

## Prognostication of Critically Ill Patients – the ‘Science’, the ‘Art’ and the Creeping Commercialism

S Hariharan

Risk assessment and prognostication has evolved as a branch of medicine with numerous scoring systems coming into existence for different categories of patients. In a recent issue of the *Critical Care Medicine* journal, the Acute Physiology and Chronic Health Evaluation (APACHE), one of the most popular instruments utilized for prognostication of the critically ill patients, has taken its fourth incarnation (1).

Since the time of their development, there have been controversies regarding the ethical issues of using prognostic models in decision-making for the management of an individual patient (2). Despite concerns of using these models for predicting individual patient outcome with respect to their ability as well as the ethical standpoint, the systems continue to flourish and take newer forms.

This article comments on the evolution of the prognostic models, their prognosticating ability and other claimed utilities, the probable influence of commercialism in their development and the importance of the clinical judgment of a physician in medical practice.

### *Evolution of the prognostic models*

APACHE is a scoring system designed for assessing the ‘severity of illness’ of a critically ill patient and predicting the patient’s outcome. It was originally developed in 1981 from a large database of physiological parameters of patients admitted to several intensive care units (ICU) across the United States of America (USA) (3). The initial version was an ‘acute physiology score’; ‘age’ and ‘chronic health status’ of the patient were later incorporated to form the APACHE score.

A few years later, the authors released a refined version termed APACHE II in which they reduced the number of physiological parameters taken into account for assigning the scores (4). This became one of the most widely used prognostic models throughout the world and still remains the most common scoring system to determine the severity of illness of an ICU patient.

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From: Dr S Hariharan, Anaesthesia and Intensive Care Unit, Faculty of Medical Sciences, The University of the West Indies, St Augustine, Trinidad and Tobago.

Correspondence: Dr S Hariharan, Anaesthesia and Intensive Care Unit, Faculty of Medical Sciences, The University of the West Indies, St Augustine, Trinidad and Tobago. Fax: (868) 662-4030, e-mail: uwi.hariharan@gmail.com.

Later, the APACHE II system was found to have many discrepancies and in an attempt to further refine it using stricter statistical criteria, the third generation APACHE III was released (5). The interesting aspect of this evolution was that the system was developed as software and was unavailable for public domain until recently and one had to purchase it to apply this system. The APACHE III model was further modified into APACHE III – Version I and Version – H and the software was released into public domain not very long ago. APACHE IV was released very recently.

Various other prognostic models were developed concurrently, which were also subjected to refinements (6). The most notable of them are the Simplified Acute Physiology Score (SAPS) – versions I, II and recently III; the Mortality Prediction Model (MPM) – versions I and II for adult patients and Paediatric Index of Mortality (PIM) – versions 1 and 2 for children in ICU. Physiological and Operative Scoring System for Enumeration of Morbidity and Mortality (POSSUM) and its Portsmouth modification (p-POSSUM) were developed for surgical patients. Trauma Injury Severity Scoring System (TRISS) was developed to predict outcome in trauma patients. Many other systems such as “A Severity Classification of Trauma” (ASCOT) and the International Classification Injury Severity Score (ICISS) are available for prognosticating trauma victims.

### *Utility of the prognostic models*

Let us consider the utility of these models in predicting the prognosis of critically ill patients. How many intensive care practitioners use these scoring systems in their routine clinical practice? Albeit there has been no global data yet to determine this, it is a generally regarded view that very few of these models are routinely used in the day-to-day practice (7). Despite the terminology, the ‘prognostic’ scoring systems are not helpful to predict individual patient ‘prognosis’, a fact which has been acknowledged by the authors of almost every single model. These systems could be efficiently used only to prognosticate a group of patients having similar severity of illness and it goes without saying that it has minimal use in the daily practice. A critic rightly described the utility of these scoring systems as a lamp-post for a drunken man – not as an illumination but only as a support. There is also the analogy of a meteorological forecast which may continuously change during the course of a weather pattern (8).

### *Other claimed utilities of prognostic models*

Earlier, the authors of APACHE II claimed that it was a very useful model not only to assess the severity of illness, but also as a quality indicator of an ICU to benchmark the performance of different ICUs (9, 10). In the recent paper publishing the APACHE IV, it was suggested that APACHE II should no more be used to assess quality (1). The utility of these prognostic systems for the purposes of audit, quality assessment and benchmarking are highly controversial due to the poor adjustment of these models to the varying case-mixes across the world as well as the fact that they do not assess the global performance of an ICU (11).

### *'Art' and 'science' of medicine*

Any physician who continuously provides care to a particular category of patients will be able to innately predict the prognosis with a reasonable degree of accuracy which is the "art" aspect of the clinical practice. There are reports where the physician's individual ability of predicting the outcome of ICU patients by clinical judgment alone was comparable to that predicted by the scoring systems (12, 13). Although this clinical judgment involved interpretation of physical signs as well as investigative reports, it was without the aid of any prognostic scoring system. Intensivists could predict the success of weaning from mechanical ventilation without the aid of any 'index' to assist them for the purpose (14). The 'gut feeling' of surgeons and anaesthetists was predictive of the outcome of surgery in patients (15). In the author's earlier research regarding the futility-of-care decisions in moribund ICU patients, a criterion was established (among others) for defining futility. When two consultant physicians caring for the patient unanimously agreed to the futility-of-care, the patient was considered to be categorized in the 'futile' group although no therapy was withdrawn (16). This criterion's scientific validity was questioned; however the fact remains that experienced clinicians will be able to prognosticate patients which is an 'art'.

### *Creeping commercialism?*

Notwithstanding all these controversies, prognostic models continue to evolve, which may be due to many reasons. Further advancement in the medical field including availability of sophisticated investigations is the foremost reason. Additionally, availability of extensive electronic database of patient data and application of stricter statistical methodologies to tease out the most important prognostic criteria from these data have helped in refining these scoring systems.

However, there is room for a view that there is a probability of an influence of commercialism. The arguments to substantiate this statement are as follows:

- C APACHE III version was available only for cost to the scientific community for a prolonged period of time

- \* Many authors of the prognostic models either provide consultancy services or hold shares in the commercial corporation which 'benchmark' ICU services
- \* The influence of managed care and insurance requires some form of objective method to categorize patients and predict outcome
- \* This is especially true in trauma where lawyers hunt for such systems to give some meat to their arguments and claims of compensation
- \* In an internet search, one would be amazed to see myriad of companies advertising their software which could be applied to trauma victims
- \* If one assumes that the benchmarking ability of such prognostic models are effective, this helps as a public relations exercise where units could proclaim that their performance has been one of the best so as to lure the clientele

### *Medical science and humanities*

It is not surprising that the 'art' aspect of clinical medicine is undermined by the high-technological practice of the present day. Undoubtedly, the high-technological investigations, imaging techniques, and software application have positively contributed to the medical practice as well as the curriculum. However, the difficult truth is that the present day medical curriculum does not foster the 'art' aspect of medicine. Although 'evidence-based practice' is the current trend, medical curricula should help in producing a 'complete' doctor and primarily aim at teaching students the human touch and establishing the rapport between the patient and the doctor as two human beings. Machines and statistical software should only be a secondary aid in patient care.

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