The implementation of Rapid Response or Medical Emergency Teams has saved many lives in hospitals around the world since its first appearance in the 1990s. Early recognition and prompt appropriate response to clinical deterioration is the most effective strategy in avoiding preventable cardiac arrests in hospitalised patients. Rapid response systems (RRS) address this and is a maturing feature in many hospitals in Australia, Europe and America.

The iSRRS 2019 will be held on 18-19 April 2019

It focuses on early recognition and management of the deteriorating hospital patient and improvement in response systems. This is the first time this conference is held in Asia, and the dedicated programme is delivered by experts in the Asia Pacific region. This meeting will be of interest to professionals involved in intensive care medicine, acute medicine, emergency medicine and palliative care, as well as those interested in improving clinical quality and patient safety.

Fast facts about the conference:

- 2 x full day conference days
- 5 x Plenary sessions
- 18 x Symposia
- 42 x International Speakers
- 2 x Workshop Sessions
- 3 x Meet-the-Expert Sessions
- 51 x Abstracts already received from 14 countries
A Novel Bedside-Focused Ward Surveillance and Response System

Rapid response systems (RRSs) have been universally adopted in much of the developed world; yet, despite broad implementation, their success has often been limited. Even with successful systems, there is a small body of evidence regarding effective organizational elements that are responsible for improved outcomes. New organizational processes were implemented that restructured the existing RRS, and the impact on the number of rapid response team (RRT) alerts, cardiac arrest, and mortality rates was evaluated.

A prospective five-year before-and-after comparison of adult ward patient outcomes was conducted at a community regional medical center.

The key intervention was expanded administrative oversight of the system, which led to (1) restructuring the content and depth of ward nurse education regarding early recognition of at-risk patients; (2) system changes empowering prompt mobilization of the RRT; (3) development of RRT treatment protocols; and (4) a more frequent and comprehensive data collection and analysis for system compliance and performance improvement.

Some 28,914 patients were observed in the 24-month control period, and 39,802 patients were observed in the 33-month intervention period. RRT activations increased from 10.2 to 48.8/1,000 discharges (p <0.001); ward cardiac arrest decreased from 3.1 to 2.4/1000 discharges (p = 0.04), hospital mortality decreased from 3.8% to 3.2% (p <0.001), and the observed-to-expected ratio decreased from 1.5 to 1.0 (p <0.001).

The authors concluded that expanded administrative involvement of an existing RRS that focused on early recognition of patient deterioration by the bedside nurse led to improved performance of the system, with a significant increase in number of RRTs and decreases in cardiac arrests and hospital mortality.

Effectiveness of rapid response teams on rates of in-hospital cardiopulmonary arrest and mortality: A systematic review and meta-analysis

In 2004, the Institute for Healthcare Improvement’s 100,000 Lives Campaign recommended that hospitals implement rapid response teams (RRTs) charged with identifying non-intensive care unit (ICU) patients at risk for rapid deterioration. Although RRTs are now in widespread use, there have been conflicting results regarding the impact of RRTs on hospital mortality and cardiopulmonary arrest.

The purpose of this systematic review and meta-analysis was to assess the effectiveness of RRTs on reducing hospital mortality and non-ICU cardiopulmonary arrest rates.


Included in the review were before-after studies, cohort studies, and cluster randomized trials that reported hospital mortality and/or non-ICU cardiopulmonary arrest for adults hospitalized in a non-ICU setting after the implementation of RRTs and/or medical emergency teams (METs). Data were extracted by 2 sets of 2 independent reviewers using a standardized data-collection form. Disagreements were resolved by a third reviewer. Authors were contacted to obtain any missing data.

The search identified 691 studies, of which 30 met criteria for inclusion in the analysis. Implementation of an RRT/MET was associated with a significant decrease in hospital mortality (relative risk [RR] = 0.88, 95% confidence interval [CI]: 0.83–0.93, I² = 86%, 3,478,952 admissions) and a significant decrease in the number of non-ICU cardiac arrests (RR = 0.62, 95% CI: 0.55–0.69, I² = 71%, 3,045,273 admissions).

The authors concluded that implementation of an RRT/MET is associated with a reduction in both hospital mortality and non-ICU cardiopulmonary arrests.
The association of clinical frailty with outcomes of patients reviewed by rapid response teams: an international prospective observational cohort study

Frailty is a state of vulnerability to poor resolution of homeostasis after a stressor event and is strongly associated with adverse outcomes. Therefore, the assessment of frailty may be an essential part of evaluation in any healthcare encounter that might result in an escalation of care. The purpose of the study was to assess the frequency and association of frailty with clinical outcomes in patients subject to rapid response team (RRT) review.

In this multi-national prospective observational cohort study, centres with existing RRTs collected data over a 7-day period, with follow up of all patients at 24 h following their RRT call and at hospital discharge or 30 days following the event trigger (whichever came sooner). Investigators also collected data on the triggers and interventions provided at the bedside assessment on the level of patients’ frailty using a clinical frailty scale.

Amongst 1133 patients, 40% were screened as frail, which was associated with older age (p < 0.001), admission under a medical specialty (p < 0.001), increased severity of illness at the time of the RRT review (p = 0.0047), and substantially higher frequency of limitations of care (p < 0.001). Importantly, 72% of patients screened as frail were either dead or dependent on hospital care by 30 days (p < 0.001). In the multivariable analysis, the significant risk factors for the composite endpoint “poor recovery” (died or were hospital-dependent by 30 days) were age (odds ratio (OR), 1.04; 95% confidence interval (CI), 1.03–1.05; p < 0.001), frailty level (p < 0.001), existing limitation of care (OR, 2.0; 95% CI, 1.3–3.0; p < 0.001), and the quick sequential organ failure assessment (qSOFA) score (p < 0.001).

The authors concluded that higher frailty scores were associated with increased mortality and dependence on health care at 30 days. Their results indicate that frailty has an influence on the clinical trajectory of deteriorating patients and that such assessment should be included in discussion of goals and expectations of care.

Advance care planning in the context of clinical deterioration: a systematic review of the literature

A Rapid Response Team can respond to critically ill patients in hospital to prevent further deterioration and unexpected deaths. However, approximately one-third of reviews involve a patient approaching the end-of-life. It is not well understood whether patients have pre-existing advance care plans at the time of significant clinical deterioration requiring Rapid Response Team review. Nor is it understood whether such critical events prompt patients, their families and treating teams to discuss advance care planning and consider referral to specialist palliative care services.

This systematic review examined advance care planning with patients who experience significant clinical deterioration in hospital and require Rapid Response Team review. The prevalence of pre-existing advance directives, whether this event prompts end-of-life discussions, the provision of broader advance care planning and referral to specialist palliative care services was examined.

Three electronic databases up to August 2017 were searched, and a manual review of article reference lists conducted. Quality of studies was appraised by the first and fourth authors.

Of the 324 articles identified through database searching, 31 met the inclusion criteria, generating data from 47,850 patients. There was a low prevalence of resuscitation orders and formal advance directives prior to Rapid Response Team review, with subsequent increases in resuscitation and limitations of medical treatment orders, but not advance directives.

There was high short- and long-term mortality following review, and low rates of palliative care referral.

The failure of patients, their families and medical teams to engage in advance care planning may result in inappropriate Rapid Response Team review that is not in line with patient and family priorities and preferences.

Earlier engagement in advance care planning may result in improved person-centered care and referral to specialist palliative care services for ongoing management.
A Validation Argument for a Simulation-Based Training Course Centered on Assessment, Recognition, and Early Management of Pediatric Sepsis

Early recognition of sepsis remains one of the greatest challenges in medicine. Novice clinicians are often responsible for the recognition of sepsis and the initiation of urgent management. The aim of this study was to create a validity argument for the use of a simulation-based training course centered on assessment, recognition, and early management of sepsis in a laboratory-based setting.

Five unique simulation scenarios were developed integrating critical sepsis cues identified through qualitative interviewing. Scenarios were piloted with groups of novice, intermediate, and expert pediatric physicians. The primary outcome was physician recognition of sepsis, measured with an adopted situation awareness global assessment tool.

Secondary outcomes were physician compliance with pediatric advanced life support (PALS) guidelines and early sepsis management (ESM) recommendations, measured by two internally derived tools. Analysis compared recognition of sepsis by levels of expertise and measured association of sepsis recognition with the secondary outcomes.

Eighteen physicians were recruited, six per study group. Each physician completed three sepsis simulations. Sepsis was recognized in 19 (35%) of 54 simulations. The odds that experts recognized sepsis was 2.6 [95% confidence interval (CI) = 0.5-13.8] times greater than novices. Adjusted for severity, for every point increase in the PALS global performance score, the odds that sepsis was recognized increased by 11.3 (95% CI = 3.1-41.4). Similarly, the odds ratio for the ESM checklist score was 1.5 (95% CI = 0.8-2.6). Adjusted for severity and level of expertise, the odds of recognizing sepsis was associated with an increase in the ESM checklist score of 1.8 (95% CI = 0.9-3.6) and an increase in ESM global performance score of 4.1 (95% CI = 1.7-10.9).

The authors concluded that, although incomplete, evidence from initial testing suggests that the simulations of pediatric sepsis were sufficiently valid to justify their use in training novice pediatric physicians in the assessment, recognition, and management of pediatric sepsis.


Sentiment in nursing notes as an indicator of out-of-hospital mortality in intensive care patients

Nursing notes have not been widely used in prediction models for clinical outcomes, despite containing rich information. Advances in natural language processing have made it possible to extract information from large scale unstructured data like nursing notes. This study extracted the sentiment-impressions and attitudes-of nurses, and examined how sentiment relates to 30-day mortality and survival.

This study applied a sentiment analysis algorithm to nursing notes extracted from MIMIC-III, a public intensive care unit (ICU) database. A multiple logistic regression model was fitted to the data to correlate measured sentiment with 30-day mortality while controlling for gender, type of ICU, and SAPS II score. The association between measured sentiment and 30-day mortality was further examined in assessing the predictive performance of sentiment score as a feature in a classifier, and in a survival analysis for different levels of measured sentiment.

Nursing notes from 27,477 ICU patients, with an overall 30-day mortality of 11.02%, were extracted. In the presence of known predictors of 30-day mortality, mean sentiment polarity was a highly significant predictor in a multiple logistic regression model (Adjusted OR = 0.4626, p < 0.001, 95% CI: [0.4244, 0.5041]) and led to improved predictive accuracy (AUROC = 0.8189 versus 0.8092, 95% CI of difference: [0.0070, 0.0126]). The Kaplan Meier survival curves showed that mean sentiment polarity quartiles are positively correlated with patient survival (log-rank test: p < 0.001).

This study showed that quantitative measures of unstructured clinical notes, such as sentiment of clinicians, correlate with 30-day mortality and survival.

Nurses’ ‘worry’ as predictor of deteriorating surgical ward patients: A prospective cohort study of the Dutch-Early-Nurse-Worry-Indicator-Score

Nurses’ ‘worry’ is used as a calling criterion in many Rapid Response Systems, however it is valued inconsistently. Furthermore, barriers to call the Rapid Response Team can cause delay in escalating care. The literature identifies nine indicators which trigger nurses to worry about a patient’s condition.

The objective of this study was to determine the significance of nurses’ ‘worry’ and/or indicators underlying ‘worry’ to predict unplanned Intensive-Care/High-Dependency-Unit admission or unexpected mortality among surgical ward patients in a 500-bed tertiary University affiliated teaching hospital.

Participants in this study were adult, native speaking surgical patients, admitted to three surgical wards (traumatology, vascular- and abdominal/oncological surgery). The investigators developed a new clinical assessment tool, the Dutch-Early-Nurse-Worry-Indicator-Score (DENWIS) based on signs underlying ‘worry’. Nurses systematically scored their ‘worry’ and the DENWIS once per shift or at any moment of ‘worry’. DENWIS measurements were linked to routinely measured vital signs.

The composite endpoint was unplanned Intensive-Care/High-Dependency-Unit admission or unexpected mortality. The investigators included two-thirds of the patients in the study with ‘worry’ and the DENWIS model (0.86) had a lower area under the receiver-operating characteristics curve than the Early Warning Score (0.85). Adding ‘worry’ and the Early Warning Score to the DENWIS model potentially may also be of value for nurses with less knowledge and experience in identifying and responding to deteriorating patients...

This work can be considered as a first effort in modelling the concept of patient deterioration, which could be specific to ACU.

The findings suggest that it might be relevant to include subjective indicators of patient deterioration in track and trigger systems and educational efforts.

Contextual factors impacting care for the deteriorating patient could be addressed in further attempts to deal with this issue.

Defining patient deterioration through acute care and intensive care nurses’ perspectives

The investigators in this study aimed to explore the variations between acute care and intensive care nurses’ understanding of patient deterioration according to their use of this term in published literature.

Evidence suggests that nurses on wards do not always recognize and act upon patient deterioration appropriately. Even if resources exist to call for intensive care nurses’ help, acute care nurses use them infrequently and the problem of unattended patient deterioration remains.

A dimensional analysis design was used as a framework to analyze papers retrieved in a nursing-focused database.

A thematic analysis of 34 papers (2002–2012) depicting acute care and intensive care unit nurses’ perspectives on patient deterioration was then conducted.

The investigators found no explicit definition of patient deterioration within the retrieved papers however, there were variations between acute care and intensive care unit nurses’ accounts of this concept, particularly regarding the validity of patient deterioration indicators. Moreover, contextual factors, processes and consequences were also explored.

From these findings the investigators concluded that, from the perspectives of acute care and intensive care nurses, patient deterioration can be defined as an evolving, predictable and symptomatic process of worsening physiology towards critical illness.

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Dear iSRRS member,

We at the International Society for Rapid Response Systems are delighted that the 2019 International Conference on Rapid Response Systems & Medical Emergency Teams will be hosted in the beautiful city of Singapore.

This is the largest international conference addressing the main causes of death in hospital – failures to recognise or act on deterioration – and an essential opportunity for frontline clinical staff, administrators and policy-makers to share and advance the optimal management of high-risk patients across the whole hospital, and beyond.

We have come to realise that we need to understand human factors, make it easy for staff to "do the right thing", and also that new technologies have huge potential to aid accurate identification of deterioration and support decision-making in critical cases.

It is fitting that our first meeting outside Europe, the USA or Australia will be in Singapore, where invention and innovation are so strongly promoted. Our mission is to eliminate death from preventable deterioration – Rapid Response Systems demonstrably save patients’ lives – but also to spread what we have learned and how we have improved processes in emergency, acute and critical care to healthcare systems around the world.

Very best wishes

JOHN WELCH, RN, BSc, MSc
President, International Society for Rapid Response Systems

Making Hospitals Safer
Rapid response systems (RRS) have been developed to proactively identify patients at risk for clinical deterioration within the hospital, and to deliver reliable, safe, quality treatment to those individuals. The RRS expands care for the critically ill across the whole hospital. The RRS has arisen in response to the widespread realisation that many patients suffer harm or death due to unrecognised or poorly managed deterioration – particularly in general wards – and is now well established or standard of care in many countries.

Annual Meeting
The iSRRS hosts an annual conference. Our conferences cover a range of topics concerning rapid response systems and patient safety, delivered in a variety of ways: lectures, roundtable discussions, pro-con debates, and oral and poster research presentations. All sessions are relevant for medical, nursing, managerial and administrative staff interested in the detection and prevention of patient deterioration, and improving patient safety in our hospitals.

Research
The leading scientific work on rapid response systems, patient deterioration, and advanced skills training had come from prior conference organizers, board members and society members. Rich local and international collaborations have originated from connections made in these gatherings. The society will promote both research and system development year-round through on-line updates and discussions, and by publicizing current and exciting work through electronic media. Our goal is to bring together the best minds in the field and create the changes that will provide the best care for the acutely ill patient. patients suffer harm or death due to unrecognised or poorly managed deterioration – particularly in general wards – and is now well established or standard of care in many countries.

Changing Hospital Culture
The Rapid Response System (RRS) is a relatively unique intervention built around the needs of patients, and that needs to work across the whole organisation. The patient in this case is one who is deteriorating, usually on the general floor of an acute hospital. Specific aspects of these relatively new systems are the implementation of means for detecting the deteriorating patient amongst others who are progressing, creation of teams and other response units, and means to summon them.