Indiana State
Department of Health

Crisis Standards of Patient Care Guidance with an Emphasis on Pandemic Influenza: Triage and Ventilator Allocation Guidelines

Developed by the Crisis Standards of Care
Community Advisory Group

Indiana State Department of Health

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In times of a health care crisis, providers retain an obligation to provide timely and effective medical care even though they may become overwhelmed with patients, supplies may run low, and not all staff will be able to report to work. This obligation includes the task of developing guiding principles for providing effective and ethical health care at a time when resources are limited and the usual professional practices may not be possible. A severe influenza pandemic would present such a situation. To address this issue a group of medical professionals, with support of the Indiana State Department of Health, developed a document providing professional guidance to health care providers as they make the difficult decisions required in such a situation.

While there are many issues to address in disasters, this guidance focuses on the decision to provide ventilators to patients with pandemic influenza. This effort provides information to each health care provider in Indiana so that all may have an equal opportunity for care. Standards of care are not static but are based on what a reasonably careful, skillful, and prudent health care provider (and system) would do if acting under the same or similar circumstances. Though adherence to these procedures and recommendations is not required by law, the adoption of consistent procedures and recommendations statewide would represent best practices during times of disaster and would assist in gaining public confidence.

Sincerely,

WILLIAM C. VANNESS II, MD
STATE HEALTH COMMISSIONER

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Executive Summary

During natural or manmade disasters, the health care system retains an obligation to provide timely and effective medical care. This obligation includes the task of developing guiding principles for providing effective and ethical health care at a time when resources are limited and the usual professional practices may not be possible. A severe influenza pandemic would present such a situation. To that end, the Indiana State Department of Health assembled a community advisory group of health care professionals (Advisory Group) to develop a guidance document for hospitals to use when there is a shortage of staff and other resources and an increased number of persons requiring medical care. Members of the Advisory Group included adult and pediatric physicians, nurses, ethicists, attorneys, respiratory therapists, educators and representatives from the Indiana Hospital Association and Indiana Association for Home and Hospice Care.

Standards of care are not static but are based on what a reasonably careful, skillful, and prudent health care provider (and system) would do if acting under the same or similar circumstances. Professional norms are the ultimate source of legal standards of care, and, increasingly, standards of care are developed by professional organizations, accrediting bodies and government agencies. It follows then that guidelines developed by professionals with State support in an inclusive, transparent and democratic process such as this, in advance of an emergency, will be authoritative as the standard of care during the time in question. Though adherence to these procedures and recommendations is not required by law, the adoption of consistent procedures and recommendations statewide would represent best practices during times of disaster and would assist in gaining public confidence.

This document addresses primarily the allocation of ventilators and shall serve as a guide for hospital policymakers. All information contained herein is subject to change and applies only to patients 2 months of age and older.

The first step in the allocation process is appropriate triage to separate the infectious patients from the non-infectious patients. Each patient, infectious and non-infectious, is then assessed for severity of illness using standardized criteria and objective data: the Sequential Organ Failure Assessment (SOFA) is used to evaluate every patient's condition. Other factors, including age and social position in the community, are not included in the assessment. A triage officer then decides if a severely ill patient qualifies for a ventilator. Some chronic medical

conditions qualify as "exclusion criteria" (because they make the likelihood of survival lower), and, thus, some patients will not qualify for a ventilator and will receive appropriate supportive and/or palliative care.

Difficult questions remain. For example, in some cases there will be a tie, meaning at least two people have the same SOFA score and would qualify for a ventilator, but only one machine is available. This is obviously a very difficult decision; many tie-breaking criteria were considered. The Advisory Group decided, in the case of two or more persons having the same SOFA score, the person who arrived at the facility and had her/his score calculated first would be given the ventilator, a first-come first-served model.

The decision to shift into this new allocation procedure resides with the hospital and is not to be taken lightly. Before adopting the new procedure, many other measures must be employed: all available bed space (including newly 'created' beds) must be utilized, additional staff sought, as many as possible elective and surgical procedures postponed, extra personal protective equipment (PPE) purchased, additional ventilators acquired, and a query of statewide resources conducted, to the extent each of these measures is possible.

The Advisory Group wants to emphasize that implementation of the allocation procedure as a whole, and not just pieces of it, is important, although it is understood the guidelines may not account for all circumstances. Adherence to the guidelines is important in order to ensure standardization and consistency of patient care throughout Indiana during a severe pandemic.

Background

A pandemic is a global disease outbreak. An influenza pandemic occurs when there is a new virus for which the human population does not have immunity. Although we have experienced the influenza pandemic of H1N1, the threat of another pandemic is not diminished. The next event may be more severe than the H1N1 outbreak. Therefore, preparation for a severe pandemic must continue. Specific treatment for a severe influenza pandemic patient will most likely be inadequate and will primarily involve supportive care measures. The virulence of a severe pandemic virus causes serious illness or death in large numbers of people. When that happens, the medical community in Indiana, the United States, and the entire world becomes overwhelmed with critically ill patients. A pandemic may involve "waves" of illness lasting several weeks. Health care personnel become patients, too. An increase in patient census and a decrease in available medical staff may reduce the ability to provide care and necessitate changes in the provision of health care for everyone.

Due to the large influx of patients and the shortage of available health care staff and medical equipment in a severe pandemic, difficult decisions need to be made regarding patient care and allocation of scarce resources. Hospitals will no longer be able to provide all things to all people. The guidance in this document helps Indiana hospitals make decisions in their efforts to be fair to everyone requesting medical treatment.

Triage

Initial triage is vital. The Advisory Group recommends initial triage be performed outside hospital and health care facilities using the chart in Appendix 1 and the guidelines in Appendix 4. These criteria can also be used at locations such as physician offices, neighborhood clinics, extended care facilities, and other appropriate locations approved by the local health systems. For reasons of infection control, the first step is to differentiate infectious from non-infectious patients in order to keep these two groups separate. People with possible pandemic influenza symptoms are immediately separated from those without contagious conditions. However, during times of scarce resources, all patients, regardless of the nature of their illness/injury, are evaluated using the same criteria. A third group includes those who are certain they are ill but display no physical symptoms. They are referred for on-site counseling and reassurance.

The second step involves assignment of patients in each of the first two initial triage categories to two more groups based on their prognosis:
Group 1) those who have the potential to benefit from scarce medical resources;
Group 2) those who are unlikely to survive regardless of the treatment provided;
Patients in Group 2 are referred for palliative care.

Patients in Group 1 are broken out into three more categories:
1) those requiring critical care;
2) those who can be sent home with instructions for supportive care;
3) those who do not need critical care but have no one at home to care for them.
(See Appendix 1)

Ethical Framework

In each group of infectious and non-infectious patients, there will be a subset of patients who will require respiratory assistance. In a severe pandemic, there may be times when there is an insufficient quantity of appropriate medical equipment and qualified personnel. Thus, the need arises for additional triage. An ethical framework must serve as the starting point for a plan that proposes to allocate ventilators fairly. The following ethical framework was used by the New York State Department of Health in developing their ventilator allocation plan. Indiana has chosen to adopt the essence of the New York plan and incorporate the New York ethical framework.

Duty to Care
Duty to Steward Resources
Duty to Plan
Distributive Justice
Transparency

- *Duty to Care:* Patients must not be abandoned if they are not eligible for ventilator care. All possible palliative and supportive care must be provided for those who do not qualify for ventilator care.

- *Duty to Steward Resources:* Clinicians must balance the obligation to save the greatest possible number of lives against the obligation to care for each single patient. Decisions on the use of scarce resources must be heavily weighed against the chances for survival.

- *Duty to Plan:* To be successful, guidelines for crisis standards of care must be established in advance of their need. Such planning will lessen the stress on front line providers who must make difficult decisions regarding patient care in a time of limited staff and supplies. The failure to do so would be a failure of responsibility toward both patients and providers. Any plan cannot be presumed to resolve inequities in pre-existing health status resulting from unequal access.

- *Distributive Justice:* A just system of allocation must be applied broadly in order to be fair. The same allocation system should be in use across the state. Ethically sound responses to disaster must not exacerbate disparities in access to care. Rather, planners must designate appropriate resources for the most vulnerable who are most likely to suffer the greatest impact in any disaster.

- *Transparency:* Broad input in the design of the triage system is necessary. Indiana has worked with a wide variety of health care professionals and received input from the general public in review of the guidance.

Pre-triage Requirements

Before implementing crisis standards of care, "engineering controls" need to take place in hospitals. The use of all other possibilities for managing the surge of patients must be exhausted first.

- Elective procedures postponed.
- All available means of increasing "surge capacity" must be implemented:
  - Plan for staff shortages;
  - Stockpile personal protective equipment;
  - Purchase additional ventilators (if possible); and
  - Share resource information statewide.

Patient Categories for Triage

A just rationing system must be applied to all hospitalized patients, not solely to those with influenza. Access to ventilators will depend on clinical factors only. *Age, social worth, and job function will not affect triage allocation decisions.*

Implications of Triage for Facilities

Statewide policies are crucial to assuring equity throughout Indiana. Equitable rationing systems, particularly ones that contemplate limiting access to lifesaving treatment, must assure the same resources are available and in use at similarly situated facilities.

Patients using ventilators at home and in chronic care facilities will not be subjected to the acute care triage guidelines at their residence. Chronic care facilities will have to provide more intensive care on site as part of the general process of expanding care beyond standard locations. Barriers to transfer are appropriate and likely during a phase in which acute care hospitals are overwhelmed. If, however, chronic care facility patients require transfer to an acute care facility, they will be assessed by the same criteria as all other patients and might fail to meet criteria for continued care in the hospital.

Clinical Evaluation

A clinical evaluation system based on the Sequential Organ Failure Assessment (SOFA) score and the Ontario Health Plan for an Influenza Pandemic (OHPIP) protocol has been adapted for use in this guidance. (See Appendices 2 and 3) Patients on ventilators in hospitals when crisis standards of care begin are also assessed to determine whether they meet criteria for continued use. Candidates for extubation during a pandemic include patients with the highest probability of mortality. The proposed system prioritizes triage decisions regarding patients requiring ventilator support.

EMS personnel should act according to their local protocols. As a result, patients who have been started on ventilatory assistance in the field by EMS will be reassessed upon arrival at the hospital.

After the initial evaluation, ongoing assessment of patients continues using the Critical Care Triage Tool. Patient status is reviewed and reassessed at intervals of 48 and 120 hours. Patients who continue to meet criteria for benefit or improvement will continue until the next assessment, while those who no longer meet these criteria will lose access to mechanical ventilation. (See Appendix 3)

Exclusion criteria focuses primarily on current organ function, rather than on specific disease entities. If any one of the exclusion criteria is present upon initial evaluation of the patient, the patient is referred for supportive and/or palliative care and not considered a candidate for ventilator support.

Pediatric Clinical Evaluation

For the purpose of treatment options during an influenza pandemic, persons aged 13 years and older are considered adults. Pediatric patients are evaluated using the same criteria as adults with some minor adjustments:

- Children aged less than 10 years: Blood pressure is calculated using the criteria of normal being equal to or greater than 70 plus (2 times the age in years).
- Children aged 10 years and older: Blood pressure is calculated using adult values.
- Children aged 10 to 16 years: Either system can be used for bed allocation decisions.

In deference to the pediatric population and patients who may be medically sedated, Glasgow Coma Scores are not calculated at 48 and 120 hours if it is necessary to awaken the patient to do so unless that calculation might place the patient in another SOFA category. Additional chronic diseases have been added to the Pandemic Influenza Triage Criteria (Appendix 4) to reflect the inclusion of the pediatric patient.

Due to the scarcity of pediatric intensive care units in Indiana, it may be necessary to explore out-of-state hospitalization for some pediatric cases. The process for making this decision is outlined in Appendix 7.

Exclusion Criteria for Ventilator Access*

- Cardiac arrest: unwitnessed arrest, recurrent arrest, arrest unresponsive to standard measures; trauma-related arrest
- Terminal condition: a condition caused by injury, disease, or illness from which, to a reasonable degree of medical certainty, death will occur within six (6) months
- Severe burn: body surface area greater than 40%, severe inhalation injury
- End-stage organ failure:
  - Cardiac: NY Heart Association Class III or IV

- Pulmonary: severe chronic lung disease with FEV_1** less than 25% predicted
- Hepatic: MELD*** score greater than 20
- Renal: dialysis dependent
- Neurologic: severe, irreversible neurologic event or condition with high expected mortality
- Patient or patient's designee declines ventilator

*Adapted from OHPIP guidelines
**Forced Expiratory Volume in 1 second, a measure of lung function
***Model of End-stage Liver Disease

Bedside clinicians treating patients are not responsible for allocating ventilators to individual patients. Clinicians directly caring for the patient assess the patient's condition and note the emergence of any exclusion criteria. A triage officer makes triage decisions based on the allocation protocol. The triage officer is a hospital-designated supervising licensed health care professional with access to information on the number and nature of patients awaiting admission to the unit and can set triage goals according to system-wide criteria.

Implementing SOFA Scores

1. A SOFA score is calculated every day for all patients requiring access to inpatient resources with each patient classified into red (high priority), yellow (intermediate priority), green (low priority), or blue (palliative care) for remaining in the ICU. Clearly document the time of every SOFA calculation.
2. If a patient's status is green (low priority), the patient is transferred out of the ICU. They do not require critical care.
3. If a patient's status is blue (palliative care) based on exclusion criteria or SOFA score at the time of initial triage, they are not admitted to the ICU.
4. If a patient's status becomes blue (palliative care) based on the presence of "exclusion criteria" at any time during the hospital stay, the patient is transferred out of the ICU.
5. If a patient's status becomes blue (palliative care) based on the SOFA score at 48 hours, 120 hours, or anytime thereafter, they are transferred out of the ICU.

If and whenever a patient's status is blue (palliative care), a *Do Not Resuscitate* order (DNR) is written and appropriate palliative and supportive care provided.

6. In the absence of "exclusion criteria," decisions to institute or continue invasive or non-invasive ventilator support are made at initial triage, then at 48 hours,

120 hours, and daily thereafter. This allows patients the opportunity to improve and continue to receive ventilator support during the first 5 days.

7. The daily SOFA assessment after 5 days (120 hours) uses the 120-hour criteria.
8. If decisions must be made to remove patients from ventilators to provide resources for new patients, the following guidelines are suggested:
    a. A patient classified as yellow (intermediate priority) who needs admission *cannot* have priority over a patient classified as yellow or red (high priority) who is already in the ICU.
    b. A patient classified as red (high priority) who needs admission *cannot* have priority over a patient classified as red who is already in the ICU.
    c. A patient classified as red (high priority) who needs admission *cannot* have priority over a patient classified as yellow (intermediate priority) during the first 5 days (120 hours) of the patient classified as yellow's stay in the ICU.
    d. A patient classified as red (high priority) who needs admission *can* have priority over a patient classified as yellow (intermediate priority) after the patient classified as yellow has been in the ICU for 5 days (120 hours).

Palliative Care

Clinicians will be faced with the need for palliative care and end-of-life care for patients in ICU or on ventilators who fail to meet rationing standards for continued support. Clinicians must clearly document the rationale and decision regarding extubation with sedation. Care must focus on decreasing pain and suffering by providing treatment for relief of symptoms along with comfort and support, which can include nasal cannula oxygen, if available, or other supplements to breathing.

The goals of palliative treatment are: relief from suffering, treatment of pain and other distressing symptoms; psychological and spiritual care; and a support system to help the individual, the individual's family, and clinicians.

As part of the crisis standards of care, providers should establish an end-of-life team that involves the treating physician and other health care professionals and social services. If a provider does not have an end-of-life/palliative care program, community resources, e.g., hospice providers, should be included in the provider's crisis standards of care plan.

Method for Resolving Identical Scores

At any time should the calculation of SOFA scores result in more than one person in the same category (red or yellow) and not enough resources for all, a means of breaking the tie may be necessary. The time of the initial SOFA calculation shall be documented on all patients. *In the event of a tie leading to more than one patient needing mechanical ventilation in the setting of a scarcity of mechanical ventilators, the person(s) with the earliest documented time of calculation of the SOFA shall be treated first.* This is consistent with the principle of first come, first served.

Daily Review of Decisions

The proposed system for triaging ventilators, based on the recommendations of the New York State Working Group, as modified by the Indiana State Department of Health and adapted for use in the state of Indiana, is based on a careful assessment of likely pandemic scenarios, principles of scarce resource allocation, and careful ethical consideration.

It is crucial that review of the outcomes of allocation decisions be undertaken insofar as resources and personnel will allow during a crisis. The outcomes of allocation decisions should be examined on a daily basis. This effort focuses on whether: 1) trends seen in allocation decisions might inform allocation decisions in future ways from an operational point of view, and 2) whether triage decisions made in the context of the ventilator triage framework led to decisions which are systematically and/or ethically problematic. If ethical concerns are identified in the course of such a review, they can be used as the basis for changes to the overall allocation algorithm midstream. Thus, this review process provides a means of adaptation for the system at large.

The scarcity of resources and personnel may make careful record keeping and retrospective review difficult or impossible. While meticulous record keeping is desirable, in such cases, it is ethically important to prioritize energies spent in the direct saving of lives over those spent keeping records and in post-hoc analyses.

Additional Crisis Standards

In addition to making decisions about patient care, crisis standards also refer to the use of supplies and equipment. They may be rationed and used in ways consistent with achieving the ultimate goal of saving the most lives. Health care facilities need to implement the re-use procedures already developed and approved by their medical boards.

Providers may need to make treatment decisions based on clinical judgment if laboratory resources or radiology resources are exhausted. Treatment decisions in such cases are then made based on physical exam, history, and clinical judgment.

Suggested Documentation

Appendices 4, 5, 6, and 7 provide additional guidance for patient documentation during the use of crisis standards of care.

Appendix 4 provides guidance for staff at off-site locations for initial triage of patients who need further evaluation for possible hospital admission. These criteria can also be used for patients who first present at hospitals.

Appendix 5 is a flow chart that can be prominently posted, so seriously ill patients can be easily monitored for changes in condition. By reviewing these flow charts, the SOFA officer of the day can quickly and easily note if patients are improving or deteriorating. The chart will also make the daily review of decisions easier to accomplish.

Appendix 6 provides a suggested list of admission orders for patients with possible pandemic influenza. In a time of increased patient census and decreased staffing, it helps to make admission orders standard and consistent so they can be quickly and easily implemented.

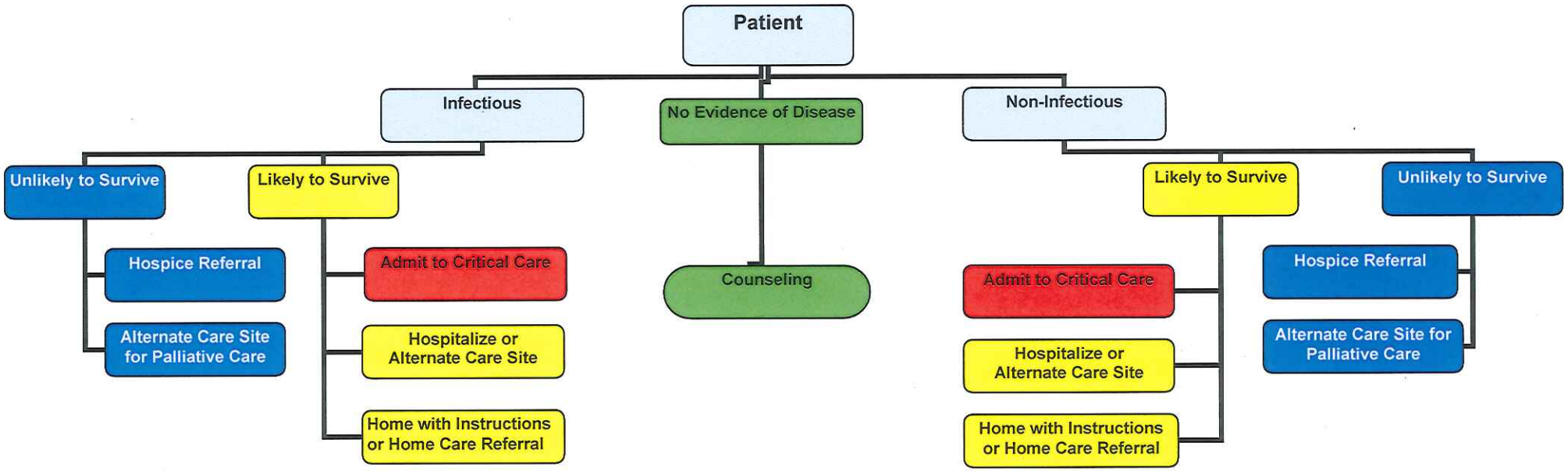
Appendix 7 offers direction about securing available beds for critically ill children.

Appendix 8 provides guidelines for consideration of non-invasive ventilatory support during an influenza pandemic. When planning for a pandemic, many health care organizations are taking inventory of their existing respiratory equipment and making strategic decisions on whether investment in more equipment is warranted. Recognizing that fully equipped mechanical ventilators are expensive and may stretch the financial resources available to institutions, health care organizations may wish to consider alternative modes of effective ventilator support, recognizing the caveats outlined in the appendix.

Communication about Crisis Standards of Care

Public education about the need for and the process of handling ventilator support issues must be carried out early and often, prior to and during the pandemic. Patients and families must be informed immediately that ventilator support represents a trial of therapy that may not improve the patient's condition sufficiently, and that the ventilator will be removed if this approach does not enable the patient to meet specific criteria.

Appendix 1. Pandemic Influenza Patient Flow Chart



Appendix 2. Sequential Organ Failure Assessment (SOFA) Score

SOFA Scale

Variable	0	1	2	3	4
PaO2/FiO2 mmHg	>400	≤400	≤300	≤200	≤100
Platelets, x 10^3/μL (x 10^6/L)	>150 (>150)	≤150 (≤150)	≤100 (≤100)	≤50 (≤50)	≤20 (≤20)
Bilirubin, mg/dL (μmol/L)	<1.2 (<20)	1.2-1.9 (20-32)	2.0-5.9 (33-100)	6.0-11.9 (101-203)	>12 (>203)
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
Glasgow Coma Score*	15	13-14	10-12	6-9	<6
Creatinine, mg/dL (μmol/L)	<1.2 (<106)	1.2-1.9 (106-168)	2.0-3.4 (169-300)	3.5-4.9 (301-433)	>5 (>434)

Dopamine [Dop], epinephrine [Epi], norepinephrine [Norepi] doses in ug/kg/min
SI units in brackets

*Glasgow Coma Scores are not calculated at 48 and 120 hours if the patient must be awakened to do so unless the score could move the patient into another category.

Adapted from:
Ferreira FI, Bota DP, Bross A, Melot C, Vincent JL. Serial evaluation of the SOFA score to predict outcome in critically ill patients. JAMA 2001; 286(14): 1754-1758.

Explanation of variables:
PaO2/FiO2 indicates the level of oxygen in the patient's blood.
Platelets are a critical component of blood clotting.
Bilirubin is measured by a blood test and indicates liver function.
Hypotension indicates low blood pressure; scores of 2, 3, and 4 indicate that blood pressure must be maintained by the use of powerful medications that require ICU monitoring, including dopamine, epinephrine, and norepinephrine.
The Glasgow Coma Score is a standardized measure that indicates neurologic function; low score indicates poorer function.
Creatinine is measured by a blood test and indicates kidney function.

Pediatric values are included in the above table based on expert opinion of the Advisory Group members.

Appendix 3. Critical Care Triage Tool

	Initial Assessment		48-Hour Assessment		120-Hour Assessment and Daily Thereafter	
Color Code	Criteria	Priority	Criteria	Priority	Criteria	Priority
Blue	Exclusion Criteria* or SOFA greater than 11	Do not admit to ICU, Palliative care	Exclusion Criteria* or SOFA greater than 11 or SOFA 8-11 no change	Palliate & discharge from critical care	Exclusion Criteria* or SOFA greater than 11 SOFA less than 8 no change	Palliate & discharge from critical care
Red	SOFA equal to or less than 7 or Single Organ Failure	High	SOFA less than 11 and decreasing	High	SOFA score less than 11 and decreasing progressively	High
Yellow	SOFA 8-11	Intermediate	SOFA less than 8 no change	Intermediate	SOFA less than 8 minimal decrease (less than 3-point decrease in past 72 hours)	Intermediate
Green	No significant organ failure	Low	No longer ventilator dependent	Discharge from critical care	No longer ventilator dependent	Discharge from critical care

*If at any time a patient's status becomes blue, based upon exclusion criteria, discontinue ventilator and refer for palliative care. Glasgow Coma Scores are not calculated at 48 and 120 hours if the patient must be awakened to do so unless the score could move the patient into another category. Decisions based on triage SOFA scores are made only at initial triage, 48 and 120 hours, and daily thereafter.

Appendix 4. Out-of-Hospital Pandemic Influenza Triage Criteria

(If a patient meets <u>any</u> one of these criteria, refer for further evaluation)

1. Presence of pulmonary symptoms and one of the following comorbid conditions:
   a. Renal failure
   b. Chronic obstructive pulmonary disease/Asthma/Bronchopulmonary dysplasia
   c. Malignancy
   d. Diabetes
   e. Congestive heart failure/Congenital heart disease
   f. Chronic liver disease
   g. Alcohol abuse
   h. Malnutrition
   i. Cerebral vascular accident/Chronic seizure disorder
   j. History of transplantation/Immunosuppression
2. Physical Findings
   a. Respiratory rate greater than 30
   b. Hypotension (systolic BP less than 90, diastolic BP less than 60)
   c. Pulse greater than 125
   d. Decreased level of consciousness
   e. For children, use Pediatric Advanced Life Support (PALS) respiratory and heart rate standards*
3. Laboratory values
   a. Pulse oximeter O_2 saturation less than 92

*PALS guidelines for children:

Respiratory rate:

4 kg.-19 kg. greater than 60
20 kg.-24 kg. greater than 35
Over 25 kg.-adult guidelines

Pulse:

4 kg.-9 kg. greater than 160
10 kg.-13 kg. greater than 140
Over 14 kg.-adult guidelines

Hypotension: systolic less than 70 plus (2 times age in years)

Appendix 5. Pandemic Influenza Flow Sheet

Name_____
MR#_____

Pandemic Influenza Flow Sheet

Date																					
SOFA																					
Initials																					
Time																					
Temp																					
Initials																					

Oxygen Saturation

Date																														
Time																														
FiO_2																														
Initials																														
100																														
99																														
98																														
97																														
96																														
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86																														
85																														
84																														
83																														

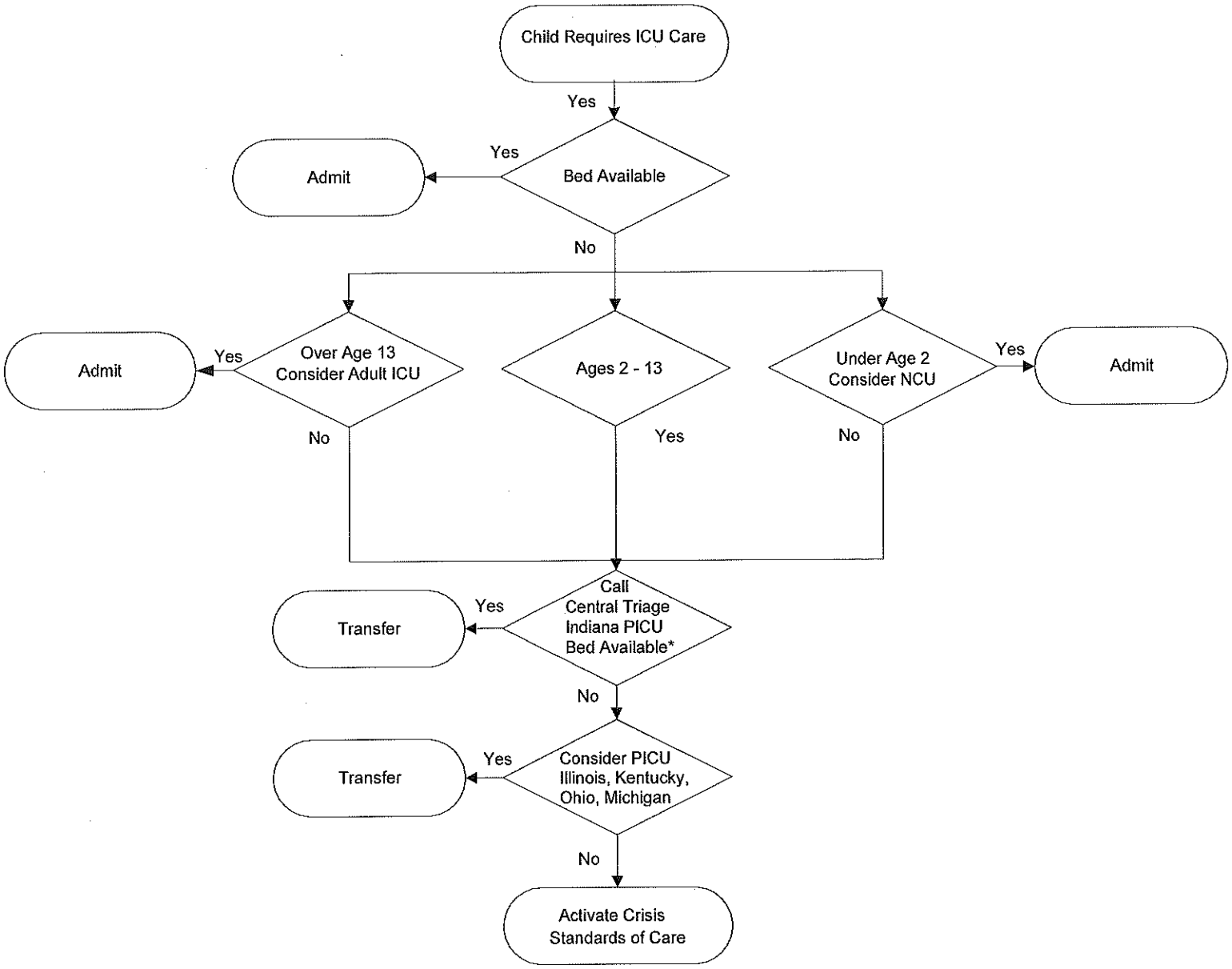
Was patient treated with anti-influenza medication? Yes ☐ No ☐ Date started:_____
Did patient require oxygen? Yes ☐ No ☐ Date started:_____
Did patient require noninvasive ventilation? Yes ☐ No ☐ Date started:_____
Did patient require invasive mechanical ventilation? Yes ☐ No ☐ Date started:_____
Final Outcome: Alive ☐ Dead ☐

Appendix 6. Sample Suspected Pandemic Influenza Admission Orders

1. Admit to: _____
2. MD/DO/NP: _____
3. Diagnosis: _____
4. Condition: _____
5. Allergies: _____
6. Vital Signs (including temperature) every 8 hours. Record on flow sheet.
7. Ins and Outs every shift.
8. Laboratory studies on admission:
   a. CBC with differential
   b. BMP
   c. ABG
   d. Nasopharyngeal swab for influenza antigen testing.
   e. Multiple nasopharyngeal swabs for influenza RT-PCR testing on different days and different times of day (to be sent to Indiana State Department of Health [ISDH] Laboratory Services if not available in hospital). Prior authorization number is required to send specimens to ISDH Laboratory before testing is performed. Call the ISDH after-hours line, 317.233.1325, or the Surveillance and Investigation Division to obtain the authorization number. Other acceptable specimens would include bronchoalveolar lavage fluid, endotracheal aspirate, pleural fluid, or nasal swab.
   f. Blood in red top tube for influenza antibody testing. Acute and convalescent serum specimens. Acute collected within 1 week of symptom onset and convalescent collected 2-4 weeks after symptom onset.
   g. Blood in red top tube for serum storage.
9. Portable chest x-ray, or P/A with/without (circle) lateral on admission.
10. Oxygen saturation by oximetry every 4 hours. Record on flow sheet.
11. Apply supplemental O_2 as necessary to maintain SaO_2 at or above 88%.

12. Guidelines for advanced respiratory support
    a. BIPAP
        i. Apply enough inspiratory pressure to achieve RR less than 25 and tidal volume greater than 6 ml/kg.
        ii. Set expiratory pressure at 5 cmH_2O.
        iii. Wear continuously for 6 hours. Can take off for 30-minute periods thereafter to eat and clear sputum.
        iv. Set backup rate of 12 breaths/minute.
    b. Indication for intubation and mechanical ventilation
        i. Failure of BIPAP as evidenced by respiratory distress or O_2 requirements greater than 12 liters/min.
        ii. Same as for BIPAP if:
            1. BIPAP is not available.
            2. Patient is too somnolent or debilitated to be able to protect his/her airway.
            3. The hospital has chosen to place all patients with respiratory failure directly on mechanical ventilation through an endotracheal tube rather than BIPAP.
            4. Calculation of SOFA score results in ventilator qualification for that day.
13. If patient has admission O_2 saturation equal to or less than 92% on room air or has infiltrates on admission CXR, begin oseltamivir (Tamiflu) 75 mg by mouth every 12 hours. This should be started within the first 24 hours after admission.
14. Medications:
    a. Tylenol 650 mg by mouth every 6 hours as needed for temp greater than 100.0° F.
    b. _____
    c. _____
    d. _____
    e. _____
    f. _____
    g. _____
    h. _____
    i. _____
    j. _____
    k. _____
    l. _____
    m. _____

Appendix 7. Pediatric Bed Assignment



*Contact the ISDH Department Operations Center (DOC) at 317 234-7355 for PICU availability.

Appendix 8. Potential Use of Noninvasive Positive Pressure Ventilation (BIPAP) in the Setting of Pandemic Influenza

Potential advantages of using BIPAP:

1. Less expensive
   a. BIPAP machine $3,500-$4,000
   b. Portable ventilator $5,000-$12,000
   c. Regular ventilator $20,000-$30,000
   d. Equipment and prices may vary as technology and manufacturing are developed
2. Potential usage during times when influenza risk small
3. Less patient morbidity for responders
4. More rapid ICU throughput
5. Less need for sedating drugs
6. Better nutrition
7. Can use with endotracheal tube, though this leads to loss of some of the benefits above

Potential disadvantages of using BIPAP:

1. Greater risk of health care worker exposure because patient expiration is unfiltered
2. Greater need for patient monitoring
3. Less options for patient support

Equipment necessary for using BIPAP:

1. BIPAP machine
   a. Must have backup rate
   b. Must be able to bleed in oxygen
   c. Capable of providing up to 30 cmH_2O inspiratory pressure
2. Facial mask, NOT nasal mask
3. Non-jet outflow device
4. Viral-bacterial filter before exhalation device

Room requirements for using BIPAP:

1. Isolation rooms vs 4-6 bed cubicles on the ward
2. Must have exhaust ventilation creating negative pressure airflow to the outside
3. 12 air exchanges per hour for cohorting, 6 air exchanges per hour for single room

Indications for using BIPAP:

1. Oxygen saturation less than 88% on supplemental oxygen
2. Not somnolent

Application of BIPAP:

1. Goals
   a. RR less than 25
   b. TV greater than 6 ml/kg
2. Wear continuously for 6 hours. Can take off for 30-minute periods thereafter to eat and clear sputum
3. Backup rate of 12 breaths/minute
4. Indication for intubation
   a. Respiratory distress
   b. O_2 requirements greater than 12 liters/minute
5. After 24 hours, success could be predicted by:
   a. Decreased respiratory rate
   b. Less severe disease on chest x-ray

Health care worker protection when caring for patients on BIPAP:

1. This is a major concern with noninvasive ventilation
2. Equipment recommended:
   a. Full gown
   b. Shoe covers
   c. Gloves
   d. HEPA-based air purifying respiratory system (hood)

Experience of using BIPAP in Severe Acute Respiratory Syndrome (SARS):

1. About 20-25% of subjects with disease required ventilation
2. Noninvasive ventilation was successful in preventing intubation in 70% of patients
3. Average time on BIPAP: 3½ days
4. Less ICU stay in responders (3 days) versus nonresponders (21 days)

Notes:

1. All patients with noninvasive ventilators at home (CPAP or BIPAP) should bring their equipment to the hospital should they seek medical attention. While CPAP may be tried initially in patients requiring respiratory assistance who have their own CPAP device, should they fail, BIPAP can be attempted. In patients who do not have a home CPAP machine, BIPAP is the preferred non-invasive ventilator support mode.
2. Disposable equipment needs are similar between noninvasive ventilation and conventional ventilation. Both need tubing, exhalation filters. Need face mask for BIPAP versus endotracheal tube for conventional ventilation.
3. Both modes of ventilation require compressed gas and oxygen.

References:

1. Cheung, TMT et al. Effectiveness of noninvasive positive pressure ventilation in the treatment of acute respiratory failure in severe acute respiratory syndrome. Chest 126:845-850, 2004.
2. So, LKY et al. Development of a standard treatment protocol for severe acute respiratory syndrome. Lancet 361:1615-1618, 2003.
3. Hui, DX et al. Noninvasive positive-pressure ventilation: an experimental model to assess air and particle dispersion. Chest 130:730-740, 2006.
4. Rubinson, L et al. Positive-pressure ventilation equipment for mass casualty respiratory failure. Biosecurity and Bioterrorism 4:1-12, 2006.

Appendix 9. Crisis Standards of Care Community Advisory Group

Meredith Addison, RN, MSN
Emergency Nurses Association
Terre Haute Regional Hospital

Clifford A. Beyler, JD
Hall, Render, Killian, Heath & Lyman, P.C.

Jeffrey L. Bowman, MD, MS
St. Vincent Hospitals/Health Services

Frank Chaten, MD
Peyton Manning Children's Hospital at St. Vincent

Douglas E. Fauber, RN, MS
West Central Community Hospital

Meg Gaffney, MD
Indiana University Center for Bioethics

Spencer Grover, FACHE
Indiana Hospital Association

Paul R. Helft, MD
Charles Warren Fairbanks Center for Medical Ethics

Bea Lamb, RN
Greater Lafayette Health Services

Jean Macdonald, RN, BSN, MS
Indiana Association for Home & Hospice Care

Christi D. Norris, RRT
Indiana Society for Respiratory Care
Clark Memorial Hospital

Homer L. Twigg III, MD
Indiana University School of Medicine

Vickie VanDeventer, MPH, BSN, RN, CIC
Bloomington Hospital

Indiana State Department of Health

Janet McCutchan, RN, MSN

John A. Braeckel, MS (retired in 2009)

Jennifer Bruner, JD (left the Agency in 2013)