

Does Pediatric Index of Mortality “Score” in Colombia?

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ABSTRACT

Pediatric index of mortality (PIM)-2 and PIM3 are the most recent versions of severity of illness scoring generated from a pediatric intensive care unit (PICU) population in Australia and the United Kingdom. The authors present a single-center evaluation of a performance of these scores in a PICU in Colombia. PIM3 seemed to demonstrate a marginally better performance at predicting mortality, although the discrimination was similar for both scores. Incorporation of this approach to the rest of the units throughout the country would help with benchmarking PICU performance.

Keywords: Pediatric index of mortality, Pediatric intensive care unit, Severity of illness scoring.

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Benchmarking pediatric intensive care unit (PICU) performance can be challenging across different units, especially if varying levels of illness severity exist in the patients admitted. The perceived value of an objective assessment of individual units led to the development of severity of illness scores over the last three decades. Such scores use variable parameters to predict an expected mortality risk, which is then used to generate the risk-adjusted standardized mortality rate. Logistic regression models on large datasets of PICU admissions were used to generate the scores. The pediatric risk of mortality (PRISM) and the pediatric index of mortality (PIM) are among the most popular scores used.¹ The PIM was initially developed using data from 5,695 PICU admissions in Australia and the United Kingdom.² It has further been revised since then with PIM2 and PIM3 versions published subsequently.^{3,4}

With every new version of a particular score, the authors have aimed to better define the mortality risk by reevaluating the parameters in increasingly larger PICU patient populations.²⁻⁴ Internal validation ensures that these scores perform well in the settings they have been created in.^{5,6} The updated versions are intended to account for an ever-changing critically ill patient population and potential advances in diagnosis and therapy. There have been attempts to validate the performance of various versions of the PIM score externally in areas other than their countries of origin. Such attempts have yielded mixed results with some studies showing agreement⁷⁻¹³ while others have not.¹⁴⁻¹⁶ The PIM has even been tested in a non-PICU¹⁷ environment and in patients retrieved to intensive care.¹⁸

Like many prior attempts, Lopez et al. have conducted a single-center evaluation of the performance of the most recent versions of PIM scores in a PICU in Bogota, Colombia (*IJCCM_19_681_R3. Comparison on performance of the pediatric index of mortality (PIM)-2 and PIM-3 scores in the pediatric care unit of a high complexity institution. Indian J Crit Care Med 2020;24(10)*). The study has used similar statistical methodology as employed in the original and subsequent validation studies. However, the use of the net reclassification index in the interpretation of such data needs caution.¹⁹ The data have been cross-checked for accuracy, and two independent statistical reviews have been performed as confirmed by the authors. In 722 patients with a crude mortality rate of 3.74%, good discrimination (the ability to differentiate between survivors and nonsurvivors) was demonstrated by both scores. However,

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PIM3 appeared to be a better predictor of the mortality rate in comparison to PIM2, which overestimated the risk of mortality.

The manuscript recognizes the limitation of using these scores in small number of patients. Mortality prediction scores have little value when applied to a single patient or a small patient subset. Inherent differences in the patient population in different geographic regions may play a role, even though the physiological variables may not be different. PIM3 performance was adequate in these settings—is this only by chance? Would another subset reveal possibly different results? Unfortunately, we will only have these answers with broader application of these scores, and one needs to be circumspect with drawing major conclusions.

That being said, the authors have to be commended for performing a first of its kind study in Colombia. The value of this manuscript may not lie in the observed results but the potential future implications for the critical care community in Colombia. This should serve as a launching pad for further incorporation of severity of illness scoring across the PICUs in the rest of the country to serve its intended goal for benchmarking. As to the performance of the score, the perfect score applicable to every PICU setting anywhere in the world may remain largely elusive.

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