kaplan-Meier curve of patients with non-severe COVID-19 pneumonia who received and did not receive corticosteroids. Panel (A) Primary Outcome. Primary outcome is a composite of ICU transfer, intubation or death. Panel (B) In-hospital Mortality. Panel (C) Composite of intubation or death.

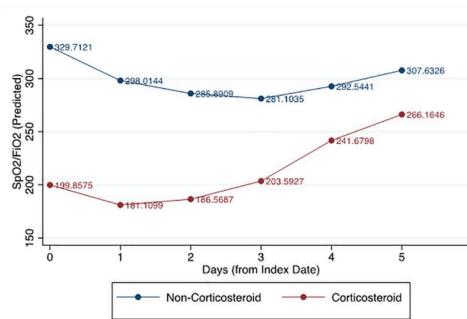


Fig 2. Comparison of trend of mean $\text{SpO}_2/\text{FiO}_2$ ratio since index date with and without corticosteroid.

Figure 2: Comparison of trend of mean $\text{SpO}_2/\text{FiO}_2$ ratio since index date with and without corticosteroid.

Table 3. Unadjusted and model-adjusted risk of primary and secondary outcomes.

Outcomes	Model Type*	Univariable Estimate (95% CI)	P-Value	Multivariable Estimate (95% CI)	P-Value
		Steroid vs. Non-Steroid		Steroid vs. Non-Steroid	
Primary Outcome	Cox-proportional hazard	0.45 (0.24–0.82)	0.009	0.15 (0.07–0.33)	<0.001
Secondary Outcomes					
ICU transfer	Cox-proportional hazard	0.49 (0.26–0.93)	0.029	0.16 (0.07–0.34)	<0.001
Intubation	Cox-proportional hazard	0.66 (0.33–1.29)	0.221	0.31 (0.14–0.70)	0.005
Death	Cox-proportional hazard	0.62 (0.29–1.35)	0.228	0.53 (0.22–1.31)	0.172
Intubation/death	Cox-proportional hazard	0.60 (0.33–1.12)	0.108	0.31 (0.15–0.66)	0.002
Discharge	Cox-proportional hazard	1.17 (0.83–1.65)	0.380	3.65 (2.20–6.06)	<0.001
Length of stay (Days)	Linear regression	1.15 (-1.61 - +3.92)	0.41	-1.06 (-4.26 - +2.14)	0.515

Primary outcome is a composite of ICU transfer, intubation or death

*Models adjusted for SF ratio, age, gender, COPD, WBC, platelet count, tocilizumab and therapeutic dose of Enoxaparin

Table 3: Unadjusted and model-adjusted risk of primary and secondary outcomes

ADJUSTING PRACTICE DURING COVID-19

FOR HEALTHCARE PROFESSIONALS

OPTIMIZING SCARCE RESOURCE ALLOCATION DURING COVID-19: RAPID CREATION OF A REGIONAL HEALTHCARE COALITION AND TRIAGE TEAMS IN SAN DIEGO COUNTY, CALIFORNIA

Devereaux A, Yang H, Seda G, Sankar V, Maves RC, Karanjia N, Parrish JS, Rosenberg C, Goodman-Crews P, Cederquist L, Burkle FM, Tuteur J, Leroy C, Koenig KL.. Disaster Med Public Health Prep. 2020 Sep 10:1-21. doi: 10.1017/dmp.2020.344. Online ahead of print.

Level of Evidence: Other - Guidelines and Recommendations

BLUF

Physicians, ethicists, and public health experts based in San Diego County, California present the systems and protocols they developed for county-wide, population-based crisis management of COVID-19 (Figure 1). The team developed healthcare community coalitions, teams to triage scarce resources, systems to transmit information across multiple facilities, virtual tabletop exercises for disaster preparedness, and committees responsible for transparent communication with the public (Figure 2, 4). The strategies described in this article may benefit other communities in need of solutions to resource scarcity during the pandemic.

ABSTRACT

Successful management of an event where healthcare needs exceed regional healthcare capacity requires coordinated strategies for scarce resource allocation. Publications for rapid development, training, and coordination of regional hospital triage teams manage the allocation of scarce resources during COVID-19 are lacking. Over a period of 3 weeks, over 100 clinicians, ethicists, leaders, and public health authorities convened virtually to achieve consensus on how best to save the most lives possible and share resources. This is referred to as population-based crisis management. The rapid regionalization of 22 acute care hospitals across 4500 square miles in the midst of a pandemic with a shifting regulatory landscape was challenging, but overcome by mutual trust, transparency, and confidence in the public health authority. Because many cities are facing COVID-19 surges, we share a process for successful rapid formation of healthcare care coalitions, Crisis Standard of Care, and training of Triage Teams. Incorporation of continuous process improvement and methods for communication is essential for successful implementation. Utilization of our regional healthcare coalition communications, incident command system, and the crisis care committee helped mitigate crisis care in the San Diego and Imperial County region as COVID-19 cases surged and scarce resource collaborative decisions were required.

FIGURES

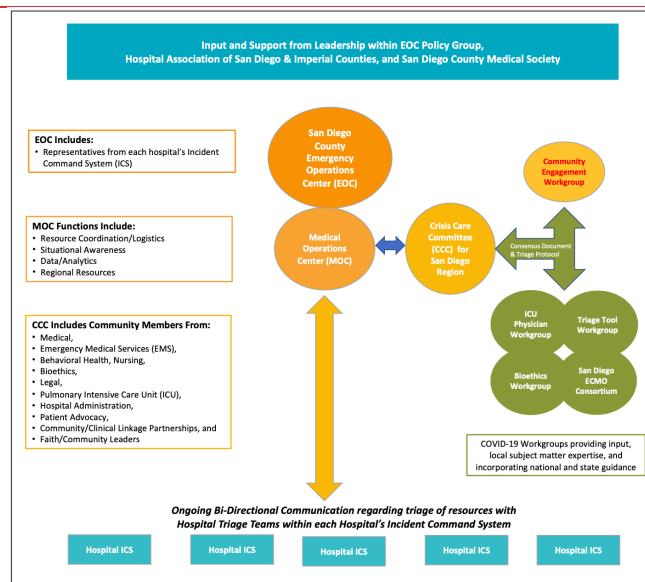


Figure 2. Organization chart for regionalization

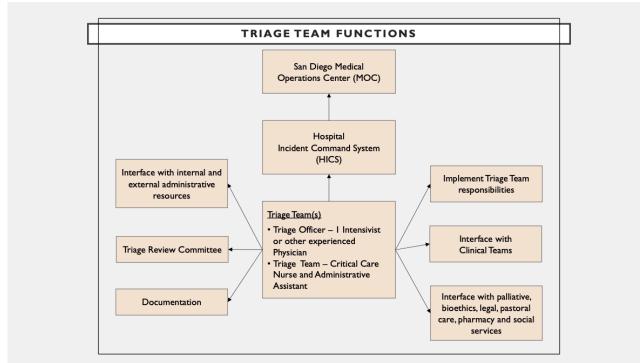


Figure 4: Triage Team Development and Education

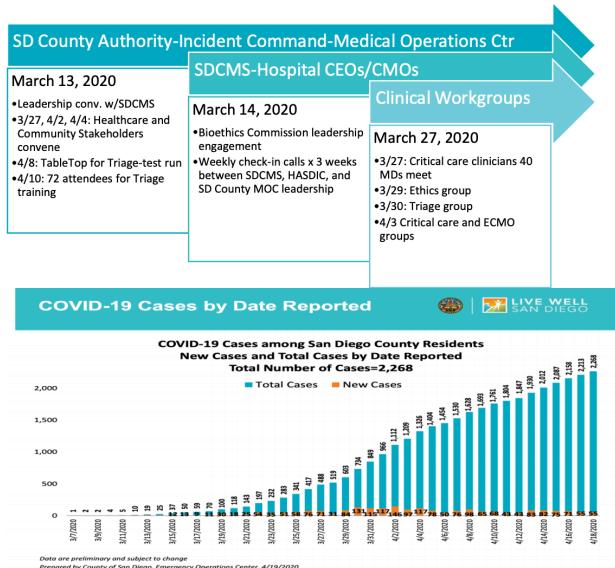


Figure 1. Timeline

R&D: DIAGNOSIS & TREATMENTS

CURRENT DIAGNOSTICS

RECENT BIOTECHNOLOGICAL TOOLS FOR DIAGNOSIS OF COVID-19 DISEASE: A REVIEW

Behera BC, Mishra RR, Thatoi H.. Biotechnol Prog. 2020 Sep 9. doi: 10.1002/btpr.3078. Online ahead of print.

Level of Evidence: 5 - Review / Literature Review

BLUF

Researchers in Biotechnology from Odisha, India conducted a brief overview of current COVID-19 diagnostic techniques and found that RT-PCR is the gold standard and the most widely used method while CRISPR is the most adaptable to low resource settings. This overview helps to inform choices between diagnostic techniques for the users depending on the context.

SUMMARY

Authors provide a brief overview of some of the current COVID-19 diagnostic techniques:

- Real time PCR (RT-PCR): "Gold standard" of diagnostics, most widely used method. Provides fast and high throughput detection and quantification of target DNA sequences extracted from upper respiratory tract using nasopharyngeal swab technique, aimed at diagnosing COVID-19 by targeting specific viral genomes (E, N, S, RdRp genes).
- Real time isothermal loop mediated amplification (RT-LAMP): fastest diagnostic test for COVID-19, works similarly as RT-PCR but does not require thermal cycling, results within 30-40 minutes. Aimed at targeting the N gene.
- Clustered regularly interspaced short palindromic repeats (CRISPR): SHERLOCK (specific High Sensitivity Enzymatic Reporter UnLOCKing) is most well known CRISPR detection strategy for COVID-19. Results appear on an easy to read strip that is akin to a pregnancy test, able to detect COVID-19 from saliva, good for low resource settings.
- Serological tests for antigen detection: nucleoprotein (NP) can be detected during the first two weeks of infection, nucleocapsid protein (N) can also be detected but has low specificity as N is also present in SARS-CoV.
- Serological tests for antibody detection: antibody IgM and IgG lateral flow immunoassays detect antibody in patients who currently have or have history of COVID-19, although this test cannot distinguish between the two.

ABSTRACT

Recently, a corona virus disease (COVID-19) caused by a novel corona virus (Sevier Acute Respiratory Syndrome Corona Virus 2; SARS-CoV-2), rapidly spread throughout the world. It has been resulted an unprecedented public health crisis and has become a global threat. WHO declared it as a pandemic due to rapid transmission and severity of the disease. According to WHO, as of 22nd of August 2020, the disease spread over 213 countries of the world having 22, 812, 491 confirmed cases and 795, 132 deaths recorded worldwide. In the absence of suitable antiviral drugs and vaccines the current pandemic has created an urgent need for accurate diagnostic tools that would be helpful for early detection of the patients. Many tests including classical and high throughput techniques have developed and obtained U.S. Food and drug administration (FDA) approval. However, efforts are being made to develop new diagnostic tools for detection of the disease. Several molecular diagnostic tests such as Real Time-PCR, Real time Isothermal loop mediated amplification (RT-LAMP), full genome analysis by next-generation sequencing (NGS), clustered regularly interspaced short palindromic repeats (CRISPR) technique and microarray-based assays along with other techniques such as Computed Tomography (CT) scan, biomarkers, biosensor, nanotechnology, serological test, enzyme-linked immunosorbent assay (ELISA), isolation of viral strain in cell culture are currently available for diagnosis of COVID-19 infection. This review provides a brief overview of promising high throughput techniques currently used for detection of SARS-CoV-2, along with their scope and limitations that may be used for effective control of the disease. This article is protected by copyright. All rights reserved.

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