Rapid Response Systems: The Stories

Family Alert: Implementing Direct Family Activation of a Pediatric Rapid Response Team

Inpatient pediatric cardiopulmonary arrests are associated with a poor prognosis. Recent studies show survival to discharge for in-hospital pediatric patients who suffer a cardiopulmonary arrest to be as low as 16%.\(^1\) Rapid response systems (RRSs) have been introduced in many hospitals to reduce cardiopulmonary arrests and mortality. Rapid response teams (RRTs), which are teams of medical providers who respond to emergent situations within the hospital, are one arm of these hospitalwide systems.\(^2\)

The interest in pediatric RRSs continues to grow as several recent studies have demonstrated their effectiveness in decreasing pediatric codes (respiratory and cardiac arrests) and deaths.\(^3^{–}6\) A previous study at the authors’ hospital revealed that the establishment of a pediatric RRS increased the number of patient days between cardiac arrests and reduced the duration of clinical instability.\(^7\)

At many hospitals, both staff and family concerns are triggers for calling the RRT.\(^5\) By recognizing the concerns of families, emergency personnel can reach deteriorating patients earlier, thus preventing cardiac arrests.\(^7\) Inclusion of family concern also reflects the understanding that, especially in pediatrics, family members are often the first to recognize that something is wrong with a patient. The Joint Commission’s National Patient Safety Goal (NPSG.12.01.01) identifies communication with patients and families as “an important characteristic of a culture of safety.”\(^7\) Patient- and family-centered care relies on communication between patients, families, and the medical team for planning, delivery, and evaluation of care. According to the Institute for Family-Centered Care, the core concepts of patient- and family-centered care are dignity and respect, information sharing, participation, and collaboration.\(^7\) In pediatrics, where patients are reliant on family members for decision making, family-centered care is essential for addressing the patient’s needs.

In this article, by describing our own experience in implementing a family-activated pediatric RRS, we identify issues that may arise during this process and share our strategies for overcoming these challenges.

Implementing the RRS

North Carolina Children’s Hospital (NCCH), a 140-bed children’s hospital in the University of North Carolina Hospitals system, implemented a pediatric RRS in August 2005 to improve patient safety and provide patient- and family-centered care. Like other hospitals with RRSs, NCCH has gained the necessary administrative and financial support, established criteria for activation (Table 1, below), and developed a quality program to measure and evaluate the impact of its system and to introduce appropriate improvements. The system uses a medical emergency team (MET), which is led by a pediatric ICU (PICU) fellow or attending physician and also includes a PICU charge nurse, a PICU respiratory therapist, a senior pediatric resident, and the patient’s primary team.\(^7\) The team was implemented as part of the Institute for Healthcare Improvement’s 5 Million Lives Campaign, before the Consensus Conference distinguished between RRTs and

<table>
<thead>
<tr>
<th>Table 1. Rapid Response Team Activation Criteria, North Carolina Children’s Hospital</th>
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<tbody>
<tr>
<td>Staff or family member concerned about the patient</td>
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<tr>
<td>Acute change in heart rate</td>
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<tr>
<td>Acute change in respiratory rate</td>
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<tr>
<td>Acute change in oxygen saturation</td>
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<tr>
<td>Acute change in systolic blood pressure</td>
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<tr>
<td>Change in mental status</td>
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<tr>
<td>New or prolonged seizure</td>
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<td>Patient with difficult to control pain or agitation</td>
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METs. Although our team is, in fact, an MET, we continue to use the broader term RRT at our hospital.

**RESPONDING TO FAMILY CONCERN**

Our first-year data revealed that “family concern” was one of the reasons for activation in 8% of the calls. More than half of the patients required transfer to the PICU, demonstrating that the calls were appropriate and necessary. In response, we developed family activation to empower family members to seek help when serious concerns arise. In planning for family activation, we sought the input of families. A nationally known parent advocate spoke about the loss of her child at our pediatric department grand rounds. She told of her frustrations with a medical team that repeatedly disregarded her concerns and reassured her that her child was experiencing routine pain and vital sign changes after a routine surgical procedure. At a time when RRSs were not yet widely in place, we became acutely aware of the possibility of such a tragic occurrence at NCCH or any other hospital.

We also engaged families of our own patients, as reflected in this case report:

One mother whose adolescent son had a terminal chronic illness and was hospitalized frequently at our hospital noticed that something was different with her son one day and asked for help. Even though her son was experiencing symptoms similar to those he had in previous non-ICU admissions, this time his mother felt that his breathing pattern was worse than normal. A resident who remembered that calls could be made on behalf of parents activated the RRT. The team arrived and transferred the child to the PICU, where he later required intubation. As a result of the rapid response call and the subsequent transfer, care was provided in a nonurgent, controlled fashion. Although this child later died from his chronic illness, his family was able to spend several more weeks with him and was ready to make the decision for a Do-Not-Resuscitate order and palliative care. He never had a code blue call and never suffered through cardiopulmonary resuscitation (CPR). Instead, he died with his family around him, not in a chaotic room of strangers performing CPR.

This compelling testimony reaffirmed our need to put systems in place that would enable families to request help directly through the RRS.

**FAMILY ACTIVATION OF THE RAPID RESPONSE SYSTEM**

Family activation empowers families by allowing them to directly activate the RRT by calling an easy-to-remember number from the phone in the patient’s room or from any other phone in the hospital. This is the same number used by the medical team when it activates the RRT. For all RRT calls, the operator asks the caller for the patient’s name and location and activates the RRT by making an overhead call and a group page. The team arrives to the patient’s location within minutes and works with the primary medical team to provide assistance to the patient. After the call, the RRT members complete a form that includes information about the patient, who made the call, reasons for the call, actions taken during the call, and outcomes of the call. This information is later reviewed to identify areas for improvement as well as outcomes of activations.

Family activation was first piloted for two months at NCCH in the children’s intermediate cardiac care unit and the pediatric hematology/oncology and pulmonary unit to learn lessons about education of families and staff and apply these lessons to the rest of the hospital. In April 2007, family activation was introduced throughout the hospital, allowing families to directly activate the RRT and incorporating families into the medical team. On admission to our hospital, all patients and families are educated about family activation by the admitting nurse. This process, which is included on the checklist of required tasks upon admission, takes less than five minutes. Persons who do not speak English are informed by a translator at admission that they can activate the RRT by handing a tear-off card that is present in all pediatric rooms to any English-speaking person (Appendix 1, available in online article).

The card tells the person to call the operator and ask for the RRT.

Dean et al. describe a system that also enables patients or families to request immediate attention. At their hospital, a call by a family member results in the activation of a special Condition HELP team (a physician, a nursing supervisor, and a patient advocate) that evaluates whether to elevate the situation and activate a rapid response emergency team, called Condition A (cardiopulmonary arrest) or Condition C (a crisis that might result in imminent arrest). This differs from family activation at our hospital, where families make a direct call to activate the RRT without a triage step.

**Education of Staff and Families for Successful Implementation**

**STAFF EDUCATION**

Open and honest dialogue to allow hospital staff to express their concerns helps ensure successful implementation. At NCCH many members of the medical team were unsure about how to explain to parents that they could call the RRT if they needed help. They feared sending the message that families...
should not talk to their medical team about their concerns or that the medical team was in some way incapable of managing the care of the patient. Through meetings with the staff and support from nurse management, the medical team has become increasingly comfortable talking to families about activating the RRT. A mock script (Appendix 2, available in online article) has helped staff better understand how to educate families at the time of admission.

EDUCATION IN PATIENT ROOMS

When family activation was implemented, a permanent poster (Appendix 3, available in online article) was placed in each patient room at NCCH. The poster, in both English and Spanish, serves as a reminder of the number to call and a prompt for nurses to provide education at the time of admission. Tear-off cards for non-English (Spanish)-speaking families, as described previously, are available next to the poster. We have found that the poster alone is not sufficient education for families but does provide a useful reminder of the phone number to call for activation. In addition to the poster, information about the RRT is included in the hospital guide that is provided to every family at the time of admission.

FLYERS IN FAMILY LOUNGES

Flyers, in English and Spanish, were created at the request of the nursing staff and can be found in the family lounge of each floor. The flyer (Appendix 4, available in online article), provides very general information about the pediatric RRT and prompts families to ask their nurse for more information. In conjunction with the posters in patient rooms, this information serves as a reminder of the phone number to call and assists families in talking to their nurse about how the system works.

FAMILY AWARENESS SURVEYS

We conduct random surveys of families at NCCH to determine how well patients’ families understand family activation and to provide further education when needed. Using a series of questions (Appendix 5, available in online article), a staff member asks the family whether they have been told about family activation. If the family members are familiar with the system, they are asked to explain, in their own words, how the system works and when it should be activated. In instances where the family is not aware of the system, the surveyor provides education through a verbal explanation as well as reference to the poster hanging in the patient’s room. Family members who were not present at the time of admission are educated but not included in the survey results. Responses are recorded on a checklist (Appendix 6, available in online article) for further analysis.

The results of the family awareness surveys are posted on each floor to remind the nursing staff to educate their patients’ families about family activation. Improved awareness on each floor has been rewarded with catered lunches, snacks, and thank-you cards to the staff. We have found that the surveys must be conducted on an ongoing basis, generally once a month. Without regular feedback to the staff, education efforts and family awareness begin to decline.

In addition to in-person surveys of family members, in April 2007 we also conducted confidential paper surveys asking family members about their confidence in knowing how to find needed help in an emergency situation and the likelihood that the needed help would respond immediately. Family members were asked to complete the anonymous survey when no staff members were around. Completed surveys were placed in an envelope and returned to a research assistant. We found wide variation in the responses and saw no difference between the surveys conducted before and after the implementation of family activation. Although some of the answers to open-ended questions were helpful, these surveys were not an effective way for us to evaluate family awareness. In particular, if the family member indicated on his or her survey that he or she did not know how to seek help, there was no mechanism for education at that time.

We encourage other hospitals to conduct surveys of family awareness in person rather than on paper. This opens the door for dialogue between families and hospital staff and enables staff to provide education about family activation when needed.

Electronic Chart Reminder

One way to assist nurses with talking to families is to include family activation education on the electronic patient chart. With the assistance of the nursing staff, this item was added to the checklist of actions that must be completed at the time of admission. Because we have found that explanation from the nurse is the most critical part of educating families, it was important to provide nurses with a reminder tool to do this. In a query of electronic charts one year after implementation of family activation, nurses documented that 100% of families present at the time of admission had been oriented to the family’s role in the RRS. Data from our family surveys, which indicate much lower percentages of awareness, highlight the need to learn more about how to educate families and to train staff to deliver information about family activation.
Pediatric Rapid Response Team (RRT) Calls per 1,000 Discharges, April 2006–April 2009

![Graph showing the number of RRT calls per 1,000 discharges from April 2006 to April 2009.](image_url)

Figure 1. The number of RRT calls per 1,000 discharges increased from 16 to 24 calls after implementation of family activation in April 2007.

Results
Family activation and the education processes as described are now in place throughout NCCH. Random in-person surveys of 276 families show that, on average, only 27% of families understand when and how to activate the RRT. Family awareness, which to date has been as high as 58% and as low as 6%, varies greatly between pediatric services and on the same service each month.

Since the introduction of family activation, the mean number of RRT calls has increased significantly, from 16 to 24 calls per 1,000 discharges (Figure 1, above). Family concern was noted as a reason for activation in 5% of all calls, and two calls were directly activated by families in the past year.

The median number of calendar days between cardiac arrests has increased from 34 days to 104 days since initial implementation of the RRS in 2005 (Figure 2, page 579). A Shewhart control chart was used to analyze the calendar days between cardiac arrests. Any points outside of the control limits indicate a significant change in the system.12,13 Because cardiac arrests are rare events, made even more rare by the RRS, we do not yet have sufficient data to evaluate the impact of family activation on cardiac arrests. A previous study revealed that there was no difference in hospital deaths or unplanned ICU admissions following implementation of the RRS at NCCH.7

Discussion
The results associated with family activation have confirmed the importance and value of providing family-centered care and have helped us understand how to better serve our patients. That is not to say that creating a blame-free, patient- and family-centered RRS is without its challenges. We found that early resistance to the RRS came primarily from physicians who were concerned that their oversight of patient care would be undermined, whereas the nursing staff was generally supportive. In contrast, nurses were more apprehensive about implementing the family activation component because of their own perceived loss of control. Over time, however, the physicians and nurses have come to understand that activation—by staff or families—of the RRT provides a means of improving care for patients. By putting the needs of the patient and concerns of the family first, the clinical staff has embraced the RRS as an extension of the quality care that they already provide for their patients.

Although some members of the medical staff and even fam-
The median number of calendar days between cardiac arrests increased from 34 to 104 following initial implementation of the rapid response system. Improvement has been maintained since addition of family activation. The longest time between cardiac arrests occurs after educational periods.

Family advisors initially feared that family activation would result in numerous calls for nonemergent situations, we have found that all calls by family members have been appropriate and required transfer to the PICU. We credit this largely to the education provided by nurses to the families. At NCCH, we promote a “no false alarms” policy for our RRS, explaining to both staff and families that all concerns are valid. Our experience has shown that staff and families use appropriate judgment when deciding whether to activate the team.

Providing complete and lasting education to families remains a challenge for our hospital. One obstacle to providing education is the volume of information that nurses must communicate to families at the time of admission. In the midst of a stressful situation, families are inundated with details, all of which they may not be able to remember. Nurses may also have difficulty remembering to conduct family activation education among all of their other tasks at the time of admission and can easily check the box in the electronic chart without actually providing education.

Although knowledge about the RRS and family activation among family members is widely variable, as described, families who have had repeat visits to the hospital seem to demonstrate the most complete knowledge about the RRS and family activation, gaining greater understanding each time they return to the hospital. Further study of the correlation between length of patient stay, number of visits to the hospital, and understanding of family activation may provide useful information about how to improve education of all families. Although the tools provided in this article have helped us improve awareness among families, we do not expect to reach 100% awareness because of high patient turnover and the limited time for education.

The number of calls per 1,000 discharges has increased since the implementation of family activation, but the overwhelming majority of these calls are still made by medical staff and not families. The additional number of calls per month is primarily due to “staff concern” or clinical criteria that the staff have recognized as early warning signs. With the introduction of family activation and a greater emphasis on family-centered care, nursing staff may be more inclined to make calls when the need arises. Data regarding the reason for the call are obtained from the information forms that are completed by the team after each response. There are generally many reasons for each call; however, the team may only list one reason on the form.
In addition to “worried family,” other selections on the form include “worried staff” or clinical criteria (such as “heart rate” or “respiratory rate”). The decline from 8% to 6% in “family concern” as a reason for the call does not truly signal diminishing concern from parents and other family members. The actual number of calls prompted by family concern has slightly increased; the percentages have decreased because of a considerable increase in the total number of rapid response calls.

Our efforts to educate both staff and families have helped create a culture in which people feel comfortable activating the RRS, and we are constantly seeking new ways to educate our families and enlist the support of our staff. Future approaches may include the use of improved electronic charting to evaluate family awareness, an in-room video about family-centered care, and consultation of a family advisory group for new ideas about improvement. The ongoing efforts to provide education about family activation serve not only to help them summon care in a time of need but also to move toward a hospitalwide culture of recognizing families as critical members of the medical team.

Although we have not seen a further decrease in the number of cardiac arrests with the introduction in family activation, the dramatic reduction of cardiac arrests that followed the initial implementation of the RRS has been maintained. In any case, the low rate of pediatric cardiac arrests makes it difficult to attribute a significant change to the RRS at one hospital.

Conclusion

Over time, we hope that more families will feel empowered to activate the RRS. This partnership is essential for providing the best possible care to the children that we serve.

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References

Appendix 1. Tear-off Card Used by Spanish-Speaking Family Members to Summon the Rapid Response Team

Gruppo Pediátrico de Rápida Assistencia

¿Emergencia Médica?

Dé Esta Tarjeta a Enfermera o a Doctor

(See reverse side for English)

Pediatric Rapid Response Team

This card is used by Spanish speaking family members to request the Pediatric Rapid Response Team. Please call the number below.

Call

64111

Give the operator the child’s location in the hospital.
Appendix 2. Mock Script for Staff Members to Inform Family Members About Family Activation of the Rapid Response Team (for English- and Spanish-Speaking Family Members)

How to inform families about the Pediatric Rapid Response Team

Here at NC Children’s Hospital, we feel that families are an important part of the medical care team. We recognize that you know your child better than anyone. With this in mind, we have developed a medical emergency team, much like 911, here in the hospital — the Pediatric Rapid Response Team. The Pediatric Rapid Response Team is a group of doctors and nurses trained to address medical emergencies.

Call the Pediatric Rapid Response Team if:
- Your child’s condition is rapidly worsening.
- There is a medical emergency.

To request a Pediatric Rapid Response Team, you may ask your floor nurse or doctor for assistance or call the hospital operators at 64111. (The phone number is on a poster in your new room.) The operators will ask for your name and your child’s room number. Then, they will page the Pediatric Rapid Response Team to your child’s room. The team will arrive within minutes. Please tell them about your child’s medical emergency.

The Pediatric Rapid Response Team is for medical emergencies ONLY. If you have complaints or concerns about your child’s care, talk with your nurse or call Patient Relations at 65006 (the phone number is by the door in your new room).

Do you have any questions?

For Spanish-speaking families

[Request a hospital Spanish interpreter.]

Here at ....

There is a card located by the Pediatric Rapid Response Team poster in your new room. To request a Pediatric Rapid Response Team, give this card to any nurse or doctor. The nurse or doctor will call the Pediatric Rapid Response Team to your child’s room. The team will arrive within minutes. Also, a Spanish interpreter will arrive. Please tell the Spanish interpreter about your child’s medical emergency.
Appendix 3. Bilingual Rapid Response Team Poster Displayed in All Patient Rooms

It’s Your Child
Is your child’s condition rapidly worsening?

Es Su Niño
¿La condición de su niño se está empeorando rápidamente?

Medical Emergency? ¿Emergencia Médica?
CALL LLAMAR AL
64111

Pediatric Rapid Response Team

When you call the Pediatric Rapid Response Team a group of highly trained medical professionals will arrive to address your child’s medical emergency.

Ask your nurse for more details.

Grupo Pediátrico de Rápida Asistencia Médica

Cuando llama a grupo pediátrico de rápida asistencia médica un grupo de profesionales médicos altamente entrenados llegará para tratar la emergencia médica de su niño.

Pida a su enfermera más detalles.
Appendix 4. Bilingual Pediatric Rapid Response Team Flyer Distributed to Family Waiting Rooms and Common Areas

**Pediatric Rapid Response Team**

Medical Emergency Call 64111

Have you heard about the Pediatric Rapid Response Team?

*Ask your nurse.*

**PEDIATRIC RAPID RESPONSE TEAM**

Here at *NC Children’s Hospital*, we feel that families are an important part of the medical care team. We recognize that you know your child better than anyone. With this in mind, we have developed a medical emergency team, much like 911, here in the hospital—the Pediatric Rapid Response Team.

The Pediatric Rapid Response Team is a group of hospital personnel trained to address medical emergencies.

You should still communicate with your nurse or doctor. The Pediatric Rapid Response Team simply provides a safety net for you and us in case of an emergency.

To request the Pediatric Rapid Response Team, you may ask a nurse or doctor for assistance or call the hospital operators at 64111.

The Pediatric Rapid Response Team is for **EMERGENCIES ONLY**.
Family Activation of Pediatric Rapid Response Team
Assessment—Are We Educating Families?

Introduction
Hello. My name is Emily and I work at the Children’s Hospital. I’d like to ask you a few questions about the Pediatric Rapid Response Team [gesture to poster for visual] It should only take a couple of minutes. Is now a good time?

Family Informed?
Have you been told about the Pediatric Rapid Response Team?

Yes

Accurate knowledge demonstrated?
I’m glad to hear that. We are trying to improve our education about the team and it would be helpful to hear, in your own words, what the purpose of the team is (i.e., what does the team do? and why would someone call the team?)

No

Were you with the patient at admission?

Provide education
To include:
• What the team is
• Why it exists (e.g., 911 analogy)
• When to call (medical worsening) vs. patient relations

(Give Patient Relations # if asked)

Unable to answer

Do you have any questions for me about the Pediatric Rapid Response Team?

Answer questions.
Clarify as needed.

Closing
Thank you for your time.
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* Peds RRT, pediatric rapid response team.