

Triage planning for critical care admission in the event of an Influenza pandemic

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Context

In the event of a pandemic of influenza, the ventilatory capacity of the critical care areas in BSUH will be overwhelmed by patients with respiratory failure due to primary influenza or that complicated by secondary bacterial pneumonia (1,2).

With the need for this limited healthcare resource far outstripping availability, the utilitarian ethical principles of maximising the number of lives saved should be employed. This argument is put forward in the Intensive Care Society's and DoH's document *Critical Care Contingency Planning in the event of an emergency where the number of patients substantially exceeds the normal critical care capacity* (3,4).

This document states: "Referral criteria for mechanical ventilatory support will need to take into account...resource availability and predicted mortality. In worse case settings critical care interventions may not be appropriate".

"...the potential number of referrals to critical care is likely to exceed bed availability. Calculations based on the *National framework* (5) suggest that even if existing critical care bed capacity can be maximally escalated, during the peak of a pandemic there may be ten times as many patients requiring mechanical ventilatory support as the number of beds available"

Under these exceptional circumstances a triage system would require robust inclusion and exclusion criteria and a severity scoring system to identify patients most likely to benefit from critical care input.

Severity scoring systems

There are a number of mortality prediction models available for use. Of these, the Sequential Organ Failure (SOFA) score appears to be the most reliable.

It is the score suggested by the DoH (1) and Intensive Care Society (3). It has been promoted for use, in a triage system during the Severe Acute Respiratory Syndrome (SARS) outbreak in Canada, by Christian *et al* (6). Moreover, this scoring system has been separately validated as the most sensitive and specific predictor of mortality in patients presenting with community acquired pneumonia (7) and has also been validated in independently predicting the mortality of ICU patients within 48 hours of their admission (8).

SOFA Scoring System

Organ system	0	1	2	3	4
Respiratory PaO ₂ /FiO ₂	>400	< 400	< 300	< 200	< 100
Renal Creatinine (μmol/l)	<106	106-168	169-300	301-433 urine output <500ml/day	>433 urine output <200ml/day
Hepatic Bilirubin (μmol/l)	<20	20-32	33-100	101-203	>203
Cardiovascular Hypotension Drug dose (mcg/kg/min)	No hypotension	Mean arterial BP <70mmHg	Dopamine < 5	Dopamine > 5 Epinephrine < 0.1 Norepinephrine < 0.1	Dopamine >15 Epinephrine > 0.1 Norepinephrine > 0.1
Haematological Platelet count (thousands/mm ³)	>150	< 150	< 100	< 50	< 20
Neurological Glasgow Coma Scale score	15	13-14	10-12	6-9	<6

Score and Triage

Based on Christian *et al* (6), and the experience of SARS in Canada

Time of SOFA score	Score and outcome
Admission	<7 or single organ failure
	8-11
	>11
48 Hours	< 11 & improving
	< 8 & no change
	8 – 11 & no change or worsening
Daily thereafter	<11 & improving
	< 8 & improving slowly
	<8 & no change or worsening

Code	Priority
	Highest
	Intermediate
	Lowest

A score of > 11 at any time moves the patient to the lowest priority

Inclusion and Exclusion Criteria

Inclusion	Exclusion
<p>A. Requirement for mechanical ventilation Sats < 90% on NRM Respiratory Acidosis Impending respiratory failure Inability to maintain/protect airway</p> <p>B. Hypotension with SBP < 90 mmHg Evidence of clinical shock Refractory to volume resuscitation</p>	<p>Severe trauma Severe burns Cardiac arrest Severe baseline cognitive impairment Advanced untreatable neuromuscular disease Metastatic malignant disease Advanced immunocompromise Severe neurological event End stage organ failure NYHA III/IV heart failure endstage COPD, fibrosis, pulmonary hypertension</p> <p>Age > 85years Elective palliative surgery</p>

Notes

- 1) Should demand overwhelm capacity, then critical care should be limited to the administration of IPPV / oxygen, inotropic support, antibiotics, intravenous fluids, sedation, analgesia, thromboprophylaxis and nutrition. The provision of renal replacement therapy should be at the clinicians' discretion.
- 2) If a patient should deteriorate to a SOFA score of >11 and so be discharged from ICU, a programme of palliative care should be instituted. This should be guided by the Liverpool Care Pathway.
- 3) The DoH (1) suggest that intensivists need not be included in the decision making process for ICU admission. We strongly feel that this is not the case. ICU admission of any patient, at any time, should be the decision of the consultant intensivist on duty.

References

- 1) http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_087733
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- 3) Taylor B et al. Critical Care Contingency Planning in the event of an emergency where the number of patients substantially exceeds the normal critical care capacity. *JICS* 2008; **9(1)**:16-19
- 4) Dept of Health, NHS Emergency Preparedness Division 2005: underpinning materials. Critical Care Contingency Planning in the event of an emergency where the numbers of patients substantially exceeds normal critical care capacity: Best Practice Guidance. Consultation paper August 2006
- 5) http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080734
- 6) Christian MD, Hawryluck L, Wax RS et al. Development of a triage protocol for critical care during an influenza pandemic *CMAJ* 2006; **175**:1377-81.
- 7) Rudnor V and Fesenko A. Validation of predictive rules for ICU patients with community-acquired pneumonia. *Critical Care* 2008; **12**:44
- 8) Ferreira et al. Serial evaluation of SOFA score to predict outcome in critically ill patients. *JAMA* 2001; **286**:1754