

Patient safety

Patient safety and rapid response systems

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In 1995, the Journal published its most cited article, reporting that some 18 000 Australians died each year in acute care hospitals and over 50 000 suffered permanent disabilities as a result of the effects of health care.¹ About half of these were judged to be preventable or to have resulted from errors of omission or commission.

Two other highly cited studies from the United States, published 4 years earlier, showed a similar high incidence of potentially preventable deaths and stimulated interest in the level of patient safety in acute care hospitals^{2,3} which continues today. A crucial insight involved recognition that safety depends largely on the system within which care is embedded⁴ and that clinical error is the final link in a causal chain of antecedent events.⁵

In response to the high levels of adverse events, a patient safety industry that aims to overcome these problems has emerged. A national patient safety organisation, the Australian Commission on Safety and Quality in Health Care, was founded in Australia in 2006. There are similar organisations around the world. The patient safety movement now has its own journals, conferences and textbooks. Most health jurisdictions and hospitals have many staff devoted to patient safety.

Much of the subsequent research has focused on further defining the problem, rather than implementing and evaluating solutions. Various reasons for the incidence of potentially preventable adverse events have been advanced, including systems problems, treatment delays, not using evidence-based medicine, failure to order (and act on the results of) appropriate investigations, medication errors, inadequate staffing, fragmentation of care, information overload, and failure to use policies and protocols effectively.⁶ It has been hard to make progress.

Rapid response systems as a patient safety system

Most potentially preventable deaths in hospitals are a result of failure to recognise that a patient's condition is deteriorating and failure to prevent further deterioration.⁷ Patients who suffer potentially preventable deaths are almost always in the general wards of hospitals. Such deaths are not common in areas such as intensive care units (ICUs). Most patient deaths in ICUs are a result of electively withdrawing and withholding further active management when such management is considered futile.⁸ The reason for the low incidence of potentially preventable deaths in ICUs is that patients are continuously monitored in an environment of high staff-to-patient ratios and where the staff are trained to care for seriously ill patients. In contrast, patients in general wards are monitored in much the same way as they have been for over a century and clinicians in general wards are not trained to recognise and manage patients who are seriously ill and whose condition is deteriorating.⁹

Summary

- Attention was drawn to the safety of patients in acute care hospitals in the early 1990s when studies found large numbers of potentially preventable deaths. Errors were initially ascribed to individual doctors and nurses, but later it was recognised that errors were mainly related to failure of systems rather than individuals.
- Mortality is not necessarily a good measure of hospital safety. It depends more on the nature of the patient's underlying clinical state and the type of intervention than on the safety of the hospital, and its prevention (as a measure of patient safety) contributes to the failure of hospitals to recognise and appropriately manage patients who are naturally at the end of life.
- It is difficult to find agreement on the best ways to measure patient safety in hospitals and, as a result of the enormous resources devoted to improving and studying safety, it is difficult to show that patient safety has improved. However, the concept of safety is beginning to include post-hospital outcomes, such as quality of life.
- A rapid response system is an organisation-wide patient safety system which recognises the deterioration of a patient's condition and provides urgent and appropriate care. Evaluating the impact of a rapid response system can provide information on hospital safety, including potentially preventable deaths and cardiac arrests.

Rapid response systems (RRSs) are a unique patient safety system. They operate across the whole organisation and respond to all at-risk patients, regardless of the cause of the deterioration of a patient's condition (Box 1).⁹ For example, the deterioration may be a result of the nature of the patient's illness or a result of individual or system failure and errors. The RRS concept involves using vital signs and observations to identify at-risk and seriously ill patients early in the course of their illness. Once identified, a rapid response is triggered and the patient is then managed by staff with appropriate skills, knowledge and experience.⁹ The concept of RRSs was developed, implemented and evaluated by front-line clinicians in response to the high number of potentially preventable deaths and serious adverse events occurring in hospitals.⁹

The aim of an RRS is to provide a level of care which is similar to that delivered in areas such as operating theatres and ICUs. This type of safety net is becoming increasingly important because the population of patients in hospitals is changing dramatically.¹⁰ Patients are older, they have more underlying comorbidities, and they are undergoing interventions that have a high risk of complications. The risk of serious deterioration of a patient's condition is therefore higher in general wards.⁷ Many patients in general wards can become as seriously ill as those in ICUs.¹¹ There is no longer the easily identified

1 Characteristics of rapid response systems relating to hospital patient safety

- Operate across the whole organisation
- Bypass traditional hierarchies and professional boundaries
- Are constructed around patient needs
- Are developed and operated by front-line clinicians
- Are not externally mandated
- Engage managers and policymakers from the bottom up
- Aim to prevent the most serious adverse events from occurring in hospitals
- Operate independently of the reasons for the deterioration of a patient's condition
- Contribute to real-time detection of safety events
- Are associated with standardised and readily measurable outcome measures

distinction between patients being cared for in an ICU and those in a general ward. This trend is likely to become even more pronounced as populations age. Moreover, pressure to decrease hospital length of stay tends to result in an even more vulnerable patient population in acute care hospitals.

So, RRSs were developed to improve patient safety in acute care hospitals, aiming to provide a safer environment in general wards by urgently providing qualified staff from areas such as ICUs when they are identified. However, there is still the challenge that patients are not monitored in the same continuous way that they are in environments such as ICUs.

Measures of hospital safety

The concept of an RRS lends itself to standardised and comparable outcome measures which reflect patient safety across the whole organisation. As the goal of an RRS is to prevent deaths and major adverse events such as cardiac arrests, measuring the effectiveness of the RRS also measures the safety of the hospital.

Many factors have been used to measure patient safety in acute care hospitals (Box 2). However, there is a lack of agreement on definitions and measures. Hospital mortality is relatively easy to define and measure. Using it as a measure of hospital performance is therefore tempting, and researchers continue to flirt with the concept.¹² One obvious problem with using mortality as a measure is that some hospitals treat more complex patients who have a lower chance of recovery than others. Another problem arises in ascribing mortality to a single doctor. For example, surgical outcomes depend on many factors apart from the surgeon, such as the treatment provided by physicians in the ICU, specialist consultations, systematic care from nursing staff, trainee medical staff and paramedical staff, and the systems within which the patient was managed. Despite problems with using mortality as a measure of hospital performance, crude mortality rates remain a common element in the way clinicians review their own practice.

More recently, there have been attempts to adjust mortality rates according to risk, by using a standardised mortality ratio (SMR).¹³ An SMR compares the actual death rate of a hospital with the expected rate based on the hospital's particular population of patients. The inference is that if the actual mortality is higher than the predicted mortality, there may be a problem in the hospital. But it is difficult to identify and accurately measure the

risk factors used for adjustment and the adjustment can exaggerate the very bias that it is attempting to reduce.¹⁴ Moreover, SMRs are a global measurement and do not identify where potential problems may be.

About one-third of rapid response calls are for patients at the end of life.¹¹ These are patients who require an urgent response by appropriately skilled clinicians but who have not previously been recognised as being at the end of life.¹¹ An often overlooked issue with using mortality as an outcome measure is that it infers that death is something to be avoided at all costs, contributing to the failure of acute care hospitals to recognise the many patients who naturally and predictably die in hospital. Concentrating on avoiding death can mean that patients may not die safely in hospitals.¹⁵ Inappropriate management of patients at the end of life has many patient safety implications, including a lack of transparency with patients and their carers, removing choice from patients, and being a major contributor to the unsustainable costs of health care. Reducing mortality is not necessarily an outcome that we should always aim for and by which we should judge a hospital.

For many years we have considered that patient safety, as a result of hospitalisation, should only be measured by outcomes derived during the patient's admission. We are now learning that hospitalisation may, in itself, cause serious adverse events that occur after a patient has left hospital.¹⁶ Many patients, particularly older patients and frail elderly patients, may leave hospital alive but have a poor quality of life. They may require admission to a nursing home, and many suffer similar symptoms to post-traumatic stress syndrome, such as nightmares, anxiety and depression. Moreover, many die soon after discharge from hospital.¹⁶ Patient outcomes that result from a hospital intervention, and the implications for patient safety, can no longer be measured only during hospital admission.

Another often overlooked dimension in hospital safety is how safety and performance are viewed from a patient's perspective — not just whether the meals are palatable and whether the staff are polite, but how appropriate the care was. This could include: whether information about the explicit aim of the hospital intervention was achieved; whether, in hindsight, the patient would undergo the same intervention again; and what information about

2 Factors that have been used to measure hospital performance

- Admission rates
- Mortality rates and standardised mortality ratios
- Length of stay
- Numbers of visits to emergency departments
- Waiting times in emergency departments
- Numbers of outpatient visits
- Numbers and types of operations
- Costs
- Patient satisfaction
- Equity and access
- Numbers of patients on waiting lists
- Ambulance response times
- Rates of return to theatre
- Readmission rates

the hospital experience was not made clear.¹⁷ There may be trends in certain diagnostic or procedural groups for which there is a high level of dissatisfaction and dissonance between the promises of interventions and the outcomes as determined by patients and their carers. A rigorous analysis of patients' outcomes and their retrospective attitudes could become important when considering whether a hospital provided safe care.

Rapid response system outcomes that reflect hospital patient safety

While we still often measure crude rates of mortality and cardiac arrest, it is more relevant to exclude patients who have a do-not-resuscitate (DNR) order because an RRS is not designed to improve the outcome of patients for whom further active management is thought to be futile. For patients who have not been assigned a DNR order, deaths and cardiac arrests may be designated as "unexpected".¹⁸ Instituting an RRS increases awareness of these patients and, as a result, the rate of DNR orders is increased in hospitals with an RRS.¹⁹

Similarly, it is clinically relevant to test whether an RRS is operating effectively by analysing data for patients who experience serious adverse events. In cases where a response to abnormal calling criteria within 24 hours of death or cardiac arrest did not occur, it is designated "potentially preventable".¹⁸ Thus, unexpected and potentially preventable deaths and cardiac arrests become meaningful, standardised and easy-to-collect outcome measures of not only the RRS but also patient safety across the whole hospital.

Other hospital-wide indicators of RRS effectiveness include failure to rescue, deaths in low-mortality diagnosis-related groups,²⁰ and number of rapid response calls per 1000 admissions. For the latter, the higher the call rate, the greater the reduction in deaths and cardiac arrests.²¹

Conclusion

Outcome measures associated with RRSs are clinically relevant, owned by those who deliver health care, and lend themselves to easy analysis and ways to improve the system. An efficiently functioning RRS can urgently provide the same level of expertise that is available in an ICU to patients in general wards of acute care hospitals. RRSs have been shown to significantly increase patient safety and decrease mortality and cardiac arrest rates, in adult and paediatric hospitals, and are widely employed around the world.²¹⁻²³ The implementation of an organisation-wide patient safety system such as an RRS, then, lends itself to evaluating the safety of an acute care hospital by measuring the impact of its implementation on end points such as prevention of deaths and cardiac arrests in patients without a DNR order. The next challenge in the evolution of RRSs and their contribution to patient safety is to identify patients

who require urgent intervention at an earlier stage in their illness. This could be achieved by providing improved technology that is capable of detecting clinical deterioration at an earlier stage.

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