Severity of Illness Scoring: One Step Closer to *"the Trenches"*

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Although not yet employed in routine clinical practice, severity of illness scoring has become an essential tool for health services research involving ill newborns(1,2), children(3), critically ill adults(4,5), and now even adults admitted to general medical-surgical wards(6). One way to conceptualize these scores is that they provide us with a method to learn, within a short time, from the combined experience of tens of thousands of patient encounters, something no physician could hope to achieve in a lifetime of practice. In an era when electronic medical records are starting to become more widespread, it is conceivable that these scores will eventually become part of how all of us practice medicine. However, before these scores are transitioned from health services research papers into "the trenches," considerable methodological work still needs to be performed.

The article by Sundaram, *et al.*(7) in this issue of *Indian Pediatrics* is an example of some of this necessary work. In their study, the authors introduced a novel adaptation of an existing tool, the Score for Neonatal Acute Physiology, version II (SNAP-II)(1): varying the T_0. Instead of employing the original scoring time frame (from NICU admission until 12 hours into said admission), they employed a variable T_0, which they set as the onset of clinical signs of septicemia. Importantly, they found that, when employed in this fashion, SNAP-II not only retained its ability to predict mortality (with a very respectable area under the receiver operator characteristic curve of 0.82), but also predicted organ dysfunction.

The methodological implications of this study for future research extend beyond neonatology. Current severity of illness scores are based on fixed time frames, which are typically bounded on one end by a highly discretionary event (typically, time of admission to some hospital unit) and by some time interval (typically 1, 12, or 24 hours) on the other. Although some work has been done on serial assignment of severity scores(8,9), variable time frames (particularly when the variability is based on disease onset) have not been employed. Implicit in the work by Sundaram, *et al.*(7) is the notion that future studies (*e.g.* randomized clinical trials or retrospective case-control studies) could employ variable severity scoring time frames. This would be highly desirable in settings where a significant – and variable – degree of physiologic instability (with its attendant confounding) is already present at the time of enrolment, and where enrolment is subject to the vagaries of "real world" medicine (*e.g.,* future studies on nosocomial sepsis). Also implicit in their results is the notion that, in the near future, *ad hoc* severity scoring time frames could be employed (*e.g.,* in a hospital with an electronic medical record, the computer could generate a severity score based on some time frame of X hours preceding the moment when the clinician hit the "assign severity score" button).

Certain limitations must temper our excitement. First, use of variable scoring time frames presumes that a degree of physiologic uniformity is present in the population being studied. In the case of this study, this assumption seems solid, and not just on account of the results: the babies were all of relatively similar chronological and gestational ages. Second, the score or scores being used must have some plausibility for the population being studied.

Thus, for example, while using SNAP-II for 3 day old 32 weekers may be reasonable, employing it for risk adjusting outcomes in 3 month old ex-32 weekers with bronchopulmonary dysplasia is probably not warranted. However, in principle, the approach described by Sundaram, *et al*.(7) could also be used in that setting, albeit with a different severity score (yet to be invented!).

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