

A Simple Decision Aid for Cardiac Surgical ICU Capacity Planning

The ramp down in cardiac surgery volumes in response to COVID-19 may result in unintended harm to patients who are at high risk of mortality if their conditions are left untreated. However, decision to treat cardiac patients requires balancing the risk of delay against the risk of nosocomial COVID-19 exposure, along with competition for scarce hospital resources.

Studies have shown that clinicians are inaccurate in predicting cardiac surgical intensive care unit (CSICU) length of stay (LOS), especially in patients whose stay will be prolonged. Triaging decisions for cardiac surgery may be improved with the aid of objective evidence to more efficiently allocate ICU resources. To respond to this need, we developed and validated clinical models to predict the likelihood of low and high CSICU resource use as defined by short (≤ 2 days) and prolonged (≥ 7 days) LOS, using variables that are readily available at the time of surgical referral. These models, together called the “CardiOttawa LOS Score”, were derived using data from the University of Ottawa Heart Institute (UOHI), validated concurrently using pan-Ontario data, as well as prospectively at the UOHI. The CardiOttawa LOS Score was shown to be 92.1% accurate in beta testing.

Dr. Sun has also developed a web-based app to bring these models to the bedside. This portable risk calculator is available at <https://jscalc.io/calc/bpeyxUmBeno8gASj>

The CardiOttawa LOS Score is calibrated to Ontario data and is to our knowledge the best performing model to predict CSICU resource needs after cardiac surgery. It may help to optimize daily operative planning, whereby scheduling of cases with varying postoperative resource requirements could be staggered to maximize the number of urgent cases performed, while minimizing non-COVID ICU bed occupancy at any given time. The care and outcomes of all patients requiring ICU resources may be substantially improved if clinical judgment is supported by objective quantification in the planning of care.

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