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Title: A collaborative in-situ simulation-based pediatric readiness improvement program for community emergency departments.

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Abstract

Background:

More than 30 million children are cared for across 5,000 US emergency departments each year (ED). Most of these EDs are not facilities designed and operated solely for children. A web-based survey provided a national and state-by-state assessment of pediatric readiness and noted a national average score was 69 on a 100-point scale. This survey noted wide variations in ED readiness with scores ranging from 61 in low-pediatric-volume EDs to 90 in the high-pediatric-volume EDs. Additionally, the mean score at the state level ranged from 57 (Wyoming) to 83 (Florida) and for individual EDs ranged from 22 to 100. The majority of prior efforts made to improve pediatric readiness have involved providing web-based resources and online toolkits. This paper reports on the first year of a program that aimed to improve pediatric readiness across community hospitals in our state through in situ simulation-based assessment facilitated by our academic medical center. The primary aim was to improve the pediatric readiness scores in the ten participating hospitals. The

secondary aim was to explore the correlation of simulation-based performance of hospital teams with pediatric readiness scores.

Methods:

This interventional study measured the PRS prior to and after implementation of an improvement program. This program consisted of three components: (1) in-situ simulations; (2) report outs; and (3) access to online pediatric readiness resources and content experts. The simulations were conducted in situ (in the ED resuscitation bay) by multi-professional teams of doctors, nurses, respiratory therapists and technicians. Simulations and debriefings were facilitated by an expert team from a pediatric academic medical center. Three scenarios were conducted for all teams and include: a six-month-old with respiratory failure, an eight-year-old with diabetic ketoacidosis (DKA), and a six-month-old with supraventricular tachycardia (SVT). A performance score was calculated for each scenario. The improvement of PRS was compared before and after the simulation program. The correlation of the simulation performance of each hospital and the PRS was calculated.

Results:

41 multi-professional teams from ten EDs in Indiana participated in the study, five were of medium pediatric volume and five were medium-high volume EDs. The PRS significantly improved from the first to the second on-site verification assessment (58.4±4.8 to 74.7±2.9, p=0.009). Total adherence scores to scenario guidelines were: 54.7%, 56.4% and 62.4% in the respiratory failure, DKA and SVT scenarios respectively. We found no correlation between simulation performance and PRS scores. Medium ED pediatric volume significantly predicted higher PRS scores compared to medium-high pediatric ED volume (β=8.7; CI: 0.72, 16.8, p=0.034).

Conclusion(s):

Our collaborative improvement program that involved simulation was associated with improvement in pediatric readiness scores in ten EDs participating statewide. Future work will focus on further expanding of the network and establishing a national model for pediatric readiness improvement.

Introduction

There has been considerable growth in the number of emergency department (ED) visits in the United States over the past two decades. More than 30 million ill and injured children are cared for across 5,000 US emergency departments each year (ED).[1] The large majority of these EDs are not facilities designed and operated solely for children (AAP 2001).[2] Over 90% of pediatric visits take place in departments caring for less than 15 pediatric patients/day (that majority of patients in these EDs are adults).[3,4] Importantly, these EDs are inconsistent in their readiness to care for children; some are well prepared and others are challenged by a lack of resources or personnel.

A report published by the Institute of Medicine (IOM) in 2006 described pediatric emergency care in the US as "uneven."[5] In response to that finding, key stakeholders from emergency medicine (ACEP/ENA) and pediatrics (AAP/EMSC) formed a national coalition in 2009 called the National Pediatric Readiness Project (NPRP) with the goal of ensuring that all US EDs have the essential guidelines and resources to provide effective and appropriate care to children.[6,7] In 2013, this group administered the NPRP Pediatric Readiness Survey (PRS). This web-based survey was completed by 82% of all US EDs (n=4,149) representing 24 million annual pediatric visits. This survey provided a national and state-by-state assessment of pediatric readiness as well as a customized gap analysis for each participating ED.[4] The survey noted a national average score of 69 on a 100-point scale and noted improvements in

readiness compared to a mean of 55 in 2003. The scores correlated with EDs pediatric patient volume with a mean score of 61 in the low-pediatric-volume EDs (<1,800/year) compared to 90 in the high-pediatric-volume EDs (>10,000/year). The mean score at the state level ranged from 57 (Wyoming) to 83 (Florida) and for individual EDs ranged from 22 to 100, demonstrating that pediatric readiness continues to be uneven.[8] Additionally, recent research has demonstrated states' efforts to improve pediatric readiness by modeling state verification programs that involved implementing processes and conducting gap analyses to identify areas for facility improvement that were associated with greater pediatric readiness.[9]

The majority of prior efforts made to improve pediatric readiness have involved providing web-based resources and online toolkits.[4,9,10] Many US states have implemented programs aiming to improve pediatric readiness, but few of them involve simulation-based assessments. In Connecticut Whitfill *et al.* reported a cohort study that noted a thirteen-point improvement in the PRS across twelve community EDs in the state following implementation of an in situ simulation–based initiative.[11] However, their study was limited to a simulation-based assessment and reports out and lacked the unique ongoing collaborative intervention with a detailed action plan described in our study. Simulation has been used as a training methodology and as an investigative methodology.[12] There has been a growing body of evidence supporting the use of simulation to measure and improve the quality of care. In situ simulation involves bringing the simulator into the clinical environment to measure the quality of care delivered by intact care teams using real-world equipment.[13,14] In situ simulation improved the quality of pediatric trauma care in a single center study.[15]

This paper reports on the first year of a program that aimed to improve pediatric readiness across community hospitals in our state. The primary aim was to improve the pediatric readiness scores in the ten participating hospitals through establishing a collaborative improvement program involving simulation guided by the academic medical center. The secondary aim was to explore the correlation of simulation-based performance of hospital teams with pediatric readiness scores using simulation as a modality assessment.

Methods

Study setting and population

The participating community ED sites included five medium volume and five medium-to-high volume EDs. These EDs volumes were chosen based on their geographic location and historical transfer of patients to our main academic center ICU. Additionally, they represent the largest proportion of EDs nationally as reported in the national pediatric readiness project[4] and the national EMSC. [16]

Sites were recruited based on their pediatric patient volume, geographic location and historical transfer patterns of pediatric patients. The academic medical centers' critical care transport service contacted sites through established relationships at each hospital. All sites visits were scheduled in coordination with each hospitals ED director and/or manager. Staff were recruited to participate in the simulation sessions by study coordinators through each ED manager or director who served as a point person for their site and distributed a sign-up sheet. An institutional review board approval was obtained from the academic medical center for this project.

Study protocol

The study was designed as a collaborative PRS improvement project that involved the use of simulation to potentiate improvement in pediatric readiness scores. Scores were measured in person by a study coordinator at baseline and the end of the study. The six domains of the PRS, as outlined in the NPRP assessment, include (1) coordination of care, (2) physician/nurse staffing, (3) quality improvement, (4) patient safety, (5) policies/procedures, and (6) equipment and supplies.

This study was conducted over a 12-month period. The preparation period extended over the first two months and included (1) website development, (2) checklist refinement; and (3) site contacting and scheduling. Baseline visits occurred at all ten hospitals over the next two months of the study period. All items in the PRS were verified during an in-person visit by our pediatric liaison with the ED manager or coordinator at each site. This visit involved directly examining all the scored items on the checklist across the six domains (locating each piece of equipment, reviewing policies/guidelines in paper or electronic form, reviewing staffing). If, during the in-person assessment, the coordinator and local ED team were unsure or unable to locate the scored item, it was considered nonexistent. Prior to conducting these visits, the study team obtained permission from EMSC to use the PRS checklists and developed a website with the state EMSC that provided a collection of resources to support pediatric readiness improvement in community EDs. The study coordinators who performed this review were a registered nurse and respiratory therapist who have ten years of experience in pediatric intensive care and critical care transport. The PI facilitated training for these coordinators related to all of the questions on the PRS prior and was available throughout the study to clarify questions related to the PRS. After this baseline measurement of the PRS, the intervention described below was implemented over a six-month time period. A follow-up PRS was completed by the same methods as described above (study pediatric liaison and ED

representative) to provide re-assessments at each site at the end of the study period over two months. The timeline of the study is showed in figure 1.

This pediatric readiness improvement intervention consisted of three components: (1) in situ simulations; (2) report outs; and (3) access to online pediatric readiness resources and content experts.

1) In situ simulations: The collaborative team members conducted in situ simulation sessions at each participating EDs over six months. Teams were composed six health care providers including physicians, nurses, respiratory therapists, and nursing assistants. Participants were protected from any clinical responsibilities during the simulations and debriefings. Each team participated in a 2.5-hour in situ simulation session that involved completing three scenarios: (1) an infant with a respiratory failure; (2) an infant with a supraventricular tachycardia (SVT); and (3) an 8-year-old with diabetic ketoacidosis (DKA) (supplemental1). These cases were chosen based on an extensive review of the high-risk critical care cases transferred to the regional children's hospital and were developed based on identified opportunities for improvement in clinical care in the ED. All cases were conducted in the actual ED resuscitation bay to enhance realism and involved teams using their actual resources. Each session began with a standardized orientation to introduce the collaborative team, its mission and describe the agenda of the day. Participants were oriented to the functionality of the simulators (SimBaby, SimJunior Laerdal). The team was also introduced to the embedded participant that was used in some of the scenarios as a parent. Laboratory data were provided on request on preprinted laminated cards, including standard point-of-care testing (e.g., venous blood gas, dextrose, electrolytes). These sessions were intended to assess individual ED teams' performance and identify local ED systems issues. Debriefing were structured to focus on opportunities for improvement in the interprofessional team

performance and to identify knowledge deficits. The instructors were recruited from an academic medical center "hub" and included three pediatric intensivists, one pediatric emergency physician, two critical care transport nurses, and a critical care transport respiratory therapist. Instructors were chosen from different professional backgrounds (EM, ICU and critical transport) due to the nature of the scenarios performed and the eventual transfer of these patients to the main pediatric ICU in the state using the critical care transport team. All instructors had experience in simulation debriefing and completed a debriefing course prior to the study (two-and-a-half-day course conducted and led by Bobbi J Byrne and her collaborative team. [17]

A scripted debriefing was used to provide a structure for discussion after each individual case. Simulation-based performance was scored for each case as described below.

2) Report-outs: After completion of the simulations a report out was created for each participating ED that included the initial in-person PRS measurement (overall and domain scores) and a simulation-based performance evaluation. This report out included the missing items from each domain, deviations from best practices (as measured by simulation) and a customized action plan for improvement. Each hospital has its own customized report to address its own score and guide its improvement efforts throughout the project. This report out was presented to each ED site director by the study team and provided as a paper document. During this meeting, a detailed timeline was created by the study investigators in collaboration with the site lead. Over the next six months, all sites had an ongoing communication with the study team regarding any needed resources or additional assistance. As an example, when a report out identified that a site was missing a guideline that was required by the PRS, the academic site would share a guideline and strategies for implementation in the community site. If a site was noted to have deficiencies in the simulation-based performance, evaluation sites were provided resources for training and/or

consultation by the study team on systems modifications. An example of a report out with action items is available as an online appendix to this article (Supplemental 2).

3) Access to online pediatric resources and content experts: A website to ensure the continuous availability of all pediatric readiness resources was created (http://pediatrics.iu.edu/pcome/get-ed-ready). The academic medical center also created clinical guidelines for best practices and educational modules focusing on managing acute illnesses in children in the ED that were distributed to participating EDs (www.pediatrics.iu.edu/pcome). Each ED site director was encouraged to directly contact the collaborative academic medical center team at any time through email or telephone. The academic medical center team regularly provided ongoing oversight and guidance related to pediatric improvement based on the timeline and action items.

Measures

PRS

At each site, pediatric readiness scores were measured in person using the surveys twice: once during the initial visits and then again during the follow-up visits with an interval of six months between the two measurements. The six domains as outlined in the National Pediatric Readiness Project assessment include: coordination of care, physician/nurse staffing, quality improvement, patient safety, policies/procedures, and equipment and supplies.

Simulation-based performance

Performances of individual teams based on the simulated scenarios checklists were calculated by adding the number of correct items in each checklist. Cases and performance checklists were iteratively developed over six months prior to starting the project. Performance measures were developed based on established best practice guidelines related to the

management of DKA and SVT. For example, DKA checklists were derived using the American Diabetic Association consensus guidelines.[18] Similarly; SVT checklists were derived using the most updated American Heart Association Guidelines.[19] Content validity evidence was provided through adaptation of existing guidelines and a modified Delphi review process by content experts in pediatric critical care, pediatric emergency medicine, and pediatric critical care transport providers and then adapted after being piloted within our institution. To add further content validity evidence to our checklists, the validation process for the checklists was improved through pilot application and iterative changes to the cases and checklists during six simulations with teams of providers in certain sites that were not included in our study.

Performance was scored in real-time based on the number of items performed correctly using individual checklists for each scenario by two separate facilitators "MD and RN and/or RT" who scored each checklist independently, and then scores were discussed between these individuals until consensus was reached. Each case performance score was calculated using equal weighting for all subcomponents and dividing by the total number of possible elements to derive a score on the scale of 0 to 100.

Demographic variables

Provider-level data were collected by a survey. In addition, all data regarding hospital demographics, including ED configuration and annual overall and pediatric patient volume, were collected as part of the PRS. Pediatric volume was categorized based on EMSC definitions: medium (1,800 to 4999 annual pediatric patients) or medium-high (5,000 to 9,999 annual pediatric patients).

Data analysis

A Microsoft Excel version 14.0 (Microsoft) was created for all data entry (pediatric readiness survey and simulation-based performance). All data were manually entered and transferred into SPSS version 22.0 (IBM Corp) with which all statistical analyses were performed.

We examined differences in survey responses and simulation data by pediatric patient volume using bivariate analyses. Data were examined for normality and homogeneity in each analysis.

We conducted Pearson $\chi 2$ or Fisher exact tests for categorical data as appropriate, independent t-tests for normal continuous data, and Wilcoxon-Mann Whitney U tests for nonparametric data.

We tested correlation between PRS improvement and simulation performance using a Pearson correlation coefficient (r). Lastly, we used a mixed-effects linear regression to model improvement in PRS as the dependent variable with a robust variance estimator to account for within-hospital correlation. The model examined which variables explained higher improvement in the PRS. We included the following potential covariates in the model: pediatric patient volume category, team composition of participants holding MDs (percentage), as well as the overall simulation checklist score.

Results

PRS scores

The PRS scores before and after the intervention and demographic data are reported for the participating community EDs in **Table 1**. There were five medium pediatric volume EDs (1,800 to 4,999 pediatric patients/year) and five medium-to-high pediatric volume EDs (5,000 to 9,999 pediatric patients/year). The mean PRS score (scaled from 0 to 100) on initial visits for all EDs was 58.4 (SEM 4.8). There were no significant differences in the initial PRS score

between medium pediatric-volume hospitals and medium- to high-pediatric-volume hospitals (PRS = 55.4 [SEM=5.5] vs. 63.2 [SEM=7.0], respectively, p= 0.405). Average time between PRS assessment was 6 months. The PRS scores significantly improved 16.2 percentage points from the first assessment (mean ± SEM = 58.4 ± 4.8) to the final assessment (74.7 ± 2.9) (mean difference = 16.2; p = 0.009). Significant improvement was noted in the patient safety by 2.7 points (out of a total of 14) (p= 0.014), policies and procedures by 1.8 points (out of 17) (p= 0.025) and pediatric equipment by 2.3 points (out of 33) (p= 0.002). The PRS scores domains also showed marked improvement: coordination of pediatric patient care by 5.3 points (out of 19) (p= 0.051), staffing by 2.2 points (out of 10) (p=0.104), and quality improvement by 1.6 points (out of 7) (p= 0.126).

Detailed results of the improvements for each domain subscore are shown in **Table 2**.

Simulation performance

A total of 41 inter-professional teams participated in the simulation sessions al all sites. Total adherence scores were: 54.7% for respiratory failure, 56.4% for DKA and 62.4% for SVT. The summative score across all three cases was 58.0%. None of the participating teams had 100% adherence scores for any of the scenarios. **Table 3** shows detailed simulation performance scores and checklists.

Predictors of improved PRS scores

No correlation was noted between baseline PRS and simulation-based performance scores. To examine potential predictors of improvements in PRS scores, we used a mixed-effects linear regression model that accounts for within-site variability seen in teams nested within each site. We found that, when accounting for simulation performance and MD ratio in the teams tested, medium pediatric patient volume significantly predicted higher PRS scores compared to medium-high pediatric patient volume (β=8.7; 95% confidence interval: 0.72,

16.8, p=0.034). This finding was significant in a similar model with MD ratio dropped: medium vs. β=8.7; 95% confidence interval: 0.63, 16.8, p=0.035.

Discussion

Our study demonstrated significant improvements in pediatric readiness scores by 16.2 percentage points after participation by ten community hospital EDs in this collaborative improvement program. Improvement was noted in all six of the PRS domain scores with the most improvement noted in the patient safety, policies and procedures, and pediatric equipment. We believe that the addition of simulation-based assessments of teams and ED systems provided a context to the opportunities for improvement identified by the pediatric readiness survey.[4] For example, simulation allowed our team to emphasize the use of kilogram only in weighing all pediatric patients during our simulated scenarios, which enhances the patient safety domain in the PRS. Similarly, we tailored our scenarios to trigger the need of utilizing the inter-facility transfer guidelines toward the end of the scenario that sites recognition of the policies and procedures domain. Another example is using simulation to highlight the ED staff ability to properly located and verify the function of many equipment and supplies used during the simulated scenarios which ultimately improves the equipment and supplies domain sores. The simulation-based performance of real world teams applying their knowledge, using their equipment and accessing their guidelines, provided ED leaders with information on gaps in the care for sick children. The simulations augmented the PRS scores and guided many of the report out discussions as well as follow-up interactions with the participating sites. Our simulation program was a trigger to potentiate change and prompted communication between the main academic center and participating sites allowing community partners to engage in a true collaboration with the academic medical center. The partnership between the participating community EDs with the main

pediatric academic center involved discussions related to the PRS, simulations, and access to our website resources. This was demonstrated by 524 visits to the program's website (supplemental 3). In addition to the engagement of leadership and smoothing the communication curve, the simulations increased individual front-line providers' engagement in pediatric readiness improvement. Historically, simulation in the emergency setting has been used to train health care professionals for high-stakes and low-frequency events and to improve teams' performances.[20, 21] Additionally, simulated scenarios naturally attempt to recreate a real clinical event and provide an opportunity to practice a range of skills and evaluate performance in a controlled environment.[22, 23] Our study showed a summative score across all three cases was 58.0% among all teams. Additionally, none of the participating teams had 100% adherence scores for any of the scenarios. Although we did not find a correlation between PRS scores and simulation-based performance measures, we assert that the simulations played a major role in our program (as both a modality of training and assessment). A simulation-based assessment allowed for assessment of teams adherence to best practice and allow for PRS measurement and improvement. We therefore tailored our action plans based on findings during in situ simulation at each site for each site and saw a significant improvement in three main domains of the PRS: patient safety by 20% (p= 0.014), policies and procedures by 10% (p= 0.025) and pediatric equipment by 7% (p= 0.002).

In comparison to the self-reported national scores reported by Gausche-Hill[4], our cohort had higher scores in the medium-high volume ED compared to the medium volume EDs. This difference could be due to the self-reporting bias of the initial survey that may have led to overestimation of the ESMC scores in comparison to this study in person verification of PRS data elements.

Our future work will focus further on using simulation in detecting safety threats and system issues as a method of improvement based on findings through our simulation-based

assessment. For example, even though many EDs reported to use "kilogram" only to weight their children in the ED based on the PRS in person survey, many teams used adult weight based-dosing for pediatric patients during simulation sessions.

Additionally, our team is continuing to work with the state and the national EMSC programs to improve the pediatric readiness across our state. We are currently in the process of enrolling an additional 24 ED sites in the state (20% of state EDs) in our readiness improvement program in the second year of this initiative.

Limitations – This is small study limited to ten EDs out of total of 121 EDs in the state. In addition, our simulated scenarios checklists were not validated using Delphi method, which could have limited the construct validity of them, but we validated these checklists among our institution experts and used them in many other EDs that subsequently added further validity. Lastly, this was not a randomized controlled study and had no negative controls for comparison against the improved PRS we observed in this cohort.

Conclusions

Our collaborative improvement program that involved simulation was associated with improvement in pediatric readiness scores in a small spectrum of ten EDs statewide. Future work will focus on further expanding of the network and establishing a national model for pediatric readiness improvement.

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Table 1.

	All hospitals	Medium	Medium to high
N	10	5	5
Median total annual patient volume (IQR)	43,907 (25,000, 54,000)	27,500 (24,250, 48,000)	48,000 (43,907, 48,000)
Pediatric annual patient volume (total)	N/A	1000-3900	4000-9999
Beginning mean Pediatric Readiness Survey score (SEM)	58.4 (4.8)	55.4 (5.5)	63.2 (7.0)
Teams			
N	41	23	18
Median team size (IQR)	5 (4, 6)	5 (4, 6)	5 (4.5, 6)
Provider type as percentage of the team			
MDs	12.4%	11.6%	13.4%
RNs	59.3%	60.3%	58.1%
RTs	8.9%	9.0%	8.9%
Other	19.8%	18.6%	21.3%

Table 2

	Pre-intervention			**Post-intervention**			**P-value**
	All	Medium	Medium-to-high	All	Medium	Medium-to-high	Pre vs. post (all)
N	10	5	5	9	5	4	--
Mean PRS score (SEM)	58.4 (4.8)	55.4 (5.5)	62.3 (7.0)	74.7 (2.9)	73.8 (3.7)	75.8 (5.3)	**0.009**
Coordination of pediatric patient care subscore (out of 19) (SEM)	8.4 (1.9)	7.6 (1.9)	9.5 (3.9)	13.7 (1.7)	13.3 (2.3)	14.3 (2.7)	0.051
Staffing subscore (out of 10) (SEM)	3.9 (0.7)	4.0 (1.0)	3.8 (1.3)	6.1 (0.7)	6.0 (1.0)	6.3 (1.3)	0.104
Quality improvement subscore (out of 7) (SEM)	2.6 (1.0)	1.2 (1.2)	4.3 (1.5)	4.2 (1.1)	3.9 (1.6)	4.6 (1.6)	0.126
Patient safety subscore (out of 14) (SEM)	9.2 (0.9)	8.3 (1.1)	10.3 (1.2)	11.9 (0.9)	11.7 (1.6)	12.3 (1.0)	**0.014**
Policies and procedures subscore (out of 17) (SEM)	6.8 (1.1)	7.2 (1.3)	6.2 (2.1)	8.6 (1.1)	9.4 (1.4)	7.6 (1.8)	**0.025**
Pediatric equipment subscore (out of 33) (SEM)	27.6 (0.7)	27.0 (0.7)	28.4 (1.4)	29.9 (0.6)	29.2 (0.8)	30.8 (1.0)	**0.002**

Table 3

	Total N=41 teams
Respiratory Failure case	
Appropriate ETT size used?	21 (52.5)
Cuffed ETT used?	10 (24.4)
Cuff checked?	4 (25.0)
Stylet used?	24 (10.0)
Appropriate blade size used?	26 (60.0)
Laryngoscope checked?	35 (87.5)
Suction catheter available?	11 (27.5)
Bag and mask available?	38 (95.0)
Time out performed?	2 (5.0)
Patient's head positioned properly?	28 (70.0)
Appropriate bagging technique?	21 (52.5)
Laryngoscope blade inserted properly?	34 (85.0)
ETT inserted to appropriate depth?	15 (37.5)
Stylet removed?	26 (65.0)
ETT placement verified using ETCO2 AND chest auscultation?	28 (70.0)
CXR ordered for confirmation?	27 (67.5)
Total adherence (mean)	**54.7%**
Median overall subjective score (IQR)	3.0 (2.0, 3.0)
DKA case	
Appropriate fluid concentrations used?	12 (31.6)
Appropriate fluid rate used?	3 (7.9)
Insulin bolus NOT given?	24 (63.2)
Correct insulin drip rate used?	25 (65.8)
Bicard bolus NOT given?	25 (61.0)
Excessive fluid bolus NOT given	23 (56.1)
Vital signs (HR, RR, SpO2, BP) checked	33 (80.5)
Mental status assessment (GCS or other description) checked	38 (92.7)
Labs (BMP, VBG, Serum and/or urine ketones) checked	38 (92.7)
Total adherence (mean)	**56.4%**
Median overall subjective score (IQR)	2.0 (2.0, 3.0)
SVT case	
Identified SVT rhythm?	31 (88.6)
Identified stable vs unstable SVT?	5 (14.3)
Performed vagal maneuvers?	18 (51.4)
Established IV access?	35 (100.0)
Administered correct doses of adenosine?	28 (80.0)
Properly administered adenosine using stopcock/flush?	20 (57.1)
Performed synchronized cardioversion (pads, j/kg, sync button)	17 (48.6)
Total adherence (mean)	62.4%
Median overall subjective score (IQR)	3.0 (2.0, 3.0)
TOTAL ADHERENCE	**58.0%**
Total subjective score	2.7