A twelve-week pediatric emergency care coordinator (PECC) facilitated free open access medical education (FOAM) curriculum to improve community emergency departments' knowledge, skills, and readiness

ImPACTS 2022

Background

The majority of acutely ill and injured children are seen in community emergency departments (CEDs) that are less prepared and have lower pediatric readiness scores (PRS) compared to pediatric EDs. To address this variability, several U.S. states, Canadian provinces, and national organizations have implemented programs to improve pediatric readiness. ImPACTS (Improving Pediatric Acute Care through Simulation) is a research and education network of Children's Hospitals formed to improve readiness, quality of care, and health outcomes of pediatric patients across CEDs. Our prior iterations have demonstrated improvement in PRS and simulation-based performance following a 6-month collaborative improvement program between community sites and ImPACTS. It also highlighted the important role of the pediatric emergency care coordinator (PECC) in the improvement process. Per the Emergency Medical Services for Children (EMSC) guidelines, EDs should designate a PECC to help improve pediatric readiness and promote the quality of pediatric care provided. Designating PECCs for Emergency Medical Services (EMS) agencies is hypothesized to improve the quality of pediatric prehospital care and ultimately lead to better outcomes for acutely ill and injured children. The connections between PECCs and improvements in quality of clinical care and patient outcomes need further evaluation. Little is known about the best means to recruit, deploy, retain and evaluate PECCs, and even less has been done to measure the effect of PECCs on community EDs and the children who require their care.

This project will involve the implementation of an "off the shelf" free open access medical education curriculum implemented and facilitated by local community ED (spoke) PECCs. The curriculum will start with a set of simulations (anaphylaxis, status epilepticus, non-vigorous newborn), four online learning activities related to status, followed by four online learning activities related to a non-vigorous newborn, and another simulation session involving the same three topics with different cases. Each participating CED will designate a PECC, who will receive curricular resources, coordinate the simulation, and serve as the point of contact with their site's participants. These PECCs will be supported by an academic medical center (AMCs) partner/coach to support them through the implementation of the curriculum (hubs).

This study aims to evaluate the implementation of a PECC facilitated twelve-week curriculum in CEDs and measure the impact on learners' (nurses, providers) knowledge, skills, and attitudes related to pediatric emergency care.

Aims:

Aim 1: To measure and improve activity completion by PECCs following a prescribed collaborative intervention with the AMC.

Hypothesis 1: The designation of a PECC in participating CEDs supported by a facilitator from the AMC/ImPACTS and resources toolkit will be associated with activity completion by designated PECCs.

Aim 2: To measure improvements in individual provider level knowledge/attitudes (measured by surveys) and in the quality of clinical care provided by the CED teams (measured during simulation-based activity)

Hypothesis 2: The designation of a PECC in participating CEDs supported by a facilitator from the AMC/ImPACTS and resources toolkit will be associated with improvements in CED providers' knowledge/attitude and the process of care in a simulated setting.

Collaboration Model

- "HUBs": AMCs within the ImPACTS network will be recruited to participate and include a hospital with pediatric emergency and intensive care specialties as well as a pediatric residency training program. Sites will be required to complete a virtual train-the-trainer session and submit a letter of commitment to enroll in at least one CED.
- "SPOKEs": CEDs designating a PECC and one team of CED providers at minimum. Each CED team must include at least 1-3 (physician, advance practice registered nurse "APRN," or physician assistant "PA") and 2-5 nurses (in addition to the PECC). Teams can include EMS and/or techs per the typical structure. If more than 3 providers or 5 nurses are interested the CED can enroll multiple teams and/or plan to enroll the others in a second cohort in the future.

HUBs will recruit CEDs to participate through a series of agreement letters.

Each HUB principal investigator will collaborate with their CED leadership to designate a PECC throughout the study period and enroll their teams in the study.

The ImPACTS core team will provide a standardized protocol for sites to collaborate, in addition to the simulated scenarios, assessment checklists, and all needed resources.

Enrollment

Spoke and HUB sites will voluntarily join ImPACTS through a set of collaborative agreements (between the HUB and "ImPACTS core" and the HUB with spoke). The ImPACTS core will provide a standardized protocol for spokes to collaborate with HUBS. Participating SPOKEs will have access to the resources toolkit and educational content that the HUB can share with each participating SPOKE. All the resources will be readily available in a centralized folder on the

impacts website and can be accessed by HUB and spoke sites at any time. This project will not involve randomization.

HUBs recruitment, collaboration, and standardization

Participating HUBs will join ImPACTS through a formal collaboration agreement. The HUB will complete training with the "ImPACTS core" using virtual "Train the Trainer" to ensure standardization in the structure and process of this intervention.

A member from the core ImPACTS team will be present virtually during the initial simulation in the CED to support the HUB and ensure standardization.

The HUB team should include health care providers with a solid background in pediatric emergency medicine and high-fidelity simulation.

The HUB team may include but is not limited to pediatric emergency physicians, pediatric critical care physicians, nurses, respiratory therapists, and nurse practitioners.

Each HUB will identify at least one CED that will participate voluntarily and commit to participating in all program elements.

This individual will coordinate the in-person pediatric readiness survey assessment, the simulations, and all follow-up interactions with the HUB upon the initial agreement, in addition to the execution of the assigned activities.

Spoke recruitment, collaboration, and standardization

The HUB site's collaboration with the spokes will involve discussions about the program vision and mission, setting the expectations from each spoke site, and having the commitment letter signed upon agreement.

The initial agreement will be performed between the HUB team, and the SPOKE leadership (medical/nursing director) and PECC.

An individual(s) will be identified as the PECC at each CED. Sites are encouraged to have a designated nurse and physician PECC. One of these will serve as the primary site contact for this project.

The ImPACTS model involves the HUB team working with that individual to arrange a site visit to the SPOKE and subsequent communications. The imPACTS core will support all HUB sites throughout the recruitment process.

The HUB team will support/coach their SPOKE before, during, and after the curriculum. Sites will have the option of enrolling additional cohorts in the curriculum after the first three months. The protocol will be adapted based on feedback for future iterations/cohorts.

Study Phases

Recruitment

PECC/Curriculum activities by week- all resources hosted on the website-

1. In-person simulation/debriefing (warm up- anaphylaxis, status, newborn) + WPRS

** Described in detail below*

2. Rebel EM Status Podcast + distribute TREKK/EIIC Status algorithm
3. Pathophysiology Video/Didactic Status lecture
4. Live action best practice Status prep/care
5. Choose your own adventure status sim
6. Break week or extra credit content or virtual sim
7. Podcast non-vigorous newborn + distribute non-vigorous newborn algorithm
8. Pathophysiology Video/didactic non-vigorous newborn
9. Live action best practice prep/care non-vigorous newborn
10. Choose your own adventure non-vigorous newborn sim
11. Break week or extra credit content or virtual sim
12. In person simulation/debriefing + WPRS- same participants/methods-modified cases
13. REPORT OUT to leadership on simulation performance, PRS, PECC activities/participant activities
    *** Described in detail below*

*** In person details:**

HUB team going to each participating CED to conduct an in-person pediatric readiness survey and three in-situ simulations.

I. Pediatric Readiness Survey: the liaison from the HUB will visit each CED site and use the Pediatric Readiness Survey to document a weighted pediatric readiness score (WPRS)(Appendix 1). This survey can be done in person or virtually if needed using a video conferencing platform. All items on checklists will be examined in person with the CED PECC. If the PECC is unsure or unable to identify an item, it will count as non-existent.

II. Simulation(s): the HUB team will conduct a series of three simulations; anaphylaxis, neonatal delivery, status epilepticus (-Appendix __). These simulations will involve inter-professional team members using the local policies, procedures, equipment, and resources and will be conducted either in-situ or virtually using virtual tele-simulation. A constructive standardized scripted debriefing session will follow the scenarios. The HUB team will answer questions about pediatric readiness related to the scenarios and provide educational materials to participants related to the scenarios. Before the simulations, demographic data, a knowledge and comfort survey, and consent for video recording

from participating team members will be collected. The PECC will also complete a survey specific to their role and responsibilities before the simulations. Teams of providers will be recruited to participate that match each department's "standard" team structure to include physicians (1-2), nurses (2-5), and other ancillary staff. If departments have additional team members that are a part of their standard resuscitation team, they will also be invited to participate.

III. Data collection: the HUB team will score each team using checklists for each case completed during direct observation (Appendix ___). The simulation-based performance checklists will be collected on paper forms by the HUB teams and entered into a centralized data collection form in addition to the pediatric readiness scores within 48 hours of completing the initial visit using the following link: ***

IV. Initial report out to PECC and the spoke AMC will review these data with the CORE after completion. This meeting will also review the explicit timeline for rolling out the educational activities among participating CED providers

*** Final report out details:**

A detailed report out (simulation performance, providers self efficacy, WPRS summary) will be created after the project for each CED. This report out will be presented to leadership at the site with the AMC to highlight successes and explore barriers/facilitators to the PECCs work.

Each HUB will complete the data forms uploaded to the ImPACTS core database for data analysis within 48 hours of each simulation session. The ImPACTS core team will convert that content into a standardized "ImPACTS report out" to be sent out to the HUB.

Additionally, these reports will include other resources from the pediatric readiness toolkit. Each HUB will schedule a conference call with CED PECC within two weeks after the initial site visit. During this meeting with the PECC, the HUB team will review the compiled data, including clinical performance, safety threats, and readiness scores. Access to the ImPACTS resources toolkit related to the educational content will be available for CED sites and the opportunities for additional cohorts will be discussed.

Outcomes

Outcomes Measures

1- Primary Outcomes- Completion of PECC Activities

- Completion % of each of the eight above-listed learner activities
- Number/percentage of providers who completed each activity

2 Secondary Outcome- Provider Knowledge/attitudes

- Multiple choice and Likert scales

3- Secondary Outcome- Simulation-based performance & WPRS

- The composite quality score of simulation-based performance pre-and post-intervention
- WPRS pre-and post-intervention

4- Implementation Outcome Measure

- Effectiveness: impact on outcomes; knowledge/attitudes of CED providers, performance during simulation
- Adoption: number of participants who complete the intervention; % of activities offered and/or completed by PECC/CED providers
- Implementation: extent to which the program is delivered; how many meetings/coaching sessions attended by PECCs, how engaged PECCs are in process

Hub Intervention Timeline:

1. Engage with community sites to commit to timeline and identify a PECC (-2 months)
    a. Schedule bi-weekly check-ins
    b. Schedule in-person sims + WPRS **(time 0 months and time 3 months)**
    c. Spoke to sign a letter of commitment
2. Training for PECCs (they would co-facilitate the sims with their HUB and ImPACTS if needed to start)
    - Best practices for faculty/training of sessions (debriefing, skills training, dissemination of resources/gamification)
    - Strategies for implementation of curriculum
3. In person Simulations and WPRS
4. PECC activity each week (weekly)
    - HUB to share educational content for PECC to disseminate to their ED staff each week over ten weeks. PECC will follow up with ED staff about the completion of content and any barriers or facilitators.
5. Biweekly check-ins with Hub
6. In person Simulations and WPRS
7. REPORT OUT to leadership

Inclusion/Exclusion Criteria:

Inclusion criteria: Hub Academic Medical Centers (AMCs) will be recruited to participate and include a hospital with pediatric emergency and intensive care specialties and a pediatric residency training program. Sites will be required to complete a train-the-trainer session and submit a letter commitment to enroll at least one community hospital spoke site within one year. CEDs which have previously participated in other ImPACTS projects are eligible in addition to

new CEDs. Spoke CEDs entail any community hospital that cares for patients of all ages. EDs will be categorized by the number of pediatric patients they care for each year: high volume (>10000), medium-high volume (5000-9999), medium (1800-4999), and low volume (<1800). Once a spoke site has agreed to be part of the study, they will be required to submit a commitment letter regarding the assessments and frequent follow-ups.

Project Facilities

The key to ImPACTS' success is buy-in from regional Academic Medical Center HUBs that will serve as primary contacts to SPOKEs in their regions/states. These HUBs will go to at least one SPOKE in a year to assess their readiness for acute care for children and conduct in situ simulations. Academic Medical Centers interested in becoming "HUBs" will participate monthly in a conference call with the ImPACTS leadership team. This ongoing communication between the ImPACTS Core and all HUBs will guarantee a standard approach to the project and maintain a line of mutual feedback and ongoing support of all regional centers.