

How shall I compare thee? – benchmarking in PICU

Benchmarking in paediatric intensive care units (PICUs) speaks to both the quality of care and the severity of illness in children, which affects the performance of an ICU according to international standards. However, in developing countries such as South Africa (SA), many factors need to be taken into consideration, given the high child mortality in sub-Saharan countries by UNICEF statistics. The standard mortality ratio as an outcome measure has several problems for comparisons, especially if compared with high-income country (HIC) standards. There is a wide disparity among regional PICUs in SA that considerably affects variations in patient outcomes. These include a range of developed and developing PICUs in respect of technology and equipment, staffing complement of intensivists and medical staff, critical care nursing ratios, complexity and heterogeneity of patients, transport efficiency and time delays to a tertiary PICU and different health priorities for the various provincial Departments of Health.

The Paediatric Index of Mortality 3 (PIM3) score is an updated version of PIM2, one of the severity scoring systems used in PICUs to determine severity of illness with information related to the first hour of admission. PIM2 scores have been validated in single-centre studies throughout the world, and it is important that an updated version (PIM3) is validated in SA to determine how well a PICU is performing. An important consideration for the study is that derivation of the PIM3 scores, like the PIM2, has been done in HIC PICU settings. A study by Lincoln Solomon *et al.*^[1] published in *Pediatric Critical Care Medicine* is a singular achievement in being the first collaborative study looking at the performance of the PIM3 score in nine tertiary academic PICUs over a 12-month period, pre-COVID, to validate the PIM3 model.

This article found that although the PIM3 provides good discrimination between survival and mortality among heterogeneous case mixed units, there was poor calibration, with the actual deaths (9.6%) being higher than the predicted (7.5%), with a standardised

mortality rate (SMR) of 1.28, hence underpredicting deaths. Notably, poor calibration with the PIM3 was also found in studies from India and Argentina that are closer to the SA setting than the derivation units. The higher SMR and poor calibration in this study possibly relate to more than standard of care, given the risk factors stated in their opening commentary, and may be related to higher risk diagnoses with sepsis, underlying conditions of HIV and tuberculosis, delayed medical treatment, access to medical care and high burden of disease. These are the factors that need greater elucidation and further studies before we seek to improve PICUs in SA.

This study is informative in establishing a benchmark for PICUs that can both speak to the quality of standard of the HIC PICUs and balance the special aspects of our population, socioeconomic diseases and health programmes that require change in our setting. Before we are disheartened by the outcomes of not performing as well, this provides a crucial reflection of striving for better care and quality in PICUs by individual unit audits and mortality aspects to review the factors that can be modified on a broader spectrum, and ultimately improve the survival of children who present to our units. This cannot be done without the equivalent support of government policies and planning that affect the care of children in SA.

Indeed, perfection may be a distant goal, but that should not deter us from reaching for it.

S A Singh

Inkosi Albert Luthuli Central Hospital and Nelson R Mandela School of Medicine, Durban, South Africa
shivansin@ialch.co.za

1. Solomon LJ, Naidoo KD, Appel I, et al. Paediatric Index of Mortality 3 – an evaluation of function among ICUs in South Africa. *Pediatr Crit Care Med* 2021;22(9):813-821. <https://doi.org/10.1097/pcc.0000000000002693>