

Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix. Methods

a. Research Approach

The research objective was to establish CSC guideline recommendations of a constructed social phenomenon, healthcare scarce resource allocation, which has a societal basis that assigns values but also has predetermined approaches. Therefore, a pragmatist paradigm was chosen to incorporate both constructivist and positivist aspects, which led to the choice of a mixed qualitative and quantitative research approach. The primary method was guideline abstraction, which was performed in duplicate with extraction of exemplar quotes and references to ensure accuracy and improve reliability. The chosen study population (state endorsed CSC guidelines) was preferred over other potential options (institutional CSC guidelines or physician group CSC guidelines) as state guidelines were most likely to come with liability protections, be enforceable, and apply to the entire U.S. population.

b. Search Strategy

The goal of the search strategy was to identify guidelines that were publicly available, readily accessible, and state-endorsed. The public availability and ready accessibility goals were adapted from the “typical patient” search strategy^{1,2} and were chosen to reflect how potential searchers would attempt to access such information. In such strategies, the search attempts are focused, relying on terms that are most likely to be used (as agreed upon by the investigators) rather than using an exhaustive list of terms, which is less likely to reflect that of a typical searcher. While additional relevant terms are available (such as “healthcare allocation” and “ventilator triage”), they were considered less likely to be used than those chosen.

The search engine queries were performed using the following terms at www.google.com:

- <STATE> + crisis standards of care
- <STATE> + COVID triage
- <STATE> + pandemic triage

The topline state department of public health and emergency preparedness (or similar department) website reviews were performed by reviewing each department’s main web page, their web page of resources for healthcare professionals, and their web page of COVID-19-related resources. Relevant appearing links were accessed from these pages. If topline pages or secondary pages accessed through links did not have links to guidelines, they were not considered available and state-endorsed unless the search engine query was able to take the searcher to the state department page with the guideline. For the few states where more than one guideline was seen on the state website, the most recent guideline that provided triage methods was used. PDFs of guidelines found are available here: https://www.dropbox.com/sh/w9m0w391ainiec0/AAD7QhbYhvvYo3w8y9yd_9nFa?dl=0

c. Guideline Abstraction Structure and Process

Guidelines were first reviewed by study investigators to ensure that they included recommendations for healthcare scarce resource allocation. If there was no information or recommendations regarding allocation, the guideline was not included in the analyses.

The abstraction outline was reviewed and developed within the research team to ensure clarity and consistency. Generally, the abstraction process followed the structure of term searches within the PDF files of each guideline, starting with the terms listed in the Field and Possible Responses column of eTable 1, followed by manual reading and review of each guideline (and linked documents, as applicable) to ensure that variations on the search terms, other descriptions of the same concept using different terms, and text within pictures/figures were included. The full outline of fields abstracted and the instructions for coding is provided in **eTable 1**. The term “primary allocation” was defined as the principal goal(s) and method(s) of resource distribution and “secondary allocation” was defined as second or lower tier methods of resolving prioritization between patients considered similar during primary allocation. These terms do not reflect the division of field triage, hospital triage, and ICU triage, which can also be termed as primary, secondary, tertiary, etc. Abstractor pairs were selected to increase differential professional responsibilities and social backgrounds in order to reduce bias and increase validity.³

d. Analysis

Data Sources and Abstractions: Finalized dichotomous and categorical field responses from CSC guideline abstractions were extracted and quantized. 2017 Medicare Physician Compare National Downloadable File (<https://data.medicare.gov/data/physician-compare>) was used to identify the number of physicians per state whose specialty was listed as “gynecological oncology,” “hematology/oncology,” “hematopoietic cell transplantation and cellular therapy,” “medical oncology,” “radiation oncology,” “pediatric oncology,” and “surgical oncology.” Physicians were only counted once and were categorized as practicing in the state listed first. The U.S. Census Bureau American Community Survey (<https://www.census.gov/programs-surveys/acs/news/data-releases.2017.html>) was used to identify the total number of persons per state. The 1-year 2017 Data Release was used to ensure coherence with other sources. Similarly, 2017 data from the Surveillance, Epidemiology, and End Results (SEER) Program was obtained from the State Cancer Profiles tool. Complete prevalence counts were obtained for each state through the online tool (<https://statecancerprofiles.cancer.gov/prevalence/index.php>). The National Cancer Institute website (<http://www.cancer.gov/research/nci-role/cancer-centers>) was used to determine states with or without Comprehensive Cancer Centers. Hospital capacity projection data was obtained from the Harvard Global Health Initiative hospital capacity data by state (<https://globalepidemics.org/our-data/hospital-capacity/>), which used the same population datasets as those listed above. The percentages of potentially available hospital and ICU bed projections at 6 months were dichotomized into greater or less than 100% to assess if capacity would exceed the most conservative measure of capacity.

eTable 1. CSC Guideline Abstraction Outline

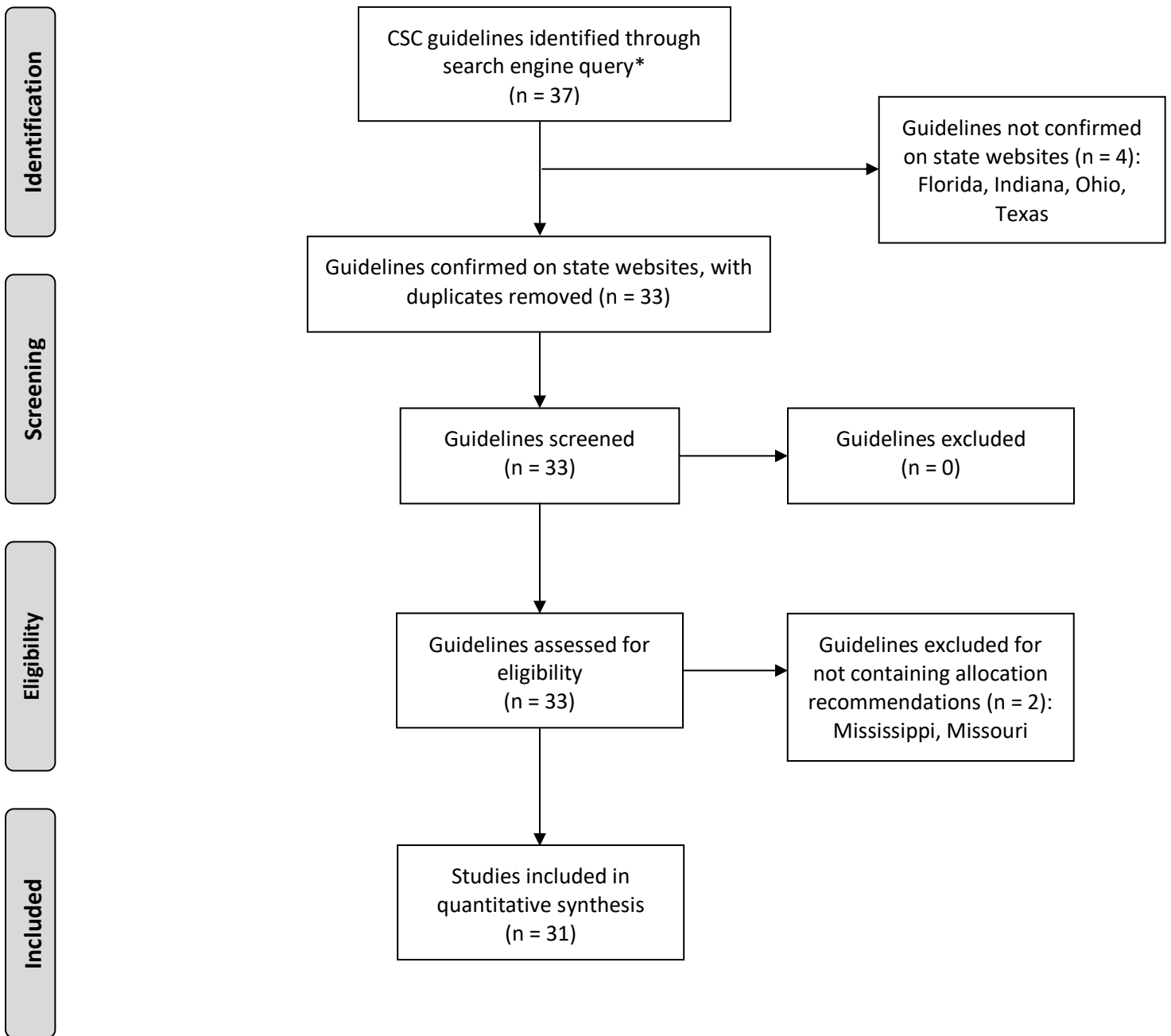
Category	Field	Response Type	Possible Responses	Reviewer Instructions
Guideline Publication	Available	Dichotomous	Yes, No	Yes if guideline is available using search strategy outlined and if contains provisions for healthcare resource allocation
	Date Published	Date	Date	Listed date of publication, can use date listed on website if not listed on guideline itself. For guidelines with only month and/or year listed, use the first date of that month or year
	Published/Updated since first US COVID Case	Dichotomous	Yes, No	Yes if guideline publication date was on or after January 21, 2020
	Days Since Publication	Numerical	Number	Days between publication date and data-cutoff date
	First Reviewer	Categorical	AH, JM, MK, SK, EM	Initials of reviewer
	Second Reviewer	Categorical	AH, JM, MK, SK, EM	Initials of reviewer
	Oncologist in Task Force	Dichotomous	Yes, No	Yes if guideline taskforce member was an oncologist (if not listed as such, searched for on public search engine)
	Palliative Care Specialist in Task Force	Dichotomous	Yes, No	Yes if guideline taskforce member was an palliative care specialist (if not listed as such, searched for on public search engine)
Ethical Values & Principles	N/A	Qualitative	Text	List ethical values and principles listed in the guideline. Use search terms of IOM principles and describe by IOM language, if applicable.
Healthcare Resources Allocated	Ventilators	Dichotomous	Yes, No	For this category, Yes if there was specific mention of this resource and how to allocate it. Does not need to constitute a whole separate policy but respond No if there was not mention of how to allocate the resource. In addition to manual review, searched for "ventilator", "respiratory".
	Renal Replacement Therapy	Dichotomous	Yes, No	In addition to manual review, searched for "dialysis" "renal" "kidney"
	Intravenous Fluids	Dichotomous	Yes, No	In addition to manual review, searched for "intravenous" "IV" "fluids" "resuscitation"
	Blood Products	Dichotomous	Yes, No	In addition to manual review, searched for "blood" "transfusion" "bleeding"
	Mental / Behavioral Health	Dichotomous	Yes, No	In addition to manual review, searched for "mental" "behavioral" "psychiatric"
	Medications	Dichotomous	Yes, No	In addition to manual review, searched for "medication" "drug"
	Staffing	Dichotomous	Yes, No	In addition to manual review, searched for "staffing" "worker" "personnel" "professional" "physician" "nurse"
	Palliative Care	Dichotomous	Yes, No	In addition to manual review, searched for "palliative" "palliation" "hospice"

Category	Field	Response Type	Possible Responses	Reviewer Instructions
Primary Allocation Goal	Lives Saved	Dichotomous	Yes, No	Yes if the guideline stated this explicitly as a goal and/or used an algorithm, scoring system, or exclusion criteria that prioritized those with the intention of maximizing immediate survival.
	Life Years Saved	Dichotomous	Yes, No	Yes if the guideline stated this explicitly or used an algorithm, scoring system, or exclusion criteria that prioritized those with a higher likelihood of non-acute survival. Did not double count organ failure scores themselves (or exclusion criteria for conditions like cardiac arrest), as prioritizing life-years such that they were not double counted (e.g., if only SOFA was used without deprioritizations for comorbidities, responses were No, but if there were additional comorbidity considerations, then responses were Yes)
	Other Goal	Categorical	Lottery	Yes if the guideline stated this explicitly or used an algorithm or scoring system that incorporated it into the primary prioritizations.
			First-Come/First-Served	Yes if the guideline stated this explicitly or used an algorithm or scoring system that incorporated it into the primary prioritizations.
			Youngest First	Yes if the guideline stated this explicitly or used an algorithm or scoring system that incorporated life-cycle considerations into the primary prioritizations.
			Reciprocity	Yes if the guideline stated this explicitly or used an algorithm or scoring system that prioritized persons for past actions (e.g., for putting themselves at risk of COVID infection by being a healthcare worker) into the primary prioritizations.
			Instrumental Value	Yes if the guideline stated this explicitly or used an algorithm or scoring system that prioritized persons for future usefulness (e.g., having skills that could be useful in treating COVID infections by being a healthcare worker) into the primary prioritizations.
Primary Allocation Method	SOFA (or SOFA-family of scores)	Dichotomous	Yes, No	Yes if a SOFA-based score was used to prioritize patients as a primary means.
	PELOD (or PELOD-family of scores)	Dichotomous	Yes, No	Yes if a PELOD-based score was used to prioritize patients as a primary means.
	SNAPPE (or SNAPPE-family of scores)	Dichotomous	Yes, No	Yes if a SNAPPE-based score was used to prioritize patients as a primary means.
	Description of Lives Saved Method	Qualitative	Text	Describe the method of allocation (e.g., SOFA score category + point for severe and major comorbid conditions, listed as...)
	Life Years Through Comorbidities/Prognosis	Dichotomous	Yes, No	Yes if comorbid conditions or other non-acute means of prognosis were considered as a primary means of prioritization (e.g., list of comorbid conditions with poor 5-year survival)
	Life Years Through Age	Dichotomous	Yes, No	Yes if age and/or life-cycle was used as a primary means of allocation
	Description of Life Years Method	Qualitative	Text	Describe the method of allocation (see example above)

	Other Method	Qualitative	Text	Describe other allocation methods for states with other primary allocation goals.
Category	Field	Response Type	Possible Responses	Reviewer Instructions
Secondary Allocation Goal	Lives Saved	Dichotomous	Yes, No	Yes if the guideline stated this explicitly or used an algorithm or scoring system that incorporated it into the secondary or later prioritizations, see above for how lives saved should be assessed.
	Life Years Saved	Dichotomous	Yes, No	Yes if the guideline stated this explicitly or used an algorithm or scoring system that incorporated it into the secondary or later prioritizations, see above for how life-years saved should be assessed.
	Lottery	Dichotomous	Yes, No	Yes if the guideline stated this explicitly or used an algorithm or scoring system that incorporated it into the secondary or later prioritizations.
	First-Come/First-Served	Dichotomous	Yes, No	Yes if the guideline stated this explicitly or used an algorithm or scoring system that incorporated it into the primary prioritizations.
	Youngest First	Dichotomous	Yes, No	Yes if the guideline stated this explicitly or used an algorithm or scoring system that incorporated life-cycle considerations into the secondary or later prioritizations.
	Reciprocity	Dichotomous	Yes, No	Yes if the guideline stated this explicitly or used an algorithm or scoring system that prioritized persons for past actions (e.g., for putting themselves at risk of COVID infection by being a healthcare worker) into the secondary or later prioritizations.
	Instrumental Value	Dichotomous	Yes, No	Yes if the guideline stated this explicitly or used an algorithm or scoring system that prioritized persons for future usefulness (e.g., having skills that could be useful in treating COVID infections by being a healthcare worker) into the secondary or later prioritizations.
Secondary Allocation Method	N/A	Qualitative	Text	Describe other allocation methods for secondary or later prioritizations. Use terms stated above as applicable.
Other Allocation Methods	Use of Triage Team and/or Officer	Dichotomous	Yes, No	Yes if the guideline stated that clinical care should be separated from the process of allocation with the use of a triage officer, team, or other similarly purposed mechanism.
	Allocation Appeals Process	Dichotomous	Yes, No	Yes if the guideline stated that allocation decisions could be appealed.
	Appeal Types and Timing	Qualitative	Text	Description of what types of appeals were allowed and when they were allowed, if stated.

Category	Field	Response Type	Possible Responses	Reviewer Instructions
Disability Rights	Disability Rights Statement	Dichotomous	Yes, No	Yes if there was at least a statement on rights for persons with disabilities pertaining to allocation considerations. If the word disability, disabled, or similar is not used, disabilities can be considered using the definition from the Americans with Disabilities Act.
	Disability Rights Statement	Qualitative	Text	Copied text or pages/lines of text discussing disability rights in allocation.
	Any Categorical Exclusions	Dichotomous	Yes, No	Yes if there were any groups/conditions excluded prior to allocation prioritization apart from acute medical conditions (e.g., cardiac arrest, refractory shock, severe burns), using search terms or via manual review.
	Statement of Categorical Exclusions	Qualitative	Text	Copied text or pages/lines of text discussing categorical exclusions.
	Standardized Ventilator Reassessment	Dichotomous	Yes, No	Yes if there were standardized times of ventilator reassessments.
	Cancer-related Categorical Exclusion	Dichotomous	Yes, No	Yes if cancer or a similar term describing patients with cancer was included in the categorical exclusions, above, using search terms or via manual review.
	Statement of Cancer-related Categorical Exclusion	Qualitative	Text	Copied text or pages/lines of text discussing cancer-related categorical exclusions.
	Cancer-related Deprioritization	Dichotomous	Yes, No	Yes if cancer or a similar term describing patients with cancer was included in the deprioritizations of patients during the primary or secondary allocation methods, above, using search terms or via manual review.
Statement of Cancer-related Deprioritization	Qualitative	Text	Copied text or pages/lines of text discussing cancer-related categorical deprioritizations.	

eFigure. CSC Guideline Screening and Selection Process



*The same numbers of guidelines were found by both independent abstractors

eTable 2. CSC Guideline Versions Dates and Cancer-Related Categorizations

State	Month/Year of Guideline Version Abstracted	Cancer-Related Categorical Exclusion Present in CSC	Cancer-Related Deprioritization Present in CSC	Blood Product Allocation Present in CSC	Palliative Care Provision Present in CSC	NCI CCC Present in CSC	Disability Rights Statement Present in CSC	Oncologist/PC on CSC Taskforce*
Alabama	2/2020				X	X		
Alaska	3/2020			X	X			N/A
Arizona	3/2020			X	X	X	X	
California	4/2020			X	X	X	X	N/A
Colorado	4/2020		X	X	X	X	X	
Connecticut	10/2010					X		
Illinois	4/2020				X	X		
Iowa	9/2007					X	X	
Kansas	9/2013	X	X		X			
Kentucky	3/2020	X			X		X	
Louisiana	9/2011	X	X		X			N/A
Maryland	8/2017		X	X	X	X		
Massachusetts	4/2020				X	X	X	X
Michigan	11/2012				X	X		N/A
Minnesota	2/2020		X	X	X	X	X	N/A
Montana	4/2020		X	X	X		X	N/A
Nevada	6/2017			X	X		X	
New Hampshire	4/2020		X	X	X	X	X	X
New Jersey	4/2020				X	X	X	N/A
New Mexico	1/2018			X	X	X	X	
New York	11/2015		X		X	X	X	X
North Carolina	4/2020		X		X	X		
Oklahoma	4/2020		X	X	X		X	N/A
Oregon	6/2018	X	X		X	X	X	
Pennsylvania	3/2020		X	X	X	X	X	
Rhode Island	4/2020	X		X	X		X	
South Carolina	9/2009	X	X		X			
Tennessee	7/2016	X	X	X	X	X		
Utah	1/2019	X	X	X	X	X	X	
Vermont	7/2019		X	X	X		X	N/A
Washington	3/2020		X	X	X	X	X	N/A

*N/A: state website and guideline did not list taskforce membership / guideline authorship; CSC: crisis standards of care; PC: palliative care specialist

eReferences

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