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SUBMITTED FOR JPSM COVID-19 RAPID PUBLICATION

Development and Implementation of a Clinician-facing Prognostic Communication Tool for Patients with COVID-19 and Critical Illness

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Abstract

Effective prognostication for a novel disease presents significant challenges, especially given the stress induced during a pandemic. We developed a point-of-care tool to summarize outcome data for critically ill patients with COVID-19 and help guide clinicians through a thoughtful prognostication process. Two authors reviewed studies of outcomes of patients with critical illness due to COVID-19 and created a visual infographic tool based on available data. Survival data were supplemented by descriptions of best and worst-case clinical scenarios. The tool also included prompts for clinician reflection designed to enhance awareness of cognitive biases that may affect prognostic accuracy. This online, open source COVID-19 Prognostication Tool has been made available to all clinicians at our institution and is updated weekly to reflect evolving data. Our COVID-19 Prognostication Tool may provide a useful approach to promoting consistent and high-quality prognostic communication across a healthcare system.

Background

Patients and families with serious illness rely upon healthcare teams to provide accurate information about prognosis. Skillfully delivered prognostic information prompts patients and families to imagine how their lived experience will change on each potential treatment path, thereby empowering them to fully participate in shared decision-making about the path that aligns best with the patient's values and goals.^{1,2} Unfortunately, clinicians face formidable challenges when attempting to deliver clear prognostic information to the families of critically ill patients with COVID-19. Existing data about survival rates are rapidly evolving and difficult to interpret with confidence because of variability in care settings and incomplete patient follow-up in most studies.³⁻¹⁰ The limited experience of any given clinician with long-term outcomes of patients with this novel disease inherently limits the value of experiential prognostication. Moreover, important data about quality-of-life outcomes will take months or years to develop due to the lengthy convalescent period for most critically ill patients with COVID-19.

Given the limited data available about COVID-19 and the heightened emotional challenges of caring for patients in a pandemic, clinicians may be particularly vulnerable to cognitive biases during the process of prognostication. Early in our institution's experience with the COVID-19 pandemic, our palliative care consult team noticed several recurring themes of cognitive bias during interdisciplinary team discussions. Recognizing the importance of providing the most objective and consistent prognostic information possible to patients and families, we created a COVID-19 Prognostication Tool designed to accomplish four objectives. First, the tool collates the latest peer-reviewed prognostic information about critically ill patients with COVID-19 into a concise, easily accessible, up-to-date prognostication guide.

Second, the tool guides clinicians through a careful process to mitigate the effects of cognitive biases on their ability to communicate about prognosis with patients and families. Third, the tool prompts clinicians to translate population-based statistical information into best-case, worst-case and most likely scenarios for a given patient.² Fourth, the tool encourages providers to seek information about patient values that can inform clinician recommendations for medically-appropriate, value-concordant care. This report describes the development and implementation of a point-of-care COVID-19 Prognostic Tool to guide best practices of relaying prognostic information to the families of critically ill patients with COVID-19 and makes this tool available to others for adaptation and implementation.

Cognitive Bias and Prognostication

We identified three cognitive biases^{11,12} that we observed impacting clinical team discussions of prognosis for critically ill patients with COVID-19 at our institution: anchoring bias, availability bias, and false consensus bias. The Prognostication Tool was designed to explicitly address these three biases described here.

Anchoring bias:¹² Early in the pandemic, “Crisis Standards of Care” was a frequent topic of discussion as our institution prepared for a predicted surge of patients with COVID-19. Clinicians contemplated the frightening possibility of reaching a crisis state where resource scarcity would prevent us from offering advanced life support to chronically ill, elderly patients with the poorest prognoses. The impact of these emotionally-charged discussions was significant. Even when staffing, ventilators, and other resources remained at objectively adequate levels, providers often continued to subconsciously anchor on a “Crisis Standards of

Care” mindset, proposing limits on aggressive treatment modalities due to concerns about future resource scarcity rather than actual scarcity or patient values.

Availability bias:¹² Clinicians who have recently cared for a dying patient with COVID-19 can grow more pessimistic about outcomes for all critically ill patients with COVID-19, and may be more likely to overestimate subsequent individual patients’ mortality risk. At times, a feeling of therapeutic nihilism seemed predominant on our healthcare teams, prompting moral distress among physicians, nurses, and others. Some family members also perceived disproportionate provider pessimism and warned against the perpetuation of self-fulfilling prophecies.

False consensus bias:¹³⁻¹⁵ Providers with strong personal beliefs about minimum acceptable quality of life are at risk of making potentially inaccurate assumptions that their patients have similar values, especially in times of stress. During the COVID-19 pandemic, family visitation restrictions have heightened the risk of false consensus bias because these infection control measures inherently reduce opportunities for family members to interface with the medical team and initiate discussions about their loved one’s values and goals. Patients and families with limited English proficiency, disproportionately affected by the COVID-19 pandemic, face an additional barrier of needing an interpreter to communicate with the healthcare team. Due to these communication challenges, clinicians in the COVID-19 pandemic are less likely to learn about their patient’s values and may subconsciously fill in knowledge gaps with inaccurate assumptions based on their own personal values.

Development of a Clinician-Facing COVID-19 Prognostication Tool

Our COVID-19 Prognostication Tool was developed as a point-of-care guide to help front-line clinicians respond to the cognitive challenges of prognosticating during an evolving pandemic. The tool is a concise, open source document that can be viewed online.¹⁶ The current tool at the time of publication is captured in this article, but the open source tool will be updated as new data emerge.

Figure 1 provides an explicit reminder that resource scarcity should *only* dictate care decisions if the healthcare system is operating under extraordinary circumstances that require Crisis Standards of Care.¹⁷ Such decisions should be made on a regional basis and not for one hospital in isolation. In all other circumstances, our goal should be to provide medically appropriate care that aligns with the patient's values (Figure 1). This reminder was placed at the beginning of the tool to explicitly name the risk of anchoring on Crisis Standards of Care and provide clinicians with the more appropriate, alternative reference point of Values-Based Care.

Figures 2 and 3 provide a visual summary of outcome data from existing cohort studies of critically ill patients with COVID-19.³⁻¹⁰ Studies were identified using a daily literature search that included ("COVID-19" OR "SARS-CoV-2") AND ("critical care" OR "ICU" OR "critically ill") AND ("outcome" OR "mortality" OR "survival"). Outcome data for critically ill patients with COVID-19 were reviewed independently by two authors, one trained in critical care, with a focus on clinical predictors of mortality. Based on published outcome data, we identified two broad categories of patients with contrasting prognostic trajectories useful to clinicians: 1) patients with COVID-19 receiving mechanical ventilation with isolated lung involvement (generally <60-70 years old), and 2) patients with COVID-19 receiving mechanical ventilation

with multi-organ involvement and/or patients who were >70 years old. For each group, we created a visual summary of the approximate likelihood of successful extubation, death in the hospital, or prolonged intubation >2 weeks with uncertain final outcome (Figure 2). Reviewers reached consensus about the two categories of patients and their respective prognoses through discussion of the literature. The tool is updated weekly to reflect newly published results.

Figure 3 also contains clinical descriptions of best-case and worst-case scenarios for elderly patients with COVID-19 receiving mechanical ventilation. These were based on both published data and the clinical experience at our institution. The best-case scenario for patients who require a prolonged course of intubation describes a typical recovery period after severe acute respiratory distress syndrome, emphasizing that recovery is often prolonged, on the order of months, with a new baseline that will likely include new functional deficits.¹⁸ This descriptive clinical scenario is provided in conjunction with estimated survival rates to provide a tangible reminder to clinicians of how a potential recovery might look. While recognizing that the likelihood of recovery may be small in some cases, we explicitly point out the possibility of recovery as a counterbalance to availability bias for clinicians who have recently cared for a dying patient and may be susceptible to inappropriate therapeutic nihilism.

Figure 4 is designed to prompt clinicians to challenge their availability bias and false consensus bias. This figure names the cognitive and emotional burden involved in caring for a large volume of seriously ill or dying patients, and introduces a framework intended to mitigate the negative effect that demoralization and cognitive biases may have on a clinician's ability to prognosticate for an individual patient. First, the framework directs providers to imagine best-case, worst-case and most likely scenarios for the individual patient. Second, clinicians are

asked to consider whether each treatment option is likely to “work” for the patient on a physiologic level. These two steps attempt to enhance provider awareness of inappropriate therapeutic nihilism by prompting providers to go through the cognitive step of considering the likelihood of benefit from each treatment option. Third, the framework attempts to challenge false consensus bias by explicitly directing the provider to ask for the patient and family’s perspective on minimum acceptable quality of life, rather than relying on assumptions that may have been made by the clinical team.

The point-of-care COVID-19 Prognostication Tool has been disseminated to front-line clinicians at our institution, as well as a local community hospital, and will be updated weekly to reflect newly published outcome data. Clinicians at our institution are invited to use the tool as a source of information about major prognostic trajectories for this novel disease, as well as a reminder of the need to continuously re-calibrate our clinical impressions as new peer-reviewed evidence emerges. Qualitative feedback on the tool has been positive, but we were not able to conduct a rigorous evaluation in the context of our pandemic response.

Limitations

Our COVID-19 Prognostication Tool has several important limitations. First, the visual summary of patient outcomes is based on limited data from early studies and is likely to change as the pandemic evolves. Moreover, patient outcome data vary widely across studies due to length of study follow-up and regional differences in resource availability, treatment protocols, and approaches to withdrawal of life-sustaining treatment. Our team strives to update our visual summary of patient outcomes at least weekly with a concerted effort to capture

pervasive, big-picture trends in survival. However, our interpretation of the data inevitably involves some degree of subjectivity. Second, this prognostication tool can only be useful when it is thoughtfully applied to the patient population and clinical circumstances for which it is intended: critically ill patients with COVID-19. Third, up-to-date and accurate prognostic information is only one step in effective prognostic communication with patients and family members. Supportive and effective communication of prognostic information is an important skill with multiple components, many of which are not addressed by this tool.^{1,19,20} Fourth, our prognostication tool focuses on three cognitive biases that we observed at our institution but may not be universally applicable to all centers; reflection prompts may need to be adapted depending on the cognitive biases that are prevalent within each institutional culture. Finally, our evaluation of this tool is subjective and preliminary. Our goal was to share the tool quickly for others to adapt, implement, and evaluate in the context of this novel pandemic. Additional evaluation will be important to understand and improve the effectiveness of the tool.

Conclusions

We have developed and implemented a point-of-care prognostic communication tool for clinicians caring for critically ill patients with COVID-19. Although this tool will need to be updated as additional evidence emerges, we present the tool and its development as a model of one approach to promote consistent and high-quality prognostic communication across a healthcare system. Our hope is that the tool will help clinicians develop an approach to communication about prognosis that is practical and patient- and family-centered. The best-case, worst-case, most likely scenario approach² supports this tool by prompting clinicians to be

objective and descriptive about likely clinical trajectories, providing patients and families with the information they need to imagine the implications of COVID-19 related critical illness and participate in informed decisions about values-based care. Studies to evaluate the utility of prognostic communication tools like this are needed.

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Philosophy of Care in the COVID-19 Pandemic

In most places, we are not implementing Crisis Standards of Care.

Due to public health measures like good social distancing, we do not expect to progress to Crisis Standards of Care.



Values-based care is the goal!

- Offer patients or their surrogates treatment options that are medically appropriate
- Patients or their surrogates may choose not to pursue treatments that do not match with their values or provide a minimally acceptable QOL

Symptomatic COVID-19 + Population

80%

Mild Illness

Stay at home with chicken soup



Two Helpful Subgroups:

Ventilated; Age < 60-70
Lungs only

Ventilated and age > 70
or moderate MOF

15%

Hospitalized
on the floor

5% ICU

Not intubated

~70% die

~30%
survive

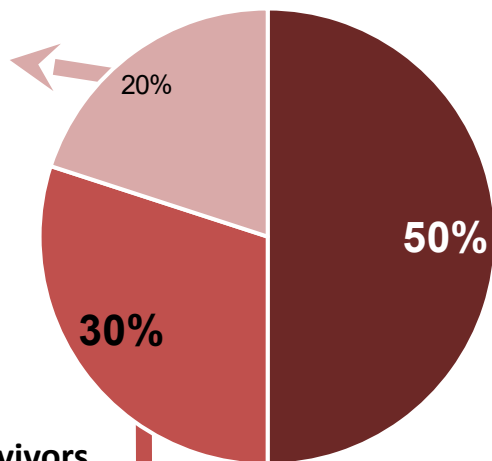
~90% die

~10%
survive

Prognosis for Intubated ICU Patients with COVID-19

Group #1

generally <60-70 years
only lung involvement



Best-case scenario:

Weeks in the hospital & more weeks recovery at home

Group 1 survivors in ICU >2 weeks:

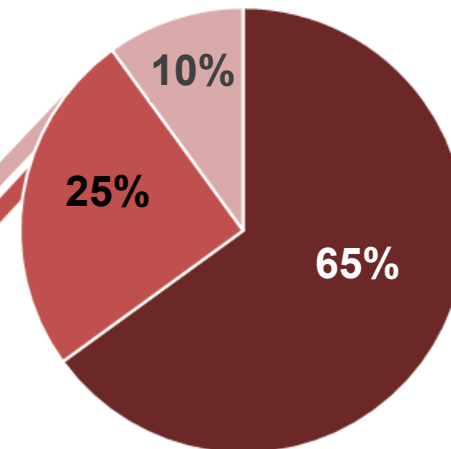
Best-case scenario:

- Weeks in the hospital
- Months of rehab
- Limited new baseline (frequent medical appts, need for 24/7 care?)

Group #2

generally >70 years
and/or
multi-organ involvement

- Die in hospital
- Still hospitalized at 2-4 wk study f/u
- Extubated/survived



Worst-case scenario: Death in hospital Signs of Worst Case Scenario:

- Severe AKI
- New heart failure
- Worsening shock
- Worsening oxygenation (usually multiple signs present)

Sources: 1) Yang X. *Lancet Respir Med*. 2020 Feb 24. pii: S2213-2600(20)30079-5. 2) Zhou F. *Lancet*. 2020 Mar 28;395(10229):1054-1062. 3) Bhatraju PK. *N Engl J Med*. 2020 Mar 30. 4) Arentz M. *JAMA*. 2020 Mar 19. 5) Grasselli *JAMA*. 2020 Apr 6. 6) Barrasa H. *Anaesth Crit Care Pain Med*. 2020 Apr 9. 7) Petrilli CM. medRxiv. 2020 Apr 11. 7) ICNARC Report 4/17/20. <https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports> 8) Richardson S. *JAMA*. 2020 Apr 22.