



5-Year Trends of Critical Care Practice and Outcomes



According to researchers in the U.S., analyses of patients, practices, and outcomes from a large geographically dispersed sample of adult ICUs revealed trends of increasing age and acuity, higher rates of adherence to best practice, use of non-invasive mechanical ventilation and decreased use of antimicrobials, transfusions, and duration of renal replacement therapies. Acuity adjusted length of stay (LOS) and in hospital mortality decreased.

The science of critical care continues to rapidly advance. However, the extent to which these advances in the science of critical care were associated with changes of critical care practice is unknown. In addition, the extent to which the aggregated effects of these advances have been associated with improved outcomes has not been carefully studied.

"The advent of electronic systems that aggregate clinical, administrative, and process of care information from our ICUs at the individual patient level has allowed us to perform analyses of the timing of changes of practice to changes of outcomes," the researchers said. "Identifying changes of critical care utilisation that are not likely to be explained by spontaneous variation is helpful for resource management because they quantify the association of the ageing of our population with the increased utilisation of adult critical care services."

For this study, data representing 991,571 consecutive critical care visits to 160 United States adult ICUs during 2009 to 2013 from the eICU Research Institute clinical practice database were used to quantitate patient characteristics, APACHE IV based acuity predictions, treatments, and outcomes. Analyses for changes over time were performed for patient characteristics, entry and discharge locations, primary admission diagnosis, treatments, adherence to consensus ICU best practices, LOS, and inpatient mortality.

The researchers detected significant trends for increasing age, body mass index (BMI), and risk of mortality, higher frequency of admission from an emergency department and step-down unit, and more frequent hospital discharge to substance abuse centres and skilled nursing facilities. Notably, more patients were admitted for sepsis, emphysema, coma, congestive heart failure, diabetic ketoacidosis (DKA), and fewer were admitted for asthma, unspecified chest pain, CABG, and stroke care.

Data also showed the frequency of non-invasive mechanical ventilation and adherence to critical care best practices significantly increased while the duration of renal replacement therapies, frequency of transfusions, antimicrobial use, critical care complications, LOS, and inpatient mortality decreased.

"In summary, we report that over the period of observation the characteristics of adults who utilised critical care

services changed. Management strategies were more aligned with guideline recommendations, however we also observed substantial variation of critical care practice. Less invasive life support modalities were used more frequently, the duration of critical illness was shorter, and the likelihood of surviving a hospitalisation for critical illness increased," the authors wrote.

A key limitation of this observational study is that it identifies associations that should not be taken to indicate cause and effect, the authors said. For instance, it is possible that the improvements of best practice adherence would be smaller for patients who did not have access to the reporting solutions and off-site support teams that are part of a comprehensive telemedicine programme. Despite these limitations, it is reasonable to expect that reducing rates of preventable complications would result in lower mortality and shorter duration of critical illnesses, the authors explained.

The study's findings are intended to encourage rather than to replace interventional studies, the authors added.

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