**Supplemental Methods:**

The following criteria was interpreted in the following manner for each of the 5 guidelines (eTables 1-5).

eTable 1: **New York State Ventilator Allocation Guidelines** 5

|  |  |
| --- | --- |
| Criteria | How Operationalized |
| **Exclusion Criteria** | |
| Cardiac arrest: unwitnessed arrest, recurrent arrest without hemodynamic stability, arrest unresponsive to standard interventions and measures | Admission diagnosis of cardiac arrest and as stated on chart review |
| Traumatic brain injury with no motor response to painful stimulus (i.e., best motor response = 1) | Admission diagnosis of traumatic brain injury and no motor response to painful stimulus on chart review |
| Severe burns: where predicted survival ≤ 10% even with unlimited aggressive therapy | Admission diagnosis of burns and as stated on chart review |
| Irreversible age-- related arrest specific hypotension unresponsive to fluid resuscitation and vasopressor therapy | Unable to operationalize |
| Any other conditions resulting in immediate or near immediate mortality even with aggressive therapy (This “catch-all” phrase encompasses other possibilities because the list above is merely a guide and does not list every medical condition that would result in immediate or near-immediate mortality.) | Unable to operationalize |

eTable 2: **Maryland** 7

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | | How Operationalized | |
| **Exclusion Criteria** | |
| Cardiac arrest: unwitnessed, recurrent, or unresponsive to defibrillation or pacing | Admission diagnosis of cardiac arrest and as stated on chart review |
| Severe burns in patient with both of the following: age 60+ & 50% of total body surface area affected | Admission diagnosis of burns and as stated on chart review |
| Advanced and irreversible neurologic event or condition | \* History of dementia of any cause, amyotrophic lateral sclerosis, Parkinson’s disease, Huntington’s Disease, or Coma of any cause and chart review for documentation of advanced severity |
| **Comorbidities Modifying Triage Score**  (Severe comorbid conditions likely causing death within 1 year) | |
| New York Heart Association class IV heart failure | History of heart failure and pre-admission chart review symptoms satisfying New York Heart Association class IV |
| Advanced lung disease with FEV1 < 25% predicted, total lung capacity < 60% predicted, or baseline Pao2 < 55 mm Hg | History of chronic obstructive pulmonary disease, interstitial pulmonary fibrosis, pulmonary hypertension, or cystic fibrosis with pre-admission pulmonary function testing or on home oxygen satisfying stated criteria |
| Primary pulmonary hypertension with NYHA class III or IV heart failure | History of pulmonary hypertension with pre-admission chart review symptoms satisfying New York Heart Association class III or IV |
| Chronic liver disease with Child-Pugh score > 7 | History of cirrhosis with a preadmission Child-Pugh score > 7 |
| Severe trauma | Trauma injury severity score predicting ≥ 90% mortality |
| Advanced untreatable neuromuscular disease | History of multiple sclerosis and pre-admission documentation that multiple sclerosis was advanced |
| Metastatic malignant disease or high-grade primary brain tumors | History of pre-admission stage IV neoplasm or chart review of a high-grade primary brain tumor |
| **Additional Triage Score Modifier** | |
| Pregnancy | Positive pregnancy test or chart review of current pregnancy |

\* Explicit criteria not defined in CSOC, but interpreted by authors.

eTable 3: **Pittsburgh** 8

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | | How Operationalized | |
| **Comorbidities modifying Triage Score** \*\*  Severely life limiting comorbidities | |
| Severe Alzheimer’s disease or related dementia | \* History of dementia or Alzheimer’s disease with pre-admission a Montreal Cognitive Assessment score < 10, a Mini Mental Status Exam score < 10, or clinical documentation stating severe on chart review |
| Cancer being treated with only palliative interventions (including palliative chemotherapy or radiation) | History of malignancy and stated criteria being satisfying on chart review |
| New York Heart Association Class IV heart failure plus evidence of frailty | \* History of heart failure, pre-admission chart review symptoms satisfying New York Heart Association class IV, and a pre-admission clinical frailty score ≥ 6 |
| Severe chronic lung disease plus evidence of frailty | \* History of chronic obstructive lung disease with pre-admission pulmonary function tests with a forced vital capacity (FVC) ≤ 35%, forced expiratory volume in 1 second (FEV1) ≤ 50%, and a pre-admission clinical frailty score ≥ 6 |
| Cirrhosis with MELD score ≥20, ineligible for transplant | History of cirrhosis with MELD on admission ≥20 & ineligible for transplant on chart review per hepatologist |
| End-stage renal disease in patients older than 75 | History of CKD-5 or on dialysis and age ≥ 75 |
| **Significantly Decreased Long Term Survival** | |
| Moderate Alzheimer’s disease or related dementia | \* History of dementia or Alzheimer’s disease with pre-admission a Montreal Cognitive Assessment score 10-17, a Mini Mental Status Exam score 11-20, or clinical documentation stating moderate on chart review |
| Malignancy with a < 10 year expected survival | \* History of stage IV malignancy |
| New York Heart Association Class III heart failure | History of heart failure, pre-admission chart review symptoms satisfying New York Heart Association class III |
| Moderately severe chronic lung disease (e.g., COPD, IPF) | \* History of chronic obstructive pulmonary disease or interstitial pulmonary fibrosis satisfying 50% ≤ FEV1 <80% predicted |
| End-stage renal disease in patients < 75 | History of CKD-5 or on dialysis and age < 75 |
| Severe multi-vessel CAD | \* History of CAD with a pre-admission left heart cardiac catheterization with ≥ 70% stenosis in ≥ major coronaries or ≥ 70% stenosis in 1 coronary & ≥ 50% stenosis in left main trunk |
| Cirrhosis with history of decompensation | History of cirrhosis with MELD on admission < 20 with a pre-admission history of ascites, spontaneous bacterial peritonitis, varices, hepatic encephalopathy, or hepatorenal syndrome |
| **Additional Triage Score Modifiers** | |
| Essential Occupation | all workers in essential jobs that face high risk of infection because of frequent workplace exposures, such as grocery store workers, bus drivers, home health workers, and food service workers |
| Social Vulnerability | Lives in a highly disadvantaged community (i.e., Area Deprivation Index (ADI) score= 8,9, or 10) |

\* Explicit criteria not defined in CSOC, but interpreted by authors.

\*\* As expressed in the original publication. An explicit list of comorbidities was removed in a revised version and replaced with “Death expected within 1 year from end stage condition”.

eTable 4: **Saskatchewan (Canada)**9

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | | How Operationalized | |
| **Exclusion Criteria** | |
| Cardiac arrest, regardless of age, with 1 of the following poor prognostic factors:  (1) unwitnessed cardiac arrest  (2) any PEA arrest  (3) recurrent cardiac arrest | Admission diagnosis of cardiac arrest with any of the 3 poor prognostic factors on chart review |
| Trauma with Injury Severity Score > 16, unless determined to be acutely reversible | Admission diagnosis trauma, Injury Severity Score > 16 and chart review to determine if acutely reversible |
| Burns with 2 of the following:  (1) age > 60  (2) > 40% BSA  (3) inhalational injury | Admission diagnosis of burn with chart review |
| TBI meeting all of the following:  (1) age > 60  (2) GCS < 8  (3) 1 or both unreactive pupils | Admission diagnosis of TBI with chart review |
| Subarachnoid hemorrhage with World Federation of Neurological Societies grade V | Admission diagnosis of Subarachnoid hemorrhage with chart review |
| Stroke with age > 70 with large MCA territory, substantial deficits, not amenable to reperfusion | Admission diagnosis of stroke with chart review |
| Posterior circulation stroke with GCS < 8 | Admission diagnosis of stroke with chart review |
| Age 80+ and clinical frailty score ≥ 5 | Chart review |
| Metastatic malignant disease with expected month of survival < 6mo | History of malignancy, stage IV, and pre-admission chart review if the patient would qualify or enrolled in hospice. |
| Advanced and irreversible immunocompromise | Unable to operationalize |
| Severe, irreversible and terminal neurologic event or condition (end-stage dementia) | \* History of dementia of any cause, amyotrophic lateral sclerosis, Parkinson’s disease, Huntington’s Disease, or Coma of any cause and pre-admission clinical frailty score ≥ 8 on chart review |
| Advanced untreatable neurodegenerative disease (Parkinson disease, ALS) | \* History of Parkinson’s disease or ALS with a pre-admission clinical frailty score ≥ 8 on chart review |
| Heart Failure NYHA class III or IV | History of heart failure with preadmission NYHA class III or IV on chart review |
| COPD w FEV1 < 30% or baseline pa02 < 55, or secondary pulmonary hypertension | History of COPD with a pre-admission PFT or arterial blood gas or documented group 3 pulmonary hypertension |
| Cystic fibrosis with post-bronchodilator FEV1 < 30% predicted or baseline pa02 < 55mmhg | History of cystic fibrosis with pre-admission PFT FEV1 < 30% or on home oxygen |
| Pulmonary fibrosis with vital capacity or total lung capacity < 60% predicted, baseline pa02 < 55mmhg or secondary pulmonary hypertension | History of interstitial pulmonary fibrosis with pre-admission PFT with vital capacity (VC) or total lung capacity (TLC) < 60%, on home oxygen, or documented group 3 pulmonary hypertension |
| Pulmonary hypertension with NYHA class IV symptoms | History of pulmonary hypertension (any cause) with pre-admission NYHA class IV symptoms |
| Cirrhosis with MELD > 20 | History of Cirrhosis with a MELD on admission > 20 |
| **Additional Triage Score Modifiers** | |
| Pregnancy | Positive pregnancy test or chart review of current pregnancy |
| Organ Transplantation | Chart review of surgery of solid organ transplant during the study period |

\* Explicit criteria not defined in CSOC, but interpreted by authors.

eTable 5: **California** 10

|  |  |
| --- | --- |
| Criteria | How Operationalized |
| **Exclusionary Criteria §** | |
| Unwitnessed out of hospital cardiac arrest without ROSC prior to arrival; Any witnessed cardiac arrest with inability to obtain ROSC after 60 min from onset without a shockable rhythm present | Admission diagnosis of cardiac arrest with chart review |
| Coma (inability to respond to verbal commands) after ROSC from cardiac arrest with non-shockable rhythm without confounding drugs, toxins, or metabolic derangements | Admission diagnosis of cardiac arrest with chart review |
| American burn association expected mortality ≥ 90% | Admission diagnosis of burn and mortality ≥ 90% per Table 145 and chart review |
| trauma injury severity score predicting ≥ 90% mortality | Admission diagnosis of trauma and TISS predicting ≥ 90% mortality per Table 155 and chart review |
| Non-traumatic intracerebral hemorrhage with max ICH score > 9 | Admission diagnosis of intracerebral hemorrhage with max ICH > 9 per Table 205 and chart review |
| Aneurysmal subarachnoid hemorrhage with HAIR score = 8 | Admission diagnosis of subarachnoid hemorrhage with HAIR score = 8 per Table 215 and chart review |
| Traumatic brain injury with ≥ 90% predicted death on IMPACT score | Admission diagnosis of traumatic brain injury with ≥ 90% predicted mortality on IMPACT score5 |
| Coma in ischemic stroke with brainstem infarction due to basilar artery occlusion which is non-revascularized or without clinical improvement after revascularization. | Admission diagnosis of stroke with chart review |
| **Severely Life-Limiting Comorbidities**  (Associated with high mortality even in absence of critical illness, survival typically ≤ 1 year, and which are correlated with significantly increased risk of short-term mortality from critical illness) | |
| Minimally conscious or unresponsive wakeful state from prior neurological injury | Admission diagnosis of coma, Alzheimer dementia, or Parkinson’s with chart review for minimally conscious or unresponsive wakeful state |
| ACC/AHA Stage D heart failure | History of heart failure with pre-admission chart review for documented Stage D |
| WHO Class 4 pulmonary hypertension | History of pulmonary hypertension with pre-admission chart review for class 4 symptoms |
| Severe chronic lung disease with FEV1 < 20% predicted, FVC < 35% predicted, or in absence of PFTs, chronic home O2 at rest or mechanical ventilation | History of COPD, ILD, or cystic fibrosis with pre-admission PFT with either with FEV1 < 20% predicted or FVC < 35% predicted, OR pre-admission home oxygen OR pre-admission home ventilation on chart review |
| Cirrhosis with MELD score ≥ 20 | History of cirrhosis with a MELD on admission of ≥ 20 |
| Metastatic cancer with expected survival ≤1 year despite treatment | Unable to be operationalized |
| Refractory hematologic malignancy (resistant or progressive despite conventional initial therapy) | History of hematologic malignancy with a chart review for ‘refractory’ or ‘progression of disease’ on initial therapy |
| Terminal illness with Clinical Frailty Score ≥ 8 | History of malignancy and pre-admission clinical frailty score ≥ 8 |
| **Major Comorbidities**  (Associated with increased risk of short-term mortality from critical illness) | |
| Pre-existing neurological condition (dementia, stroke, other neurodegenerative disease) with baseline modified Rankin Score > 4 | History of dementia or stroke with a modified Rankin score > 4 or clinical frailty score ≥ 8 |
| ACC/AHA Stage C heart failure, NYHA Class II-IV | History of heart failure with pre-admission chart review for NYHA Class II-IV |
| Severe, inoperable multi-vessel coronary artery disease or valvular disease | History of CAD with pre-admission chart review. Inoperable valvular disease was not assessed. |
| WHO Class 3 pulmonary hypertension (symptomatic with minimal exertion, asymptomatic only at rest) | History of pulmonary hypertension with a pre-admission chart review for class 3 symptoms. |
| Moderately severe chronic lung disease (e.g., COPD, IPF) but not requiring chronic oxygen or ventilation | History of COPD or IPF with a pre-admission PFT FEV1 50-80% without home oxygen or home ventilation |
| End stage renal disease on dialysis | Pre-admission history of current ESRD on dialysis |
| Cirrhosis with MELD <20 and history of prior decompensation | Pre-admission history of cirrhosis with a MELD < 20 on admission and a pre-admission history of ascites, spontaneous bacterial peritonitis, varices, hepatic encephalopathy, or hepatorenal syndrome |
| **Additional Triage Score Modifiers** | |
| Pregnancy | Positive pregnancy test or chart review of current pregnancy |
| Critical Occupation | EMTs, police officers, firefighters, clinical healthcare workers (any health care worker who (a) has been disproportionately exposed to COVID-19 through the workplace, and who works in a field that is (b) necessary for the control of the pandemic, and where in addition (c) prioritizing workers in that field is reasonably viewed as a necessary step to maintain adequate medical staffing in that field during the pandemic). |
| Solid organ transplant recipients | Transplant Recipient |
| Immediate post-operative care of complex surgical patients | Chart review of patient’s undergoing a staged surgical procedure or those who “portend an otherwise excellent recovery prospect” 5 |
| Patient’s receiving solid organ transplants | Chart review of those who received a solid organ transplant during the study period |

§ California CSOC does not have an explicit exclusion category but only provides to this group if excess supply is present. Return of Spontaneous Circulation (ROSC). Return of Spontaneous Circulation (ROSC).