



## Editorial

## Training teams and leaders to reduce resuscitation errors and improve patient outcome

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Medical errors and adverse events are alarmingly frequent in hospital. A systematic review has found that one in eleven patients suffer at least one adverse event during their hospital stay.<sup>1</sup> Many of these events have minor consequences but about one in fourteen are fatal. The emergency setting is particularly prone to errors and adverse events,<sup>2</sup> relating to the time-critical, high-impact decision making that is required of the emergency responders, often made up of an ad-hoc team.

In this edition Ornato et al.<sup>3</sup> present a study of the impact of errors made during in hospital cardiac arrest (IHCA) resuscitations in the United States. They analysed information from 118,387 IHCA cases, using the National Registry of Cardiopulmonary Resuscitation database and identified resuscitation errors in approximately one third of cases. Unsurprisingly the outcomes for this group of patients with recognised errors were significantly worse: they had lower rates of return of spontaneous circulation, 24-h survival and survival to discharge compared to the group with no such errors. In line with previous work, the authors found that the specific errors associated with poor outcome included delays in executing critical actions and in administering essential medication.

Observational data from national registries such as these cover large populations but their validity is limited by the quality of the available information and the process used to obtain it. This study relied upon hand written resuscitation notes compiled by the emergency team and reviewed by a data abstractor, who was not blinded to patient outcome. Documentation is a vital part of any medical emergency, however, notes are inevitably retrospective and recall

of events occurring during emergencies can be poor, even immediately following the event.<sup>4</sup> Documentation proformas can improve the completeness of records but not necessarily the accuracy.<sup>5</sup> It could be argued that errors in this study were more likely to be under rather than over reported which would decrease its power, but not bias the results. Further descriptive data to compare the two groups such as pre-morbid conditions that might have had a significant effect on survival, as well as analysis of the spread of errors across participating hospitals would also have been interesting to collate. Despite these limitations, these findings are difficult to challenge and deserve analysis and debate.

In particular, similar to other researchers<sup>6,7</sup> the authors<sup>3</sup> highlight the role that poor leadership and teamwork might have had in the resuscitation system errors. However, there was no significant association between the broad leadership categories recorded and IHCA survival. A possible reason for this lack of association is the subjective way leadership was assessed and recorded. It has been shown that it is not simply the knowledge, skills and attitudes of leaders (or in fact of other team members) that affect teams' ability to manage catastrophic medical emergencies efficiently,<sup>8</sup> it is the way teams apply these to practice through teamwork.<sup>9</sup> Specifically, there are certain leader and team member behaviours associated with improved team efficiency in performing critical actions and administering critical drugs in simulated<sup>10</sup> or real-life<sup>11</sup> catastrophic emergencies. Coaching individuals and teams to adopt these behaviours within an evidence-based, multiprofessional team training and safety programme<sup>12</sup> could improve care<sup>13–16</sup> and outcomes<sup>14–16</sup> for high-consequence emergencies such as cardiac arrest.

Historically teamwork has had little emphasis in resuscitation training<sup>17</sup> however, the latest European and American Resuscitation Guidelines recommend that teamwork and non-technical skills should be included in training in order to improve resuscitation and outcomes.<sup>18,19</sup> These guidelines do not recommend a specific type of teamwork training. Crew Resource Management (CRM) programmes, widely acclaimed in the aviation industry, have been translated into medical team training in varied settings, with limited success to date. Participants of such programmes often report a positive reaction to training, however, this may not translate into improved clinical outcomes and safety;<sup>20</sup> further research is needed.<sup>13</sup> CRM style training in the Emergency Department has been associated with reduced clinical error rates in one multicentre study.<sup>21</sup> However, the generalisability of this observation is uncertain as there was at unit level both self-selection for intervention, and self-observation of errors by internal assessors.

**Table 1**  
Leadership: exemplary evidence from simulated and real-life catastrophic emergencies, and relevance to the Resuscitation 2010 Guidelines.

Issues	Focus groups [10] (real-life experiences of catastrophic emergencies)	Content analysis [11] (simulated emergency requiring immediate life support)	Resuscitation 2010 Guidelines [27]
Leadership responsibility	Legal responsibility perceived as lying with the senior doctors.	Senior doctors behaved like leaders in all 18 simulations they attended.	The ultimate responsibility and decision for DNAR (do not attempt resuscitation) rests with the senior doctor. It is wise for this individual to consult others before making the decision.
Leadership attributes	The leader needs to have adequate experience to anticipate the possible end to the emergency. The leader must be calm and compassionate.	Early declaration of the nature of the emergency was associated with better team efficiency.	The leader of the resuscitation team will decide when to stop the resuscitation; this should be expressed with sensitivity and understanding
Leadership behaviours	The leader should stop, stand back, stop momentarily everyone speaking if necessary, and clarify the situation. The leader should verbalize the objective of management to the rest of the team. The leader should allocate the critical tasks for each emergency to specific team members, including a specific team member to talk to the patient and/or family.	Allocation of critical tasks with closed loop communication and structured handover (e.g. SBAR) were associated with higher team efficiency in the conduct of critical tasks including administration of essential drugs	The pre-shock pause can easily be reduced by having an efficient team coordinated by a leader who communicates effectively.  Identify one person to be responsible for handover to the resuscitation team leader.  Use a structured communication tool for handover (e.g. SBAR). It is essential for the doctor to have discussions with close relatives.

Change in practice should be grounded in research and developed in conjunction with practicing clinicians.<sup>22,23</sup> Andersen et al.<sup>24</sup> interviewed a range of doctors and nurses in their role as Advanced Life Support instructors in order to identify the perceived barriers for improvement of teamwork in cardiac arrest teams.<sup>25</sup> Other groups have conducted similar research<sup>26</sup> with the hypothesis that highlighting areas of weakness within a team during a resuscitation event will allow constructive feedback, and targeted training. Whereas lessons from flight incidents are useful, improvement in outcomes of medical emergencies might require training based on evidence from experiences of medical emergencies. It is possible that the improvement of teamwork requires approaches that are sophisticated in their development yet simple to apply to practice.<sup>11</sup> For example, it might be possible to inculcate best leadership and teamwork practices by debriefing after real or simulated events, using simple pragmatic guidance based on robust evidence from mixed-methods research (Table 1).

In conclusion, we applaud the study by Ornato et al., and recommend that further research focuses on improving outcomes for patients using findings from real-life emergencies, triangulated with other sources if necessary, to inform better training and development of acute care teams.

### Conflict of interest

Dimitrios Siassakos is a registered member of the PROMPT Maternity Foundation, a UK-based charity, and has no financial interest from this association. Sian Edwards received salary from the PROMPT Maternity Foundation from August to November 2011.

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- <sup>b</sup> RiSQ (Research into Safety and Quality), Southmead Hospital, Chilterns, Women's Health, Southmead Hospital, Westbury on Trym, Bristol BS10 5NB, United Kingdom
- Dimitrios Siassakos<sup>c,d,\*</sup>
- <sup>c</sup> School of Clinical Sciences, University of Bristol, United Kingdom
- <sup>d</sup> RiSQ (Research into Safety and Quality), Southmead Hospital, Chilterns, Women's Health, Southmead Hospital, Westbury on Trym, Bristol BS10 5NB, United Kingdom
- \*Corresponding author at: RiSQ (Research into Safety and Quality), Southmead Hospital, Chilterns, Women's Health, Southmead Hospital, Westbury on Trym, Bristol BS10 5NB, United Kingdom. Tel.: +44 117 323 2321; fax: +44 1179683464. E-mail address: jsiasakos@googlemail.com (D. Siassakos)

Sian Edwards<sup>a,b</sup>

<sup>a</sup> Chilterns, Women's Health, Southmead Hospital, Westbury on Trym, Bristol BS10 5NB, United Kingdom

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