Over 20 years ago, physicians and nurses in separate regions of the globe started work to reduce cardiac arrests by reorganizing healthcare delivery systems. The novel process involved identifying patients who were deteriorating and developed critical illness outside the ICU. Subsequently a response team was notified or “triggered” in later terminology, and these multidisciplinary professionals brought clinical and equipment resources to the bedside very quickly. While they did not supplant the “home” care team, they did augment it by enhancing the resources brought to bear to prevent further deterioration, cardiac arrest, and death. The results were impressive, but because the early studies were before and after trials, the quality of the data was judged by many to be poor and the results inconclusive. Their emphasis on the team response was significant and a controversy of sorts developed over what was the best response team. The first of two consensus conferences allowed these investigators to “compare notes.” As a result, they concluded that the team response was only one component of a four-part system, which was named the Rapid Response System (RRS). The second conference reflected the growing appreciation by most investigators that the whole system did not work unless it was reliably “triggered.” Without the trigger, there could be no response. Since this report, many investigators have continued to work on this afferent limb of the RRS. Our first two books in this field reflected these two modes of thinking, although we did try to demonstrate how the RRS could be adapted to many other critical and time-sensitive situations in the hospital setting. We devoted many pages in both books related to defining the characteristics of the system, how to create one in hospitals naïve to the process, and how to both improve and expand the process in more experienced settings.

In this third book, the second edition of the Rapid Response Textbook, we have tried to again capture the major trends in RRS implementation and modes of thought. At the 13th annual International Meeting on Rapid Response Systems and Medical Emergency Teams, the new International Society for Rapid Response Systems had its third general meeting. The Society has grown from 15 people in a room in London to well over 100 members from almost 20 countries. The meeting had almost 600 attendees. At this time, some form of RRS (although not named this way in all countries) is required in all or part of about ten countries around the world, and it is becoming more common in many other countries. Indeed, we feel that the
RRS in a sense is becoming an integral part of how acute hospitals function. And the demonstration of its effectiveness is becoming more obvious.

At this 13th meeting, we were struck by an interesting coalescing of data. Initially, in-hospital cardiac arrest rates were between two and eight per thousand admissions. Virtually all organizations implementing RRS effectively, meaning an RRS rate of greater than about 40 per 1000 admissions, showed decreased mortality. However, at this meeting, not one presentation now notes a cardiac arrest rate above 1 per 1000. Thus, in the decade and a half since our first meeting, there has been a one log improvement. This is a stunning achievement and it mirrors the improvements in safety initiatives in the airline industry and automobile industry. The change in scale from 0.6/1000 to 6/10,000 may be confusing at first, but it will serve to reset our frame of vision.

This prompts us to ask, “How low can in-hospital cardiac arrest rates go?” We are not sure of the answer to that, but we do have some thoughts on the matter. First, we would like to distinguish between cardiac arrest responses on the one hand and in-hospital death events on the other. Patients who might live have vital sign abnormalities that are the same as those of patients who are dying. Many patients in hospital are in fact dying naturally and expectedly from their underlying disease. As many as 1/3 of Rapid Response events are triggered for patients who are dying and expected to die. Most of these patients are more in need of palliative care to help promote a safe, painless, and comforting dying process. While some have decried the use of the RRS for patients who are dying, we support it if the patient’s death is “out of control” due to pain, distress, or inadequate preparation. We believe that the RRS trigger may be an opportunity to introduce palliation into such patient’s care plan. Because of this, we advocate promoting either palliative care skill sets for responders or a close linkage between the RRS and the palliative care team. With this in effect, cardiac arrest rates could drop by perhaps 30% due to implementation of “not for resuscitation” orders, some of those occurring at or after an RRS event. Second, better triage of hospitalized patients to special care wards may help. More effective triage may be possible through the use of better predictive tools using any one of a variety of severity scoring systems designed to find patients likely to die in the next few hours or days. Patients with elevated risk can have additional resources to bear. Indeed, some investigators have designed systems to not only provide risk estimates but also give decision support to bedside clinicians to promote better care management. Some tools go so far as to alert managers to clusters of high acuity patients. Knowing where (unexpectedly) sick patients are can enable moving resources to up-staff stressed units. These interventions have been shown to help as well, and their use is likely to spread. As they do, expect cardiac arrest rate to fall.

The third intervention which is starting to gain some momentum is continuous physiological monitoring. We are not talking about continuous ECG monitoring which does not signal well early signs of deterioration. We are focusing instead on the continuous monitoring of one or more of the following: heart rate, respiratory rate, level of consciousness, oxygen saturation, and exhaled carbon dioxide. Deterioration of any of these portends
trouble. Intermittent monitoring has been used on the general floors of acute hospitals for over a century. However, today’s patients are sicker and have more complex interventions which can increase risk of unexpected and sudden deterioration. The unexpected death rate in hospitals among those who are selected high risk and who are monitored is not very different from “healthier” patients selected to not have monitoring. This begs the question of what likelihood of deterioration is sufficiently low to decide to not continuously monitor someone. Because we can never perfectly predict the future, until there is the ability to detect deterioration as it occurs, there will always be unexpected and tragic deaths.

So our answer to the question of “how low can the cardiac arrest rate go?” is “Zero.” We feel it is time to target zero cardiac arrest responses in hospital (even though hospital death rates will never fall that low because as we noted, some people are dying from incurable and irremediable illness). We are looking for zero preventable deaths. We are a long way from that goal, but keeping that goal in mind was helpful in other safety initiatives that we would like to emulate.

There are barriers to even aiming for zero. First, the culture change needed to get clinicians to believe that it is a realistic target. Second, the continued change in hospital staffing to enable RRSs to flourish is not easy in some organizations. Additional data and examples from forward thinking hospitals may lead such organizations to progress. A third barrier is cost. Continuous monitoring is expensive, and most hospitals simply cannot see their way to finding the money to invest, let alone consider the return on investment. Fear is another barrier. Some of us have found that some clinicians are more afraid of being blamed for not responding to an alarming monitor than they are of the consequences for the patient of that action. This is a startling observation, but this type of fear of failure exists in all of us to some extent.

There are promoters as well. All clinicians have experienced the situation when they have had to interact with the family of a patient who was not supposed to die. These tragedies impact the clinician in profound ways that may be different and less tragic for the patients themselves and their family, but which are tragic and life altering nonetheless. Some clinicians have left healthcare as a result.

We think the advances in safety that the RRS is promoting will continue to spread and become better. We hope that our textbook is moving beyond the simple introduction of the system and providing resources that can be used to target zero.

The first chapter of the textbook is important. In it, Helen Haskell puts a very personal face on the need for the RRS. These stories moved us so much that we felt they needed to be the first thing the reader of this textbook sees. It will impact in a way that mere numbers cannot. The remainder of the first section is devoted to the patient safety system and the place of RRSs in building the business case and promoting culture change. The second section is geared towards how to create or improve the system. And the final section is focused on assessing the impact and educational interventions to support system improvements.
With the tools in this book, we hope that we will not only help you improve your hospital’s safety but also help you to imagine a hospital with a zero cardiac arrest and zero preventable death rate.

New York, NY, USA                  Michael A. DeVita
Liverpool BC, NSW, Australia        Ken Hillman
Melbourne, VIC, Australia            Rinaldo Bellomo
Textbook of Rapid Response Systems
Concept and Implementation
2017, XIX, 392 p. 53 illus., 28 illus. in color., Softcover
ISBN: 978-3-319-39389-6