ORIGINAL ARTICLE

Simulation of "North Carolina Protocol for Allocating Scarce Inpatient Critical Care Resources in a Pandemic" in a Multi-hospital Health Care System

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BACKGROUND An integrated nonprofit health care system with 13 North Carolina medical centers conducted a time-pressured quality improvement simulation of its plan to implement the "North Carolina Protocol for Allocating Scarce Inpatient Critical Care Resources in a Pandemic" attendant to pandemic scenario planning. Simulation objectives included assessing the plan in terms of a) efficiency and effectiveness; b) comorbidity scoring validity; c) impact by race/ethnicity, gender, age, and payer status; and d) simulation participant impressions of potential impact on clinicians.

METHOD The simulation scenario involved scoring 14 patients with the constraint that only 10 could be afforded critical care resources. Also included were independent scoring validation by four clinicians, structured debriefs with simulation participants and observers, and tracking patient outcomes for 30 days.

RESULTS Triage scoring was identical among four triage teams. Lack of concordance in clinician comorbidity scoring did not alter patient prioritization for withdrawal of treatment in this small cohort. Protocol scoring was not correlated with resource utilization or near-term mortality.

LIMITATIONS The simulation sample was small and selected when COVID-19 census was temporarily waning. No protocol for pediatric patients was tested.

CONCLUSIONS The simulation yielded resource allocation concordance using comorbidity scoring by attending physicians, which significantly accelerated triage team decision-making and did not result in notable disparities by race/ethnicity, gender, or advanced age. Qualitative findings surfaced tensions in balancing de-identified data with individualized assessment and in trusting the clinical judgments of other physicians. Additional research is needed to validate the protocol's predictive value related to patient outcomes.

Background and Objectives

The COVID-19 pandemic prompted health care professionals in North Carolina, and others worldwide, to confront the unsettling question: How are we to decide who receives access to a scarce resource and who does not? While rationing is more commonplace than generally acknowledged [1], few clinicians have been faced with informing a patient or patient's loved ones that critical care resources will be withheld or withdrawn to be (re)allocated to someone thought to have better survival prospects.

Scarce resource allocation protocols proliferated during the height of the COVID-19 pandemic should crisis standards of care be invoked by state governing bodies, signaling an excess of demand over supply. These protocols share an ethical basis in utilitarian values aimed at achieving the greatest good for the greatest number in lieu of patient-centered values that customarily underlie clinical care. The Institute of Medicine (now the National Academy of Medicine) advises that allocation frameworks should be grounded in fairness, the duty to care, the duty to steward resources, consistency, proportionality, and accountability [2]. A shared statewide protocol would promote public trust and social stability through impartial procedural integrity. Further, it would establish altered standards of care, bolstering safe harbor legislation to protect clinicians and health care systems.

The "North Carolina Protocol for Allocating Scarce Inpatient Critical Care Resources in a Pandemic" (NC Protocol) was sent to the North Carolina Department of Health and Human Services on April 6, 2020, in a joint submission from the North Carolina Institute of Medicine, North Carolina Medical Society, and North Carolina Healthcare Association [3]. Admittedly, the document was hastily drafted under what felt like a looming crisis. A last-minute pivot led to basing the NC Protocol on a University of Pittsburgh Medical Center (UPMC) model protocol published on March 27, 2020 [4]. The resulting NC Protocol was soon challenged in a complaint to the federal Office of Civil

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Rights from Disability Rights North Carolina [5]. Although the UPMC model protocol has been amended [6], the NC Protocol remains unchanged as of this writing. Thankfully, North Carolina has not experienced a surge requiring allocation of scarce critical care resources.[a]

This article describes a time-pressured quality improvement simulation of the NC Protocol conducted with 14 patients needing mechanical ventilation at one tertiary hospital in an integrated nonprofit health care system with 13 North Carolina medical centers, ranging from 22 to 859 beds (HC System). The objectives of the simulation were to assess the HC System's implementation plan in terms of a) efficiency and effectiveness; b) comorbidity scoring validity; c) impact by race, ethnicity, gender, age, and payer status; and d) simulation participant impressions of potential impact on clinicians.

Scarce Resource Allocation Protocol (SRAP) Operational Design

The HC System's operations team, including the pandemic command center, appointed an SRAP Development Team (SRAPDT) to establish the structure, processes, and policies to operationalize the NC Protocol in the event crisis standards of care were invoked by the governor. Preparedness included testing and refinement through simulation. The Chief Diversity, Inclusion and Equity Officer, a member of the HC System's executive team, ensured resource availability and interdisciplinary physician engagement as needed. The SRAPDT was cochaired by a regional medical executive and lead system bioethicist, with facilitation by an operational improvement leader. A nursing executive, the Chief Medical Information Officer (an experienced critical care intensivist), an assistant general counsel, and an experienced clinical ethicist were added to provide needed operational, legal, and ethics integration.

The Protocol

The NC Protocol triage scoring system is shown in Table 1. Hospitals have the option of grouping scores in triage ranges or using the raw scores. The SRAPDT elected to use raw scores as these could be captured in the electronic medical record (EMR), providing transparency to care teams. The NC Protocol specifies age as a tiebreaker for patients with comparable SRAP scores, giving preference to younger patients. The SRAPDT elected to calculate ties using date of birth versus age ranges because ties within a range would ultimately revert to date of birth. For patients with higher scores who are already receiving critical care resources, the triage team is expected to conduct a more individualized assessment of the patient's medical condition before withdrawing treatment. The NC Protocol states that patients are to receive an adequate trial of treatment, and reassessment should include factors such as "recalculation of severity of illness scores, appraisal of new complications, and treating clinicians' input" [3].

The SRAPDT elected to test clinical elements of the protocol without modification. Despite recognized limitations, the Sequential Organ Failure Assessment (SOFA) score was accepted as familiar to critical care physicians, though acknowledged to be more clinically relevant when trended over time. While the SRAPDT learned that other North Carolina systems had convened internal clinician groups to develop more specificity in defining comorbid conditions, the team elected to test the comorbidities as presented in the protocol, using the simulation to evaluate ease of assessment, inter-clinician reliability, and educational needs.

Operational Structure, Roles, and Processes

The SRAPDT defined three structures for protocol implementation: Regional Triage Teams, a Triage Review Committee, and a System Oversight Committee, depicted and described in Figure 1. Use of three triage regions reflects the HC System's operational structure, including a hub-and-spokes framework in which smaller community and short-stay surgical hospitals surround a tertiary care facility. A single Triage Review Committee would promote consistency in protocol interpretation and resolving requests for review (appeals). The Oversight Committee would maintain situational awareness of resource availability, ensure overall operational effectiveness, and retrospectively assess impact on race, ethnicity, language, gender, age, payer, sexual orientation/gender identification defined by the HC System's Health Equity Council.

Beyond structure, key operational decisions were made regarding the role of attending physicians, data integration, and triage team operations.

Recognizing the need for expediency during surge conditions, the SRAPDT elected to assign responsibility for assessing the comorbid conditions to attending physicians, who would have the most thorough and immediate knowledge of their patients. Attending physicians would also be responsible for communicating allocation decisions to their patients or patients' loved ones, but would be excluded from making those decisions to minimize clinician moral tension stemming from allocation based on maximal population benefit rather than patient-centric ethical obligations underlying usual standards of care. Recognizing that other systems may elect comorbidity scoring by triage teams instead of attending physicians, the simulation incorporated validation of the HC System's comorbidity scoring approach.

To ensure that triage teams would be insulated from considering irrelevant social factors (e.g., race, ethnicity, sex, religion, sexual orientation, gender identity, intellectual disability or other disability unrelated to critical care utilization, insurance status, citizenship, or social status) they were given de-identified data for allocation decisions. Initially they received three data points for each patient: SOFA

[a] **Editors' Note.** As of December 16, 2020, this protocol is undergoing revisions by the convening organizations, NCIOM, NCMS, and NCHA.

score, comorbidity score, and resulting SRAP score. Age was not offered unless needed for a tiebreaker. Only the triage team's administrator would have direct access to the EMR. Admittedly, this boundary cannot be fully maintained with patients for whom withdrawal of treatment is being considered, as the triage team would be expected to confer with the attending physician to assess clinical progress.

The Chief Medical Information Officer sought to facilitate the data entry process for attending physicians and data retrieval for the triage teams. A flow sheet was created in Epic (the EMR platform) for use by attending physicians to capture moderate and severe comorbid conditions per the SRAP, with an open field for "other." An Epic feature that (re)calculates and displays daily SOFA scores was activated. Once operational, the EMR would combine the SOFA score and comorbidity assessment to calculate the SRAP score, which could be viewed by the care team and exported to a spreadsheet by the triage administrator to provide de-identified data for triage teams.

Simulation Method

The simulation process, including patient selection, is detailed in Table 2. Four triage teams were simultaneously given this scenario: two new patients are awaiting treatment in your full 10-bed unit; two more patients are soon added to simulate emergent conditions. Thus, decisions allocating resources to incoming patients would involve withdrawal from existing patients. Attending physicians assigned comorbidity scores for the 14 patients (current and incoming). When one score was not submitted on time, that patient was retained in the cohort because absence of clinical history was considered foreseeable under actual conditions (e.g., emergency department patient without capacity and new to system or to medical care). Validation of the comorbidity scores was performed by three physicians and one advanced practice practitioner who retrospectively reviewed the EMR to independently score all fourteen patients.

All meetings were conducted via Zoom, which allowed observation by at least three SRAPDT members. Prior to concluding each Zoom session, a SRAPDT member led a structured debrief discussion using standard quality improvement methodology to elicit lessons learned, participants' personal impressions, and SRAPDT observations. The largest debrief session, including the four triage teams and all SRAPDT members, was recorded and transcribed by a third party. Qualitative conclusions published here reflect SRAPDT consensus derived from debriefs, observations, and transcribed material.

Results

Quantitative Results

Triage scoring. The four triage teams, using comparable SRAP score data (SOFA scores plus comorbidity scores), selected the same four patients for withdrawal, the fourth

TABLE 1.
Scarce Resource Allocation Protocol (SRAP) from NC Protocol
Points are assigned according to the patient's SOFA score (range from 1 to 4 points) plus the presence or absence of comorbid conditions (2 points for major life-limiting comorbidities, 4 points for life-limiting comorbidities likely to cause death within a year). These points are then added together to produce a total priority score, which ranges from 1 to 8. Lower scores indicate higher likelihood of benefiting from critical care, and **priority will be given to those with lower scores**.

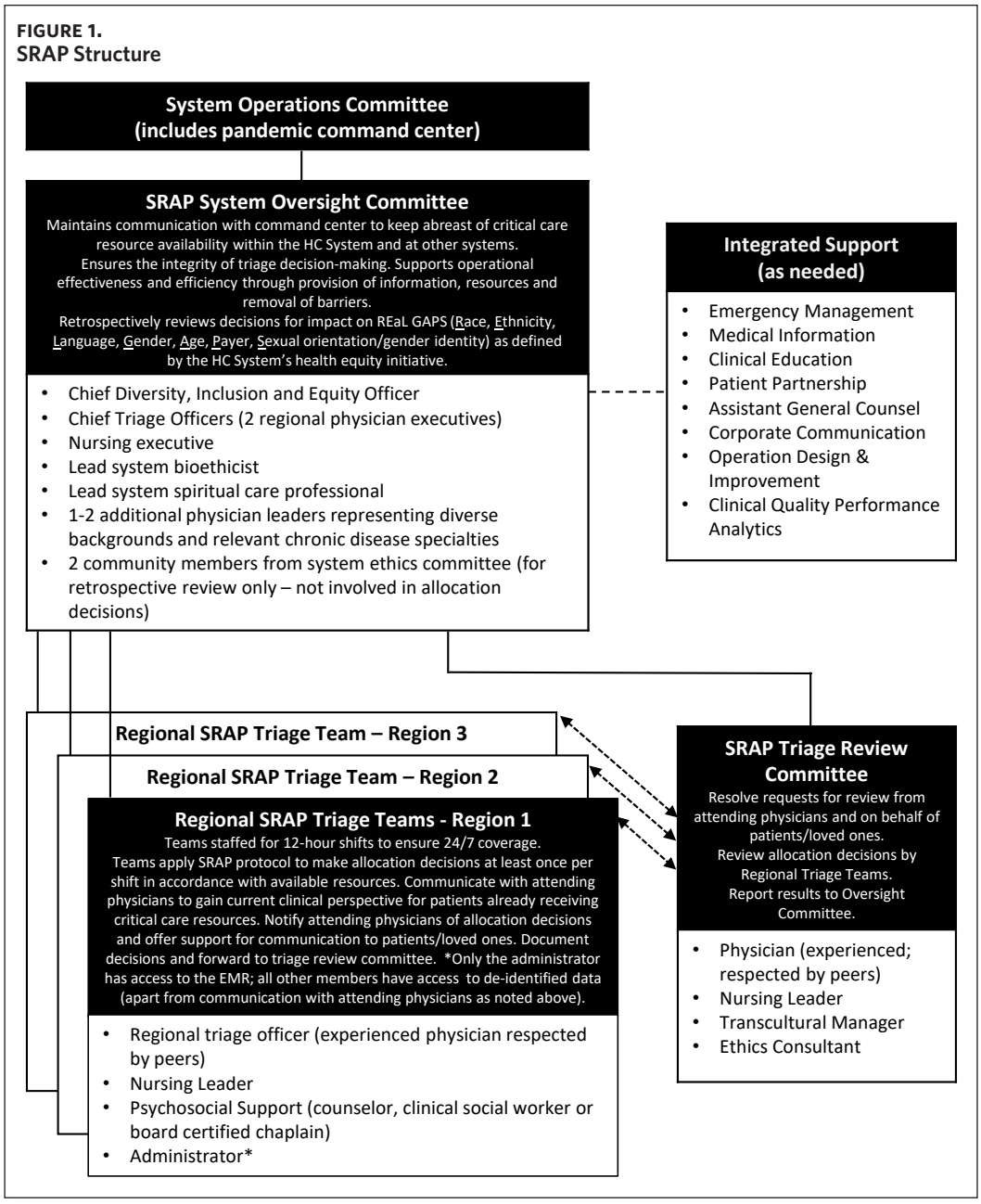
		Point System[a]			
Principle	**Specification**	**1**	**2**	**3**	**4**
Save the most lives	Prognosis for short-term survival (SOFA score[b])	SOFA score <6	SOFA score 6-8	SOFA score 9-11	SOFA score ≥12
Save the most life- years	Prognosis for long-term survival (medical assessment of comorbid conditions)		Major comorbid conditions with substantial impact on long-term survival		Severely life-limiting conditions; death likely within 1 year

[a]Scores range from 1 to 8, and persons with the lowest score would be given the highest priority to receive critical care beds and services.
[b]SOFA = Sequential Organ Failure Assessment

Examples of Major Comorbidities[c] (associated with significantly decreased long-term survival)	**Examples of Severely Life-Limiting Comorbidities[c]** (commonly associated with survival < 1 year)
• Moderate Alzheimer's disease or related dementia	• Severe Alzheimer's disease or related dementia
• Malignancy with a < 10 year expected survival	• Cancer being treated with only palliative interventions (including palliative chemotherapy or radiation)
• New York Heart Association Class III heart failure	• New York Heart Association Class IV heart failure plus evidence of frailty
• Moderately severe chronic lung disease (e.g., COPD, IPF)	• Severe chronic lung disease plus evidence of frailty
• End-stage renal disease in patients younger than 75	• Cirrhosis with MELD score ≥20, ineligible for transplant
• Severe multi-vessel CAD	• End-stage renal disease in patients 75 and older
• Cirrhosis with history of decompensation	
• Severe Alzheimer's disease or related dementia	

[c]This table only provides examples and is not an exhaustive list. Clinicians may include other conditions as major comorbidities or severely life-limiting comorbidities in decision-making. There are likely other reasonable approaches to designating 0, 2, or 4 points according to the "save the most life-years" principle. Indices such as Elixhauser or COPS2 may be an option, but these scores may be difficult to calculate quickly.

FIGURE 1.
SRAP Structure



being determined by invoking date of birth as a tiebreaker between two other patients with the same SRAP score (Table 3, "Sim SRAP Score"). The teams displayed varying degrees of reliance on the data provided, some asking their administrator for more information about underlying comorbid conditions included in attending physician flowsheets or directly accessing the EMR. Only one team attempted to contact the attending physician for additional clinical insight related to withdrawal of treatment, without response in the allotted time. No team detected the missing comorbidity score for the patient with the highest SOFA score, despite this patient's inclusion in the tiebreaker.

Validation of comorbidity scoring. Comorbidity scores assigned retrospectively by each validating clinician displayed relatively weak concordance when compared to each other and with scores assigned by the attending physicians (Table 4). From a patient-by-patient perspective, there was 100% agreement among the validating physicians for only two of 14 patients, both with no comorbid conditions, and 75% concordance with the attending score for three patients. Scores assigned by individual validating clinicians showed concordance rates of 36% to 57% with scores assigned by the attending physicians (Table 4). However, the consensus score agreed upon by all four validating clinicians agreed with the attending physician's score in 79% of patients.

Interestingly, the significance of these disparities in validation scoring would have had little impact on the selection of patients for withdrawal in this small cohort. When com-

bining the comorbidity scores for each validating clinician with the SOFA scores for each patient, the resulting SRAP scores were essentially concordant with those of the triage team. Table 3 shows the top four SRAP scores (including ties) from the triage process compared to those from validating clinicians. Patients 9, 2, and 8 would have been selected for withdrawal by the triage teams and the validating clinicians. Patient 11 is the patient with a high SOFA score for whom no comorbidity score was reported to the triage team. Assuming an appropriate comorbidity score for that patient, the triage team would have prioritized patient 11 for withdrawal of treatment as did the validation team (which had the benefit of viewing the patient's full medical record). With this assumption, there would have been complete concordance in withdrawal decisions between the triage team and the individual validation team members.

TABLE 2.
Simulation Design – Scarce Resource Allocation Protocol (SRAP)

Day 1: Select simulation patients (n = 14)
Simulation cohort from one tertiary care facility: all 9 vented patients from medical ICU (5 COVID-19 positive); 1 vented patient from cardiac ICU; 3 randomly selected vented patients from neuro ICU; 1 randomly selected COVID-19-positive patient from intermediate care unit.
De-identified SOFA scores calculated for each patient by EMR software and entered into spreadsheet.
Age added to separate spreadsheet in case needed as tiebreaker.
Day 2: SRAP education – all participants (1.25 hours)
All simulation participants: protocol design, rationale, organizational structure, simulation design.
Days 2-3: Attending physicians complete chronic comorbidity flowsheet for 13 of 14 patients
Scores transferred to spreadsheet.
Day 3: Education for four triage team coordinators (0.5 hour)
Role explained; spreadsheets distributed with de-identified data: MRN number, SRAP total score, raw SOFA score, SOFA points per SRAP protocol, comorbidity points per SRAP protocol, flowsheet data for comorbidity scoring. DOB on separate sheet in case needed as tiebreaker.
Day 3: Four triage teams independently confirm SRAP scores for all 14 patients; collectively discuss withdrawal with attending and debrief (2.5 hours)
Simulation scenario: 12 patients for 10 beds; 2 additional patients added emergently.
Day 4: SRAP review team reviews triage results and considers 2 appeals and debriefs (2.5 hours)
Days 6-11: Four validation team members independently assign comorbidity scores based on EMR review
3 physicians + 1 APP from multiple disciplines (internal medicine, palliative care, oncology, and otolaryngology).
Days 9-10: REaL GAPS data collected for 14 patients
Race, **E**thnicity, **L**anguage, **G**ender, **A**ge, **P**ayer, **S**exual orientation/ gender identity
Day 11: SRAP validation team reviews chronic comorbidity scores for concordance and debriefs (2.5 hours)
Team arrived at consensus score for each patient.
Day 19: Oversight committee reviews data and debriefs overall process and experience (2.0 hours)
Data from SRAP scoring, validation, REaL GAPS, and prior debriefs.
Day 30: Study closed
Patient disposition determined; LOS calculated at disposition/study close.

Abbreviations. SOFA = Sequential Organ Failure Assessment; EMR = electronic medical record; DOB = date of birth; APP = Advance Practice Practitioner; LOS = length of stay

Clinical outcomes. Three patients had died by study close, only one of whom was among the four highest-scoring. Average length of stay for the four highest-scoring patients was 31.25 days versus 35.2 for the others, reflecting high utilization for all. Only one of six COVID-19-positive patients in the cohort was among those considered for withdrawal.

Social demographics. Three of the four patients selected for withdrawal identified as Black, compared to 64% for the cohort; half were female, compared to 64% of the cohort; three of the selected patients had Medicare as a payer source, with Medicaid for the other. Notably, none of the three patients aged 80 or older was selected for withdrawal, though one was COVID-19 positive.

Qualitative Observations

Debriefs surfaced some tensions between the protocol intent and the implementation experience. One tension lay in trusting de-identified data represented as scores. An administrator observed, "Everyone wanted more data because it's a big decision." A psychosocial professional added, "It was tough. I live in a real gray world and this was pretty black and white. And as a counselor and a social worker, I want to know the system and the family and the story." Also, reliance on scores may have inhibited more personalized assessment needed for withdrawal, which was attempted by only one triage team. Yet, there was acknowledgment that a more objective view was useful for discounting nonclinical factors and maintaining public health objectives. One observer noted that in the brief conversation between the triage teams and the attending physician discussing communication strategies for withdrawal, several non-clinical descriptors arose, including occupation, homelessness, substance use, payer source, and education. A nurse commented, "You wonder about those internal biases, because even when the provider spoke, one of the things that kind of made me cringe: 'This family was reasonable and this family is unreasonable.' So, I'm like, what does that mean? Does that mean we should look at the unreasonable family and make a different decision?" An experienced intensivist reiterated, "I think it's very important for us to remember that the situation where these protocols would be applied isn't business as usual. It is really a mass casualty in slow motion and we really have to adhere to the tenets of triage." Overall, there was general support for blinding initial data. While psychosocial professionals struggled with de-identification, their perspective was considered valuable for supporting communication with patients/loved ones.

Another tension involved trust in the clinical judgment of others, affecting confidence in comorbidity scores and Review Committee reluctance to rely on triage team deci-

TABLE 3.
Patients for Whom Critical Care Resources Prioritized to be Withdrawn or Withheld (Simulation was designed to identify the four highest-scoring patients as candidates for withdrawal/withholding of treatment.)

SRAP patient ID	Patient descriptors by REaL GAPS (Race, Ethnicity, Language, Gender, Age, Payer, Sexual orientation/gender identity) Highlighted patients scored highest by SRAP triage teams (n = 4) Patients in bold type were COVID-19 positive (n = 6)					Four highest-scoring patients, including ties: comparison of triage team highest scores with highest scores of validating clinicians						Disposition LOS at dispostion or study conclusion (none in in ICU)
	Race Group[a]	Language	Gender[b]	Age	Payer	Sim SRAP Score[c]	Phys. A	Phys. B	Phys. C	APP	Consensus Validation Score	
1	**Hispanic or Latino**	**Spanish**	**F**	**70**	**Medicaid**	(4) tie						Hospitalized 69 days
2	White or Caucasian	English	M	53	Medicaid	6	6	4		6	6	Hospitalized 40 days
3	**White or Caucasian**	**English**	**F**	**61**	**Medicare**							Died/ 45 days
4	Black or African American	English	F	46	Private Insurance							Home health/ 19 days
5	**Black or African American**	**English**	**F**	**55**	**Private Insurance**							Inpatient rehab/ 71 days
6	**Black or African American**	**English**	**F**	**71**	**Medicare Managed Care**	4 tie breaker			4		4 tie	Hospitalized 55 days
7	**Black or African American**	**English**	**M**	**76**	**Medicare Managed Care**							Died/ 40 days
8	Black or African American	English	F	74	Medicare Managed Care	5	5	3 tie	5	5	5	Home health/ 14 days Readmitted
9	Black or African American	English	M	78	Medicare	7	5	5	5	7	7	Died/ 16 days
10	**Black or African American**	**English**	**M**	**82**	**Medicare Managed Care**							Home health/ 8 days
11	Black or African American	English	F	57	Unknown	(4) tie		6	4	8	4 tie	Home health/ 23 days
12	White or Caucasian	English	F	85	Medicare			3 tie				Home health/ 10 days Readmitted
13	Black or African American	English	M	80	Medicare			3 tie				Hospitalized 32 days
14	White or Caucasian	English	F	40	Medicare Managed Care		5	3 tie				Hospitalized 35 days

[a]Combination of race and ethnicity. No Hispanic or Latino patient identified as Black or AA.
[b]No patient identified as LGBTQ.
[c]SRAP score is a combination of SOFA score + comorbid conditions score. All four triage teams assigned highest scores to same four patients.
Abbreviations. APP = advance practice practitioner; ICU = intensive care unit

sions. Physicians noted they are trained to make independent clinical assessments and acknowledged trusting some colleagues over others. One bluntly stated, "At some point in our career, we have followed and we've picked up a situation from a colleague that we're like, 'I have no idea why these decisions were made and I would never make these decisions.' So now I'm left with this pile of whatever and now I've got to try to make the best of it and restore it into something that I can stand by." An administrator, referring to comorbidity scoring by attending physicians, cautioned, "I think the other thing we need to be mindful of in the background is that there is an opportunity for individual physicians at the clinical level to be gaming the system."

Limitations

The simulation sample was small and selected when COVID-19 census was temporarily waning. There was no analysis of comorbidities in relation to specific concerns raised by disability advocates. No protocol for pediatric patients was tested. Participants received minimal training

TABLE 4.
Concordance in Scoring of Chronic Comorbid Conditions Among Validating Clinicians and With Attending Physicians

Patient SRAP ID	Attending Physician Sim Score	Validation Physician A	Validation Physician B	Validation Physician C	Validation APP*	Validation Consensus Score	# clinicians Concordant With Attending by Patient
1	2	0	0	0	0	0	0/4
2	4	4	2	0	4	4	2/4
3	2	2	0	2	0	2	2/4
4	0	0	0	0	0	0	4/4
5	2	0	0	0	0	0	0/4
6	2	0	0	2	0	2	1/4
7	0	0	0	0	0	0	4/4
8	4	4	2	4	4	4	3/4
9	4	2	2	2	4	4	1/4
10	2	0	0	0	0	0	0/4
11	0 (none)	0	2	0	4	0	2/4
12	2	0	2	2	2	2	3/4
13	2	0	2	0	0	2	1/4
14	2	4	2	2	2	2	3/4
Percentage concordance with attending physician across all patients		6/14 43%	5/14 36%	8/14 57%	7/14 50%	11/14 79%	

to conserve time and test the limits of educational needs. Though artificial time constraints were imposed, these cannot replicate surge pressure or information flow regarding resource availability versus demand.

Conclusions

The simulation yielded resource allocation concordance using comorbidity scoring by attending physicians, which significantly accelerated triage team decision-making. These allocation decisions did not result in notable disparate impact by race/ethnicity, gender, or advanced age, although the cohort, including ventilator-dependent patients regardless of COVID-19 status, reflects an atypically high percentage of persons of color in the hospital's critical care units at simulation commencement. Further simulation with larger cohorts will be needed to verify both physician comorbidity scoring and impact by social factors. Triage teams suggested the use of additional data to improve confidence in decision-making, including depiction of SOFA trending to better reflect clinical course and potential use of analytics such as the deterioration score in development by Epic, if sufficiently validated.

This study raised questions integral to the NC Protocol itself. Notably, assigned SRAP scores did not correlate with resource consumption or near-term mortality within the patient cohort. Additional modeling with significantly larger patient populations will be needed to test the NC Protocol algorithm relative to these clinical outcomes. Also, participants recommended refining the algorithm through capturing the compounding effect of multiple comorbidities, perhaps by adding a score of 3 in the comorbid-conditions component of the SRAP score. In addition, the study revealed that absence of medical history related to chronic conditions may result in scoring advantage, which contradicts the aims of preventive medicine and population health.

Participant debriefs revealed two primary tensions in applying the protocol. One is the need to rely on the clinical assessments of others under crisis conditions, which runs counter to physician accountability for independent medical judgement as reinforced in our medico-legal culture. Secondly, triage participants noted challenges in balancing de-identification of patient data to exclude non-clinically relevant factors with the need for more personalized clinical assessment, which may improve prognostication. The role of de-identified data has come into question. Many commentators argue that disability-blind and color-blind decisions fail to consider bias against historically marginalized populations [7]. In fact, the latest version of the UPMC protocol incorporates language about "individualized assessment" and omits examples of moderate and severe comorbidities, instead relying on prognoses of expected death within 5 years or 1 year [6]. Additional validation is needed to determine whether these open-ended categories, designed to protect disabled and vulnerable populations, will help or hurt scoring consistency.

Hands-on simulation experience is needed to promote team formation and decision-making efficiency. Thorough education about SRAP scoring is necessary, as is emphasis on the importance of consultation with attending physicians when assessing potential withdrawal of treatment. Education should include awareness of conscious and unconscious bias that may appear in the medical record and arise in conversations with clinicians, as well as within the teams. Self-awareness may be the best strategy to supple-

ment, if not supplant, de-identification.

Even in simulation, the participants found withholding treatment unsettling. The greatest benefit of scenario planning may be intensified resolve to avoid allocation through resourceful contingency planning. NCMJ

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