Support for Critical Care Decisions in Adults and Children.

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Introduction

or decades, the medical profession has relied on decision support tools, which have evolved with technology to become largely computer-based and widely accessible to all clinicians in the form of smart phone apps, web-based search engines, online references and journal access, and bedside tools incorporated into daily clinical practice. The potential for further breakthroughs in biomedical informatics to improve healthcare quality is enormous, and it is being investigated more and more at the patient care and research levels. Clinical decision support aims to give physicians with up-to-date and relevant information to aid patient care at the point of care delivery. Computerized technology makes it possible to send this information to clinicians at the bedside in a timely manner.

Hospitals throughout the world have deployed Computerized Decision Support (CDS) systems with the goal of improving diagnostic accuracy, reducing errors, providing preventative care, and improving patient outcomes. These tools are likely to become more incorporated into patient care as the field of medicine becomes more complex, as well as providing significant resources for clinical research. Clinicians in Intensive Care Units (ICUs) work in unique situations where computerized systems collect and display huge volumes of data, and where prompt, accurate diagnosis and treatment can have a significant impact on the quality of care and patient outcomes.

ICU clinicians are confronted on a daily basis with managing vast amounts of data from a variety of sources and incorporating this information into patient-specific choices. CDS will most certainly become crucial to critical care delivery in the next years, given the unique position of ICU clinicians. However, CDS design in critical care is complicated by inter-provider decision variability, the lack of universal diagnostic and treatment protocols for many frequent diseases, and the necessity for real-time individual variation at the bedside. In this study, we provide an overview of CDS's history in clinical medicine, explain several types of CDS tools, examine some current uses in adult and pediatric critical care, discuss the benefits and drawbacks of CDS tool use, and speculate on CDS's future potential in critical care.

CDS systems in critical care continue to advance, and care for both adult and pediatric ICU patients is continuing to improve. Each ICU patient has a tremendous quantity of data available, and CDS systems are designed to help clinicians incorporate this wealth of information into patient-specific therapy strategies. Diagnostic assistance tools are available to aid in disease identification as well as the prediction of outcome utilizing symptoms and the patient's condition at the time of admission.

This is a cross-sectional study conducted in the city of Kerman, Ranson's criterion and other APACHE models are two examples of models that have been validated in critically ill patients utilizing real-time data to predict mortality risk.

Alert support technologies are used to optimize workflow, alert practitioners about bad medication reactions, and educate practitioners about the potential side effects of an ordered therapy, such as anticoagulation. Following deployment, this type of system reduces reported patient problems from drug-drug interactions and adverse drug events in the ICU. Implementation of a CDS programmer resulted in significant reductions in drug-drug interactions and adverse events associated to drug-drug interactions, such as prolonged QT interval and hypokalemia, according to Bertsche et al prospective cohort study. CDS also improves adherence to mechanical ventilation, sepsis, and venous thromboembolism prevention regimens, as well as patient care. The implementation of such protocols in critical care standardizes the treatment of common physiologic conditions and is frequently at the heart of ICU quality improvement efforts.

Following the installation of CDS, Tafelski et al found a significant increase in adherence to established sepsis care procedures, as well as a significant link between mortality and adherence to those care protocols. CDS can also be used to help patients without following a protocol by making recommendations for ventilator settings and weaning, antibiotic help, and drug dosing. When compared to the traditional nomogram, Mungall et al colleagues reported that employing a CDS tool for heparin dose following tissue plasminogen activator treatment in myocardial infarction resulted in a considerable improvement in reaching intended anticoagulation targets. Blood glucose control is a popular field for support tools research, and studies show that using these tools results in more consistent target glucose levels and fewer adverse effects.

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