

ORIGINAL RESEARCH

The Effect of a Rapid Response Team on Resident Perceptions of Education and Autonomy

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BACKGROUND: The impact of rapid response teams (RRTs) on resident physicians' education and clinical autonomy is not well described.

OBJECTIVE: To determine whether resident physicians perceive educational benefit from collaboration with an RRT and whether they believe that the RRT adversely affects their clinical autonomy.

DESIGN: Survey study.

METHODS: Study subjects were asked to participate in a brief online survey. The survey contained 7 demographic items and 20 RRT-related items graded on a 5-point Likert scale ranging from strongly disagree to strongly agree.

SETTING/SUBJECTS: The study was conducted at a tertiary care academic medical center. Subjects included all residents in specialties involving direct patient care and the potential to use the adult RRT.

RESULTS: The response rate was 72%; 35% of respondents were interns, and 69% were in medical fields. Residents agreed that working with the RRT is a valuable educational experience (78%) and disagreed that the RRT decreased their clinical autonomy (76%). Surgical residents were less likely than medical residents to perceive educational value from RRT interactions ($P = 0.01$) or to report collaborative decision making with the RRT ($P = 0.04$).

CONCLUSIONS: The majority of resident physicians perceive educational benefit from interaction with the RRT, though this benefit is greater for less experienced residents and for those residents who routinely provide care for critically ill patients and serve as code team leaders. Few residents, irrespective of years of training or specialty, felt that the RRT reduced their clinical autonomy. *Journal of Hospital Medicine* 2015;10:8–12. © 2015 Society of Hospital Medicine

Rapid response teams (RRTs) have been promoted by patient safety and quality-improvement organizations as a strategy to reduce preventable in-hospital deaths.¹ To date, critical analysis of RRTs has focused primarily on their impact on quality-of-care metrics.^{2–4} Comparatively few studies have examined the cultural and educational impact of RRTs, particularly at academic medical centers, and those that do exist have focused almost exclusively on perceptions of nurses rather than resident physicians.^{5–10}

Although a prior study found that internal medicine and general surgery residents believed that RRTs improved patient safety, they were largely ambivalent about the RRT's impact on education and training.¹¹ To date, there has been no focused assessment of resident physician impressions of an RRT across years of training and medical specialty to inform the use of this multidisciplinary team as a component of their residency education.

We sought to determine whether resident physicians at a tertiary care academic medical center perceive educational benefit from collaboration with the RRT and whether they feel that the RRT adversely affects clinical autonomy.

METHODS

The Hospital

Moffitt-Long Hospital, the tertiary academic medical center of the University of California, San Francisco (UCSF), is a 600-bed acute care hospital that provides comprehensive critical care services and serves as a major referral center in northern California. There are roughly 5000 admissions to the hospital annually. At the time the study was conducted, there were approximately 200 RRT calls per 1000 adult hospital discharges.

The Rapid Response Team

The RRT is called to assess, triage, and treat patients who have experienced a decline in their clinical status short of a cardiopulmonary arrest. The RRT has been operational at UCSF since June 1, 2007, and is composed of a dedicated critical care nurse and respiratory therapist available 24 hours a day, 7 days a week. The RRT can be activated by any concerned staff member based on vital sign abnormalities, decreased urine output, changes in mental status, or any significant concern about the trajectory of the patient's clinical course.

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When the RRT is called on a given patient, the patient's primary physician (at our institution, a resident) is also called to the bedside and works alongside the RRT to address the patient's acute clinical needs. The primary physician, bedside nurse, and RRT discuss the plan of care for the patient, including clinical evaluation, management, and the need for additional monitoring or a transition to a higher level of care. Residents at our institution receive no formal instruction regarding the role of the RRT or curriculum on interfacing with the RRT, and they do not serve as members of the RRT as part of a clinical rotation.

The Survey Process

Study subjects were asked via e-mail to participate in a brief online survey. Subjects were offered the opportunity to win a \$100 gift certificate in return for their participation. Weekly e-mail reminders were sent for a period of 3 months or until a given subject had completed the survey. The survey was administered over a 3-month period, from March through May, to allow time for residents to work with the RRT during the academic year. The Committee on Human Research at the University of California San Francisco Medical Center approved the study.

Target Population

All residents in specialties that involved direct patient care and the potential to use the adult RRT were included in the study. This included residents in the fields of internal medicine, neurology, general surgery, orthopedic surgery, neurosurgery, plastic surgery, urology, and otolaryngology (Table 1). Residents in pediatrics and obstetrics and gynecology were excluded, as emergencies in their patients are addressed by a pediatric RRT and an obstetric anesthesiologist, respectively. Residents in anesthesiology were excluded as they do not care for non-intensive care unit (ICU) patients as part of the primary team and are not involved in RRT encounters.

Survey Design

The resident survey contained 20 RRT-related items and 7 demographic and practice items. Responses for RRT-related questions utilized a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." The survey was piloted prior to administration to check comprehension and interpretation by physicians with experience in survey writing (for the full survey, see Supporting Information, Appendix, in the online version of this article).

Survey Objectives

The survey was designed to capture the experiences of residents who had cared for a patient for whom the RRT had been activated. Data collected included residents' perceptions of the impact of the RRT on their residency education and clinical autonomy, the quality of care provided, patient safety, and hospital-wide culture. Potential barriers to use of the RRT were also examined.

TABLE 1. Demographics of Survey Respondents (N = 236)*

Demographic	No. (%)
Medical specialty	
Internal medicine	145 (61.4)
Neurology	18 (7.6)
General surgery	31 (13.1)
Orthopedic surgery	17 (7.2)
Neurosurgery	4 (1.7)
Plastic surgery	2 (0.8)
Urology	9 (3.8)
Otolaryngology	10 (4.2)
Years of postgraduate training	Average 2.34 (SD 1.41)
1	83 (35.2)
2	60 (25.4)
3	55 (23.3)
4	20 (8.5)
5	8 (3.4)
6	5 (2.1)
7	5 (2.1)
Gender	
Male	133 (56.4)
Female	102 (43.2)
Had exposure to RRT during training	
Yes	106 (44.9)
No	127 (53.8)
Had previously initiated a call to the RRT	
Yes	106 (44.9)
No	128 (54.2)

NOTE: Abbreviations: RRT, rapid response team; SD, standard deviation.

*Where data do not equal 100%, this is due to missing data or rounding. Table does not include 10 respondents who had never cared for a patient for whom the RRT was activated.

Outcomes

The study's primary outcomes included the perceived educational benefit of the RRT and its perceived impact on clinical autonomy. Secondary outcomes included the effect of years of training and resident specialty on both the perceived educational benefit and impact on clinical autonomy among our study group.

Statistical Analysis

Responses to each survey item were described for each specialty, and subgroup analysis was conducted. For years of training, that item was dichotomized into either 1 year (henceforth referred to as interns) or greater than 1 year (henceforth referred to as upper-level residents). Resident specialty was dichotomized into medical fields (internal medicine and neurology) or surgical fields. For statistical analysis, agreement statements were collapsed to either disagree (strongly disagree/disagree), neutral, or agree (strongly agree/agree). The influence of years of resident training and resident specialty was assessed for all items in the survey using χ^2 or Fisher exact tests as appropriate for the 3 agreement categories. Analysis was conducted using SPSS 21.0 (IBM Corp., Armonk, NY).

TABLE 2. Resident Perceptions of the RRT (N = 236)*

The resident...	Strongly Disagree/ Disagree, n (%)	Neutral, n (%)	Agree/ Strongly Agree, n (%)
Is comfortable managing the unstable patient without the RRT	104 (44.1)	64 (27.1)	66 (28.0)
And RRT work together to make treatment decisions	10 (4.2)	13 (5.5)	208 (88.1)
Believes there are fewer opportunities to care for unstable floor patients due to the RRT	188 (79.7)	26 (11.0)	17 (7.2)
Feels less prepared to care for unstable patients due to the RRT	201 (85.2)	22 (9.3)	13 (5.5)
Feels that working with the RRT creates a valuable educational experience	9 (3.8)	39 (16.5)	184 (78.0)
Feels that nurses caring for the unstable patient should always contact them prior to contacting the RRT	123 (52.1)	33 (14.0)	76 (32.2)
Would be unhappy with nurses calling RRT prior to contacting them	141 (59.7)	44 (18.6)	51 (21.6)
Perceives that the presence of RRT decreases residents' autonomy	179 (75.8)	25 (10.6)	28 (11.9)

NOTE: Abbreviations: RRT, rapid response team.

*Where data do not equal 100%, this is due to missing data or rounding. Includes only data for respondents who had cared for a patient that required RRT activation.

RESULTS

There were 246 responses to the survey of a possible 342, yielding a response rate of 72% (Table 2). Ten respondents stated that they had never cared for a patient where the RRT had been activated. Given their lack of exposure to the RRT, these respondents were excluded from the analysis, yielding a final sample size of 236. The demographic and clinical practice characteristics of respondents are shown in Table 1.

Demographics and Primary Outcomes

Interns comprised 83 (35%) of the respondents; the average time in postgraduate training was 2.34 years (standard deviation = 1.41). Of respondents, 163 (69%) were in medical fields, and 73 (31%) were in surgical fields. Overall responses to the survey are shown in Table 2, and subgroup analysis is shown in Table 3.

Effect of the RRT on Resident Education

Of all residents, 66 (28%) agreed that they felt comfortable managing an unstable patient without the assistance of the RRT. Surgical residents felt more comfortable managing an unstable patient alone (38%) compared medical residents (24%) ($P < 0.01$). Interns felt less comfortable caring for unstable patients without the RRT's assistance (17%) compared with upper-level residents (34%) ($P = 0.01$).

Residents overall disagreed with the statement that the RRT left them feeling less prepared to care for unstable patients ($n = 201$; 85%). More upper-level residents disagreed with this assertion (91%) compared with interns (75%) ($P < 0.01$). Responses to this question did not differ significantly between medical and surgical residents.

Upper-level residents were more likely to disagree with the statement that the RRT resulted in fewer opportunities to care for unstable patients ($n = 129$; 86%) compared with interns ($n = 59$; 73%) ($P = 0.05$). Medical residents were also more likely to disagree with this statement ($n = 136$; 86%) compared with surgical residents ($n = 52$; 72%) ($P = 0.04$).

With respect to residents' overall impressions of the educational value of the RRT, 68 (83%) interns and 116 (77%) upper-level residents agreed that it provided a valuable educational experience ($P = 0.61$). Medical and surgical residents differed in this regard, with 134 (83%) medical residents and 50 (70%) surgical residents agreeing that the RRT provided a valuable educational experience ($P = 0.01$).

Effect of the RRT on Clinical Autonomy

Of all residents, 123 (52%) disagreed that the bedside nurse should always contact the primary resident prior to calling the RRT; 76 (32%) agreed with this statement. Medicine residents were more likely to disagree with this approach ($n = 97$; 60%) than were surgical residents ($n = 26$; 36%) ($P < 0.01$). There was no difference between interns and upper-level residents in response to this question. Most of those who disagreed with this statement were medical residents, whereas most surgical residents ($n = 38$; 54%) agreed that they should be contacted first ($P < 0.01$).

There were no differences between interns and upper-level residents with respect to perceptions of the RRT's impact on clinical autonomy: 11% of interns and 13% of residents agreed that the RRT decreased their clinical autonomy as a physician. There was no significant difference between medical and surgical residents' responses to this question.

The majority of residents ($n = 208$; 88%) agreed that they and the RRT work together to make treatment decisions for patients. This was true regardless of year of training ($P = 0.61$), but it was expressed more often among medical residents than surgical residents ($n = 151$, 93% vs $n = 57$, 83%; $P = 0.04$).

DISCUSSION

Most studies examining the educational and cultural impact of RRTs exist in the nursing literature. These studies demonstrate that medical and surgical nurses are often reluctant to call the RRT for fear of criticism by the patient's physician.^{5,8-13} In contrast, our data demonstrate that resident physicians across all

TABLE 3. Perceptions of the RRT Based on Years of Training and Specialty*

The resident ...	1 Year, n = 83, n (%)	>1 Year, n = 153, n (%)	P Value	Medical, n = 163, n (%)	Surgical, n = 73, n (%)	P Value
Is comfortable managing the unstable patient without the RRT			0.01			<0.01
Strongly disagree/disagree	39 (47.6)	65 (42.8)		67 (41.6)	37 (50.7)	
Neutral	29 (35.4)	35 (23.0)		56 (34.8)	8 (11.0)	
Agree/strongly agree	14 (17.1)	52 (34.2)		38 (23.6)	28 (38.4)	
And RRT work together to make treatment decisions			0.61			0.04
Strongly disagree/disagree	2 (2.4)	8 (5.4)		4 (2.5)	6 (8.7)	
Neutral	5 (6.1)	8 (5.4)		7 (4.3)	6 (8.7)	
Agree/strongly agree	75 (91.5)	137 (89.3)		151 (93.2)	57 (82.6)	
Believes there are fewer opportunities to care for unstable floor patients due to the RRT			0.05			0.04
Strongly disagree/disagree	59 (72.8)	129 (86.0)		136 (85.5)	52 (72.2)	
Neutral	13 (16.0)	13 (8.7)		15 (9.4)	11 (15.3)	
Agree/strongly agree	9 (11.1)	8 (5.3)		8 (5.0)	9 (12.5)	
Feels less prepared to care for unstable patients due to the RRT			<0.01			0.79
Strongly disagree/disagree	62 (74.7)	139 (90.8)		140 (85.9)	61 (83.6)	
Neutral	14 (16.9)	8 (5.2)		15 (9.2)	7 (9.6)	
Agree/Strongly agree	7 (8.4)	6 (3.9)		8 (4.9)	5 (6.8)	
Feels working with the RRT is a valuable educational experience			0.61			0.01
Strongly disagree/disagree	2 (2.4)	7 (4.7)		2 (1.2)	7 (9.9)	
Neutral	12 (14.6)	27 (18.0)		25 (15.5)	14 (19.7)	
Agree/strongly agree	68 (82.9)	116 (77.3)		134 (83.2)	50 (70.4)	
Feels nurses caring for unstable patients should always contact the resident prior to contacting the RRT			0.49			<0.01
Strongly disagree/disagree	47 (57.3)	76 (50.7)		97 (60.2)	26 (36.6)	
Neutral	9 (11.0)	24 (16.0)		26 (16.1)	7 (9.9)	
Agree/strongly agree	26 (31.7)	50 (33.3)		38 (23.6)	38 (53.5)	
Would be unhappy with nurses calling RRT prior to contacting them			0.81			<0.01
Strongly disagree/disagree	51 (61.4)	90 (58.8)		109 (66.9)	32 (43.8)	
Neutral	16 (19.3)	28 (18.3)		30 (18.4)	14 (19.2)	
Agree/strongly agree	16 (19.3)	35 (22.9)		24 (14.7)	27 (37.0)	
Perceives that the presence of the RRT decreases autonomy as a physician			0.95			0.18
Strongly disagree/disagree	63 (77.8)	116 (76.8)		127 (79.9)	52 (71.2)	
Neutral	9 (11.1)	16 (10.6)		17 (10.7)	8 (11.0)	
Agree/strongly agree	9 (11.1)	19 (12.6)		15 (9.4)	13 (17.8)	

NOTE: Abbreviations: RRT, rapid response team.

*Where data do not equal 100%, this is due to missing data or rounding.

levels of training and specialties have a positive view of the RRT and its role in patient care. The data support our hypothesis that although most residents perceive educational benefit from their interactions with the RRT, this perception is greater for less-experienced residents and for those residents who routinely provide care for critically ill patients and serve as code team leaders. In addition, a minority of residents, irrespective of years of training or medical specialty, felt that the RRT negatively impacted their clinical autonomy.

Our data have several important implications. First, although over half of the residents surveyed had not been exposed to RRTs during medical school, and despite having no formal training on the role of the RRT during residency, most residents identified their interactions with the RRT as potential learning opportunities. This finding differs from that of Benin and colleagues, who suggested that RRTs might negatively impact residents' educational development and decrease opportunities for high-stakes clinical reasoning by allowing the clinical decision-making process to be driven by the RRT staff rather than the resident.⁵

One possible explanation for this discrepancy is the variable makeup of the RRT at different institutions. At our medical center, the RRT is comprised of a critical care nurse and respiratory therapist, whereas at other institutions, the RRT may be led by a resident, fellow, attending hospitalist, or intensivist, any of whom might supersede the primary resident once the RRT is engaged.

In our study, the perceived educational benefit of the RRT was most pronounced with interns. Interns likely derive incrementally greater benefit from each encounter with an acutely decompensating patient than do senior residents, whether the RRT is present or not. Observing the actions of seasoned nurses and respiratory therapists may demonstrate new tools for interns to use in their management of such situations; for example, the RRT may suggest different modes of oxygen delivery or new diagnostic tests. The RRT also likely helps interns navigate the hospital system by assisting with decisions around escalation of care and serving as a liaison to ICU staff.

Our data also have implications for resident perceptions of clinical autonomy. Interns, far less

experienced caring for unstable patients than upper-level residents, expressed more concern about the RRT stripping them of opportunities to do so and about feeling less prepared to handle clinically deteriorating patients. Part of this perception may be due to interns feeling less comfortable taking charge of a patient's care in the presence of an experienced critical care nurse and respiratory therapist, both for reasons related to clinical experience and to a cultural hierarchy that often places the intern at the bottom of the authority spectrum. In addition, when the RRT is called on an intern's patient, the senior resident may accompany the intern to the bedside and guide the intern on his or her approach to the situation; in some cases, the senior resident may take charge, leaving the intern feeling less autonomous.

If training sessions could be developed to address not only clinical decision making, but also multidisciplinary team interactions and roles in the acute care setting, this may mitigate interns' concerns. Such curricula could also enhance residents' experience in interprofessional care, an aspect of clinical training that has become increasingly important in the age of limited duty hours and higher volume, and higher acuity inpatient censuses. An RRT model, like a code blue model, could be used in simulation-based training to increase both comfort with use of the RRT and efficiency of the RRT-resident-nurse team. Although our study did not address specifically residents' perceptions of multidisciplinary teams, this could be a promising area for further study.

For surgical residents, additional factors are likely at play. Surgical residents spend significant time in the operating room, reducing time present at the bedside and hindering the ability to respond swiftly when an RRT is called on their patient. This could cause surgical residents to feel less involved in the care of that patient—supported by our finding that fewer surgical residents felt able to collaborate with the RRT—and also to derive less educational benefit and clinical satisfaction from the experience. Differences between medical and surgical postgraduate training also likely play a role, manifest by varying clinical roles and duration of training, and as such it may not be appropriate to draw direct comparisons between respective postgraduate year levels. In addition, differences in patients' medical complexity, varying allegiance to the traditional hierarchy of medical providers, and degree of familiarity with the RRT itself may impact surgical residents' comfort with the RRT.

Limitations of our study include that it was conducted at a single site and addressed a specific population of residents at our tertiary academic center. Though we achieved an excellent response rate, our subspecialty sample sizes were too small to allow for individual comparisons among those groups. Conducting a larger study at multiple institutions where the makeup of the RRT differs could provide further

insight into how different clinical environments and different RRT models impact resident perceptions. Finally, we allowed each respondent to interpret both *educational benefit* and *clinical autonomy* in the context of their own level of training and clinical practice rather than providing strict definitions of these terms. There is no standardized definition of autonomy in the context of resident clinical practice, and we did not measure direct educational outcomes. Our study design therefore allowed only for measurement of perceptions of these concepts. Measurement of actual educational value of the RRT—for example, through direct clinical observation or by incorporating the RRT experience into an entrustable professional activity—would provide more quantitative evidence of the RRT's utility for our resident population. Future study in this area would help to support the development and ongoing assessment of RRT-based curricula moving forward.

CONCLUSION

Our data show that resident physicians have a strongly favorable opinion of the RRT at our institution. Future studies should aim to quantify the educational benefit of RRTs for residents and identify areas for curricular development to enhance resident education as RRTs become more pervasive.

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