

Knaus W A, Draper E A, Wagner D P & Zimmerman J E. APACHE II: a severity of disease classification system. *Crit. Care Med.* 13:818-29, 1985.
[ICU Research Unit, Departments of Anesthesiology and Computer Medicine, George Washington University Medical Center; and APACHE Medical Systems, Inc., Washington, DC]

The article describes the derivation and initial validation of the acute physiology, age, chronic health evaluation (APACHE II) prognostic scoring system. APACHE is a method for taking a limited amount of pretreatment clinical information and using it, along with a database of recently treated seriously ill intensive care unit patients, to estimate the likelihood that patients will survive their illness. [The *SCF*[®] indicates that this paper has been cited in more than 770 publications, making it the most-cited paper published in this journal.]

APACHE II—A Prognostic Scoring System for Seriously Ill Hospitalized Patients

William A. Knaus
ICU Research Unit
George Washington University
Medical Center
Washington, DC 20037

As medicine focuses more on treating severe illness more aggressively, hospitals are becoming large intensive care units (ICUs). We believe the acute physiology, age, chronic health evaluation (APACHE) approach to clinical prediction (which began with APACHE I¹ and now extends to the current version, APACHE III²) has been so well accepted because it is a comprehensive way of measuring patient risk for the growing number of ICU admissions. APACHE takes into account the acute severity of a patient's illness and their condition at the time they became acutely ill.

APACHE II predictions have been used to evaluate the relative or risk-adjusted mortality performance of vari-

ous ICUs.³ The same approach is useful for evaluating whether a new treatment is improving a patient's outcome. With the acceptance of the use of risk prediction as a means of evaluating the outcome from intensive care, it has become increasingly recognized that such estimates might also play a role in decision making for individual patients.⁴ The current version of the system, APACHE III, is based on a 17,440-patient, nationally representative database. It has the ability to calculate risk predictions on the first and all subsequent days of ICU treatment. Individual risk predictions are new to clinical medicine and their exact role is still evolving. The widespread acceptance of APACHE, however, has ensured that medical practice will soon benefit from a strong predictive capability.

Back in 1984, we had little idea how popular APACHE would become. We never envisioned having software that would instantly calculate a patient's predicted risk of death. As often occurs with such successful projects, it was a relatively simple idea that was developed at the right time.

One nonscientific decision also helped. We placed all of the major components of APACHE II on a single manuscript page. This sheet appeared in hospitals around the world. In 1990, one of our computer programmers, on a climbing expedition in the Himalayas, fell 50 feet from the summit, fractured her collarbone, and was hospitalized in Kathmandu. In the four-bed hospital, pinned to the wall, was a copy of the APACHE II prognostic system. She felt right at home.

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2. Knaus W A, Wagner D P, Draper E A, Zimmerman J E, Bergner M, Baslos P G, Sirio C A, Murphy D J, Lotring T, Damiano A & Harrell F E. The APACHE III prognostic system: risk prediction of hospital mortality for critically ill hospitalized adults. *Chest* 100:1619-36, 1991.

3. Knaus W A, Draper E A, Wagner D P & Zimmerman J E. An evaluation of outcome from intensive care in major medical centers. *Ann. Intern. Med.* 104:410-8, 1986. (Cited 240 times.)

4. Knaus W A, Wagner D P & Lynn J. Short-term mortality predictions for critically ill hospitalized adults: science and ethics. *Science* 254:389-94, 1991.

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