Crisis Standards of Care: Clinical Issues

Arizona Crisis Standards of Care: Initial Planning Workshop
Arizona Dept of Health Services & Partners
Phoenix, AZ

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Jan. 24, 2013

Acknowledgements

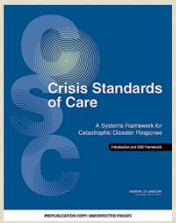
- Megan Jehn, PhD, MHS
  - Coauthor & co-presenter
    - Considerations For Prioritizing Medical Care During an Overwhelming Influenza Pandemic
    - Jan. 12, 2011, Tempe, AZ
- Josh Gaither, MD & Dan Beskind, MD
  - Coauthors & co-founders
  - Advanced Disaster Preparedness & Response™
    - ADPR™

Presentation Outline

- **IOM crisis standards of care**
- National planning progress
- Arizona planning progress
- Triage systems
- Duty to plan

IOM Crisis Standards of Care

- Substantial change in usual healthcare operations & level of care possible to deliver
- Justified by specific circumstances
- Formally declared by state government
- Recognizing crisis operations will be in effect for sustained period



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National Planning Progress

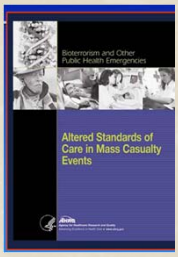
- **AHRQ in 2005**
  - ***Altered Standards of Care in Mass Casualty Events***
    - http://www.ahrq.gov/research/altstand/
- **IOM in 2009**
  - ***Summary of a Workshop: Crisis Standards of Care***
    - http://books.nap.edu/openbook.php?record_id=12787
- **IOM in 2009**
  - ***Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations: A Letter Report***
    - *http://books.nap.edu/openbook.php?record_id=12749&page=1*
- **CDC in 2010**
  - ***Ethical Considerations for Decision Making Regarding Allocation of Mechanical Ventilators*, 2010**
    - http://www.cdc.gov/od/science/integrity/phethics/docs/ethical-considerations-allocation-mechanical-ventilators-in-emergency-201011.pdf

National Planning Progress

- **IOM in 2012**
  - ***Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response***
    - http://www.iom.edu/Reports/2012/Crisis-Standards-of-Care-A-Systems-Framework-for-Catastrophic-Disaster-Response.aspx

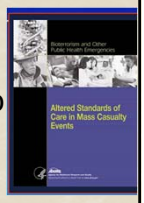
AHRQ in 2005: Key Findings

- Goal
  - Maximize number of lives saved
- Basis for allocating scarce medical resources
  - Fair
    - As judged by public
  - Clinically sound
  - Transparent



AHRQ in 2005: Key Findings

- Triage guidelines
  - Flexible to change with
    - Size & nature of incident
- Participant input is necessary to
  - Create
  - Adopt
  - Implement
  - Revise



IOM in 2009: Key Recommendations

- Develop consistent crisis standards of care (CSC) protocols with 5 key elements
  - Strong **ethical** grounding
    - Equitable
    - Consistent
    - Transparent
    - Proportional
    - Accountable
  - Community & providers integrated & ongoing
    - Engagement
    - Education
    - Communication
  - Legal authority & environment
  - Clear indicators, triggers, & lines of responsibility
  - **Evidence-based** clinical processes & operations

IOM in 2009: Key Recommendations

- Seek community & provider engagement
- Adhere to ethical norms during CSC
- Provide necessary legal protections for healthcare providers & institutions using CSC
- Ensure consistency in CSC
- Ensure intrastate & interstate consistency among neighboring jurisdictions

George J. Annas, JD, MPH
Standard of Care – In Sickness & in Health & in Emergencies, *NEJM* 2010;362(22):2126-2131.

"...in legal terms, the standard of care for a physician is what a reasonably prudent physician would do in the same or similar circumstances, taking into account the resources available…

there is no "crisis" or "altered" standard of care – there are altered circumstances…

Emergencies do not alter the standard of care... doing what you can under the circumstances, with the patient's informed consent."

CDC 2010: Ethical Considerations for Decision Making Regarding Allocation of Mechanical Ventilators

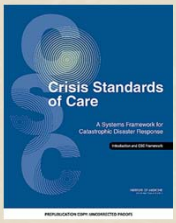
- **Ventilator priority allocation**
  - Sickest first?
  - First-come, first-served?
  - Save those most likely to recover?
  - Save those most likely to preserve societal functions?
  - Maximize the years of life saved?
  - Maximize the adjusted (quality) years of life saved?
  - Save the most lives?

CDC 2010: Ethical Considerations for Decision Making Regarding Allocation of Mechanical Ventilators

- **Who should make ventilator allocation decisions?**
  - Triage expert?
    - Separate clinical care from ventilator allocation?
    - Intensivist physician?
    - Emergency medicine physician?
    - Other physician?
  - Triage team?
    - CCRN?
    - RRT?
    - Physician?

IOM 2012: Crisis Standards of Care

- **Systems Framework for Catastrophic Disaster Response**
  - Systems
    - Government
      - Federal
      - State & Territorial
      - Tribal Nations
      - Local
    - EMS
    - Hospitals & other healthcare facilities
    - Alternate care systems
      - Out-of-hospital
    - Public engagement



IOM 2012: Crisis Standards of Care

- **Conventional care**
  - Space, staff, & supplies (3Ss) used in daily practice
- **Contingency care**
  - 3Ss not used in daily practice, but
  - Functionally equivalent patient care
- **Crisis care**
  - Adaptive 3Ss not used in daily practice
  - Best possible care in difficult circumstances with limited resources

IOM 2012: CSC Triage

- **Primary triage**
  - 1st assessment
  - Prior to medical interventions
  - **EMS**
    - START, etc.
  - **Hospital Emergency Department (ED)**
    - Level 1-5, normally
    - START, etc. in disaster

IOM 2012: CSC Triage

- **Secondary triage**
  - After 1st assessment & diagnostics
  - After initial medical interventions
  - **Hospital surgeons**
    - Determine priority for OR
- **Tertiary triage**
  - After definitive diagnostics
  - After significant medical interventions
  - **Hospital intensivists**
    - Determine priority for ICU

Presentation Outline

- IOM crisis standards of care
- National planning progress
- **Arizona planning progress**
- Triage systems
- Duty to plan

Arizona Planning Progress

- **Disaster Triage of Critical Care Resources**
  - Arizona Hospital & Healthcare Assoc. (AzHHA) Altered Standards of Care Workgroup
    - Proposed Dec. 2009
- **Disaster Triage Protocol Workshop**
  - ADHS BPHEP hosted
    - Jan. 12, 2011

Arizona Planning Progress

- **Alternate Triage, Treatment, & Transport Guidelines for Pandemic Influenza**
  - ADHS BEMS & Trauma Systems facilitated
    - Approved Jan. 20, 2011
    - http://www.azdhs.gov/diro/admin_rules/guidancedocs/GD-PANFLU.pdf

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Triage

- French verb "trier" = "to sort"
- Do the greatest good for the greatest number
  - With limited resources
- Dynamic
  - Reassess
  - Reprioritize
- 3 types
  - Primary
  - Secondary
  - Tertiary

Primary Triage Systems

- **MASS** (Move, Assess, Sort, & Send)
- **START** (Simple Triage & Rapid Treatment)
  - Both above use **I**D**M**E mnemonic
- **JumpSTART©** for kids
- **SALT** (Sort, Assess, Lifesaving Treatment)
  - Both above use **I**D**M**E**D** mnemonic

Primary Triage: IDME Mnemonic

- **Immediate = RED**
  - Life-threatening injury or illness
  - Lifesaving interventions
  - 1st to treat
- **Delayed = YELLOW**
  - Serious, but not life-threatening
  - Delaying treatment will not affect outcome
  - 2nd to treat
- **Minimal = GREEN**
  - Walking wounded
  - 3rd to treat
- **Expectant = BLACK**
  - Last to treat

Primary Triage: JumpSTART© & SALT use IDMED Mnemonic

- **Immediate = RED**
- **Delayed = YELLOW**
- **Minimal = GREEN**
- **Expectant = GRAY**
- **Dead = BLACK = Deceased**

Primary Triage Immediate

- Serious injuries
- Immediately life-threatening
- High potential for survival
- Examples
  - Airway obstruction
  - Cervical spinal cord injury
  - Tension pneumothorax
  - Exsanguinating hemorrhage
  - Severe nerve agent poisoning

Primary Triage Delayed

- Serious injury, but delaying treatment will not affect outcome
- Examples
  - Fractures
  - Paraplegia

Primary Triage Minimal

- Examples
  - Abrasions
  - Mild nerve agent poisoning
    - Eye signs & symptoms only

Primary Triage Expectant

Expectant (SALT)

- Unlikely to survive
  - Very large total body surface area (TBSA) burns
    - 2nd, 3rd, & 4th degree

- Expectant does not mean no care
  - Do the best with what we have

Primary Triage
Dead = Deceased

- Not breathing after
  - Opening airway
  - Rescue breaths in kids
    - SALT
      - Consider 2 rescue breaths
    - JumpSTART®
      - If pulse present, give 5 rescue breaths

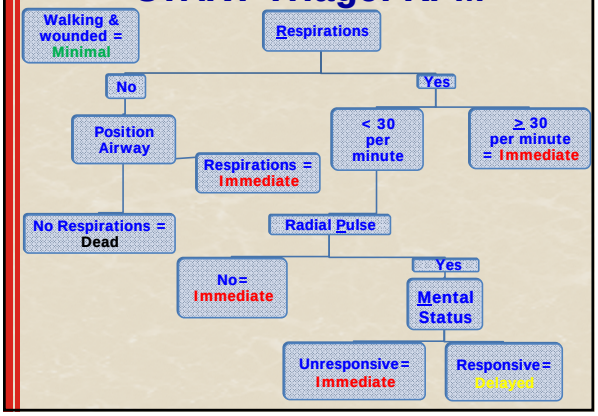
Primary Triage
MASS

- **Move**
- **Assess**
- **Sort**
- **Send**

MASS Triage

- Step 1: **M**ove – ask patients to move
  - "If you can hear me, please walk to designated area."
    - **Minimal / Green / Ambulatory**
  - "If you can hear me, please move your arm or leg."
    - **Delayed / Yellow / Nonambulatory**
- Step 2: **A**ssess patients who did not move
  - **Immediate / Red** or
  - **Expectant / Black**
- Step 3: **S**ort into severity levels
  - **I M E**
- Step 4: **S**end for further care
  - **Immediates** to hospitals
  - Others to hospitals or other facilities

START Triage: RPM



JumpSTART© for Kids

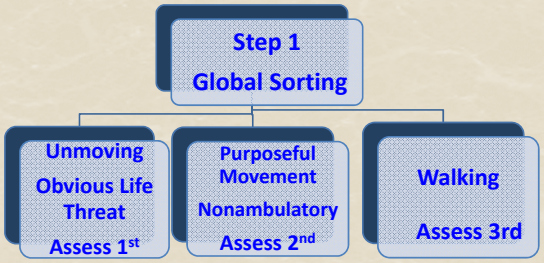
- Pediatric triage system
  - Use JumpSTART© if patient looks like a child
    - Ages 1-8 years
  - Use START if patient looks like an adult
- Physiologic decision points (**RPM**) with pediatric values

JumpSTART© for Kids

SALT Triage Step 1: Global Sorting

- **M**ove – ask patients to move
  - "If you can hear me, please walk to designated area."
    - Walking
    - Assess this group 3rd
  - "If you can hear me, please move your arm or leg."
    - Waving
    - Purposeful movement
    - Assess this group 2nd
  - Patients who did not move
    - Still
    - Obvious life threat
    - Assess this group 1st

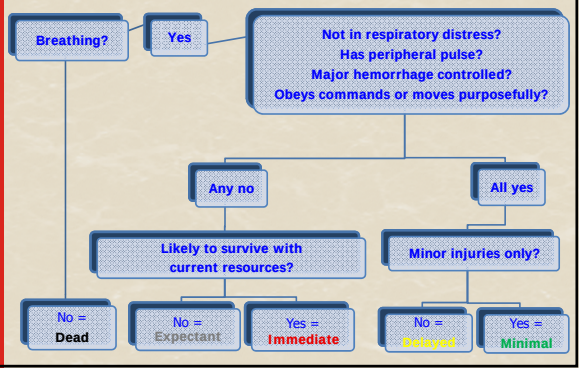
SALT Triage: Step 1 Summary



SALT Triage: Step 2 Assess Individuals & Perform Lifesaving Interventions

- Lifesaving interventions
  - Open airway
    - For child consider 2 rescue breaths
  - Needle decompress tension pneumothorax
  - Control major hemorrhage
  - Administer nerve agent antidotes
    - Atropine
    - Pralidoxime (2-PAM)

SALT Triage: Step 2 Assess Individuals & Assign Triage Color



Which primary triage system is best?

- Little evidence
- Use the system adopted for your area

Does START triage work?

- *Annals of Emergency Medicine* 2009;54(3):424-430.
  - START evaluated for train crash
  - Compared field & retrospective, outcomes-based triage categories for 148 patients sent to 14 hospitals

Does START Triage Work?

IDME	Field (n)	Outcomes-Based (n)
Immediate/Red	22	2
Delayed/Yellow	68	26
Minimal/Green	58	120
Expectant/Black	0	0
Total	148	148

Annals of Emergency Medicine 2009;54(3):424-430.

Does START Triage Work? Conclusions

- START
  - –Substantial over-triage
  - –Acceptable under-triage
- Over-triage
  - –Human nature not to abandon others

Annals of Emergency Medicine 2009;54(3):424-430.

Does SALT Triage Work?

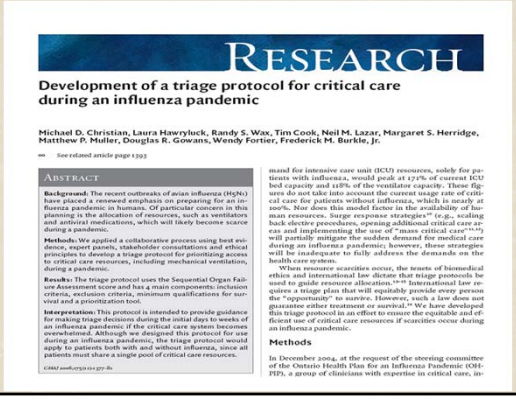
- Simulated MCI
  - – 100 victims triaged, 15 s per victim[1]
    - 78% correct
    - 4% over triage
    - 14% under triage
  - – 281 victims triaged, 28 s per victim[2]
    - 81% correct
    - 8% over triage
    - 11% under triage

1. Cone DC, et al. Pilot test of the SALT mass casualty triage system. *Prehosp Emerg Care*. 2009;13(4):536-40.
2. Lerner EB, et al. Use of SALT triage in a simulated mass-casualty incident. *Prehosp Emerg Care*. 2010;14(1):21-5.

Primary Triage

- **Emergency Department triage**
  - – **Level 1: Resuscitation**
    - Requires immediate lifesaving intervention
  - – **Level 2: Emergent**
    - Time critical, high risk condition or vital signs predict rapid decline if not treated quickly
  - – **Level 3: Urgent**
    - Requires ≥ 2 resources to properly diagnose & treat, e.g., abdominal pain requiring lab, CT, or ultrasound
  - – **Level 4: Less urgent**
    - Requires 1 resource to properly diagnose or treat, e.g., x-ray or suturing
  - – **Level 5: Nonurgent**
    - Requires no resources other than evaluation & treatment by a physician, e.g., prescription refill

Tertiary Triage



RESEARCH

Development of a triage protocol for critical care during an influenza pandemic

Michael D. Christian, Laura Hawryluck, Randy S. Wax, Tim Cook, Neil M. Lazar, Margaret S. Herridge, Matthew P. Muller, Douglas R. Gowans, Wendy Fortier, Frederick M. Burkle, Jr.

See related article page 1393

ABSTRACT

Background: The recent outbreaks of avian influenza (H5N1) have placed a renewed emphasis on preparing for an influenza pandemic in humans. Of particular concern in this planning is the allocation of resources, such as ventilators and antiviral medications, which will likely become scarce during a pandemic.

Methods: We applied a collaborative process using best evidence, expert panels, stakeholder consultations and ethical principles to develop a triage protocol for prioritizing access to critical care resources, including mechanical ventilation, during a pandemic.

Results: The triage protocol uses the Sequential Organ Failure Assessment score and has 4 main components: inclusion criteria, exclusion criteria, minimum qualifications for survival and a prioritization tool.

Interpretation: This protocol is intended to provide guidance for making triage decisions during the initial days to weeks of an influenza pandemic if the critical care system becomes overwhelmed. Although we designed this protocol for use during an influenza pandemic, the triage protocol would apply to patients both with and without influenza, since all patients must share a single pool of critical care resources.

CMAJ 2006;175(11):1377-1381

mand for intensive care unit (ICU) resources, solely for patients with influenza, would peak at 171% of current ICU bed capacity and 118% of the ventilator capacity. These figures do not take into account the current usage rate of critical care for patients without influenza, which is nearly at 100%. Nor does this model factor in the availability of human resources. Surge response strategies[10] (e.g., scaling back elective procedures, opening additional critical care areas and implementing the use of "mass critical care"[11,12]) will partially mitigate the sudden demand for medical care during an influenza pandemic; however, these strategies will be inadequate to fully address the demands on the health care system.

When resource scarcities occur, the tenets of biomedical ethics and international law dictate that triage protocols be used to guide resource allocation.[13–15] International law requires a triage plan that will equitably provide every person the "opportunity" to survive. However, such a law does not guarantee either treatment or survival.[16] We have developed this triage protocol in an effort to ensure the equitable and efficient use of critical care resources if scarcities occur during an influenza pandemic.

Methods

In December 2004, at the request of the steering committee of the Ontario Health Plan for an Influenza Pandemic (OHPIP), a group of clinicians with expertise in critical care, in-

Tertiary Triage for Critical Care during Influenza Pandemic *CMAJ* 2006; 175(11)1377-1381

- **Determine need for critical care**
  - – **Assess inclusion criteria**
  - – **Assess exclusion criteria**
    - If yes, "blue" triage code
      - – Do not transfer to critical care
      - – Continue current level of care or palliative care
  - – **Proceed to triage tool (initial SOFA Score)**
    - This applies to all patients, not only influenza patients

Tertiary Triage for Critical Care during Influenza Pandemic *CMAJ* 2006; 175(11)1377-1381

- **Inclusion criteria**
  - **Requires ventilator**
    - Refractory hypoxemia
      - SpO2 < 90% on nonrebreather reservoir mask or FIO2 > 0.85
    - Respiratory acidosis (pH < 7.2)
    - Clinically impending respiratory failure
    - Unable to protect or maintain airway

    or
  - **Hypotension** (SBP< 90 mmHg or relative hypotension) with **clinical evidence of shock** (altered LOC, decreased urine output, etc.)
    - Refractory to volume resuscitation
    - Requires vasopressor or inotrope

Tertiary Triage for Critical Care during Influenza Pandemic *CMAJ* 2006; 175(11)1377-1381

- **Exclusion criteria for ICU**
  - Severe trauma
  - Severe burns with any 2
    - Age > 60 yr
    - > 40% TBSA 2nd &/or 3rd degree burns
    - Inhalation injury
  - Cardiac arrest
    - Unwitnessed
    - Witnessed, not responsive to electrical therapy (defibrillation or pacing)
    - Recurrent
  - Severe baseline cognitive impairment
  - Advanced untreatable neuromuscular disease
  - Severe & irreversible neurologic condition

Tertiary Triage for Critical Care during Influenza Pandemic *CMAJ* 2006; 175(11)1377-1381

- **Exclusion criteria for ICU**
  - Metastatic malignant disease
  - Advanced & irreversible immunocompromise
  - End-stage heart failure (NYHA class III or IV CHF)
  - End-stage pulmonary disease
    - COPD with FEV_1 < 25% predicted or baseline PaO_2 < 55 mm Hg or secondary pulmonary hypertension
    - Cystic fibrosis with post-bronchodilator FEV1 < 30% or baseline PaO2 < 55 mm Hg
    - Pulmonary fibrosis with VC or TLC < 60% predicted or baseline PaO2 < 55 mm Hg or secondary pulmonary hypertension
    - Primary pulmonary hypertension with NYHA class III or IV heart failure or right atrial pressure > 10 mm Hg or mean pulmonary arterial pressure > 50 mm Hg
  - End-stage liver disease (Child-Pugh score ≥ 7)
  - Age > 85 yr
  - Elective palliative surgery

Sequential Organ Failure Assessment (SOFA)

Resusc. Component	Variable	0	1	2	3	4
A & B	PaO2/FiO2 (mmHg)	>400	<400	<300	<200	<100
C	Hypotension	Adults: None Children: >70 + (2 X age in years)	Adults: MABP <70 mmHg Children: <70 + (2 X age in years)	Dop <5	Dop >5, Epi <0.1, Norepi <0.1	Dop >15, Epi >0.1, Norepi >0.1
C	Platelets (x 10^6/L)	>150	<150	<100	<50	<20
D	GCS	15	13-14	10-12	6-9	<6
E	Creatinine (mg/dL)	<1.2	1.2-1.9	2.0-3.4	3.5-4.9	>5
E	Bilirubin (mg/dL)	<1.2	1.2-1.9	2.0-5.9	6.0-11.9	>12

Tertiary Triage for Critical Care during Influenza Pandemic *CMAJ* 2006; 175(11)1377-1381

Triage code	Criteria	Action or priority
Blue	Exclusion criteria met or SOFA score > 11*	• Manage medically • Provide palliative care as needed • Discharge from critical care
Red	SOFA score ≤7 or single-organ failure	Highest priority
Yellow	SOFA score 8–11	Intermediate priority
Green	No significant organ failure	• Defer or discharge • Reassess as needed

Note: SOFA = Sequential Organ Failure Assessment.
*If an exclusion criterion is met or the SOFA score is > 11 anytime from the initial assessment to 48 hours afterward, change the triage code to Blue and proceed as indicated.

Fig 1: Prioritization tool used in triage protocol for the initial assessment of patients' needs for critical care during an influenza pandemic. See online Appendix 1 for the SOFA scoring criteria and online Appendix 2 for the complete prioritization tool, which includes details on reassessing patients at 48 and 120 hours (appendices are available at www.cmaj.ca/cgi/content/full/175/11/1377/DC1). See Box 2 for exclusion criteria.

SOFA scores were significantly associated with survival during 2009 H1N1 in Canada

	Survivors (n = 139)	Nonsurvivors (n = 29)	*P Value*
SOFA score on Day 1, Mean (SD)	6.4 (3.4)	8.4 (3.5)	0.01

Kumar, et al. Critically Ill Patients with 2009 Influenza A(H1N1) Infection in Canada. *JAMA*, Nov. 4, 2009;302(17):1872-1879.

SOFA scores were significantly associated with survival during 2009 H1N1 in Mexico

	Survivors (n = 33)	Nonsurvivors (n = 23)	*P Value*
SOFA score on Day 1, Mean (SD)	6.7 (3.4)	12.3 (3.2)	<0.001

Dominguez-Cherit, et al. Critically Ill Patients with 2009 Influenza A(H1N1) in Mexico. *JAMA*, Nov. 4, 2009;302(17):1880-1887.

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- Arizona planning progress
- Triage systems
- **Duty to plan**

Duty to Plan

"..entering a crisis standards of care mode is not optional - it is a forced choice, based on the emerging situation.

Under such circumstances, failing to make substantive adjustments to care operations, i.e., not to adopt crisis standards of care is very likely to result in greater death, injury, or illness."

IOM Letter Report, 2009

Crisis Standards of Care: Clinical Issues

Arizona Crisis Standards of Care: Initial Planning Workshop

Arizona Dept of Health Services & Partners

Phoenix, AZ

Frank G. Walter, MD, FACEP, FACMT, FAACT

Jan. 24, 2013

Sort Assess Lifesaving Treatment (SALT)

- Meets Model Uniform Core Criteria
  - General Considerations
    - Simple, rapid, practical, etc.
  - Global sorting into groups with MASS method
  - Lifesaving interventions for individuals
  - Assign triage categories to individuals
    - No
      - Counting or timing vital signs
      - Capillary refill
      - Diagnostic equipment
    - Uses
      - Yes/no criteria

Sequential Organ Failure Assessment

(b) Modified Sequential Organ Failure Assessment (MSOFA)

The MSOFA requires only one lab value, which can be obtain using bedside point-of-care testing (creatinine obtained through iSTAT). MSOFA has not been validated in children, but is currently under study.

MSOFA scoring guidelines						
Variable	Score 0	Score 1	Score 2	Score 3	Score 4	Score for each row
SpO_2/FIO_2 ratio* or nasal cannula or mask; O2 required to keep SpO_2 >90%	SpO_2/FIO_2 >400 or room air SpO2 >90%	SpO_2/FIO_2 316-400 or SpO_2 >90% at 1-3 L/min	SpO_2/FIO_2 231-315 or SpO_2 >90% at 4-6 L/min	SpO_2/FIO_2 151-230* or SpO_2 >90% at 7-10 L/min	SpO_2/FIO_2 ≤150 or SpO_2 >90% at >10 L/min	____
Jaundice	no scleral icterus			clinical jaundice; scleral icterus		____
Hypotension†	None	MABP <70	dop ≤5	dop 5-15 or epi ≤0.1 or norepi ≤0.1	dop >15 or epi >0.1 or norepi >0.1	____
Glasgow Coma Score	15	13-14	10-12	6-9	<6	____
Creatinine level, mg/dL (use iSTAT)	<1.2	1.2-1.9	2.0-3.4	3.5-4.9 or urine output <500 mL in 24 hours	>5 or urine output <200 mL in 24 hours	____
MSOFA score = total scores from all rows:						____