G. M. Shaw
J. G. Chase

Does “treatment failure bias” impact comparisons of ICUs?

Accepted: 19 March 2012
Published online: 14 April 2012
© Copyright jointly held by Springer and
ESICM 2012

Dear Editor,

We recently read the article by Louriz et al. [1] about determinants and outcomes associated with decisions to deny or delay ICU admission. We found the results both as we expected and also quite intriguing in their representation of what we feel is a growing phenomenon that should demand significant further study.

In particular, with increasing economic stress worldwide, the pressure to contain costs, particularly in expensive units such as the ICU, puts pressure on decision makers to limit admission only to those who both need intensive care and, importantly, are (potentially) most likely to benefit. This choice requires clinicians to make significant prognostic choices about whom to admit when resources are scarce.

Equally importantly, the results of these choices have a significant effect on cohorts, which, in turn, may skew both individual unit research studies as well as larger comparison studies. After a recent article by Minne et al.

[2] examining prognostic models for mortality, we commented [3] on what we termed “*treatment failure bias*.” Specifically, when resources are limited, those most likely (and not obviously required) to be admitted are those who do not initially respond to therapy outside the ICU.

This bias is effectively what was quantified in this article, where it measures for the first time (we think) the outcome of repeated selection, via triage, of patients who are failing treatment outside the ICU. In particular, when patients are repeatedly assessed, clinicians are constantly selecting patients for ICU admission with a higher risk of death. This is seen in the higher mortality rate for those patients whose admission to the ICU was delayed, 43.8 % versus 33.3 % for those admitted immediately [1]. At the outset all these patients come from a cohort with exactly the same risk of death! This behavior will result in an apparent increase in the observed death rates, thus increasing standardized mortality ratios (SMRs) of ICUs operating under higher levels of constraint. This is statistically equivalent to the so-called “Monty Hall problem” [4].

We feel this problem has emerged quite unobserved, but may be very important, and requires significant further study. Resources are not likely to become less restricted. However, when treatment failure bias appears, it also renders moot many of what we might assume to be typical expectations of outcome in a given study.

In particular, it makes comparisons between units, despite matching on a variety of severity scores and diagnostics, invalid or less relevant.

Thus, many of our studies might fail to generalize and, as a result, be less

informative unless we find a means to quantify and control this variable.

Thus, we ask the authors, what is the SMR of their unit, and how do they think it would change with more or fewer resources, or different assessment procedures? To the community at large we posit that this study is worth repeating or examining in the context of every unit so we better understand the results behind the outcomes of our research.

References

1. Louriz M, Abidi K, Akkaoui M, Madani N, Chater K, Belayachi J, Dendane T, Zeggwagh AA, Abouqal R (2012) Determinants and outcomes associated with decisions to deny or to delay intensive care unit admission in Morocco. *Intensive Care Med*. doi: [10.1007/s00134-012-2517-0](https://doi.org/10.1007/s00134-012-2517-0)
2. Minne L, Ludikhuizen J, de Jonge E, de Rooij S, Abu-Hanna A (2011) Prognostic models for predicting mortality in elderly ICU patients: a systematic review. *Intensive Care Med* 38:1258–1268
3. Chase JG, Shaw GM (2011) How standard is the “S” in SMR? *Intensive Care Med* 38:1–3
4. Monty Hall Problem [http://en.wikipedia.org/wiki/Monty_Hall_problem]

G. M. Shaw (✉)
Department of Intensive Care,
Christchurch Hospital,
Christchurch, New Zealand
e-mail: Geoff.Shaw@cdhb.govt.nz

J. G. Chase
Department of Mechanical Engineering,
Centre for Bio-Engineering,
University of Canterbury,
Private Bag 4800, Christchurch,
New Zealand