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## Triaging for adult critical care in the event of overwhelming need

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**Abstract** *Introduction:* Predictions of the need for critical care within the H1N1 influenza pandemic suggested overwhelming need beyond potential resources, necessitating rationing of care via triaging. *Method:* The triage model described was derived from informed discourse within a conjoined NHS and University Clinical Ethics Committee, supplemented by specialists in intensive care and infectious diseases. *The Model:* The triage methodology described is justified ethically primarily upon 'utilitarian' principles within an aggregate public health model, with additional reference to 'fairness'. Advantages of such a model, which partially suspends usual clinical judgment applied to individuals in favour of also utilizing organ failure scores, include minimization of aggregate influenza morbidity and mortality, and minimization of psychological stress upon staff making triaging decisions. Legally, in England and Wales, the model is uncontentious as regards rationing of admission to critical care; however, the law adopts 'futility' as the core justification for withdrawal of

treatment, applied to the individual, thus failing to allow for rationing through triaging individuals out of critical care in the interest of other patients with better chances of survival. There is therefore a mismatch between a clinically and ethically acceptable model of triaging, based upon a public health approach, and the law, based upon the paradigm of the individual patient. *Conclusion:* The good fortune that the H1N1 pandemic was less severe than predicted, allowing time for calm consideration, debate and decision making about what model of triaging should be adopted whenever it might be necessary in the future. It is in the interest of the health of the nation, and government, to decide upon a critical care triaging model while there is not an imminent health service crisis.

**Keywords** Influenza A (H1N1) · Triage · Model · Ethical · Ethics · Law · Utilitarian · Fairness · Organ Failure · SOFA · Rationing · Need · Critical care · Withdrawal · Human Rights Act

### Introduction

The 2009 influenza A (H1N1) pandemic raised many important questions for clinicians and managers responsible for the provision of health care services, and many

of these related significantly to critical care [1–6]. Early predictions suggested that there might be a lack of availability of critical care beds. This would have led to the necessity to make difficult and stressful triaging decisions, and many staff were rightly concerned about

the ethics and likely legality of such decisions, albeit taken in extra-ordinary clinical circumstances. This paper describes an ethical framework that justifies a particular proposed triage model.

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### Scale of the problem

Influenza A (H1N1) is a highly transmissible viral illness, predicted to affect up to 12% of the non-immune population. For the majority, the illness is likely to be mild and self limiting, but it is estimated that up to 1% will need hospitalization, with potentially 25% of these needing admission to intensive care. For the UK this equated, around the time of drafting the paper, to 5,300 critical care admissions for H1N1 flu-related illness [7]. In July 2009 there were 3,647 adult critical care beds in England [8]. The absolute number of cases needing intensive care within a pandemic, and any ‘need gap’, will clearly depend upon the severity and time distribution of the pandemic set against resources that can be made available. However, even with a potential doubling of effective ICU beds [9], there was predicted to be a significant shortfall against the number of patients who could derive some benefit. This would necessitate triaging, arising probably in response to a ‘surge’ trajectory of need [10, 11].

The potential for an overwhelming ‘need gap’ to arise, as well as its ramifications for patients and health care staff, raises profound clinical, ethical and legal questions. This paper proposes an ethical framework that is capable of justifying a triage model that might reasonably be adopted as a response to overwhelming need for a limited resource, whether during the current influenza pandemic or some other future mass casualty situation. We also consider the legal implications of operating such a model. Although we do so in relation to current law in England and Wales, it is likely that similar legal issues to those we describe would arise in other jurisdictions, especially those based upon common law foundations. The background to, and many of the specifics of, the model itself have been previously published by Christian [12], which arose in the context of a previous influenza ‘scare’, in relation to the avian influenza (H5N1) virus. The model applies solely to adults (those of 18 years of age and over), given the lack of aggregate predictive data for benefit from intensive care for children compared with that available for adults.

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### Available advice

Provisional guidelines have been issued by a number of bodies that comprehensively address the assessment and management of patients requiring acute care due to

influenza infection [13]. The Department of Health document ‘Critical Care Contingency Planning in the event of an emergency where the numbers of patients substantially exceeds normal critical care capacity’ [14] gives further advice regarding organisational planning during a pandemic. This document considers the appropriate trigger point for critical care support to be the requirement for either mechanical ventilation and/or treatment for hypotension which conventionally would necessitate admission to ICU. The document also highlights that “referral criteria for mechanical ventilatory support will need to take into account...resource availability and predicted mortality. In worst case settings critical care interventions may not be appropriate.”

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### The need for an ethical framework

There is no ‘ethically right’ method of triaging. However, it is important that any method adopted is not only explicit and transparent, both in its technical and ethical underpinnings, but is also capable of ethical justification [15]. The importance of both transparent explicitness and ethical justification is emphasised by the potential for disparity between the approach of an ethically and clinically justifiable triage model operated within the extraordinary circumstance of a pandemic, and established law, particularly as regards withdrawal of care.

The DoH has published guidance on the ethical foundations for deciding about the allocation of resources during a flu pandemic [16]. This document asserts “Equal concern and respect is the fundamental principle that underpins this ethical framework. This means that everyone matters; everyone matters equally—but this does not mean that everyone is treated the same; the interests of each person are the concern of all of us, and of society; the harm that might be suffered by every person matters, and so minimizing the harm that a pandemic might cause is a central concern.” In accordance with this guidance, the principles that justifiably underpin allocation of care, including within triaging, are described as including “(1) respect; (2) minimizing the harm the pandemic could cause; (3) fairness; (4) working together; (5) reciprocity (meaning potentially receiving benefit for taking risks); (6) keeping things in proportion; (7) flexibility; and (8) good decision making, which includes (i) openness and transparency; (ii) inclusiveness; (iii) accountability; and (iv) reasonableness.” However, such guidance is inadequate as a basis for justifying any particular method of triaging, given its very general character and given that adherence to one principle is likely to be at variance with adherence to another. There is therefore a need for further specification of the ethical underpinnings of any triage model, consistent with, but going beyond, these broad principles. This document also observes

“(triaging) may create tension between the needs of individuals and the needs of the population...(and) such decisions can be personal... decisions will need to be made in accordance with the law but, within that context...this ethical framework is designed to help people think about the ethical aspects of their decisions, and about how to put their decisions into practice within their specific context...” [16].

### Ethical and technical responses to triage issues

The choice of a specific model for triage, and the determination of its ethical rationale, arose from addressing, and responding to, a number of somewhat disparate issues obviously relevant to triaging [15, 17]. These can be summarized as follows.

#### Key issues and responses

- Any ‘triage model’ adopted must be determined within an agreed ‘ethical framework.’
- The two key triage issues are (1) what criteria/guidelines should be applied and (2) who should decide on the allocation of places?
- In addressing these issues, the aims of any triage model should be to maximise consistency and to lessen the psychological impact of decision making upon individuals.

#### Ethical underpinnings

- The number of critical care beds available for use will be determined in part by hospital policy concerning the reduction of services to other types of patients (for example, through canceling scheduled surgical cases).
- Within the triage model, a utilitarian approach can justifiably be adopted in determining the allocation of places (without ‘valuing’ individuals differently), albeit with reference also to the principle of ‘fairness.’
- The triage approach should be applied not only to the individual patient, but also in terms of a public health model aimed at limiting national flu mortality and morbidity.
- Any ‘preference’ applied towards any class of individuals (for example, health care staff) should therefore be based predominantly upon ‘impact on aggregate flu damage,’ as well as upon the principle of ‘reciprocity’ (reflecting ‘fairness’). It should not be based upon any notion of ‘societal value’ unconnected with the epidemic and service responses to it.
- In ordinary circumstances, adult critical care admits anyone who has an acute reversible problem, with decisions about admission made on an ‘individual

clinical basis,’ albeit informed by aggregate statistical knowledge concerning ‘likely benefit/survival.’ The ‘alternative approach’ of the triage model will be triggered by occurrence of an ‘overwhelming need gap.’

- It can be argued that there is an ethical difference between withholding and withdrawing treatment. There is a robust counter-argument that the two are ethically equivalent, most obviously in relation to the individual patient. However, in the aggregate, and specifically within triaging, this ignores the fact that the ‘likelihood of benefit’ to each individual patient intensively cared for may not be clear at the point of deciding whether or not to ‘triage in;’ more fundamentally, there is a risk in using ‘mirror image’ criteria for triaging of premature withdrawal, with rapid ‘ins and outs’ of patients, resulting in loss of overall group patient benefit.
- Clinical judgment will take into account a range of clinical factors that reasonably can be considered relevant to the allocation of beds on a ‘utilitarian’ basis, but that are not amenable to measurement and therefore to explicit inclusion within a triage model.
- Application of clinical judgment within triaging is open to the risk of ‘unreliability’ and ‘invalidity.’ However, this is clinically and ethically acceptable so long as factors are considered ‘honestly’ as best the clinicians can achieve. Inevitably clinicians will exercise, at least in part, not merely clinical but value judgments. Again, the presence of a clearly expressed justification for the decision combined with honest endeavor will render such decisions acceptable ethically.
- The apparent ‘inequity’ of a patient remaining in critical care with less potential benefit compared to another patient competing for admission is countered by acceptance that there is bound to be a ‘social lottery’ in terms of when an individual becomes acutely unwell and what resource circumstances happen to apply at that time.
- Withdrawal of care is psychologically more difficult for staff to effect than withholding care. This has implications for staff welfare. It also has ethical significance per se.

#### Practical operation of a triage model

- Any triage system adopted should apply to all patients potentially requiring critical care; the model therefore applies to intensive care resource utilisation generally during the period necessitating triage.
- Patients are admitted to critical care on the basis of ‘trial of therapy,’ subject to withdrawal based upon the ‘clinical trajectory.’ Triage decisions should be taken by more than one clinician wherever possible, ideally by at least three clinicians, at least one of whom should be an intensivist and one a nurse.

- There may be advantage in separation of ‘who decides’ on the triage allocation and those delivering care; albeit this may not often be practicable.
- Objective criteria should take account solely of factors likely to affect the outcome for the patient in relation to ‘this acute illness.’ Hence, a patient’s current co-morbidity would be a factor in determining (or potentially not offering) critical care where that co-morbidity impacted upon the likelihood of survival from this event. Taking account of ‘unrelated co-morbidity’ will vary according to the ‘need gap’ present at any particular point of triaging.
- Clinical judgment is required to ‘allow in’ factors that cannot be part of any strict criteria but which are reasonably deemed relevant. Acceptance of the role of clinical judgment will also allow for ‘flexible operation’ of decision-making as the ‘need gap’ varies.
- A chronic, non-life-threatening condition would not be considered relevant even within individual clinical judgment, given the risk of ‘devaluing particular social groups’ (for example the mentally ill), thus contravening the principle of ‘equal value’.

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### The model adopted

There are different triage approaches to critical care available that vary somewhat in the balance they infer between objective criteria and clinical judgment. The most commonly discussed triage system is ‘the Canadian model’ [10, 12], which is based upon the systemic organ failure assessment (SOFA) score [18]. This model adopts initial inclusion and exclusion criteria, which can form the basis of a ‘pre-triage’ stage, applied prior to referral into ‘the triage model.’ The specific ‘SOFA score’ is then used to prioritize treatment allocation. A score of 11 or greater is considered in circumstances of a ‘need gap’ to describe the ceiling of organ failure beyond which critical care resource should not be allocated to a patient. A score of zero would imply no organ failure and therefore no need for admission to critical care. Scores between these two limits justify clinicians categorizing patients as falling into either ‘high’ or ‘intermediate prioritization’ for escalation (or withdrawal) of care. The total score determining the priority category into which a patient falls will not vary according to variations in the level of ‘need gap’ (on different days). However, the numbers of patients gaining critical care from different priority groups will necessarily vary as the gap alters.

The SOFA score was originally designed to be an objective measurement of organ dysfunction [18]. It was not designed to be used as a prognostic marker nor as a triage tool. It has therefore been questioned as to whether either the sensitivity or the specificity of this tool is high

enough for it to be used for this critical decision-making process [19–22]. Recent data have suggested that it may be more appropriate to use the rate of change (the delta) of the SOFA score for prognostication [23], although obviously this would not be possible for triage into critical care.

Due to these concerns we believe that the SOFA score should not be used in isolation to determine treatment status for admission to, or withdrawal from, critical care. We would advocate that clinical judgment by three senior health care professionals would be better serve to be able allow weighing up of the competing and often highly complex clinical scenarios that are likely to arise. We would suggest, however, that the SOFA score is recorded in order to be able to compare and objectively record the rationale behind decisions, should ever they needed to be justified.

It is important to appreciate that patients triaged not to receive critical care are not excluded from other best available modalities of therapy. Excluded patients should still be given the best available alternative treatment and care that is appropriate within a non-critical care ward setting. This may be either therapeutic or palliative, as the clinical condition dictates.

Use of the triage model will be triggered by overwhelming demand for ICU facilities and should only ever be implemented as a last resort when all available resources have been exhausted. The point at which triggering will or should occur will be governed properly at a senior managerial or even governmental level. The triage model should then remain active for as short a time as possible, consistent with the ‘need gap’ narrowing to less than the ‘trigger point.’ It is of paramount importance that the triage model adopted is similar, ideally identical, across health care networks and/or regions in order to avoid ‘inefficiencies’ arising, where some hospitals have beds empty and others are triaging to a high degree. This is likely to be particularly important near the beginning of a pandemic surge, when the incidence and prevalence of disease may not be homogeneously distributed across a country.

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### Legal problems and their implications for patients, relatives and health care staff

Triaging infers cessation of the provision of services, including the allocation of resources, as it is usually offered to patients. Ideally, staff should therefore receive specific reassurance that suspension of ‘ordinary clinical practice’ by applying triaging will not result in legal liability, where in ordinary circumstances it might do so. This should include specific reassurance concerning withdrawal of treatment. However, ultimately such reassurance can be offered only by the courts.

In the alternative, or in addition, adherence to a hospital- or government-sanctioned 'ethical framework' with adequate specificity, such as that offered within this document, is likely in itself to offer some legal protection to staff and hospitals, including through the framework potentially being referred to in legal proceedings by way of 'clinical and ethical justification for actions.'

The risk of legal challenge during treatment, by way of judicial review, or of legal action afterwards is most likely to occur with regard to the withdrawal of treatments rather than in relation to non-admission to critical care. The legal basis for withdrawal of treatment is that of 'futility,' such that it can be adjudged to be in the patient's 'best interest' that withdrawal should occur; the test is therefore applied solely in relation to the individual patient under consideration. As things stand, the law has not sanctioned 'rationing' of health care resources beyond its relevance to the application of treatment; that is, the English courts have not applied the principle to withdrawal of care from one patient in the interest of another. However, failing to apply rationing to both allocation and withdrawal of care ignores the fact that the application of care to an individual patient and its withdrawal have similar implications for other patients across the health service, even if not necessarily, or usually, within precisely the same 'domain' of care.

There is no English case law relating to the extraordinary circumstance of a pandemic, with 'overwhelming' need for resources, which addresses whether it is lawful to withdraw treatment from one patient, with poor prospects (albeit falling short of 'futility'), in favor of its application to a 'competing' patient with clinically adjudged better prospects. There is therefore potentially an inherent conflict between the clinical and ethical underpinnings of the model described within this paper specifically as regards withdrawal of treatment (in that it adopts a 'public health' approach) and the law as it stands (which adopts an 'individual patient' approach). Reassurance concerning the legality of withdrawal of treatment in circumstances falling short of 'futility' could arise through judicial determination in relation to an individual case, brought either by, or on behalf of, an individual patient or (ideally) by the hospital treating that patient. Alternatively, although the courts may hold to the principle of not ruling upon 'hypothetical situations,' an approach could be made to the court, in advance of an individual case arising but in recognition that such a case is reasonably predicted to arise. Such an approach might reasonably be based upon the argument that determining the legal position would be much better addressed before the health care system is in the throes of having to deal with overwhelming need for critical care. Refusal of the court to consider a 'hypothetical' situation could, in itself, potentially provide an aspect of defence against legal action later within an individual case.

Either in relation to litigation concerning an individual case, or a request to the court for a declaration, the court

would have to deal with the issue of withdrawal of care in terms of what is an 'unqualified' right, within the European Convention on Human Rights, as adopted within the English Human Rights Act, under Article 2, that is 'the right to life.' However, this paper, or some other similar paper, describing a triage model adopted might be submitted to the court as demonstration of reasonable and ethical clinical practice. Given the tendency of the courts to adopt the approach, in relation to application of treatment, that decisions are properly 'clinical' in nature (including 'clinically ethical'), certainly in relation to rationing into treatment, it seems likely that they could be persuaded to follow that approach within the extraordinary circumstance of 'overwhelming need' within a pandemic in relation to withdrawal of care, including in circumstances that are less than 'futile' for the individual patient. However, only the courts can clarify, or rather determine, what is the true legal situation.

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### Political consequences

There is a political dimension to the triaging of critical care. No government will wish to be held responsible for 'unnecessary deaths.' There is therefore a risk that adoption nationally of common criteria, or a common triage model, which is necessary in order to determine maximum efficiency in the allocation of scarce resources, will not occur, because of a political wish to 'leave provision of critical care to local decision making' and for government not to be associated with complaints arising from individual deaths. However, the government should be encouraged, rather, to acknowledge not only its duty to do all possible to minimize the morbidity and mortality arising from the pandemic, but also to be seen to be doing so through taking the lead on triaging. There is, perhaps, in any event a greater political risk to government in doing otherwise, in that they may be held responsible for deaths that, with a rational aggregate approach to triaging, could indeed have been avoided. As in relation to appropriate law, everything comes down to whether health care is conceived in relation to the individual patient or within an aggregate public health model. A pandemic sits firmly within the latter, both in its nature per se and in the service responses to it that are required.

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### Conclusion

Health care services are designed, both in their nature and quantity, according to a range of 'ordinary circumstances.' Akin to unusual circumstances of extreme weather conditions, for example massive snow, it is accepted as a tenet



of public policy that, in rare circumstances, there will be temporary disruption of normal social and economic life. The alternative of constant provision of resources to meet rare events is economically too costly for society to bear. Hence, in the event of the current H1N1 pandemic, or some future pandemic, giving rise to an ‘overwhelming need gap’ in relation to critical care, triaging of that care will be inevitable. It might even be said that it has been ‘planned for,’ in that implicit in government provision of critical care resources is the entirely reasonable decision not to expend on services that would lie unused except in an extraordinarily rare circumstance. What is at issue therefore is only the ‘method’ of any triage model adopted and the ethical rationale for that method.

There is an inherent disparity between an ethical and clinical model that is justified on a ‘public health’ or ‘aggregate’ basis, and the current legal basis for withdrawal of care, which is restricted to an ‘individual patient’ paradigm, that is, without consideration of the potential benefit to other (‘unseen’) patients who might be denied care. Legal consideration of ‘rationing’ of health care has developed so far only in relation to the application of care, and not in regard to its withdrawal. This

disparity between a reasonable clinical ethical approach and the law as it stands requires addressing, and urgently, both in relation to the substantive objective of minimizing the aggregate morbidity and mortality arising from the pandemic and in relation to staff morale.

If the current pandemic does not give rise to an ‘overwhelming need’ for critical care, as originally predicted, then the space thereby granted to services and government, and even to the courts, should be used to debate upon what should be the bases for triaging within some future pandemic. We hope that this paper will encourage, even fuel, such debate.

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## References

1. Webb SAR, Seppelt IM, the ANZIC Influenza Investigators (2009) Pandemic (H1N1) 2009 influenza (“swine flu”) in Australian and New Zealand intensive care. *Crit Care Resusc* 11:170–172
2. Jamieson DJ, Honein MA, Rasmussen SA, Williams JL, Swerdlow DL, Biggerstaff MS, Lindstrom S, Louie JK, Christ CM, Bohm SR, Fonseca VP, Ritger KA, Kuhles DJ, Eggers P, Bruce H, Davidson HA, Lutterloh E, Harris ML, Burke C, Cocoros N, Finelli L, MacFarlane KF, Shu B, Olsen SJ, Novel Influenza A (H1N1) Pregnancy Working Group (2009) H1N1 2009 influenza virus infection during pregnancy in the USA. *Lancet* 374:451–458
3. Perez-Padilla R, de la Rosa-Zamboni D, Ponce de Leon S, Hernandez M, Quiñones-Falconi F, Bautista E, Ramirez-Venegas A, Rojas-Serrano J, Ormsby CE, Corrales A, Higuera A, Mondragon E, INER Working Group on Influenza (2009) Pneumonia and respiratory failure from Swine-Origin Influenza A (H1N1) in Mexico. *N Engl J Med* 361:680–689
4. Novel Swine-Origin Influenza A (H1N1) Virus Investigation Team (2009) Emergence of a Novel Swine-Origin Influenza A (H1N1) virus in humans. *N Engl J Med* 360:2605–2615
5. Rello J, Rodriguez A, Ibanez P, Socias L, Cebrian J, Marques A, Guerrero J, Ruiz-Santana S, Marquez E, Del Nogal-Saez F, Alvarez-Lerma F, Martínez S, Ferrer M, Avellanás M, Granada R, Maraví-Poma E, Albert P, Sierra R, Vidaur L, Ortiz P, Prieto del Portillo I, Galván B, León-Gil C, H1N1 SEMICYUC Working Group (2009) Intensive care adult patients with severe respiratory failure caused by Influenza A (H1N1) in Spain. *Crit Care* 13:R148
6. Ercole A, Taylor BL, Rhodes A, Menon DK (2009) Modelling the impact of an influenza A H1N1 pandemic on critical care demand from early pathogenicity data: the case for sentinel reporting. *Anaesthesia* 64:937–941
7. Department of Health (2009) Swine Flu: UK planning assumptions. [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/@ps/@sta/@perf/documents/digitalasset/dh\\_107428.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/@sta/@perf/documents/digitalasset/dh_107428.pdf)
8. Department of Health (2009) Critical Care beds. 17 September 2009. [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/@ps/@sta/@perf/documents/digitalasset/dh\\_104711.xls](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/@sta/@perf/documents/digitalasset/dh_104711.xls)
9. Department of Health (2007) Pandemic flu—a national framework for responding to an influenza pandemic. [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_080745.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_080745.pdf)
10. Department of Health (2009) DoH draft guidance: pandemic influenza. Surge capacity and prioritisation in health services. [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_087734.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_087734.pdf)
11. Department of Health (2005) Emergency preparedness division. The NHS Emergency Planning Guidance. [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_4121236.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4121236.pdf)
12. Christian MD, Hawryluck L, Wax RS, Cook T, Lazar NM, Herridge MS, Muller MP, Gowans DR, Fortier W, Burkle FM (2006) Development of a triage protocol for critical care during an influenza pandemic. *CMAJ* 175:1377–1381

13. British Infection Society; British Thoracic Society; Health Protection Agency; Department of Health (2006) Pandemic flu. Clinical management of patients with an influenza-like illness during an influenza pandemic. *J Infect* 53:S1–S58
14. Department of Health (2007) NHS Emergency Planning Guidance 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. [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_081303.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_081303.pdf)
15. Daniels N (2000) Accountability for reasonableness. *BMJ* 321:1300–1301
16. Department of Health (2007) Responding to pandemic influenza: the ethical framework for policy and planning. [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_080729.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_080729.pdf)
17. Society of Critical Care Medicine Ethics Committee (1994) Consensus statement on the triage of critically ill patients. *JAMA* 271:1200–1203
18. Vincent JL, Moreno R, Takala J, Willatts S, De Mendonça A, Bruining H, Reinhart CK, Suter PM, Thijs LG (1996) The SOFA (sepsis-related organ failure assessment) score to describe organ dysfunction/failure. On behalf of the working group on sepsis-related problems of the European Society of intensive care medicine. *Intensive Care Med* 22:707–710
19. Jones AE, Trzeciak S, Kline JA (2009) The sequential organ failure assessment score for predicting outcome in patients with severe sepsis and evidence of hypoperfusion at the time of emergency department presentation. *Crit Care Med* 37:1649–1654
20. Khan Z, Hulme J, Sherwood N (2009) An assessment of the validity of SOFA score based triage in H1N1 critically ill patients during an influenza pandemic. *Anaesthesia* 64(12):1283–1288
21. Christian MD, Hamielec C, Lazar NM, Wax RS, Griffith L, Herridge MS, Lee D, Cook DJ (2009) A retrospective cohort pilot study to evaluate a triage tool for use in a pandemic. *Crit Care* 13:R170
22. White DB, Angus DC (2009) Preparing for the sickest patients with 2009 Influenza A (H1N1). *JAMA* 302:1905–1906
23. Guest T, Tantam G, Donlin N, Tantam K, McMillan H, Tillyard A (2009) An observational cohort study of triage for critical care provision during pandemic influenza: ‘clipboard physicians’ or ‘evidenced based medicine’? *Anaesthesia* 64:1199–1206