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May 15, 2008

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FINAL NARRATIVE REPORT
UCSF RWJF RRT Initiative Evaluation Project
ID: 55702
December 15, 2005 (April14, 2008)
Amount: $224,023

Goal: Provide evaluation data to the Foundation, RRT grantees and the "community-at-large" that advances understanding of RRT impacts, outcomes and effective implementation.

FINAL NARRATIVE REPORT
UCSF RWJF RRT Initiative Evaluation Project

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1. What measurable goals did you set for this project and what indicators did you use to measure your performance? To what extent has your project achieved these goals and level of performance?

In 2005 the Robert Wood Johnson Foundation (RWJF) funded nine health care systems/associations to establish learning networks to assist hospitals in implementing rapid response teams (RRTs). The UCSF RWJ RRT Evaluation Project, a solicited proposal, was undertaken to evaluate the impacts of the RWJF RRT initiative. It is important to note that the evaluation design was “retrofitted” to the RRT Program and funded after the grantees had launched their diverse learning collaboratives. Despite this logistical challenge, with the support of the RWJF RRT grantees, their Institute for Healthcare Improvement (IHI) partners, and RWJF staff, the resulting 2 year project has deepened the understanding of the impact of Rapid Response Teams as seen through the eyes of the nurse. The primary objectives for the descriptive evaluation project were undertaken in collaboration with RWJF Project Staff and Grantees to:

1. Establish standardized metrics that build on IHI and Grantee proposed measures to establish a matrix of baseline, formative and summative measures that are feasible to collect and aggregate across sites and provide insight into the impacts of RRT implementation over time in diverse RWJF RRT grantees’ hospital settings.
2. Identify, explore, validate and describe contextual factors, including variation in nurse staffing, that are associated with comparatively “best” implementation of RRTs and factors that emerge as barriers to effective RRT implementation.
3. Develop and deploy educational and consultative assistance to grantees to build their capacity for evaluation data capture and optimize the integrity of the evaluation data they submit.
4. Conduct baseline, formative and summative point-in-time aggregation and analysis of “core” quantitative variables.

During the evaluation project's first six months the UCSF's research team developed a matrix of common measures derived from grantee evaluation metrics and worked with grantees to confirm access to data that described the development and implementation of RRTs. As noted previously, the aggregated quantitative data analysis was "retrofitted" to grantee scope of work post-award thus standardized data, baseline and summative, data access and capacity to receive/submit data were not anticipated and presented a special challenge. The UCSF research team found that missing data were common and the actual data received were generally much less than originally anticipated by the nine grantees. Data were gathered on RRT schedules, RRT staffing, RRT call volumes, calls to the RRT per 1000 discharges, and source of RRT calls. Eight of the nine grantees reported baseline and final quantitative data indicating their progress in establishing Rapid Response Teams for 584 hospitals. A summary of the quantitative data analysis is provided as Attachment A.

The UCSF RRT Evaluation project also used a qualitative methodological approach to explicate contextual factors, best practices and impacts of factors associated with RRT implementation success and challenges from the perspective of hospital Chief Nursing Officers (CNOs), RRT Leaders and "through the eyes" of the Staff Nurses. Two cohorts of participating hospitals meeting selection criteria as either representing a robust, highly successful adoption of the RRT or a hospital representing a more challenged, difficult and less robust adoption of the RRT were gleaned from grantees and then one from each cohort of robust and less robust adopters was randomly selected for a site visit, providing a representative sample of 18 hospitals in 13 states drawn from all grantees. Members of the research team then visited each hospital. During the visit team members conducted and recorded semi-structured interviews, which were later transcribed, with a total of 17 Chief Nurse Officers, 42 Rapid Response Team leaders/members, and 56 Staff Nurses who had at least one experience using the RRT. Narrative content from the interview transcripts were systematically analyzed to extract themes. Findings revealed that there were specific catalysts and unique challenges to planning and implementing RRTs. CNOs and RRT Leaders cited patient safety priorities, the quest for clinical excellence, and the aim of supporting staff nurses as primary reasons for implementing the RRT. Leadership also reported challenges in adopting RRTs such as the availability of resources for staffing the emerging RRT, reaching target audiences effectively, negotiating competing missions, and multiple concurrent safety initiatives. The impact of RRT "through the eyes of the nurse" revealed that the most common reasons staff nurses cited for calling the RRT were significant changes in patient signs or symptoms, nurse's "gut feeling" something was wrong, and nurse's inability to engage the MD in a timely response to observations and/or concerns regarding deterioration in the patient. Nurses reported that the RRT brought to the bedside crucial assistance, plus expertise that included critical care competencies. RNs noted that the RRT expedited patients transfer to higher level of care when needed. Before the RRT was called, nurses felt concerned, frustrated, anxious, uneasy, and nervous. When the RRT arrived, they felt relieved, confident, and appreciative. After the team left, nurses felt supported, confident, relieved, and appreciative. Nurses found the RRT to be life saving to their patients, affirming to their role, and workload ameliorating. The attached PowerPoint presentation (Attachment B) provides detail on the qualitative methods and findings. The interview guide used to elicit these findings is provided in Attachment C.

2. Did the project encounter internal or external challenges? How were they addressed? Was there something RWJF could have done to assist you?

There were unique challenges in obtaining quantitative data. The UCSF RRT Evaluation project was initiated after the Robert Wood Johnson Foundation (RWJF) funded nine health care systems/associations to establish learning networks to assist hospitals in implementing rapid response teams (RRTs). The nine grantees were generous and willing to participate in data collection; however grantees were generally hesitant to ask hospitals to submit their internally obtained data. Thus, the aggregated quantitative data analysis was "retrofitted" to the grantees scope of work post award, limiting access to standardized data. Further, the capacity to receive/submit data was not anticipated by grantees during their initial planning and presented a special challenge. For example, one grantee was simply not able to obtain final data to submit to the evaluation research team. In addition, missing data were common, thus, actual data received were generally much less than originally anticipated by grantees. We advised our project officer, Nancy Fishman, of these challenges and included in our briefing to RWJF staff our recommendation that the evaluation design and expectation for participation would be strengthened in future projects if it was integrated into the initial scope of work and grantee funding requirements. Our efforts in optimizing the special challenges of the quantitative data clearly benefited from the insights and support of both Nancy Fishman and the RRT Grantee Project Officer, Rosemary Gibson.

3. Have there been other sources of support?

The University of California School of Nursing (UCSF) Center for Nursing Research and Innovation in Patient Care, provided in-kind support for office space, administrative needs, computer equipment and telephone services.

4. What lessons did you learn from undertaking this project?

When the observations gleaned from this evaluation study are examined using the lens of the First Consensus Conference Report on Medical Emergency Teams (Devita, Bellomo et al. 2006), it is clear that the RWJF and IHI partnership fostered and expedited hospital adoption of Rapid Response Teams that were fairly robust in their implementation and viewed as successful by users in bringing urgent assistance to the bedside of patients whose nurses triggered calls for urgent assistance. Upon reflection however, it may be posited that the majority of hospitals we visited for on-site interviews had focused on implementation teams rather than medical emergency systems, considered a more complex and perhaps more effective solution to the challenge of bringing urgently needed resources (treatment prescription, advanced airway management; central lines, establish ICU level of care instantly) to the bedside of non-critical care patients who have emergent need. Some hospitals had in fact adopted a variant of the RRT and integrated critical care outreach into their programs, through prospective identification of high risk patients and proactive early intervention to prevent physiological crisis. Despite the variation in RRT program characteristics, we were consistently impressed by the passion of hospitals for the RRT implementation they had undertaken. We were particularly struck by the emotion-laden reports from staff nurses about their experiences using the RRT. Hearing stories from nurses, we became convinced that the RRT is truly important to nurses as a source of immediate assistance when they are faced with deteriorating patient condition.

5. *What impact do you think the project has had to date? Who can be contacted a few years from now to follow up on the project?*

On a micro level, feedback from several of the RWJF RRT Grantees suggested that participation in the evaluation strengthened their own evaluation efforts and gave them insights into measures they had not initially considered. The UCSF Research Team in its contacts with RWJF Grantees provided informal consultation and in one case was asked to provide formal consultation (North Carolina) in expanding project specific evaluations.

On a macro level, findings from the USCF RRT Evaluation project can be expected to add to the body of evidence describing the impact of RRTs through the eyes of the nurse. To date, studies exploring the responses of nurses to RRT implementation have been undertaken primarily in Australia and typically drawing nurse respondent samples from 1-2 hospitals. Our study tapped nurses from 18 hospitals in 13 states and while the number of nurses interviewed was relatively small, the themes resonated across sites and were generally consistent with those reported by others (Cioffi 2000; Salamonson, van Heere et al. 2006); (Jones, Baldwin et al. 2006)and (Galhotra, Scholle et al. 2006). The breadth of the findings from the USCF RRT Evaluation project contributes toward the development, implementation and impacts of RRTs throughout the United States. Importantly, our study may be particularly valuable to those who seek better insight into factors that contribute to the nurses' decision to call the RRT. At the 4th Annual International Symposium on Rapid Response Systems and Medical Emergency Teams (Toronto, May 8-9, 2008) it was noted that more knowledge is needed related to "important factors in failure to activate the rapid response system" and about nurses' decision-making in triggering the RRT (Comments by Michael DeVita, "Consensus Conference Summation and Recommendations, May 9, 2008). Findings from this study will contribute to this area of inquiry.
Future inquiries related to this project may be directed to: Nancy Donaldson, Clinical Professor, Director, Center for Research and Innovation in Patient Care**,** UCSF School of Nursing, Telephone: 650-723-7062**,** Email: Nancy.Donaldson@nursing.ucsf.edu

6. *What are the post-grant plans for the project if it does not conclude with the grant?*

This project formally ends with the evaluation of the RWJF RRT program. However, a number of potential next steps have emerged from this study. We have urged the RWJF to consider further studies that examine the following research questions:

- How does the effectiveness and robustness of RRT implementation impact successful rescue of patients.
- How do microsystem and workforce characteristics, staff expertise and RRTs impact relate to processes of care and patient care outcomes and costs?

It is noteworthy that these research priorities were also highlighted at the 4th Annual International Symposium on Rapid Response Systems and Medical Emergency Teams (Toronto, May 8-9, 2008) and are validated by the results of the preliminary report of the International MET and RRS Consensus Conference Summit.

Next, since the Center for Medicare and Medicaid Services (CMS) has proposed adoption of Failure to Rescue as a quality measure effective with its 10th scope of work, research and development studies that explore the processes of care leading to triggering the RRT or MET is timely and important. Single setting studies suggest wide variation in the accuracy and reliability of vital sign observations, documentation and data synthesis as the basis for early identification of patient deterioration. As the nation gears up to measure Failure to Rescue and focuses on outcomes that are considered sensitive to nursing (Needleman and Buerhaus 2007), it will be imperative to examine the processes of assessing and responding to changes in vital signs, observation accuracy, reliability, documentation and systematic review of these data to trigger early signs of adverse events. Equally important will be to study how variation in characteristics of the direct care staff may impact these vital process in early rescue. This new measure is being proposed to the California Nursing Outcomes Coalition Research Team when it meets May 31, 2008.

7. With a perspective on the entire project, what have been its key publications and national/regional communications activities? Did the project meet its communication goals?

Our first communication goal was to meet with key RWJF staff stakeholders and share with them findings and recommendations emerging from this evaluation study. This meeting was held at RWJF headquarters, January 2008.

Next we focused on immediate priorities for presentations which benefited from recommendations from RWJF's Nancy Fishman and Rosemary Gobson. We immediately worked with IHI to schedule a teleconference with RWJF RRT Grantees. In addition, we successfully pursued an opportunity to present at the 4th International MET Conference in Toronto. In summary, the findings from the UCSF RWFJ Rapid Response Team Evaluation project have been accepted for presentation at the following conferences.

1. IHI RWJF RRT Grantee Teleconference, May 2, 2008. Moderated by Kathy Duncan, IHI and co-presented by Drs. Donaldson, Shapiro, Scott and Mary Foley, of the UCSF Team. Power Point provided in Attachment D.
2. 4th International MET Conference - 4th International Symposium on Rapid Response Systems and Medical Emergency Teams, May 8 & 9, 2008, Toronto, Canada. Poster Presentation by Nancy E. Donaldson. Abstract and poster graphic are provided in Attachment D.
3. 2008 National State of the Science in Nursing Research. October 2-4, 2008. Washington, D.C. Poster presentation has been confirmed by Susan Shapiro. Abstract provided in Attachment D.

In addition to the above we were not successful in our effort to win selection of our abstract for presentation at the June 2008 Academy Health Conference.

We have collaborated with Kathy Duncan in proposing a workshop for the 20th Annual National Forum on Quality Improvement in Health Care. December 8-11, 2008. Nashville, Tennessee and hope to receive confirmation of acceptance shortly.

In collaboration with our RWJF Project Officer, the UCSF RWJF RRT Evaluation Team has developed the following publications plan and has completed preliminary editorial contacts. The table below summarizes the focus and target audience for planned publications:

Journal	Target Audience	Key Message	Status
AJN	Staff Nurses and APNs in Acute Care	Impact of RRTs on RN role satisfaction;	Conf. Call with Diana Mason; Outline complete
JONA	CNOs and Nurse Leaders	Tactics associated with robust implementation of RRT from CNO perspective	Outline complete
TJC Journal of Quality & Safety	Interdisciplinary team; quality and safety leaders in acute care	Qualitative characteristics of successful RRT implementation	Outline under development
Modern Health Care	CEOs; COOs	Strategic impacts of RRTs through the eyes of the nurse	Outline under development

In summary, as we conclude the UCSF RWJF RRT Evaluation Project we have a focused plan for communication, dissemination and publications. We note that we had hoped to attach to this report a draft first manuscript for publication. We revised this timeline in order to capitalize on emerging opportunities for presentations. We are committed to completing and submitting all manuscripts above on or before September 1, 2008.

In Conclusion

The UCSF RWJF RRT Evaluation Project leveraged a unique opportunity to work closely with 9 RWJF Grantees in the midst of launching multisite learning collaboratives with the aim of expediting adoption and implementation of RRTs in hospitals. While the project's capacity to collect quantitative data from grantees confronted numerous barriers and was ultimately quite limited, the opportunity to visit 18 representative hospitals in 13 states was an extraordinary journey in appreciating the experiences of nurses who activated RRTs in an effort to rescue their patients. Noting that our study did not address the impacts of regulatory and staffing variations on RN experiences with RRTs in practice, we acknowledge that our findings are quite preliminary and inherently have limited generalizability. However, through hours of interviews with 56 staff nurses we tapped into themes across hospitals that were powerful and recurring. We defer to others to debate the impact of RRTs on patient care safety, mortality and cost. We conclude that the most significant impact of the RRT, as observed in this study, may actually be found among the nurses who experience the RRT as life saving to their patients, affirming to their role, and workload ameliorating. The impact of RRTs on RN recruitment, retention, intent to leave, perceived role support, role stress and failure to rescue is unmeasured in this study but observed to be profound, pervasive and ultimately workforce enhancing.

We are hopeful that the Foundation will consider future studies that will build on the foundation of this study and reflect the urgent need for evidence to better understand the role of the nurse in patient rescue and how characteristics of the workforce may influence the triggers to and outcome of the RRT.

Acknowledgements

We gratefully acknowledge the collaboration of the IHI RRT Team and of the RWJF RRT Grantees and the 18 hospitals in 13 states that welcomed our team and shared the story of their RRT implementation journey and impacts.

Special thanks to Dr. Lena Gunningberg RN, PhD, for her contribution to the analysis of the qualitative data in her role as a visiting scholar, UCSF Center for Research & Innovation in Patient Care.

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ID: 55702
December 15, 2005 to October 2008

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2. Nancy E. Donaldson. "UCSF-RWJF Rapid Response Team Initiative Evaluation Project" 4th International MET Conference - 4th International Symposium on Rapid Response Systems and Medical Emergency Teams, May 8 & 9, 2008, Toronto, Canada. Poster Presentation by Abstract and poster graphic are provided in Appendix D.
3. Susan Shapiro 2008 National State of the Science in Nursing Research. October 2-4, 2008. Washington, D.C. Poster presentation has been confirmed by. Abstract provided in Appendix D.

ATTACHMENTS

Attachment A. Summary Final Quantitative Data Analysis

Attachment B. Presentation of all Results / Detail Qualitative Methods & Findings

Attachment C. Interview Guide

Attachment D.

1. IHI RWJF RRT Grantee Teleconference, May 2, 2008. Moderated by Kathy Duncan, IHI and co-presented by Drs. Donaldson, Shapiro, Scott and Mary Foley, of the UCSF Team. Power Point provided in Attachment D
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Attachment A

UCSF School of Nursing
Center for Research and Innovation in Patient Care
RWJF RRT Evaluation Project

Summary -Final Data Analysis
April 15, 2008

This report revises the findings of the quantitative analysis, based on the analysis plan presented November 8, 2007. This revision addresses questions raised in our meeting on March 4, 2008. The key change in most of the analysis is that hospitals that reported multiple times were reduced to a single observation.

Summary of grantee characteristics

The hospitals that implemented rapid response teams (RRTs) averaged 305 beds, with half the hospitals having 243 or more beds (Table 1). The median number of average daily discharges was 31.4. Some hospitals reported their average daily census, with a median of 145. Many hospitals involved in the RRT project were teaching facilities; 27% reported that they were teaching hospitals. Table 2 summarizes the characteristics of hospitals for each grantee.

Table 1. Summary of grantee characteristics

	Mean	Std. Dev.	25th percentile	50th percentile	75th percentile	Number of hospitals
Beds	304.6	232.6	136	243	412	661
Average daily discharges	37.7	29.4	17.0	31.4	50.7	560
Average daily census	179.9	138.3	79	145	250	442

Table 2. Means of grantee characteristics, by grantee. (Standard deviations in parentheses.)

	Number of participating hospitals*	Beds	Average daily discharges	Average daily census	Teaching?
ID 1	18	783.4 (327.8)	96.6 (59.4)		100.0%
ID 2	45	170.3 (218.9)			0.0%
ID 3	28	263.2 (154.9)		205.8 (120.7)	40.9%
ID 4	25	248.6 (306.1)	34.0 (40.7)		36.0%
ID 5	46	344.7 (160.1)	51.3 (27.9)		21.7%
ID 6	55	255.9 (242.9)	39.5 (46.9)		18.2%
ID 7	20	355.9 (210.6)	35.2 (17.9)		5.0%
ID 8	307	311.7 (210.3)	36.2 (25.8)	178.8 (139.0)	27.6%
ID 9	40	233.7 (177.9)			

* Not all participating hospitals reported data on hospital beds, average daily discharges, average daily census, and teaching status.

As presented in Table 3, most RRTs were implemented to operate 24 hours per day, 7 days per week (90.1%). There was greater variation in the staffing of RRTs; 46 percent of hospitals staffed their RRT with an intensive care unit (ICU) registered nurse (RN) and a respiratory therapist (RT). Another 26 percent added a physician (MD) to the team. Fewer than two percent of hospitals used a team with an ICU RN and a physician assistant (PA). "Other" staffing plans were used by 45 percent of hospitals. Teaching facilities were more likely to have a physician work with an ICU RN and RT on the RRT (35% vs. 17.9%).

Table 3. Summary of RRT schedule and staffing

	All hospitals	Teaching	Non-Teaching
RRT schedule	(n=182)	(n=40)	(n=102)
24 hours / 7 days	90.1%	87.5%	87.3%
7 days, not 24 hrs	2.2%	5.0%	2.0%
Weekdays only	3.3%	7.5%	2.9%
7 nights only	1.6%	0.0%	2.9%
Other schedule	2.7%	0.0%	4.9%
RRT staffing	(n=184)	(n=40)	(n=106)
ICU RN + RT	46.2%	37.5%	46.2%
ICU RN + RT + MD	26.1%	35.0%	17.9%
ICU RN + PA	1.6%	0.0%	0.0%
Other staffing	45.1%	37.5%	47.2%

Notes: Columns might not add to 100% because some hospitals reported more than one schedule or staffing plan. Not all hospitals reported teaching status; data for hospitals with unknown teaching status are not reported separately.

Table 4 presents the schedule and staffing of RRTs for hospital size categories. Hospitals with 101 to 200 beds were most likely to have their RRT operating 24 hours per day, 7 days per week

(95.6%). Hospitals with more than 450 beds were least likely to use this schedule (80.5%). The largest hospitals also more often used weekday-only schedules (9.8%) and other schedules (4.9%). Many hospitals with 201 to 300 beds implemented a seven-day schedule for days only (6.7%).

RRT staffing also varied with hospital size. Larger hospitals with 201 or more beds were somewhat more likely to have a RRT team composed of an ICU RN, RT, and MD than any other configuration.

Table 5 summarizes RRT schedules and staffing for each grantee. Three grantees implemented a 24/7 schedule in all hospitals, but the composition of the RRT varied across hospitals for every grantee.

Table 4. Summary of RRT schedule and staffing, by hospital size

	Up to 100 beds	101-200 beds	201-300 beds	301-450 beds	More than 450 beds
RRT schedule	N=32	(n=45)	(n=30)	(n=34)	(n=41)
24 hours / 7 days	93.8%	95.6%	86.7%	94.1%	80.5%
7 days, not 24 hrs	3.1%	0.0%	6.7%	0.0%	2.4%
Weekdays only	0.0%	2.2%	3.3%	0.0%	9.8%
7 nights only	0.0%	2.2%	3.3%	0.0%	2.4%
Other schedule	3.1%	0.0%	0.0%	5.9%	4.9%
RRT staffing	(n=34)	(n=45)	(n=31)	(n=34)	(n=40)
ICU RN + RT	44.1%	51.1%	41.9%	52.9%	40.0%
ICU RN + RT + MD	23.5%	20.0%	25.8%	29.4%	32.5%
ICU RN + PA	2.9%	4.4%	0.0%	0.0%	0.0%
Other staffing	50.0%	53.3%	41.9%	35.3%	42.5%

Note: Columns might not add to 100% because some hospitals reported more than one schedule or staffing plan.

Table 5. Summary of RRT organization and schedule, by grantee

	Schedule of RRT					Composition of RRT			
	24 / 7	7 days	Week-days	7 nights	Other	RN + RT	RN + RT + MD	RN + PA	Other
ID 1	60.0%	20.0%	20.0%	0.0%	0.0%	0.0%	85.7%	0.0%	14.3%
ID 3	95.5%	0.0%	4.5%	0.0%	0.0%	40.9%	0.0%	0.0%	59.1%
ID 4	100.0%	0.0%	0.0%	0.0%	0.0%	36.0%	28.0%	0.0%	38.0%
ID 5	66.6%	7.7%	5.1%	7.7%	12.8%	20.0%	30.0%	0.0%	50.0%
ID 6	93.5%	0.0%	6.4%	0.0%	0.0%	84.4%	15.6%	0.0%	50.0%
ID 7	100.0%	0.0%	0.0%	0.0%	0.0%	55.0%	15.0%	0.0%	30.0%
ID 9	100.0%	0.0%	0.0%	0.0%	0.0%	55.3%	39.5%	7.9%	47.4%

Note: Rows might not add to 100% because some hospitals reported more than one schedule or staffing plan.

The staffing of RRTs varied somewhat with the schedule established, as seen in Table 6. A team comprised of an ICU RN and RT was most common for RRTs that operated 24/7 or seven days per week. "Other" staffing strategies were used more often for RRTs that operated on weekdays or nights only.

Table 6. RRT staffing plan by schedule

	24/7	7 days	Weekdays	7 nights	Other
ICU RN + RT	48.7%	66.7%	40.0%	33.3%	0.0%
ICU RN + RT + MD	24.7%	33.3%	0.0%	0.0%	80.0%
ICU RN + PA	1.9%	0.0%	0.0%	0.0%	0.0%
Other staffing	46.1%	0.0%	80.0%	66.7%	20.0%

Note: Columns might not add to 100% because some hospitals reported more than one staffing plan.

Summary of RRT utilization

There was substantial variation in the utilization of rapid response teams. Table 7 presents summary statistics of RRT use. Hospitals reported an average of 0.121 RRT calls per hospital bed, with median calls at 0.087 per bed. The interquartile range of call rates was 0.041 to 0.149, indicating that the top 25 percent of hospitals had at least three times as many calls as the bottom 25 percent of hospitals. RRTs averaged 4.6 calls per 1000 discharges, and the distribution of calls per 1000 discharges is skewed, with 10 percent of hospitals having 6 or more calls per 1000, and the maximum number of calls being 181 per 1000. Figure 1 presents RRT calls per hospital bed according to hospital and RRT characteristics, and Figure 2 presents RRT calls per 1000 discharges. Robust adopters had slightly lower RRT call rates than weak adopters (0.12 vs. 0.14). Teaching hospitals had higher call rates (0.15). RRT call rates per hospital bed generally increased with hospital size, but call rates per 1000 discharges did not follow this pattern. RRTs that operated 24 hours per day, 7 days per week, were called more often than RRTs on other schedules.

Table 7. RRT calls per hospital bed and per discharge in final data period

	RRT calls per bed	RRT calls per 1000 discharges
Mean	0.121	4.6
Standard deviation	0.139	15.4
25th percentile	0.041	0.9
50th percentile	0.087	1.9
75th percentile	0.149	3.3
Number of observations	319	331

Figure 1. RRT calls per hospital bed, by facility and RRT characteristics

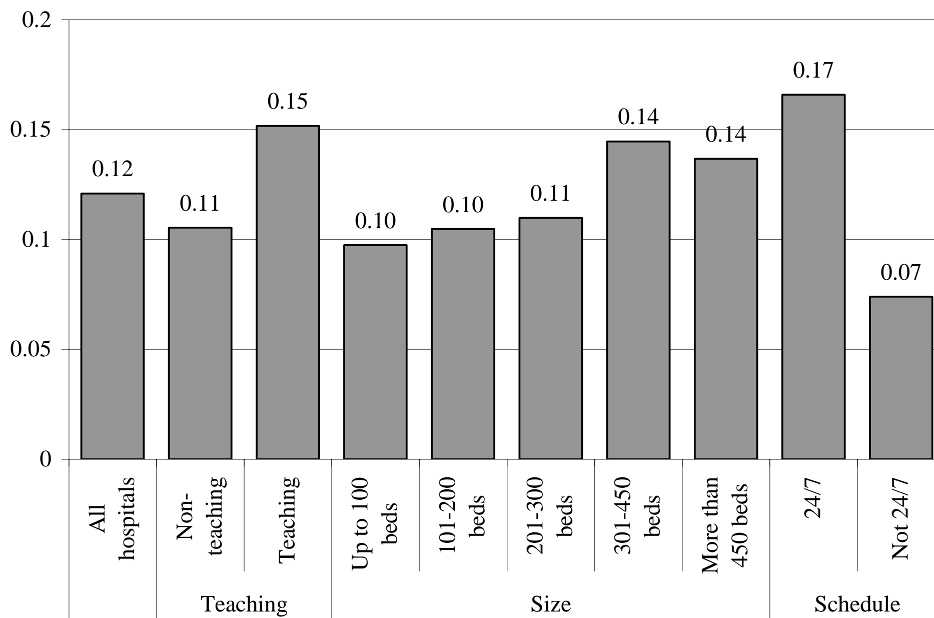
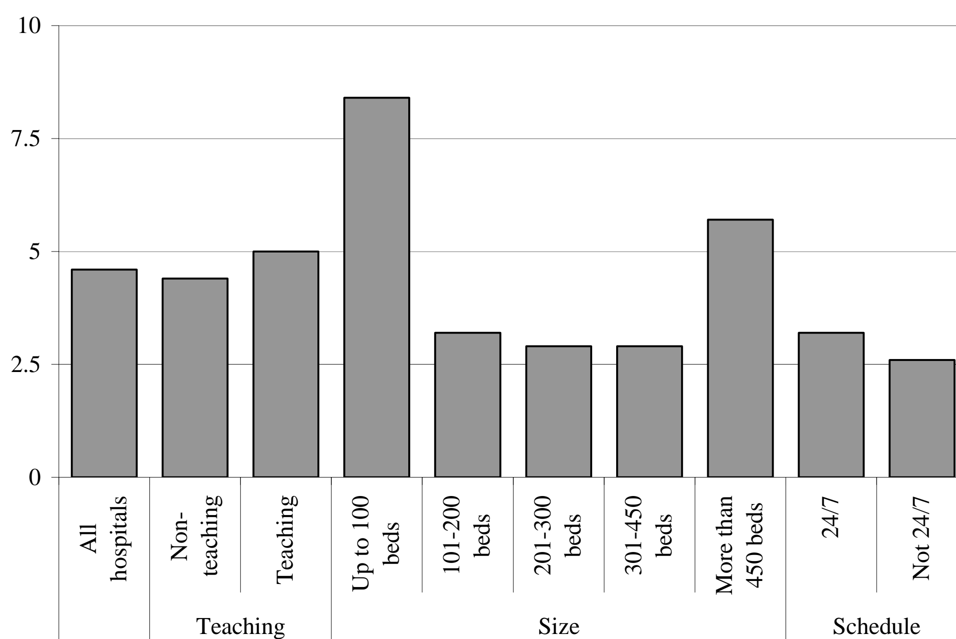


Figure 2. RRT calls per 1000 discharges, by facility and RRT characteristics



Grantee utilization of RRTs varied substantially, as presented in Table 8. Average RRT calls per hospital bed for grantees ranged from 0.103 to 0.391. Average RRT calls per 1000 discharges ranged from 2.48 to 4.97, with large standard deviations.

Table 8. RRT calls per hospital bed and per 1000 discharges

	Calls per hospital bed		Calls per 1000 discharges	
	Mean	Standard Deviation	Mean	Standard Deviation
ID 1	0.193	0.171	Not available	Not available
ID 3	0.391	0.403	Not available	Not available
ID 4	0.123	0.125	2.48	3.39
ID 5	0.111	0.063	2.85	2.85
ID 6	0.167	0.215	3.90	5.18
ID 8	0.103	0.101	4.97	17.48

Only one grantee provided information about RRT activation; Figure 3 summarizes these data. For the 32 hospitals that reported about their RRT activation history, 92 percent of responses were activated by RNs, 1 percent were activated by MDs, 3 percent were activated by other clinicians, and less than one percent were activated by physician assistants. Teaching hospitals reported more cases activated by MDs than non-teaching hospitals (3.7% vs. 0.2%). This, combined with teaching hospitals being more likely to have MDs on the RRT, suggests that physicians were more actively involved in RRTs in teaching hospitals.

Figure 3. Summary of who called the RRT for Grantee 6

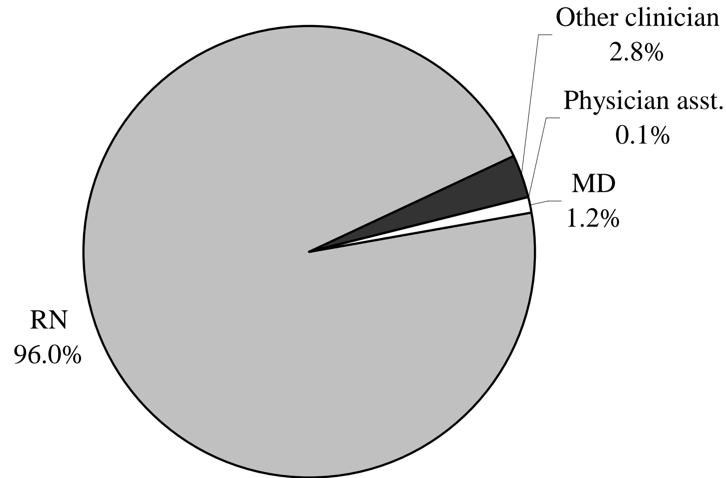


Table 9 summarizes the outcomes of RRT events for the two grantees that reported these data. Nearly half of RRT events resulted in the patient being transferred to ICU (46.8%), and the patient was stabilized in 47 percent of cases. Patients were slightly more likely to be transferred to the ICU in non-teaching hospitals than in teaching hospitals (48.5% vs. 42.6%).

Table 9. Summary of RRT outcomes

	All hospitals	Teaching	Non-teaching
Outcome of call… (n)	(n=53)	(n=15)	(n=38)
Transferred to ICU	46.8%	42.6%	48.5%
Outcome for patient (n)	(n=39)	(n=8)	(n=31)
Patient coded	3.6%	4.0%	3.6%
Patient stabilized	46.9%	49.4%	46.3%

Changes in patient outcomes

A primary goal of rapid response teams is to improve patient outcomes. Grantees were asked to submit data about their inpatient mortality rates, code rates, and share of codes outside the ICU, to ascertain whether the RRT improved these outcomes. Table 10 summarizes inpatient mortality rates before and after RRT implementation. The change in mortality is measured, and unmatched t-tests were conducted to determine if changes were statistically significant. Inpatient mortality rates were not adjusted for differences in patient acuity or other factors that might affect mortality rates. On average, inpatient mortality rates were higher after RRT implementation, but none of the changes were statistically significant. The observed increase in

mortality rates could have resulted from differences in measurement, casemix, or other factors, or could simply be indicative of random variation in mortality.

Table 10. Inpatient mortality

	Initial data	Final data	Change	Significant?	N
All hospitals	0.0272	0.0552	0.0280	No	281
ID 1	0.0243	0.0248	0.0005	No	22
ID 2	0.0205	0.0531	0.0325	No	90
ID 3	0.0204	0.0222	0.0018	No	17
ID 5	0.0580	0.1121	0.0541	No	43
ID 6	0.0234	0.0406	0.0172	No	89
Teaching	0.0255	0.0267	0.0012	No	55
Non-teaching	0.0277	0.0615	0.0338	No	226
Up to 100 beds	0.0208	0.0534	0.0325	No	78
101 – 200 beds	0.0199	0.0924	0.0725	No	58
201 – 300 beds	0.0243	0.0261	0.0018	No	30
301 – 450 beds	0.0231	0.0260	0.0029	No	49
More than 450 beds	0.0433	0.0630	0.0197	No	66
24 / 7 schedule	0.0231	0.0396	0.0165	No	131
Not 24/7 schedule	0.0907	0.2154	0.1247	No	16

Table 11 presents rates of codes per 1000 discharges before and after RRT implementation. These data show a small but statistically insignificant increase in codes per 1000 discharges. Table 12 presents the share of codes occurring outside ICU, which declined on average. This decline was statistically significant for one grantee, but not significant for any other subgroup.

Table 11. Codes per 1000 discharges

	Initial data	Final data	Change	Significant?	N
All hospitals	7.304	6.931	-0.373	No	708
ID 1	7.072	9.906	2.834	No	26
ID 3	5.340	5.192	-0.148	No	17
ID 4	4.688	3.374	-1.314	No	32
ID 5	9.113	9.620	0.506	No	42
ID 6	6.042	6.462	0.420	No	81
ID 8	7.684	6.931	-0.753	No	491
Teaching	7.040	7.158	0.118	No	211
Non-teaching	7.416	6.754	-0.662	No	466
Up to 100 beds	6.868	9.393	2.524	No	64
101 – 200 beds	6.785	4.886	-1.899	No	140
201 – 300 beds	6.855	6.880	0.256	No	105
301 – 450 beds	8.733	7.442	-1.292	No	139
More than 450 beds	7.097	7.195	0.098	No	260
24 / 7 schedule	6.682	6.563	-0.119	No	159
Not 24/7 schedule	6.402	6.032	-0.370	No	16

Table 12. Percent of codes outside ICU

	Initial data	Final data	Change	Significant?	N
All hospitals	49.2%	48.3%	-0.9	No	711
ID 1	56.2%	47.9%	-8.3	No	19
ID 3	45.1%	54.1%	9.0	No	16
ID 4	58.6%	48.5%	-10.2	No	32
ID 5	41.7%	47.2%	5.5	No	44
ID 6	57.4%	43.7%	-13.8	Yes	89
ID 8	47.7%	48.9%	1.2	No	495
Teaching	50.4%	49.5%	-0.8	No	201
Non-teaching	48.7%	47.5%	-1.2	No	479
Up to 100 beds	43.6%	49.7%	6.0	No	77
101 – 200 beds	54.1%	48.9%	-5.3	No	140
201 – 300 beds	47.3%	46.7%	-0.5	No	106
301 – 450 beds	47.7%	46.5%	-1.1	No	139
More than 450 beds	50.1%	49.2%	-0.9	No	249
24 / 7 schedule	50.1%	46.4%	-3.8	No	157
Not 24/7 schedule	49.3%	55.8%	6.6	No	16

Conclusions

Grantees reflected a wide range of facility size, RRT implementation strategy, and RRT utilization. Most hospitals elected to operate their RRT 24 hours a day, 7 days per week. RRT staffing varied across and hospitals, even within grantees. There is no indication that any particular RRT staffing model is better than another. RRTs were most often called by RNs, and RRT calls resulted in a patient returning to the ICU as often as the patient stabilizing and staying in their bed.

The minimal data on patient outcomes received for this evaluation did not demonstrate any statistically significant improvement in patient outcomes after the RRTs were implemented. Future evaluation of RRTs should include collection of risk-adjusted mortality and other outcomes data at multiple points in time. Proper risk-adjustment is particularly important, because measurement of the impact of RRTs on mortality is confounded by differences in patient acuity. The lack of significant improvement in patient outcomes in this evaluation should not be taken as evidence that RRTs have no effect on patient outcomes.

Table 1. Summary of grantee characteristics

	Mean	Std. Dev.	25th percentile	50th percentile	75th percentile	Number of hospitals
Beds	304.6	232.6	136	243	412	661
Average daily discharges	37.7	29.4	17.0	31.4	50.7	560
Average daily census	179.9	138.3	79	145	250	442

Table 2. Means of grantee characteristics, by grantee. (Standard deviations in parentheses.)

	Number of participating hospitals*	Beds	Average daily discharges	Average daily census	Teaching?
ID 1	18	783.4 (327.8)	96.6 (59.4)		100.0%
ID 2	45	170.3 (218.9)			0.0%
ID 3	28	263.2 (154.9)		205.8 (120.7)	40.9%
ID 4	25	248.6 (306.1)	34.0 (40.7)		36.0%
ID 5	46	344.7 (160.1)	51.3 (27.9)		21.7%
ID 6	55	255.9 (242.9)	39.5 (46.9)		18.2%
ID 7	20	355.9 (210.6)	35.2 (17.9)		5.0%
ID 8	307	311.7 (210.3)	36.2 (25.8)	178.8 (139.0)	27.6%
ID 9	40	233.7 (177.9)			

* Not all participating hospitals reported data on hospital beds, average daily discharges, average daily census, and teaching status.

Table 3. Summary of RRT schedule and staffing

	All hospitals	Teaching	Non-Teaching
RRT schedule	(n=182)	(n=40)	(n=102)
24 hours / 7 days	90.1%	87.5%	87.3%
7 days, not 24 hrs	2.2%	5.0%	2.0%
Weekdays only	3.3%	7.5%	2.9%
7 nights only	1.6%	0.0%	2.9%
Other schedule	2.7%	0.0%	4.9%
RRT staffing	(n=184)	(n=40)	(n=106)
ICU RN + RT	46.2%	37.5%	46.2%
ICU RN + RT + MD	26.1%	35.0%	17.9%
ICU RN + PA	1.6%	0.0%	0.0%
Other staffing	45.1%	37.5%	47.2%

Notes: Columns might not add to 100% because some hospitals reported more than one schedule or staffing plan. Not all hospitals reported teaching status; data for hospitals with unknown teaching status are not reported separately.

Table 4. Summary of RRT schedule and staffing, by hospital size

	Up to 100 beds	101-200 beds	201-300 beds	301-450 beds	More than 450 beds
RRT schedule	N=32	(n=45)	(n=30)	(n=34)	(n=41)
24 hours / 7 days	93.8%	95.6%	86.7%	94.1%	80.5%
7 days, not 24 hrs	3.1%	0.0%	6.7%	0.0%	2.4%
Weekdays only	0.0%	2.2%	3.3%	0.0%	9.8%
7 nights only	0.0%	2.2%	3.3%	0.0%	2.4%
Other schedule	3.1%	0.0%	0.0%	5.9%	4.9%

Note: Columns might not add to 100% because some hospitals reported more than one schedule or staffing plan.

Table 4. Summary of RRT schedule and staffing, by hospital size cont.

	Up to 100 beds	101-200 beds	201-300 beds	301-450 beds	More than 450 beds
RRT staffing	(n=34)	(n=45)	(n=31)	(n=34)	(n=40)
ICU RN + RT	44.1%	51.1%	41.9%	52.9%	40.0%
ICU RN + RT + MD	23.5%	20.0%	25.8%	29.4%	32.5%
ICU RN + PA	2.9%	4.4%	0.0%	0.0%	0.0%
Other staffing	50.0%	53.3%	41.9%	35.3%	42.5%

Note: Columns might not add to 100% because some hospitals reported more than one schedule or staffing plan.

Table 5. Summary of RRT organization and schedule, by grantee

	Schedule of RRT					Composition of RRT			
	24 / 7	7 days	Week-days	7 nights	Other	RN + RT	RN + RT + MD	RN + PA	Other
ID 1	60.0%	20.0%	20.0%	0.0%	0.0%	0.0%	85.7%	0.0%	14.3%
ID 3	95.5%	0.0%	4.5%	0.0%	0.0%	40.9%	0.0%	0.0%	59.1%
ID 4	100.0%	0.0%	0.0%	0.0%	0.0%	36.0%	28.0%	0.0%	38.0%
ID 5	66.6%	7.7%	5.1%	7.7%	12.8%	20.0%	30.0%	0.0%	50.0%

Note: Columns might not add to 100% because some hospitals reported more than one schedule or staffing plan.

Table 5. Summary of RRT organization and schedule, by grantee cont.

	Schedule of RRT					Composition of RRT			
	24 / 7	7 days	Week-days	7 nights	Other	RN + RT	RN + RT + MD	RN + PA	Other
ID 6	93.5%	0.0%	6.4%	0.0%	0.0%	84.4%	15.6%	0.0%	50.0%
ID 7	100.0%	0.0%	0.0%	0.0%	0.0%	55.0%	15.0%	0.0%	30.0%
ID 9	100.0%	0.0%	0.0%	0.0%	0.0%	55.3%	39.5%	7.9%	47.4%

Note: Columns might not add to 100% because some hospitals reported more than one schedule or staffing plan.

Table 6. RRT staffing plan by schedule

	24/7	7 days	Weekdays	7 nights	Other
ICU RN + RT	48.7%	66.7%	40.0%	33.3%	0.0%
ICU RN + RT + MD	24.7%	33.3%	0.0%	0.0%	80.0%
ICU RN + PA	1.9%	0.0%	0.0%	0.0%	0.0%
Other staffing	46.1%	0.0%	80.0%	66.7%	20.0%

Note: Columns might not add to 100% because some hospitals reported more than one staffing plan.

Table 7. RRT calls per hospital bed and per discharge in final data period

	RRT calls per bed	RRT calls per 1000 discharges
Mean	0.121	4.6
Standard deviation	0.139	15.4
25th percentile	0.041	0.9
50th percentile	0.087	1.9
75th percentile	0.149	3.3
Number of observations	319	331

Figure 1. RRT calls per hospital bed, by facility and RRT characteristics

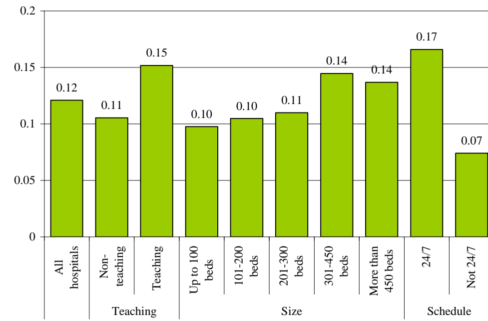


Figure 2. RRT calls per 1000 discharges, by facility and RRT characteristics

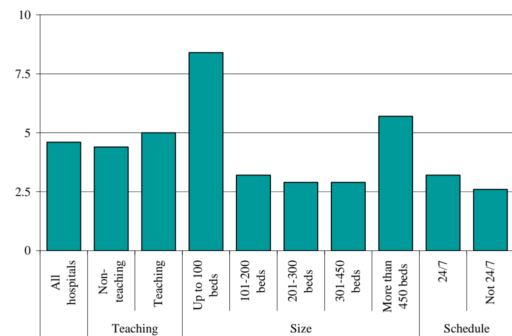


Table 8. RRT calls per hospital bed and per 1000 discharges

	Calls per hospital bed		Calls per 1000 discharges	
	Mean	Standard Deviation	Mean	Standard Deviation
ID 1	0.193	0.171	Not available	Not available
ID 3	0.391	0.403	Not available	Not available
ID 4	0.123	0.125	2.48	3.39
ID 5	0.111	0.063	2.85	2.85
ID 6	0.167	0.215	3.90	5.18
ID 8	0.103	0.101	4.97	17.48

Figure 3. Summary of who called the RRT for Grantee 6

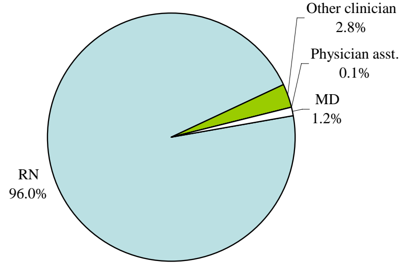


Table 9. Summary of RRT outcomes

	All hospitals	Teaching	Non-teaching
Outcome of call… (n)	(n=53)	(n=15)	(n=38)
Transferred to ICU	46.8%	42.6%	48.5%
Outcome for patient (n)	(n=39)	(n=8)	(n=31)
Patient coded	3.6%	4.0%	3.6%
Patient stabilized	46.9%	49.4%	46.3%

Table 10. Inpatient mortality

	Initial data	Final data	Change	Significant?	N
All hospitals	0.0272	0.0552	0.0280	No	281
ID 1	0.0243	0.0248	0.0005	No	22
ID 2	0.0205	0.0531	0.0325	No	90
ID 3	0.0204	0.0222	0.0018	No	17
ID 5	0.0580	0.1121	0.0541	No	43
ID 6	0.0234	0.0406	0.0172	No	89
Teaching	0.0255	0.0267	0.0012	No	55
Non-teaching	0.0277	0.0615	0.0338	No	226

Table 10. Inpatient mortality cont.

	Initial data	Final data	Change	Significant?	N
Up to 100 beds	0.0208	0.0534	0.0325	No	78
101 – 200 beds	0.0199	0.0924	0.0725	No	58
201 – 300 beds	0.0243	0.0261	0.0018	No	30
301 – 450 beds	0.0231	0.0260	0.0029	No	49
More than 450 beds	0.0433	0.0630	0.0197	No	66
24 / 7 schedule	0.0231	0.0396	0.0165	No	131
Not 24/7 schedule	0.0907	0.2154	0.1247	No	16

Table 11. Codes per 1000 discharges

	Initial data	Final data	Change	Significant?	N
All hospitals	7.304	6.931	-0.373	No	708
ID 1	7.072	9.906	2.834	No	26
ID 3	5.340	5.192	-0.148	No	17
ID 4	4.688	3.374	-1.314	No	32
ID 5	9.113	9.620	0.506	No	42
ID 6	6.042	6.462	0.420	No	81
ID 8	7.684	6.931	-0.753	No	491
Teaching	7.040	7.158	0.118	No	211
Non-teaching	7.416	6.754	-0.662	No	466

Table 11. Codes per 1000 discharges cont.

	Initial data	Final data	Change	Significant?	N
Up to 100 beds	6.868	9.393	2.524	No	64
101 – 200 beds	6.785	4.886	-1.899	No	140
201 – 300 beds	6.855	6.880	0.256	No	105
301 – 450 beds	8.733	7.442	-1.292	No	139
More than 450 beds	7.097	7.195	0.098	No	260
24 / 7 schedule	6.682	6.563	-0.119	No	159
Not 24/7 schedule	6.402	6.032	-0.370	No	16

Table 12. Percent of codes outside ICU

	Initial data	Final data	Change	Significant?	N
All hospitals	49.2%	48.3%	-0.9	No	711
ID 1	56.2%	47.9%	-8.3	No	19
ID 3	45.1%	54.1%	9.0	No	16
ID 4	58.6%	48.5%	-10.2	No	32
ID 5	41.7%	47.2%	5.5	No	44
ID 6	57.4%	43.7%	-13.8	Yes	89
ID 8	47.7%	48.9%	1.2	No	495
Teaching	50.4%	49.5%	-0.8	No	201
Non-teaching	48.7%	47.5%	-1.2	No	479

Table 12. Percent of codes outside ICU cont.

	Initial data	Final data	Change	Significant?	N
Up to 100 beds	43.6%	49.7%	6.0	No	77
101 – 200 beds	54.1%	48.9%	-5.3	No	140
201 – 300 beds	47.3%	46.7%	-0.5	No	106
301 – 450 beds	47.7%	46.5%	-1.1	No	139
More than 450 beds	50.1%	49.2%	-0.9	No	249
24 / 7 schedule	50.1%	46.4%	-3.8	No	157
Not 24/7 schedule	49.3%	55.8%	6.6	No	16

Attachment C – Interview Guide

UCSF Center for Research & Innovation in Patient Care
UCSF RWJF RRT Evaluation Project

Hospital Visit

Introduction

The development of Rapid Response Teams (RRTs) in U.S. hospitals is a fairly recent occurrence. Few studies have dealt with the impact of RRT on the functioning of the RN's nursing care and knowledge. Also, few studies have addressed factors related to "best practices" in RRT development and factors that emerge as significant barriers to the development of effective RRTs. It is the goal of the UCSF Robert Wood Johnson Foundation Rapid Response Team (RWJ-RRT) Evaluation Project to provide evaluation data to the Rober Wood Johnson Foundation, RRT grantees and the "community-at-large" that advances understanding of RRT impacts, outcomes and effective implementation.

The UCSF RWJ RRT Evaluation Project Team, Drs. Nancy Donaldson, Mary Scott and Susan Shapiro, and Ms. Mary Foley, is assisting the Robert Wood Johnson Foundation to evaluate the impact of its rapid response team initiative, with particular attention to the impact of RRTs on the role of the nurse. Visits to hospitals engaged in RRT implementation are a key step in the evaluation process. The principal aim of our visits is to identify, explore, and describe contextual factors, including variation in nurse staffing, role and experience that are associated with comparatively "best" implementation of RRTs.

During our visits we will have the opportunity to briefly talk with the Chief Nursing Officer, the RRT Leader, and 2-3 staff RNs with experience working with the RRT in that setting. Our visits and conversations with be informal, although purposeful. We will request permission to audio record our conversations, simply to help us be sure to capture all the important insight, information and feedback we hear—audio recordings will not include identification of the hospital or the people we are talking with. We will keep anonymous and confidential what people specifically tell us and only report our conclusions in an aggregated summary of learnings.

To help hospitals anticipate our visit and because we take seriously the spirit of collaboration and time of hospital CNOs, RRT Leaders and RNs, we have provided an overview of our discussion topics/interests below.

<u>**Visit with the Chief Nurse Officer (CNO) is estimated to require 30 minutes:**</u>

- **Motivation for RRT Implementation**
    - o What was your motivation for implementing an RRT (e.g., IHI Initiative; State Hospital Association, Hospital System; nurse frustration, bed availability issues; reduce LOS; reduce diversion hours; increase throughput)?
    - o What was the impetus? Was this a response to a clinical occurrence? Did the impetus come from staff, or from hospital administration?
- **Nurse utilization of RRT**
    - o What have you heard about the nursing staff using the RRT?

    - What is it about the RRT that the nurses most appreciate?
    - What would they change and why?
    - Do the nurses in general feel comfortable calling the RRT?
- **Challenges of RRT in your setting**
    - What has been the greatest challenge or barrier in implementing your RRT?
- **Family calls to RRT, if applicable**
    - Have you partnered with families in allowing them to call the RRT?
    - Have you gotten any feedback from family members of patients receiving an RRT call? If so, what was it… if not, why not?
- **Learning from RRT**
    - Have you had to increase RN FTE to staff the RRT?
    - What effect has the RRT had on nurse satisfaction?
    - Has the RRT had an effect on the hospital's culture of safety?
- **Future Plans**
    - Do you have any future plans to improve your RRT
        - Expansion of RRT services,
        - Nurse education on early detection of hospital complications?

Visit with the RRT Team Leader—estimated to require 30 minutes:

- **Implementation**
    - What was your motivation for implementing an RRT
        - IHI Initiative alone
        - Patient safety
        - Vision of CEO to be at the competitive cutting edge
    - Did you need to find physician champions for this project or did they come forward?
- **Challenges**
    - What were the greatest challenges or barrier in implementing your RRT?
    - Did you have any difficulties "selling" the idea of implementing an RRT?
- **Learning from RRT**
    - What are the clinical outcomes from implementing a RRT
    - What effect has the RRT had on staff satisfaction?
    - Has the RRT had an effect on the hospital's culture of safety?
- **Future Plans**
    - Do you have any future plans to improve your RRT
        - Expansion of RRT services,
        - Increase number of calls, use of RRT?

Visit with 2-3 RN Staff with experience with using/calling the RRT—we would like 2-3 staff for a one hour small group discussion but would be pleased to meet with staff as individuals for 30 minutes each if that would be preferred in your setting:

We consider stories "through the eyes of the nurse" as a key source of insight into the impact of RRT implementation. The following questions are intended to engage staff RNs in sharing their RRT experiences, perceptions and observations.

Attachment C – Interview Guide

<u>**Activating a rapid response team**</u>

We are interested in finding out <u>why (under what conditions) nurses activate</u> a rapid response team at this hospital…

- Did you have previous training and/or experience regarding the role of the RRT?
- Think about one particular example of when you initiated the call to or activation of the RRT. What led you to activate the RRT? Why did you activate the team? Describe what you were seeing/experiencing with the patient; describe the context on the floor/unit at that time…..
- Thinking about the same example… what were you hoping the team would do with or for you? (e.g., Did you need specific content knowledge? A particular skill/task? A second opinion? Reassurance? Other…)
- Still thinking about the same example… what conditions enabled you to contact the RRT? (e.g., Did someone encourage you to do so? Had you been encouraged prior to this particular moment?)

We are interested in finding out <u>**how comfortable and confident nurses are in their decisions to/not to activate**</u> the rapid response team…

- Think again about a time when you *did* activate the rapid response team. How confident were you that activating the team was an appropriate action?

<u>**Experience with a rapid response team…**</u>

- Think about a particular experience with a rapid response team---What did you do while the team was present
- How would you describe your experience with the RRT? (a) I supported the team., (b) The team supported me., (c) We worked together as one team., (d) other… Describe the power dynamics a bit…

<u>**Result of working with a rapid response team…**</u>

Complete this sentence: Before the team arrived, I felt __________ . While the team was there with me, I felt ____________ . After the team left, I felt ______________ .

- Think about a particular experience working with a rapid response team. <u>*After*</u> working with the team, did you feel like you…
  - ✓ Had learned something new? (Describe…)
  - ✓ Were better equipped to deal with a similar situation in the future? (Describe…)
  - ✓ Were less stressed or worried about the patient and/or your capacity to serve the patient effectively? (Describe…)
- Consider one or two of your experiences with the RRT. Describe the ultimate impact on the patients.

Attachment C – Interview Guide

Overall…

- Some hope that rapid response teams might even be able to support nurses to the point that their job satisfaction increases. What has been your experience? In what ways has working with a rapid response team increased your job satisfaction?
- Any other stories that would reveal the challenges of working with rapid response teams?

Attachment D - IHI Teleconference Presentation

UCSF RWJF Rapid Response Team Initiative Evaluation Project—A Preliminary Report

Nancy Donaldson RN, DNSc. FAAN, Principal Investigator
Mary Scott RN, PhD, Project Director and Co-Investigator
Susan Shapiro RN, PhD, Co-Investigator
Joanne Spetz PhD, Statistician and Co-Investigator
Mary Foley, RN, MS, Research Associate
Donna Frantz BS, Project Administrative Analyst
Nancy Szaflarski RN, PhD, FCCM, Consultant
Lena Gunningberg RN, PhD, Uppsala University Hospital, Sweden, Visiting Scholar
Nancy Fishman RN, MS, Project Officer, Robert Wood Johnson Foundation, Princeton, NJ

Acknowledgements

The UCSF RWJF RRT Initiative Evaluation Project was made possible by $300,000 in funding from RWJF, 12/15/05 through 12/14/07.

We gratefully acknowledge the collaboration of the RWJF RRT Grantees and the 18 hospitals in 13 states who welcomed our team and shared the story of their RRT implementation journey and impacts.

Special thanks to Dr. Lena Gunningberg RN, PhD, for her contribution to the analysis of the qualitative data in her role as a visiting scholar, UCSF Center for Research & Innovation in Patient Care.

Project Purpose and Aims

The UCSF RWJ RRT Initiative Evaluation Project, a solicited proposal from the RWJF, engaged the UCSF Center for Research & Innovation in Patient Care Team, in conducting a summative evaluation of RWJF RRT grantee impacts by working with grantees to:

- **Gather standardized measures, to the extent possible, of their outcomes;**
- **Aggregate and analyze data submitted by grantees to trace the impacts of the RRT Initiative at baseline and final points in time.**
- **Integrate qualitative measures which explore important contextual factors related to "best practices" in RRT implementation and factors that emerge as significant barriers to progress.**
- **Explicate qualitative impacts of RRT implementation "through the eyes" of the nurse.**

Evaluation Approach

- Inventory grantee metrics for evaluating their 9 national RRT learning collaboratives geared to advance RRT implementation.
- Develop portfolio of common measures and work with grantees to confirm access to these data and timelines for baseline and final data capture.
- Design and conduct qualitative study to explicate contextual factors, best practices and impacts of RRT "through the eyes of the nurse".
- Synthesize results and articulate the story.

Characteristics of Hospitals in Data Submitted by 8 RWJF Grantees for Quantitative Evaluation

Table 1. Summary of grantee characteristics

	Mean	Std. Dev.	25th percentile	50th percentile	75th percentile	Number of hospitals
Beds	304.6	232.6	136	243	412	661
Average daily discharges	37.7	29.4	17.0	31.4	50.7	560
Average daily census	179.9	138.3	79	145	250	442

Characteristics of Hospitals in Data Submitted by 8 RWJF Grantees for Quantitative Evaluation (N=584)

Table 2. Means of grantee characteristics, by grantee. (Standard deviations in parentheses.)

	Number of participating hospitals*	Beds	Average daily discharges	Average daily census	Teaching?
ID 1	18	783.4 (327.8)	96.6 (59.4)		100.0%
ID 2	45	170.3 (218.9)			0.0%
ID 3	28	263.2 (154.9)		205.8 (120.7)	40.9%
ID 4	25	248.6 (306.1)	34.0 (40.7)		36.0%
ID 5	46	344.7 (160.1)	51.3 (27.9)		21.7%
ID 6	55	255.9 (242.9)	39.5 (46.9)		18.2%
ID 7	20	355.9 (210.6)	35.2 (17.9)		5.0%
ID 8	307	311.7 (210.3)	36.2 (25.8)	178.8 (139.0)	27.6%
ID 9	40	233.7 (177.9)			

* Not all participating hospitals reported data on hospital beds, average daily discharges, average daily census, and teaching status.

Attachment D - IHI Teleconference Presentation

Quantitative Methods

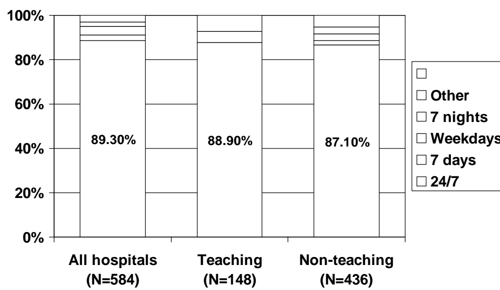
Aim: *Explore measures of central tendency for key demographic and RRT variables available from grantee hospitals*

- The aim of aggregated quantitative data analysis was "retrofitted" to grantee scope of work post award thus standardized data, data access and capacity to receive/submit data were not anticipated and presented a special challenge.
- Convenience sample—the UCSF team received selected data submitted by hospitals to the 8 of 9 RWJF grantees.
- Missing data were common; actual data received were generally much less than originally anticipated by grantees.
- Precision of analysis was confounded by rolling pre-post dates.
- Findings are shared cautiously due to threats to power, effect size and variation in reliability of data capture methods.

Descriptive Variables Examined

- RRT Schedules
- RRT Staffing
- RRT call volumes
- Source of RRT call
- RRT intervention
- Selected and Limited RRT Outcomes

RRT Schedules



RRT Staffing

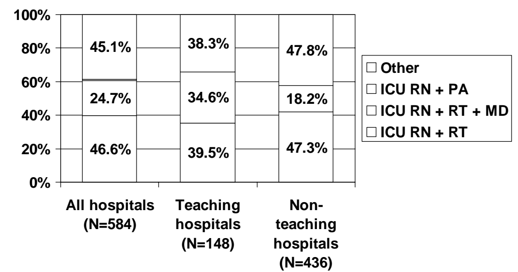
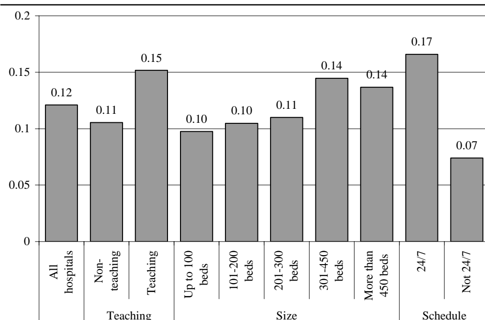
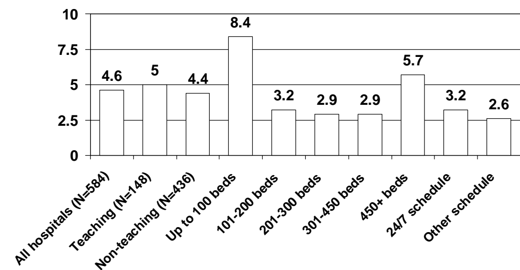


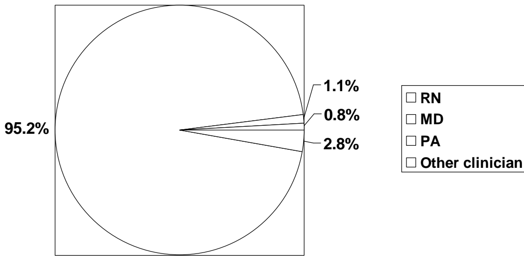
Figure 1. RRT calls per hospital bed, by facility and RRT characteristics



Calls per 1000 Discharges



Who Activated the RRT? Exemplar Data from Grantee 6



Catalysts to Planning and Implementing the RRT……

- Impetus for change
  - All had heard about initiative from external sources, either granting agency, conference attendance, journal article, etc.
  - Leadership cited patient safety, clinical excellence, and support of staff nurses as primary reasons for adopting RRTs
  - It was a "no brainer"

Catalysts to Planning and Implementing the RRT……

Our vision is Safe, Superior Care. So it's very interesting. We would be interested in anything that improves the quality and the safety of the care of patients (4A)

Our motivation was the additional patient safety and the impact on mortality. We became aware of it via literature review, IHI initiative. We also felt this would allow us to decrease the number of in house transfers to ICU and therefore creating bed availability for our patients.(7A)

Because I felt that our nursing staff needed that support and that if there were better patients outcomes we needed to do what we could for our patients(5B)

Challenges Confronted in Planning and Implementing the RRT……

- Resources—team composition and costs
- Communications
- Staff training
- Competing missions

Challenges Confronted in Planning and Implementing the RRT……

- **Resources**
  - Who would be on the team?
  - How would it be paid for?

Challenges: Resources/Staffing

Okay. We have a respiratory therapist, we have a critical care nurse, and we have our house physician. Now it's not 24/7… One of the issues that we had to tackle was finances …So we thought okay what can we do without incurring any additional cost and yet get data that we could show the ED physicians, if that's the way we wanted to go down the road, or if we wanted to hire physician coverage, you know, or a nurse practitioner or whatever. So that's what we've been doing. (5B)

That was our biggest challenge was the staffing part. At that time we thought we had to have a physician on the team, well we later found out that our best clinicians were our bedside respiratory folks and our ICU folks so we had to work through that.(2B)

Challenges Confronted in Planning and Implementing the RRT……

- **Communications and staff training**
  - Reaching target audiences effectively
  - Communicating messages consistently
- **Negotiating competing missions**
  - Resident education vs. patient safety
  - Multiple safety initiatives
  - Other unrelated initiatives, e.g. efforts to organize nursing staff

RRTs through the Eyes of the Nurse—What Triggered the RRT Call?

- Significant changes in patient signs or symptoms
- Nurse's "gut feeling" there was something wrong, but no apparent changes in measurable signs
- Unable to reach or engage the MD or to get the desired physician response

RRTs through the eyes of the Nurse

- RRTs are activated for similar reasons regardless of hospital
  - For significant changes in patient signs or symptoms, e.g.

    I had a patient who was having shortness of breath and dyspneic, and O2 Sats were in the 70's. And so I called the rapid response team and it was a respiratory therapist and our ICU nurses came and helped.(2A.3)

Reasons for Activating the RRT

- RN "gut feeling" there was something wrong, but no apparent changes in measurable signs, e.g.

  I was really not sure what to do with this patient because there was nothing I could see that was wrong with him; I knew something wasn't right.(8B)

Reasons for Activating the RRT

- Unable to get desired physician response.
  - Sometimes the physician called back – or even came to the bedside - but the nurse did not feel the response was appropriate, e.g.,

    its during shift change so everybody's calling and running and doing this and that and we called the doctor and he said, well she's got a pulmonologist on the case call them. He gave us nothing. No orders. No meds. No-No nothing… at that point we decided we're not going to wait for anybody else we'll just call rapid response and get them down here. (8B)

Reasons for Activating the RRT

- Sometimes the physicians were physically unable to respond, e.g,
  - *I did call the doctors but they weren't able to get there they were in a classroom somewhere far away so they couldn't come right then (4B).*

What value did the RRT bring to the Patient's bedside?

- **Crucial assistance--**extra eyes, hands, brains and bodies to meet the immediate needs of the patient
- **One call** resulted in comprehensive response
- **Expertise**--competencies of a critical care nurse and related protocols; authority; communication skills
- **Expedited transfer** to higher level of care when needed

Value added by RRT

- RRT brought many things to the patient's bedside, e.g. extra eyes, hands, brains and bodies to meet the immediate needs of the patient....

Mostly because I need that extra pair of hands, because when something starts to go I can't do it all. You know like they said, I can't call the doctor, fax the orders, write the orders, and be at the bedside doing the care that the patient needs in that situation, I need more than one set of hands (8B)

You don't have to figure it out; there's going to be other minds there to work through it. (2B)

Value added by RRT

- Having everyone needed with just one phone call

I mean it just prevents any delay in treatment, you know, you're calling the operator, you're on hold with the operator, you have to page the resident. With the RRT you have everybody there at your fingertips, it's not waiting for the resident to come up to now page the respiratory therapist...to page the phlebotomist... it's a hospital 911. (5-A)

Value added by RRT

- The competencies of a critical care nurse and related protocols:
  - Administer critical care meds on acute care units, e.g.

Pretty much, you know, provide the medical care that the patient needed as far as administering medication to the patient that needed it because we didn't feel comfortable giving the medication...they did, they responded, she gave him medication ... (4B)

Value added by RRT

- Acute care nurses felt physicians gave more credence to reports from critical care nurses

When they have the ICU nurse assess this patient and these are the recommendations of this team, then it carries more weight with those physicians...even though the staff nurse probably called two hours before with the same information. (2B)

Value added by RRT

- Critical care nurses expedited transfer to critical care units when needed.

The patient needed to be cared for in MICU, and I didn't have to hassle for a bed up there because the MICU nurse was part of the team...With the team, we sort of circumvent that process and get a bed right away. (3B)

Like you need a bed, you need to transfer somebody, if you call rapid response you can have them transferred in minutes. If you call bed control you can have them transferred in two hours. (8B)

Outcome of RRT calls

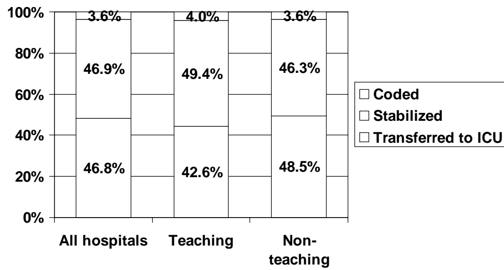


Table 9. Summary of RRT outcomes

	All hospitals	Teaching	Non-teaching
Outcome of call… (n)	(n=53)	(n=15)	(n=38)
Transferred to ICU	46.8%	42.6%	48.5%
Outcome for patient (n)	(n=39)	(n=8)	(n=31)
Patient coded	3.6%	4.0%	3.6%
Patient stabilized	46.9%	49.4%	46.3%

Table 10. Inpatient mortality

	Initial data	Final data	Change	Significant?	N
All hospitals	0.0272	0.0552	0.0280	No	281
ID 1	0.0243	0.0248	0.0005	No	22
ID 2	0.0205	0.0531	0.0325	No	90
ID 3	0.0204	0.0222	0.0018	No	17
ID 5	0.0580	0.1121	0.0541	No	43
ID 6	0.0234	0.0406	0.0172	No	89
Teaching	0.0255	0.0267	0.0012	No	55
Non-teaching	0.0277	0.0615	0.0338	No	226

Table 10. Inpatient mortality cont.

	Initial data	Final data	Change	Significant?	N
Up to 100 beds	0.0208	0.0534	0.0325	No	78
101 – 200 beds	0.0199	0.0924	0.0725	No	58
201 – 300 beds	0.0243	0.0261	0.0018	No	30
301 – 450 beds	0.0231	0.0260	0.0029	No	49
More than 450 beds	0.0433	0.0630	0.0197	No	66
24 / 7 schedule	0.0231	0.0396	0.0165	No	131
Not 24/7 schedule	0.0907	0.2154	0.1247	No	16

Table 11. Codes per 1000 discharges

	Initial data	Final data	Change	Significant?	N
All hospitals	7.304	6.931	-0.373	No	708
ID 1	7.072	9.906	2.834	No	26
ID 3	5.340	5.192	-0.148	No	17
ID 4	4.688	3.374	-1.314	No	32
ID 5	9.113	9.620	0.506	No	42
ID 6	6.042	6.462	0.420	No	81
ID 8	7.684	6.931	-0.753	No	491
Teaching	7.040	7.158	0.118	No	211
Non-teaching	7.416	6.754	-0.662	No	466

Table 11. Codes per 1000 discharges cont.

	Initial data	Final data	Change	Significant?	N
Up to 100 beds	6.868	9.393	2.524	No	64
101 – 200 beds	6.785	4.886	-1.899	No	140
201 – 300 beds	6.855	6.880	0.256	No	105
301 – 450 beds	8.733	7.442	-1.292	No	139
More than 450 beds	7.097	7.195	0.098	No	260
24 / 7 schedule	6.682	6.563	-0.119	No	159
Not 24/7 schedule	6.402	6.032	-0.370	No	16

Table 12. Percent of codes outside ICU

	Initial data	Final data	Change	Significant?	N
All hospitals	49.2%	48.3%	-0.9	No	711
ID 1	56.2%	47.9%	-8.3	No	19
ID 3	45.1%	54.1%	9.0	No	16
ID 4	58.6%	48.5%	-10.2	No	32
ID 5	41.7%	47.2%	5.5	No	44
ID 6	57.4%	43.7%	-13.8	Yes	89
ID 8	47.7%	48.9%	1.2	No	495
Teaching	50.4%	49.5%	-0.8	No	201
Non-teaching	48.7%	47.5%	-1.2	No	479

Table 12. Percent of codes outside ICU cont.

	Initial data	Final data	Change	Significant?	N
Up to 100 beds	43.6%	49.7%	6.0	No	77
101 – 200 beds	54.1%	48.9%	-5.3	No	140
201 – 300 beds	47.3%	46.7%	-0.5	No	106
301 – 450 beds	47.7%	46.5%	-1.1	No	139
More than 450 beds	50.1%	49.2%	-0.9	No	249
24 / 7 schedule	50.1%	46.4%	-3.8	No	157
Not 24/7 schedule	49.3%	55.8%	6.6	No	16

Summary of Quantitative Patient Outcomes

- **Inpatient mortality**
  - Observed increase trend
  - Change not statistically significant for any subgroup
- **Codes per 1000 discharges**
  - Observed decrease trend
  - Change not statistically significant for any subgroup
- **Percent of codes outside ICU**
  - Observed decrease trend
  - Change not statistically significant, except…
    - **Significant decrease for one grantee--ID 6**

Qualitative Data Aims & Methods

Aims:

- Explore factors associated with RRT implementation success and challenges from the perspective of hospital CNOs, RRT Leaders and Staff Nurses
- Explicate examples of "best practices" in RRT implementation
- Explore the impact of RRT adoption "through the eyes of the nurse"

Variation in RRT Implementation--Strong & Robust vs. Challenged Hospital Adopters

- We were interested in contrasting early, strong adopters of RRTs, vs. later strong adopters vs. "challenged" adopters in an effort to elicit factors that might explain differences.
- We asked Grantees to assist us in identifying hospitals, from among those participating in their projects, that they believed could be met these conceptual definitions:
  - Strong Adopters—effective and successful RRT role development and implementation.
  - Challenged Adopters—difficult, problem-prone, less successful RRT role development and implementation.

Qualitative Methods

- Each grantee was asked to provide UCSF Team with names of 2 hospitals they considered strong early adopters of RRT and 2 hospitals they considered later or challenged adopters of RRT.
- Hospitals (N=36) were then randomly selected from each cohort, with 2 hospitals per grantee drawn from a hat for a site visit (N=18).
- Interview schedule was created and reviewed/refined with Grantees with focus on interviewing CNOs, RRT Leaders and Staff RN users of the RRT in each hospital with each visit lasting 3-4 hours.
- UCSF IRB approval obtained.
- Interviews were recorded with consent of participants and transcribed with identifiers removed.
- Transcriptions verified—audio recordings were compared with transcript.
- Thematic analysis used answer evaluation questions
- Internal consistency through constant comparison and consensus among two to three team members
- Preliminary results, conclusions and transferability of findings was checked with two RRT implementation academic hospitals not included in grant.

Qualitative Approach

- Site visit hospitals (N=18) varied widely....
  - Bed size ranged from 72-910; half had at least one residency training program, half had none
  - Configuration of RRT varied widely
    - Some 24/7; some days only; some nights only
    - Some with MD; some without.
    - All had critical care RN, most had respiratory therapy
  - Drawn from 13 states, hospitals included both urban and rural settings.

Robert Wood Johnson Rapid Response Team Site Visits

Keys to Successful Implementation

- **Passionate leadership**
  - CNOs and RRT leaders "out there" among the staff
  - Consistent message from the top that RRT was not optional; all would participate
- **Clear, consistent communication**
  - Single strong message to staff, "Call the RRT"
  - Effective training and reinforcement
  - Close relationship between RRT and staff nurses—IP skills, "good call" notes; feedback
  - Unqualified physician support

Keys to Successful Implementation—Risks associated with calling the RRT

Robust Adopters	Challenged Adopters
Nurses ***knew*** all calls valid; they perceived *unconditional* commitment to respond to their call for assistance at the bedside	Nurses **questioned** whether to call RRT vs. code vs. chain of command
Nurses ***knew*** they would not be questioned, chastised, or belittled	Nurses remained concerned about **possible negative reactions** if they called the RRT
Nurses ***knew*** they would be supported by nursing and physician leadership	Nurses **not convinced** of leadership support

Keys to Successful Implementation

Robust Adopters	Challenged Adopters
Nurses *knew* all calls valid	**Nurses questioned whether to call RRT vs. code vs. chain of command**
...so you call the rapid response to prevent the situation from getting worse. So and it's never wrong to call a rapid response. They are there as a resource for them so if they have any feeling that something is not right with that (2B, Manager)	*Do you call, do you not call, some services like it, some people don't* (1B) *We on our floor have been told that they are to be used as one of the last resources* (4B)

Keys to Successful Implementation

Robust Adopters	Reluctant Adopters
Nurses *knew* they would not be questioned, chastised, or belittled	**Nurses remained concerned about possible negative reactions**
I tell them, call. I will take the heat off of you if somebody is going to yell and it seems just by me doing that has allowed them to call more, because they know that I'll jump in front of anybody who is going to yell at one of my nurses.(5B, Manager)	*So I learned that I was supposed to call staff and not the RRT...I think I would have been reprimanded either way* (4B) *Yah, 'cuz* [the residents] *don't like you to go above them, and they want to take care of it and they'll get in trouble if you – that's what I'm used to, you know what I mean, so that's what we always do.* (1B)

Keys to Successful Implementation

Robust Adopters	Reluctant Adopters
Nurses *knew* they would be supported by nursing and physician leadership	**Nurses not convinced of leadership support**
[The Attendings] *appreciate you calling the MET to get people there and watching out for their patients in that way. I think it develops a little more rapport.* (9A)	***If you're right, great, but if you're wrong, you got** …**[the team]** **yelling at you*** (1B)
So the feedback we get regarding the use of the team has been a great training tool for all of us and great encouragement. I don't think anybody hesitates anymore to call. **(9A)**	

Keys to Successful Implementation

- **Leadership in a robust adopter** – 3A

When you think of a safety culture, it means that you should be able to ask and not worry about asking for help, I mean I think that's a piece of it. And that's out there for everyone I mean a staff nurse can feel that. Then you know the person in the lobby can feel that if they're calling for help…this allows the doors to open a little bit more about what can safety mean within the hospital? And it's okay to ask for help. (RRT Leader, RN)

And so it was just a, I mean I think it was an embarrassingly obvious safety measure, I guess, is the way I always look at it. Because I look at it now and think, what have I been doing for the past 20 years? Before this happened, what have we all been doing? Why haven't we seen this before? (RRT Leader, MD)

Keys to Successful Implementation

- Robust adopter, cont'd

And one of our tenets was – there is never an inappropriate call. Never, never, never, never. I don't care what. There is not an inappropriate call…(MD)

…so in a sense we did usurp some – once again, some private physician autonomy of, you know, that here was a major intervention going on with their patient in our hospital and they were not being consulted first, and I'm sorry. (MD)

RRT Impacts Through the Eyes of the Nurse……..

In a nutshell we found……….

- Overwhelming consensus that RRTs have made an important positive difference in nurses' work environment
- Staff expressed profound, emotion laden relief at having someone to call when they needed immediate assistance.

RRTs Through the Eyes of the Nurse

Knowing that they are there to help take some of the burden from that load off of me on it and when they give you kudos for doing, you know, you did the right thing? **(2A)**

I think it brings that nursing is definitely not a one-man show; it's your teamwork and anytime you have that team to back you up, I think it's a nice little hint…that you're not alone. **(4A)**

Impact of the RRT

- RN Interviewees completed the following:
  - ***"Before the RRT arrived, I felt" ________***
  - ***"When the RRT arrived, I felt"_________***
  - ***"After the RRT left, I felt"__________***

In Summary Nurses Reported……

- Before the RRT was called, nurses felt ***concerned***, ***frustrated***, ***anxious***, ***uneasy***, **and** ***nervous***.
- When the RRT arrived, they felt ***relieved***, ***better, good there were other people there***, ***confident,*** and appreciative of the backup provided.
- After the team left, nurses felt ***supported, confident, relieved,*** and appreciative

Examples of Nurses' responses:

…when we called anticipating what's going on feeling a little nervous, and I was so impressed with the rapidness of the response, oh, it felt so good, and when they left it's like ahhhh! The situation was resolved you know, it worked. I feel relief. And I tell you it just happened so fast I was so impressed! I can't wait to do this again (5B)

Examples of Nurses' responses:

Before the team I felt concerned about the patient and confident that there would be somebody there is a few minutes. So concerned about the patient and yet confident that I was gonna get what that patient needed.

[When the team got there] *I felt relieved that … we would come up with a solution to help this patient. So I felt relieved, and I felt again, continuing confidence that we were going to get something done that would benefit the patient*

[After the team left, I felt] *Happy. And you know, the patient, whether the patient is transferred off my floor or remains on the floor with a different plan of care, the plan can go forward and that patient's care needs will be met. So, it's a good thing all the way around. (9A)*

RRT Success – from the Nurses' Perspective….

- Opportunity to learn from the team

  I do learn a lot from each and every RAT call (4A)

  They explained or talked about EKGs or calling the doctor with updates.(4B)

  Well it just becomes easier, maybe recognizing something earlier next time…Maybe a lab value or their vital signs or something I don't know. (2B)
- Validation of their clinical acumen

  It was validating for me it was not my imagination, you know, where he wasn't just tired from having a long, crappy day. (9B)

RRT Success – from the Nurses' Perspective….

- 24/7, unquestioning support

  It's nicer to know that you have someone to call even if it's a false alarm. We still feel comfortable that you can at least make the call and that someone will come and you don't have to run around. (8A)

  If I even got just a hint of feeling that something didn't look right or his vitals are not adding up or something doesn't look right I just call, and they encourage you to do that. Even CNA's can call them if they feel like there is something not right. (2A)

  There were times before the RAT Team you maybe were in between where you needed to get help but you didn't really want to call a code…This gives you that other level (4A)

RRT Challenges – from the Nurses' Perspective….

- Competing priorities for care, both for themselves and for RRT members
- Confidence in appropriateness of activating the RRT
- Mixed messages re: when to call RRT vs code or chain of command
- Unsupportive physicians

RRT Challenges – from the Nurses' Perspective….

- Competing priorities for care, both for themselves and for RRT members

…while I feel very confident about the care my patient is receiving from rapid response, I know that other things are not being done with their time that normally would be done with their time…I am aware of somebody is going to be not getting their two o'clock treatment because I have the respiratory therapist. Someone is maybe not going to get their meal break or maybe not going to have their medications delivered from the pharmacy in as timely a manner as they would like because I have the house supervisor locked up in something (9B)

RRT Challenges – from the Nurses' Perspective….

- Confidence in activating the RRT

I wanted to get that second opinion…before I called…because I didn't want to waste anybody's time (2B)

Sometimes you don't know if it's really appropriate…I don't want to be there when everybody comes up and it's like oh, she called for no reason (1B)

A couple of my calls were questionable in my mind…I've had a couple that weren't an emergency but it was a change of status…even if it's minor and I'm kind of wondering in my head…(4A)

RRT Challenges – from the Nurses' Perspective….

- Mixed messages re: when to call
  - RRT vs. code

So when do you call it? Nobody can answer this question. When do you call the rapid response? Like this patient wasn't breathing, so that's obviously a code. But like when do you call the rapid response? I'm not quite sure. Either it's a code or it's not, that's how I see it. (1B)

  - RRT vs. chain of command –

I don't know about respiratory therapists but nurses are just pounded in their education and then in the hiring and orientation process, chain of command, chain of command, chain of command and it feels like, can feel, like calling rapid response is skipping steps. (9B)

RRT Challenges – from the Nurses' Perspective…

- Unsupportive physicians

Our physicians have stated they are not for the RRT. They're against it because their feeling…and I totally understand where they're coming from, is that if their residents are not responding to the nurse's calls that they want to know about it (4B)

And [the physician] *was very upset. He said why was his patient – he didn't need to be transferred, and she just told him, well, we weren't getting any orders, he was respiratory compromised and he wasn't getting the orders and so that's why I* [called RRT]. *And she took flack from the doc, but she wasn't uncomfortable telling him the way it was 'cuz he hadn't been there to see the situation. So I know, she was so stressed all day* (1B)

Key Contextual Factors Not Addressed in this Evaluation…..

- Regulatory scope of practice issues that impact competencies of medical-surgical staff and their critical care RRT nurse colleagues
- Skill Mix and Mandated Ratios that impact RN/LVN mix and related scopes of practice and demand for RRT…..
- Organizational complexity
- Organizational culture of safety

In Conclusion……..

- We defer to other's to debate the impact of RRTs on patient care safety, mortality and cost.
- We believe the most significant impact may actually be found among the ***nurses who experience the RRT as life saving to their patients, affirming to their role, and workload ameliorating.***
- The impact of RRTs on RN recruitment, retention, intent to leave, perceived role support, role stress and failure to rescue is unmeasured in this study but observed to be profound, pervasive and ultimately workforce enhancing.

Emerging Priorities for Further Study!

- How does the effectiveness and robustness of RRT implementation impact successful rescue of patients vs staffing effects on failure to rescue?
- How do micro system and workforce characteristics, staff expertise and RRTs impact rescue related processes of care and patient care outcomes and costs?

Impact of Rapid Response Teams—Through the Eyes of the Nurse

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Introduction: In 2005 the Robert Wood Johnson Foundation (RWJF) funded nine health care systems/associations to establish learning networks that would assist hospitals in implementing and evaluating rapid response teams (RRTs). The UCSF RWJ RRT Evaluation Project was undertaken, at the request of RWJF, to evaluate of the impacts of the RWJF RRT initiative across the nine grantees, with particular emphasis on the impact of RRT implementation "through the eyes of the nurse".

Methods: Because the aims of this evaluation focused on the perceptions and lived experience of nurses who had worked with RRTs, qualitative methods were used. A purposive sample was obtained from the RWJF grantees with the aim of identifying hospitals with robust, early and strong RRT adoption and hospitals with a later, less robust adoption journey. From the sample of hospitals obtained from grantees, a random sample of hospitals was selected for site visits and interviews. The final sample consisted of 2 hospitals per grantee (N=18 hospitals from nine grantees) drawn from 13 states in the U. S. IRB approval was obtained, and with the assistance of the RWJF grantees, key contacts at sample hospitals were contacted to arrange for site visits and interviews. The interviews lasted approximately four hours, with one hour each with chief nursing officers (N=18), RRT members (N=40), and RN staff nurse RRT users (N= 56). Following informed consent, interviews were digitally audio recorded, transcribed, and systematically verified. Thematic analysis was conducted to answer evaluation questions; internal consistency of the results was enhanced by constant comparison with the original transcripts and consensus among research team members. Transferability of findings was checked with comparable RRT personnel at two teaching hospitals not included in the grant.

Results: The composition of the RRTs varied greatly, but almost all included a critical care credentialed nurse. The most common reasons for calling the RRT were significant changes in patient signs or symptoms and the nurse's "gut feeling" something was wrong. Nurses felt that RRTs brought many valuable things to the patient's beside including: a) extra hands, eyes and minds for help with assessment, immediate treatment, and system engagement; b) critical care competencies, expanded diagnostic tools, and the ability to engage physicians and the multidisciplinary team in expedited consensus and planning; and c) the ability to facilitate transfer to a higher level of care when needed. Before the RRT was called, nurses stated they felt concerned, frustrated, anxious, uneasy, and nervous. When the RRT arrived, they felt relieved, confident, and appreciative. After the team left, nurses felt supported, confident, relieved, and appreciative. Most of all, robust RRT implementation was found to foster a sense of unconditional support in staff and staff expressed the notion that the presence of the RRT was important to the work environment.

Discussion and Conclusions: This study focused on the bedside nurse's perception of the RRT. They found the RRT was life saving to their patients, affirming to their role, and workload ameliorating. Nurses' stories about their experience with RRTs were laden with emotion, suggesting that the presence of robust, unconditionally supportive RRTs may contribute to the nurse's perception of a profoundly supportive environment and may ultimately be workforce enhancing. Clearly, more research is needed on the impact of the RRT on RN recruitment, retention, intent to leave, perceived role support, role stress, and even failure to rescue. Finally, these findings suggest that RRTs may reduce variation in efforts by individual nurses to respond to actual or impending decline in condition and may bring a more standardized approach to rapidly assessing and intervening before cascading changes in the patient's condition culminate in a catastrophic event. Given the likelihood of endemic complexity compression and the prevalence of work-arounds in patient care at the bedside, the RRT may be a crucial resource for nurses in surmounting barriers that impede their urgent care of patients in need.

Conflict of Interest: None

Attachment D 4th Int. MED Conference Poster

UCSF-RWJF Rapid Response Team Initiative Evaluation Project

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Nancy Fishman RN, MS, Project Officer, Robert Wood Johnson Foundation, Princeton, NJ, Donna Frantz BA, Project Administrative Analyst

Project Purpose & Aims

The UCSF RWJ RRT Initiative Evaluation Project, a solicited proposal from the RWJF, engaged the UCSF Center for Research & Innovation in Patient Care Team, in conducting a summative evaluation of RWJF RRT grantee impacts by working with grantees to:

- Gather standardized measures, to the extent possible, of their outcomes;
- Aggregate and analyze data submitted by grantees to trace the impacts of the RRT Initiative at baseline and final points in time.
- Integrate qualitative measures which explore important contextual factors related to "best practices" in RRT implementation and factors that emerge as significant barriers to progress.
- Explicate qualitative impacts of RRT implementation "through the eyes" of the nurse.

Evaluation Approach

- Inventory grantee metrics for evaluating their 9 national RRT learning collaboratives geared to advance RRT implementation.
- Develop portfolio of common measures and work with grantees to confirm access to these data and timelines for baseline and final data capture.
- Design and conduct qualitative study to explicate contextual factors, best practices and impacts of RRT "through the eyes of the nurse".
- Synthesize results and articulate the story.

Quantitative Methods

Aim: Explore measures of central tendency for key demographic and RRT variables available from grantee hospitals

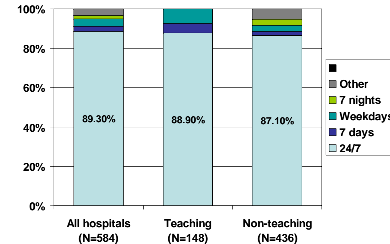
- The aim of aggregated quantitative data analysis was "retrofitted" to grantee scope of work post award
- Convenience sample—the UCSF team received selected data submitted by hospitals to the 8 of 9 RWJF grantees.
- Missing data were common; actual data received were generally much less than originally anticipated by grantees.
- Precision of analysis was confounded by rolling pre-post dates.
- Findings are shared cautiously due to threats to power, effect size and variation in reliability of data capture methods.

Characteristics of Hospitals in Data Submitted by 8 RWJF Grantees for Quantitative Evaluation (N=584)

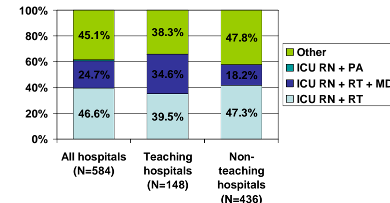
Means of grantee characteristics, by grantee. (Standard deviations in parentheses)

	Number of participating hospitals*	Beds	Average daily discharges	Average daily census	Teaching?
ID 1	18	783.4 (327.8)	96.6 (59.4)		100.0%
ID 2	45	170.3 (218.9)			0.0%
ID 3	28	263.2 (154.9)		205.8 (120.7)	40.9%
ID 4	25	248.6 (306.1)	34.0 (40.7)		36.0%
ID 5	46	344.7 (160.1)	51.3 (27.9)		21.7%
ID 6	55	255.9 (242.9)	39.5 (46.9)		18.2%
ID 7	20	355.9 (210.6)	35.2 (17.9)		5.0%
ID 8	307	311.7 (210.3)	36.2 (25.8)	178.8 (139.0)	27.6%
ID 9	40	233.7 (177.9)			

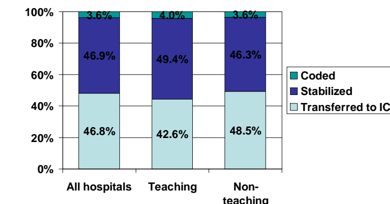
RRT Schedules



RRT Staffing



Outcome of RRT Calls



Qualitative Methods

Aims:

- Explore factors associated with RRT implementation success and challenges from the perspective of hospital CNOs, RRT Leaders and Staff Nurses
- Explicate examples of "best practices" in RRT implementation
- Explore the impact of RRT adoption "through the eyes of the nurse"

Robert Wood Johnson Rapid Response Team Site Visits

RRTs through the Eyes of the Nurse—What Triggered the RRT Call?

- Significant changes in patient signs or symptoms
- Nurse's "gut feeling" there was something wrong, but no apparent changes in measurable signs
- Unable to reach or engage the MD or to get the desired physician response

What value did the RRT bring to the Patient's bedside?

Crucial assistance--extra eyes, hands, brains and bodies to meet the immediate needs of the patient

- **One call** resulted in comprehensive response
- **Expertise**--competencies of a critical care nurse and related protocols; authority; communication skills
- **Expedited transfer** to higher level of care when needed

Keys to Successful Implementation

- **Passionate leadership**
  - CNOs and RRT leaders "out there" among the staff
- **Clear, consistent communication**
  - Single strong message to staff, "Call the RRT"
  - Effective training and reinforcement

RRT Impacts and Barriers Through the Eyes of the Nurse……..

Overwhelming consensus that RRTs have made an important positive difference in nurses' work environment

- Staff expressed profound, emotion laden relief at having someone to call when they needed immediate assistance.
- Competing priorities for care, both for themselves and for RRT members were barriers to triggering the RRT
- Mixed messages re: when to call RRT vs code or chain of command and unsupportive physicians were also barriers
- Before the RRT was called, nurses reported they felt concerned, frustrated, anxious, uneasy, and nervous for the welfare of their patient.
- When the RRT arrived, they felt relieved, better, good there were other people there; confident, and appreciative of the backup provided.
- After the team left, nurses felt supported, confident, relieved, and appreciative of the help in caring for their patient.

Key Contextual Factors Not Addressed in this Evaluation…..

- Regulatory scope of practice issues that impact competencies of medical-surgical staff and their critical care RRT nurse colleagues
- Skill Mix and Mandated Ratios that impact RN/LVN mix and related scopes of practice and demand for RRT…..
- Organizational complexity
- Organizational culture of safety

In Conclusion……………

- We defer to other's to debate the impact of RRTs on patient care safety, mortality and cost.
- We conclude that the most significant impact may actually be found among the nurses who experience the RRT as life saving to their patients, affirming to their role, and workload ameliorating.
- The impact of RRTs on RN recruitment, retention, intent to leave, perceived role support, role stress and failure to rescue is unmeasured in this study but observed to be profound, pervasive and ultimately workforce enhancing.

Acknowledgements: *The UCSF RWJF RRT Initiative Evaluation Project was made possible by $300,000 in funding from RWJF, 12/15/05 through 12/14/07.*
We gratefully acknowledge the collaboration of the RWJF RRT Grantees and the 18 hospitals in 13 states who welcomed our team and shared the story of their RRT implementation journey and impacts.
Special thanks to Dr. Lena Gunningberg RN, PhD, for her contribution to the analysis of the qualitative data in her role as a visiting scholar, UCSF Center for Research & Innovation in Patient Care.

Attachment D – CANS abstract

Title: Impact of Rapid Response Teams—Through the Eyes of the Nurse

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Lena Gunningberg RN, PhD, Visiting Scholar, Uppsala University Hospital, Uppsala, Sweden

Aims: In 2005 the Robert Wood Johnson Foundation (RWJF) funded nine health care systems/associations to establish learning networks to assist hospitals in implementing rapid response teams (RRTs). The UCSF RWJ RRT Evaluation Project was undertaken to evaluate the impacts of the RWJF RRT initiative. The aim of this paper is to report findings from the evaluation's qualitative arm, exploring the impact of RRT implementation "through the eyes of the nurse.

Methods: Interviews, lasting approximately 1 hour each, were conducted with chief nursing officers (N=18), RRT members (N=40) and RN staff nurse (N= 56). RRT users drawn from 18 hospitals in 13 states (total interview time = approx 4 hours/hospital). Following informed consent, interviews were audio recorded digitally. The resulting digital files were transcribed and systematically verified. Thematic analysis was conducted to answer evaluation questions; internal consistency of the results was enhanced by constant comparison with the original transcripts and consensus among research team members. Transferability of findings was checked with comparable RRT personnel at two teaching hospitals not included in the grant.

Results: The most common reasons for calling the RRT were significant changes in patient signs or symptoms, nurse's "gut feeling" something was wrong, and nurse's inability to engage the MD. Nurses reported that the RRT brought to the bedside crucial assistance, plus expertise that included critical care competencies. RNs noted that the RRT expedited transfer to higher level of care when needed. Before the RRT was called, nurses felt concerned, frustrated, anxious, uneasy, and nervous. When the RRT arrived, they felt relieved, confident, and appreciative. After the team left, nurses felt supported, confident, relieved, and appreciative.

Conclusions: Nurses found the RRT to be life saving to their patients, affirming to their role, and workload ameliorating. The impact of RRTs on RN recruitment, retention, intent to leave, perceived role support, role stress and failure to rescue is unmeasured in this study but observed to be profound, pervasive and ultimately workforce enhancing. More research on these relationships is urgently needed.