Declaration of interest
A.S.J. has been consultant to many companies dealing with diagnostics.

References

Triage during pandemic influenza: seeking absolution in numbers?

A. Conway Morris
Division of Anaesthesia, University of Cambridge, Box 93, Addenbrooke’s Hospital, Hills Road, Cambridge, CB2 0QQ, UK
E-mail: mozza@doctors.org.uk

Decisions on the prioritization of health-care resources are a feature of all health-care systems and are often taken by organizations such as the UK National Institute for Health and Care Excellence (NICE), Canadian Agency for Drugs and Technology in Health (CADTH), or Deutsches Institut für Angewandte Technologie Assessment (DAHTA). These organizations bring together clinicians, health economists, academics, and other interested parties, and produce recommendations after careful consideration of the evidence presented. However, there are times when prioritization decisions need to be made far more
rapidly, for instance when services are overwhelmed by pandemic infectious diseases, such as influenza, resulting in the need to triage patients. It is in critical care, where the UK already has some of the lowest numbers of beds per head of population,¹ that this pressure may be felt most acutely.

It is suggested that critical care should be provided only to those who are most likely to benefit from it, while admission should be denied to those who are likely to do well irrespectively and those for whom intensive care is likely to be futile.² Even without the pressures of pandemic infectious disease, decisions need to be made on triage to critical care and are influenced by immediate resource availability.³ The acute pressures of a pandemic infectious disease, with the likely rapid exhaustion of critical care capacity, result in much tighter boundaries for admission decisions.

Decisions on the allocation of health-care resources are, at their core, moral decisions and sit within the framework set out by classical biomedical ethics. Health care is always in tension between what care and therapy can in theory be offered and which patients it is offered to. Although not always explicit in everyday prioritization decisions, provision of care to one patient or group of patients often means that another goes without as we negotiate the balance between beneficence and distributive justice. However, when health-care resources are acutely overwhelmed, the utilitarian principle of the greatest good for the greatest number is pre-eminent. It is agreed that in disaster situations the best overall outcomes are achieved by focusing intensive therapy on those with the greatest chance of benefit, while providing only comfort care measures to those unlikely to survive.⁴ However, while these principles may be widely accepted, knowing how to implement them in the face of an overwhelming pandemic remains challenging.

The UK Department of Health has issued ethical guidance to inform the planning for possible pandemic infections.⁵ The principles behind decision making are that it should be open, transparent, accountable, and reasonable. Under the last criterion, reasonableness, the guidance suggests that decisions should be rational, based on best evidence, not arbitrary, and practical. Similar principles are advanced by the US Centres for Disease Control ethical subcommittee,⁶ although they have two additional criteria of (i) consistent application of guidelines, treating all patients alike and minimizing individual interpretation (author’s emphasis), and (ii) impartiality and neutrality of decision makers.

In preparation for a severe pandemic outbreak, several groups have attempted to make the rationing of critical care more objective through the development of triage tools. In this edition of the BJA, Morton and colleagues have evaluated two such triage systems, the Simple Triage Scoring System⁷ and the Ontario Health Plan for an Influenza Epidemic scheme (OHPIP),⁸ and compared them with a simple measure of pulmonary function [Pao₂/Fio₂ (P/F) ratio]. They also evaluate a ‘reverse triage’ tool, which has been promulgated as a way of identifying patients who are failing to improve with intensive care and could have therapy withdrawn to make way for those waiting to enter the unit. Through an analysis of patients admitted to two hospitals during the A/H1N1 influenza pandemic of 2010–11, the authors apply the proposed tools in a real-world, albeit retrospective, scenario. Although the 2010–11 pandemic did not overwhelm critical care resources in the UK or lead to the need for widespread mechanical ventilation outside of critical care units, it did result in hospitals implementing escalation policies and reducing or completely stopping non-emergency work. Hence, this reflects a useful period for the study of triage tools, because we can see the effect of widespread severe influenza, while still being able to see what happens to patients who might have been excluded from critical care had the system been completely overwhelmed.

Using the outcomes of admission to the intensive care unit and institution of mechanical ventilation, Morton and colleagues demonstrate that P/F ratio is a good predictor. As gauged by comparisons of the area under the receiver operating characteristic curve of the scalar Simple Triage Scoring System measure or the sensitivity and specificity of the categorical OHPIP, P/F ratio outperforms both. It is interesting to note that the Simple Triage Scoring System performed less well than it had done in a previous retrospective cohort with H1N1,¹⁰ although performance was very close to that shown in the original derivation and validation of the tool in a population presenting with a much broader range of infections.⁹

It is perhaps unsurprising that an established measure of oxygenation, the P/F ratio, is a strong predictor of the need for mechanical ventilation. Apart from it being a numerical variable susceptible to quantitative analysis, it is difficult to know what the P/F ratio would add over the clinical assessment of an experienced critical care physician. As Morton and colleagues point out, the predictive ability of the P/F ratio applies only to patients with presumptive A/H1N1 influenza. During a pandemic, many patients will continue to develop critical illness from other diseases, and P/F ratios are unlikely to triage them all effectively. Although potentially useful as a method of identifying patients who are likely to require invasive ventilation, in pandemic situations what is also needed are tools that indicate patients who are unlikely to survive. In the study by Morton and colleagues,⁷ the size of the available sample precluded effective analysis of any of the measures examined for this outcome.

The OHPIP tools were developed by expert consensus and review of the literature, which indicated that the sequential organ failure assessment (SOFA) score was a good predictor of outcomes in the intensive care unit.¹¹ As Morton and colleagues⁷ show, SOFA scores alone are less effective predictors of critical care admission and ventilation than the P/F ratio. The OHPIP also developed a reverse triage tool to aid decisions about discontinuation of therapy, and in what is the largest examination of this tool in patients with H1N1 influenza to date, this analysis suggests that it is poorly able to discriminate between patients who will survive and those who will not.

Critical and emergency care is awash with scoring systems, including the various iterations of acute physiology and chronic health evaluation (APACHE), SOFA, simplified acute physiology score (SAPS), and mortality in the emergency department (MEDS) scores. The impetus behind the development of these scores has been to quantify and analyse patient cohorts, allowing comparisons between populations. However, they almost invariably come up short when applied to individual patients and cannot be used for individual decision making. Indeed, even at a unit population level they are outperformed by the subjective judgement of clinicians.¹²

The receiver operating characteristic curves in the study reported in this edition illustrate the problem with these triage tools. Whilst the diagnostic performance is good, with an area under curve of >0.8 for the best-performing measures, even at the optimal cut-off the measures are some considerable distance from 100% sensitivity and specificity for admission to intensive care, let alone prediction of mortality. It is in these margins, between the upper bounds of the confidence interval and absolute certainty, that we as clinicians operate on a day-to-day basis. However, for all our superiority over existing clinical prediction scores,¹² critical care physicians tend to have an overly pessimistic view of patient mortality rates¹³ and quality of life,¹⁴ whilst showing frequent disagreement with each other.¹⁵ Indeed, even
when applying the apparently objective criteria set down in the OHPIP triage tool, the investigators found considerable disagreement between clinicians over which category patients should be placed.16

The practice of medicine in general and critical care in particular will be altered significantly when we face our next pandemic of an infectious disease, and clinicians will be thrust into the forefront of rationing decisions in an attempt to achieve the best utilitarian outcome. The best available scoring systems may help us to identify patients who are critically unwell and in need of advanced support, but they remain imperfect and are likely to perform less well than the opinion of an experienced clinician. For now, the best we have is the subjective view of the individual charged with making the decision at the time, a moral decision by a moral agent. The numbers cannot absolve us of this responsibility, at least not yet.

**Declaration of interest**

None declared.

**References**


doi:10.1093/bja/aev142

**Measurement of competence: achievable goal or ‘holy grail’?**

S. N. Bolsin1,* , D. Chan1 and M. Colson2

1 Department of Anaesthesia, University Hospital Geelong, Ryrie Street, Geelong, VIC 3220, Australia, and
2 St John of God Hospital, Mercer Street, Geelong, VIC 3220, Australia

*Corresponding author: E-mail: steveb@barwonhealth.org.au

We believe that the answer to this question is not in the esoteric realms of educational theory. It is in the hands of the specialty of anaesthesia itself.

For many years, we have known that formal assessment of medical outcomes with appropriate feedback of results will lead to improvements in the measured results.1 2 When Ernest Avery Codman introduced attempts to measure the ‘product of a hospital’, in 1914, he was shunned by his colleagues in North America, but similarly unpopular anaesthetists have contributed to the development of this body of knowledge in some specialties, leading eventually to clinical governance and public reporting of outcomes.3–7 There is little doubt that the profession has benefited from such monitoring of performance, but the true beneficiaries of clinical governance have been our patients.8 An article published