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SCHOOL OF MEDICINE
DEPARTMENT OF PEDIATRICS

Rady Children's Hospital San Diego

UC San Diego
SANFORD INSTITUTE FOR EMPATHY AND COMPASSION
Center for Mentorship in Medicine

Inaugural Symposium for Innovation in Medical Education

Virtual e-Poster Session – Room A

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Poster Title	Presenter
Virtual Reality Curriculum Increases Pediatric Residents' Knowledge and Ability to Diagnose Congenital Heart Defects: A Multi-institutional Study	David Werho, MD Clinical Assistant Professor, Department of Pediatrics dwerho@rchsd.org
Stepping up: Creation of a resident-driven program to promote leadership and professional growth	Christine Zacheck, MD Resident, Obstetrics, Gynecology and Reproductive Science cmzachek@health.ucsd.edu
Pairing Medical Students with Engineering Students Stimulates Medical Device Innovation in Medical Education	Denzil Mathew, BS Medical Student mathew.denzil@gmail.com
Med Ed in the Time of COVID-19: Utilizing Simulation and Zoom for Fellow Feedback Training	Jennifer Yu, MD Associate Clinical Professor, Department of Pediatrics jyu@rchsd.org
Choose Your Own Adventure (CYOA): A Medical Education Innovation for Virtual Interactive Teaching	Francesca Nichols, MD Pediatric Emergency Medicine Fellow, Department of Pediatrics fnichols@health.ucsd.edu
The development and implementation of a clinician-educator track for trainees in the UC San Diego Neurology Residency Program	Victoria Wu, MD Resident, Department of Neurosciences vlwu@health.ucsd.edu
Choose Your Own Adventure: Resident Clinical Informatics Curriculum	Cindy Kuelbs, MD Clinical Professor, Department of Pediatrics ckuelbs@rchsd.org
Pediatric Resident Bereavement and Debriefing After Patient Death	Varsha Gupta, MD Chief Resident, Department of Pediatrics vgupta@health.ucsd.edu
A method to improve fairness in clerkship small group evaluations with apparent systematic rater errors	Bernice Ruo, MD Clinical Professor, Department of Medicine bruo@health.ucsd.edu
Exploratory Study to Increase Knowledge of Medicine-Pediatric Trainees on Transition of Care from Pediatric to Adult Medicine	Shannon Kim, MD, MPH Assistant Professor, Department of Pediatrics sleung@health.ucsd.edu

Virtual Reality Curriculum Increases Pediatric Residents' Knowledge and Ability to Diagnose Congenital Heart Defects: A Multi-institutional Study

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Background

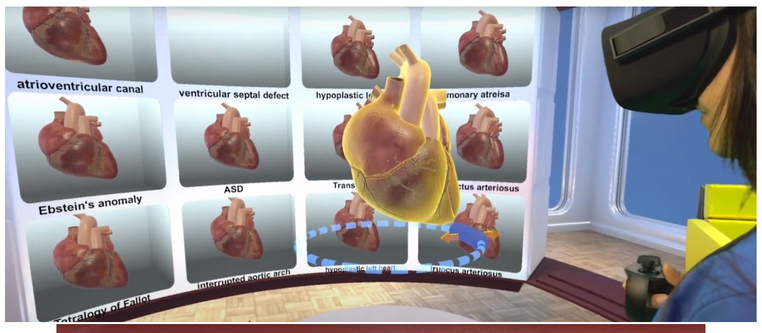
Virtual reality (VR) is a unique learning modality which may more effectively teach cardiovascular physiology and anatomy of congenital heart lesions, though formal incorporation of VR into training programs has been limited. We describe a multicenter effort to develop, implement and evaluate the efficacy of a VR curriculum for pediatric trainees participating in pediatric cardiology elective rotations.

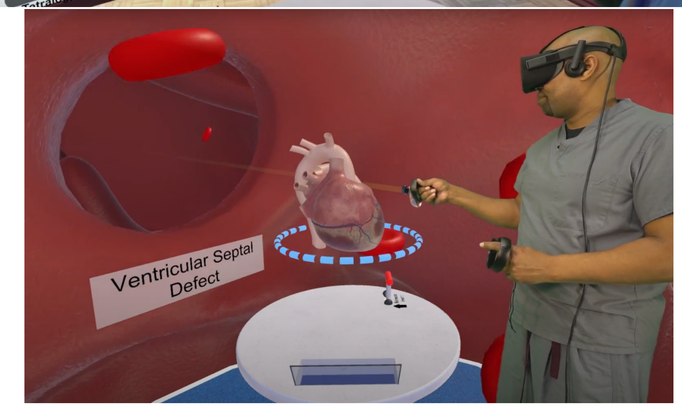
Objectives

- To develop learning modules for several common congenital heart defects to be implemented into a self-guided VR experience
- To incorporate the VR experience into the pediatric residency training curriculum
- To evaluate efficacy of the VR curriculum by comparing case vs. control scores on a validated assessment tool
- To assess subjective user experience with the VR program

Materials and Methods

- A VR software program (the "Stanford Virtual Heart") was utilized as a platform for curricular development in which users can navigate within the VR heart guided by narrative scripts to explore non-traditional views of cardiac anatomy
- Modules for 6 congenital heart lesions including atrial septal defect, ventricular septal defect, patent ductus arteriosus, coarctation of the aorta, pulmonary stenosis and aortic stenosis, were created by pediatric cardiologists and fellows from 4 large pediatric centers (Stanford University, University of Michigan, Medical College of Wisconsin and University of California San Diego)





Materials and Methods

- A prospective case-control study was performed with 3 large pediatric residency programs
- From July 2018 to June 2019, trainees (residents and senior medical students) enrolled in an outpatient cardiology rotation completed a 27-question, validated pediatric cardiology assessment tool developed by our multi-center group
- From July 2019 to March 2019, trainees completed the 1-hour long self-guided VR intervention including modules for the 6 targeted congenital heart lesions and subsequently completed the assessment tool at the end of their rotation
- Trainees in the intervention group also gave qualitative feedback about the VR experience
- Inclusion criteria: All pediatric trainees enrolled in an outpatient cardiology rotation with no previous exposure to the VR program nor assessment tool

Results

- There were a total of 80 trainees in the control group and 62 trainees in the intervention group (Table 1)
- Trainees in the VR intervention group performed better on the assessment tool than those in the control group (20.4 +/- 2.9 vs 18.8 +/- 3.8 out of 27 questions answered correctly, p=0.01)
- Analyses of individual questions showed significantly higher scores in the intervention group for questions testing visuospatial concepts
- Qualitative feedback about the VR experience was overwhelmingly positive with all participants recommending integration of the program into the pediatric residency curriculum (Table 2)
- Of note, the intervention period was shortened due to hospital and medical school closures related to COVID-19

Table 1. Trainee information (N=142)

	All (N=142)	Intervention (N=62)	Control (N=80)	P-value
Site				0.46
UM	60 (42.3)	25 (40.3)	35 (43.8)	
MCW	32 (22.5)	17 (27.4)	15 (18.8)	
UCSD	50 (35.2)	20 (32.3)	30 (37.5)	
Duration of rotation				0.42
1 week	39 (27.5)	16 (25.8)	23 (28.8)	
1.5 weeks	2 (1.4)	1 (1.6)	1 (1.3)	
2 weeks	32 (22.5)	15 (24.2)	17 (21.3)	
3 weeks	17 (12.0)	4 (6.5)	13 (16.3)	
4 weeks	52 (36.6)	26 (41.9)	26 (32.5)	
Current year of training				N/A
MS3	1 (0.7)	0 (0.0)	1 (1.3)	
MS4	6 (4.2)	4 (6.5)	2 (2.5)	
PGY1	65 (45.8)	29 (46.8)	36 (45.0)	
PGY2	37 (26.1)	14 (22.6)	23 (28.8)	
PGY3	29 (20.4)	14 (22.6)	15 (18.8)	
PGY4	4 (2.8)	1 (1.6)	3 (3.8)	
Prior formal rotations in Pediatric Cardiology	89 (62.7)	40 (64.5)	49 (61.3)	0.69

* Data are presented as N (%).

§ P-value from Chi-square test for comparison of each trainee information between intervention and control groups.

Table 2. Feedback about the VR experience (N=45)

How easy was it to use the VR experience (knowing which buttons to press, how to move from one chamber to another?	
Very easy	18 (40.0)
Easy	23 (51.1)
Difficult	3 (6.7)
Very difficult	1 (2.2)
How much do you think the VR experience improved your knowledge and understanding of cardiovascular physiology and anatomy?	
Significantly improved	19 (42.2)
Improved	26 (57.8)
Decreased	0 (0.0)
Significantly decreased	0 (0.0)
How much would you recommend that a VR teaching tool be incorporated into a medical education curriculum?	
Highly recommend	34 (75.6)
Recommend	11 (24.4)
Avoid	0 (0.0)
Strongly avoid	0 (0.0)
How likely would you recommend that this VR education tool (specifically the Stanford Virtual Heart) be incorporated into the Pediatric Cardiology Outpatient Rotation?	
Highly recommend	35 (77.8)
Recommend	10 (22.2)
Avoid	0 (0.0)
Strongly avoid	0 (0.0)
How enjoyable was your overall experience with VR?	
Very enjoyable	32 (71.1)
Enjoyable	13 (28.9)
Not enjoyable	0 (0.0)
Extremely not enjoyable	0 (0.0)

* Data are presented as N (%).

Discussion

- Trainees in the intervention group performed better on the assessment tool as compared to those in the control group, with more significantly improved performance on questions that tested visuospatial concepts
- VR may be best dedicated to teaching visuospatial relationships that are more difficult to convey with traditional teaching methods
- Based on 100% positive trainee feedback and objective improvement in cardiovascular knowledge, the VR program effectively augmented the pediatric residency training curriculum

Conclusions

- VR is an effective and well-received adjunct to clinical curricula for trainees participating in pediatric cardiology rotations.
- Our positive results support continued VR development and expansion to other clinical subspecialties and amongst other medical trainees

Disclosures

Dr. David Axelrod is the lead medical advisor and a shareholder at Lighthaus Inc., the company that produces the Stanford Virtual Heart. The remaining authors have no disclosures. Funding provided, in part, by the Rady Children's Hospital Physician Development Fund.

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Stepping up: Creation of a resident-driven program to promote leadership and professional growth

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UC San Diego School of Medicine

Aims

- Leadership skills are increasingly recognized as critical to team-based care and physician advocacy. We aim share our residency leadership structure and augmented curriculum.

To develop physician leaders with a robust fund of obstetrics and gynecologic knowledge, superb clinical and surgical skills, and a compassionate and just approach to care.

Process

- Resident Leadership Council (RLC) was created to facilitate resident self-governance and professional growth
- **Previous Structure:** Admin Chiefs (2) & Education Chiefs (2) each one-year term
- **New Structure:** RLC open to PGY-3 and PGY-4 to serve in one or two-year terms
- Admin chiefs peer-selected with PD/APD affirmation, select RLC team
- Resident leads self-select projects of interest within their domain
- Small stipend from department's resident budget ($6000)

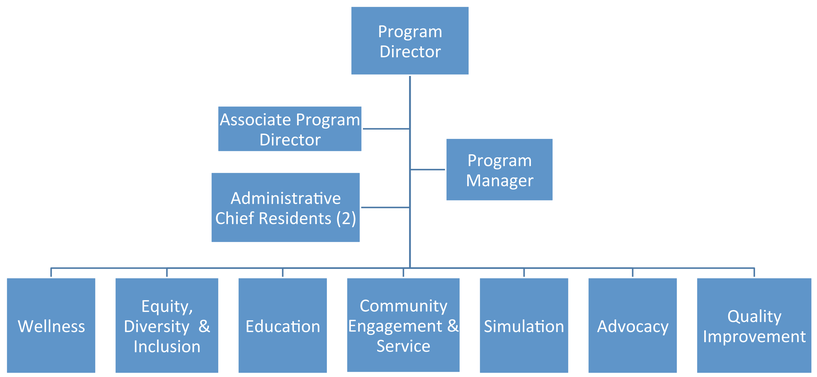


Figure 1. RLC Organizational Structure

Curriculum

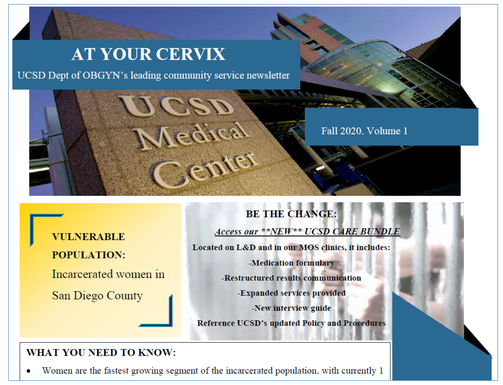
1) Monthly RLC Meetings
   - Goal setting with 2-3 annual targets per lead
   - Develop lead roles & responsibilities, metrics to rack progress

2) Quarterly Leadership Development
   - Effective Communication Styles Inventory
   - Career self-efficacy, project management

3) Monthly Betterment Series
   - Incorporated into didactics
   - Rotate Advocacy & Health Policy, DEI, Practice Habits & Information Technology

2020-2021 Highlights

Resident Lead	Example Projects	Impact
Quality Improvement	Staff-wide education, Epic tools to support salpingectomy	Rates increased from 4.7% to 83.3%, dissemination at ACOG
Diversity, Equity & Inclusion	Antiracism lectures, integrating equity in M&M, mentorship mixers	Continued social justice journal club, "inequity inbox" implementation
Education	Onboarding curriculum, review of didactics to match CREOG objectives	Evaluation in process, CREOG score analysis
Community Engagement & Service	Newsletter & care bundle, period poverty drive	$12,000 raised, new parking voucher program
Simulation	Intern simulation bootcamp, FLS focus	Addition of level-specific FLS, cadaver, robotic skills sessions
Wellness	Virtual wellness, curriculum aligned with ACOG wellness week	All residents to train as peer support
Advocacy	Voter registration, streamline MVA process	Continued collaboration MVA order set, ACOG advocacy agenda



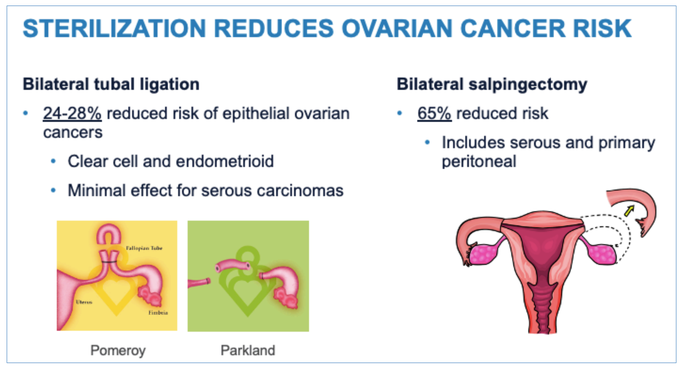


Figure 2. Example RLC products (clockwise) community engagement newsletter, Intern Boot Camp cesarean simulation, QI educational project sample slide promoting bilateral salpingectomies for sterilization

Conclusions

- RLC provides **feasible** opportunities for **longitudinal** development of leadership and project implementation skills.
- Aligned the department's mission and resident professional interests to advance clinical care, education, community engagement, and social justice principles.
- Future steps include evaluation of program outcomes, resident satisfaction, and correlates of early-career success.

Acknowledgements

Thank you to the hard-working residents whose dedication and compassion make these projects possible. Drs. Lacoursiere and Eskander for the creation of the program and excellent mentorship. Justin Maisonet for his administrative and programmatic support. The OB/GYN & RS department for allowing us the space to innovate and empower women in our community.

Idea Pipeline Initiative: Pairing Medical Students with Engineering Students Stimulates Medical Device Innovation in Medical Education

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Introduction

Medical device innovation is a rigorous process involving many stages of success, failure, and reappraisal. While physicians are often the primary user for these devices, there is often a disconnect between physicians sharing their ideas with engineers and additionally engineers optimally engaging physicians in the design process. Most medical schools do not provide opportunities for students to engage in interdisciplinary collaboration with regard to innovation and technology. Our institution developed a unique collaboration between medical students and biomedical engineers which was designed to foster innovative thinking with the goal to learn about medical device design while producing devices with real clinical impact.

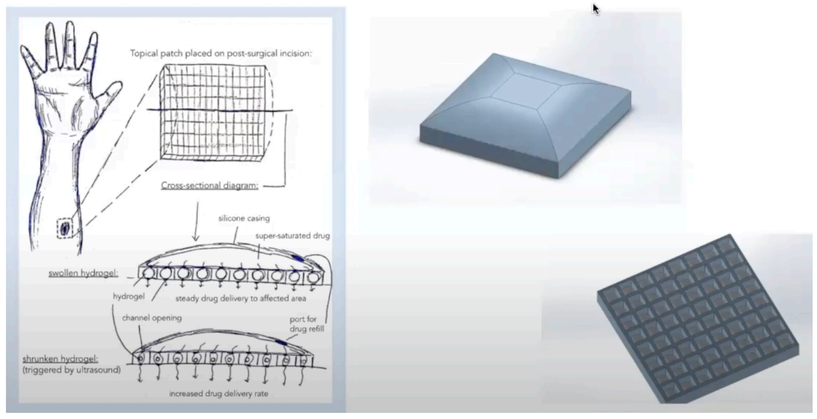

Figure 1. DrugSlug: A Novel Hydrogel Drug Delivery System for Melanoma Treatment.

Settings and Participants

At our institution, third- and fourth-year medical students had the opportunity to collaborate with undergraduate biomedical engineering students from a local university. The engineering students' graduation capstone project involved identifying a clinical need and creating a novel solution to this problem. The role of medical students was to help identify clinical problems and provide input towards the solution and subsequent medical device. Each medical student was paired with a group of 3 to 5 engineers. An engineering faculty member and physician were added to each team to provide mentorship and assistance. In addition to the intersection of medicine and engineering, medical students joined workshops about patents and intellectual property to learn more about the commercialization of medical devices.

Figure 4. Our team in the ASU workshop constructing a prototype version of a reusable breast implant delivery device.

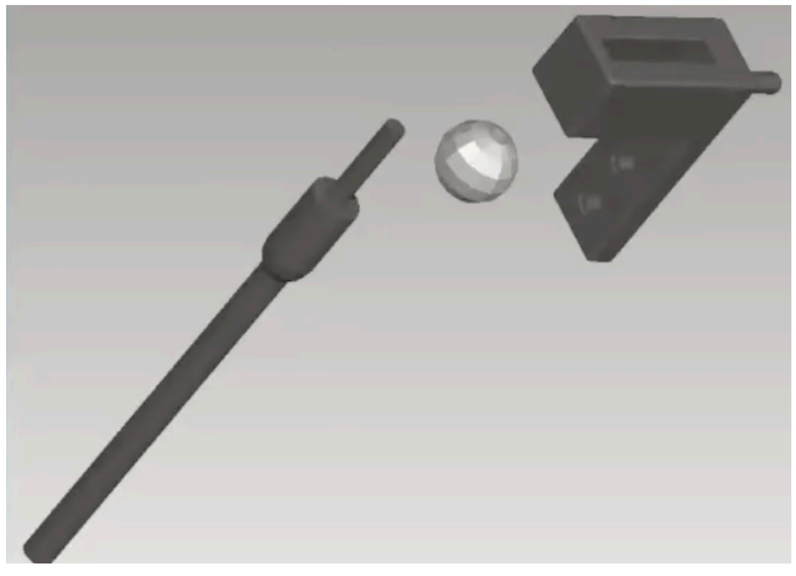

Figure 2, left. Distraction Osteogenesis Device for micrognathia.
Figure 3, above. Proximal Radioulnar Joint Implant for Surgical Intervention of Proximal Radioulnar Synostosis

Results

6 medical students participated in the development of 13 medical device projects. Two medical devices won awards at the annual Arizona State University Biomedical Engineering Symposium. Two provisional patents were filed by medical students. This innovative collaboration led to our medical school, Creighton University, formally establishing a partnership with Arizona State University.

Discussion

Medical students bring a unique perspective to the biomedical engineering design process. Their understanding of the clinical setting assists engineers in discovering problems and areas of need in medicine as well as contributing to the practicality of solutions. Although innovation is not explicitly taught in medical school, this idea pipeline allows medical students the opportunity to understand the medical device design process and helps both engineers and medical students understand the need for inter-disciplinary collaboration for success.

Acknowledgements: Thank you to Dr. Vincent Pizziconi and Dr. Randy Richardson for their continued support of this idea pipeline

Med Ed in the Time of COVID-19: Utilizing Simulation and Zoom for Fellow Feedback Training

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Background

- Feedback is essential for trainees to improve their clinical and communication skills.[1]
- However, most healthcare providers do not receive formal feedback training.[2]
- Observed Structured Clinical Exams (OSCEs) have been used for performance assessment of students and trainees.[3]

Objectives

- **Aim:** Assess pediatric fellows' confidence and performance of feedback skills, before and after an interactive feedback training workshop and Observed Structured Feedback Examination (OSFE)

Methods

- **Study framework:** Kern's 6 steps of Curriculum Development

Problem Identification & General Needs Assessment
- Literature Review

Targeted Needs Assessment
- Fellowship Program Director (FPD) Survey

Goals & Objectives
- Research plan, with IRB approval

Educational Strategies
- Pre- and post-OSFEs with individualized feedback
- 20 min interactive Feedback Training[4]

Implementation
- Use of standard scenario – struggling intern
- Simulation Center for OSFEs pre-COVID-19
  - Separate rooms to lessen observer bias
- Zoom for 3-month post OSFEs during COVID-19

Evaluation & Feedback
- Prior exposure to feedback training
- Change in application pre to 3 months post
- Change in confidence pre, post, & 3 months post
- Observer & recipient OSFE checklists[5]
- Evaluation of session by fellow participants

- **Inclusion Criteria:**
  - UC San Diego pediatric medical and surgical fellows
  - Approval from FPDs to recruit fellows to participate
- **Exclusion Criteria:**
  - Prior formal feedback training
  - Declination or lack of response from FPD

- **Data Analysis:** Descriptive statistics and signed rank sum test

Results

Demographics:
- **Targeted Needs Assessment of FPDs:** 19 of 23 FPDs completed survey (83%); 18 of 19 expressed interest in allowing their fellows to participate (95%)
- **Enrollment of fellows:** 60 eligible pediatric fellows invited; 19 enrolled. 100% follow up at 3-month post-assessment

Confidence in Giving Feedback		Pre-Training Score Median (IQR)	Mean change in score from pre to post-training (SD)	Mean change in score from pre-training to 3-month follow up (SD)
Knowledge	Definition of Feedback	3 (1)	1.21 (0.71)***	0.68 (0.75)**
	Problems if Feedback Does Not Occur	3 (2)	1.32 (0.95)***	1.11 (0.94)***
	Effective vs Ineffective Feedback	3 (1)	1.26 (0.81)***	1.11 (0.88)***
	Ende's Rules of Feedback	1 (0)	2.63 (1.01)***	1.74 (1.24)***
	Feedback vs Evaluation	3 (1)	2.21 (0.71)***	1.58 (0.77)***
	Just-in-Time Feedback	1 (2)	2.58 (1.07)***	2.26 (1.15)***
	The Feedback Sandwich Model	3 (1)	1.11 (0.81)***	1.21 (1.03)***
	The Ask-Tell-Ask Model	2 (2)	2.26 (0.93)***	2.05 (1.22)***
Skills	How to Deliver Just-in-Time Feedback	1 (2)	2.37 (1.30)***	2.16 (1.07)***
	How to Deliver Formal Sit-down Feedback	3 (1)	1.74 (0.87)***	1.47 (0.96)***
	How to Direct Learner Self-Assessment	2 (1)	2.21 (0.92)***	2.00 (0.94)***
	How to Use Feedback Sandwich Model	3 (2)	1.11 (0.81)***	1.05 (0.85)***
	How to Use Ask-Tell-Ask Model	2 (2)	2.47 (0.77)***	2.16 (1.17)***
	How to Deliver Feedback to a Problem Learner	2 (2)	1.42 (0.96)***	1.37 (0.76)***
	How to Receive Feedback	3 (2)	0.74 (0.81)**	0.89 (0.74)***

Table 1: Changes in fellow self-assessment of confidence in feedback knowledge and skills pre, post, and 3-month post feedback training session; assessed by 5-point Likert scale (1 – Not at all confident; 5- Very confident); SD = standard deviation; Signed Rank Sum Test: * = p of < 0.05, ** = p of < 0.01, *** = p of < 0.001

Observed Structured Feedback Examination (OSFE) Standardized Feedback Checklist	Observer			Recipient		
	Pre-Training Score Median (IQR)	Mean change in score from pre to post-training (SD)	Mean change in score from pre-training to 3-month follow up (SD)	Pre-Training Score Median (IQR)	Mean change in score from pre to post-training (SD)	Mean change in score from pre-training to 3-month follow up (SD)
Had skills and/or knowledge needed to provide feedback	4 (0)	1.13 (0.40)***	1.08 (0.58)***	4 (1)	0.47 (0.51)**	0.74 (0.56)***
Respectful of recipient as individual	5 (0)	0	-0.11 (0.32)	5 (0)	0.21 (0.42)	0.21 (0.42)
Before feedback given, recipient was asked for self-assessment of performance	4 (1)	0.53 (0.51)**	0.47 (0.61)*	5 (1)	0.32 (0.58)	0.42 (0.61)*
Feedback contained specific details about performance	4 (1)	1.24 (0.89)***	1.32 (1.11)***	4 (2)	1.26 (1.05)***	1.26 (1.15)***
Feedback included suggestions on how to improve	4 (0)	1 (0.82)***	1.11 (0.99)***	5 (1)	0.58 (1.07)*	0.74 (0.99)**
When giving feedback on how to improve, expectations were reasonable and feasible	4 (1)	1.47 (1.12)***	1.42 (1.12)***	4 (2)	0.53 (0.70)**	0.74 (0.93)**
Respectful tone of voice used	5 (0)	0	-0.11 (0.32)	5 (0)	0.05 (0.23)	0.05 (0.23)
Recipient received reinforcing and corrective feedback	3 (1)	1.11 (0.99)***	1.37 (1.07)***	3 (2)	1.11 (1.10)***	1.32 (1.11)***
Checked if recipient understood purpose of feedback	3 (2)	1.71 (1.66)**	1.18 (1.80)*	3 (2)	1.42 (1.54)**	1.68 (1.45)***
Asked if recipient had questions about feedback	4 (2)	1.11 (1.41)**	1.58 (1.26)***	4 (2)	0.89 (1.33)*	1.58 (1.50)***
Feedback discussion was two-way conversation	4 (0)	1 (0.75)***	0.42 (1.17)	3 (2)	1.53 (1.17)***	1.26 (1.41)**
Overall rating of quality of feedback given	4 (1)	1.08 (0.38)***	1.24 (0.65)***	4 (0)	0.84 (0.60)***	0.89 (0.66)***
Recipient was comfortable with person giving feedback	-	-	-	5 (1)	0.37 (0.50)*	0.32 (0.48)*
Feedback prompted recipient to reflect on performance	-	-	-	4 (1)	0.47 (0.51)**	0.47 (0.77)*
Feedback helped recipient identify strengths & weaknesses	-	-	-	3 (1)	0.95 (0.85)***	1.37 (1.12)***

Table 2: Observer and Recipient evaluation of OSFE pre, post, and 3-month post feedback training session; assessed by 5-point Likert scale (1 – Strongly Disagree; 5- Strongly Agree); SD = standard deviation; Signed rank sum test: * = p of < 0.05, ** = p of < 0.01, *** = p of < 0.001

Results

- **Prior Exposure**
  - 100% familiar with Feedback Sandwich Model
  - 63% familiar with Ask-Tell-Ask Model
  - 42% familiar with Just-In-Time feedback concept
  - Main setting of exposures: residency
- **Applications of Skills** (pre to 3 months post training):
  - 11% reported giving sit-down feedback once every 2-4 weeks; increased to 21% (p=0.06)
  - 21% reported giving just-in-time feedback once every 2-4 weeks; increased to 63% (p=0.01)
- **Confidence** (pre, post, 3 months post training; Table 1):
  - 100% improved
  - Sustained 3 months post
- **OSFE performance rated by observer and recipient** (Table 2):
  - 100% improved
  - Sustained 3 months post
- Positive evaluations of feedback training by fellow participants

Conclusions & Next Steps

- Feedback training using standardized recipients and individualized feedback can improve fellow confidence, performance, and retention of feedback skills
- Use of technological innovations such as simulation and Zoom can help to adapt educational training during a pandemic
- **Next steps:** Evaluate sustainability, expand feedback training, use workshop and OSFE method to address other gaps in medical education

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UC San Diego
School of Medicine

Choose Your Own Adventure (CYOA): A Medical Education Innovation for Virtual Interactive Learning

Rady Children's Hospital San Diego

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BACKGROUND

Description: Gamification is gaining popularity in medical education and the pandemic necessitated novel virtual didactic methods. Virtual group learning with serious games fosters a sense of accomplishment, reinforces core knowledge, and builds teamwork via healthy competition.

Needs and Objectives: Our objective was to design an interactive, educational series to teach pediatric emergency medicine (PEM) topics in a virtual setting using gamification for group learning.

Setting and Participants:
- Virtual teaching conferences
- Various Pediatrics, Family Practice, and Emergency Medicine (EM) residents
- PEM fellows
- EM and PEM attendings

METHODS

- PEM physicians/educators developed a novel, interactive teaching tool, modeled after the popular Choose Your Own Adventure (CYOA) book series
- Three PEM topics with recent evidence-based updates were chosen:
  - Neonatal resuscitation
  - Hematologic/oncologic emergencies
  - Pediatric trauma
- 1 hour-long CYOA modules designed on Google Forms and made available by internet hyperlink
- Small groups created via break out rooms, with a variety of training levels including residents, fellows, and attendings
- CYOA format:
  - Case vignettes were presented in CYOA style
  - Learners progressed through medical management by choosing the next steps in assessment and treatment
  - With each successful outcome, teams obtained a code of letters/numbers
  - The final vignette required unscrambling the code to yield the answer to a final question
  - Winning team completed the adventure and submitted the final answer in the shortest time
- Each team summarized key learning points with the entire group, guided by the faculty facilitator(s)
- Learners completed anonymous pre- and post-session evaluations related to confidence levels in the management of the selected topics; participants answered the same five questions via a five-point Likert scale

RESULTS

- Neonatal resuscitation showed statistically significant improvement in self-reported confidence (Figure 1), as well as comfort in identifying/managing tumor lysis syndrome (Figure 2) and performing pediatric trauma procedures (Figure 3)
- Qualitative feedback was exceedingly positive

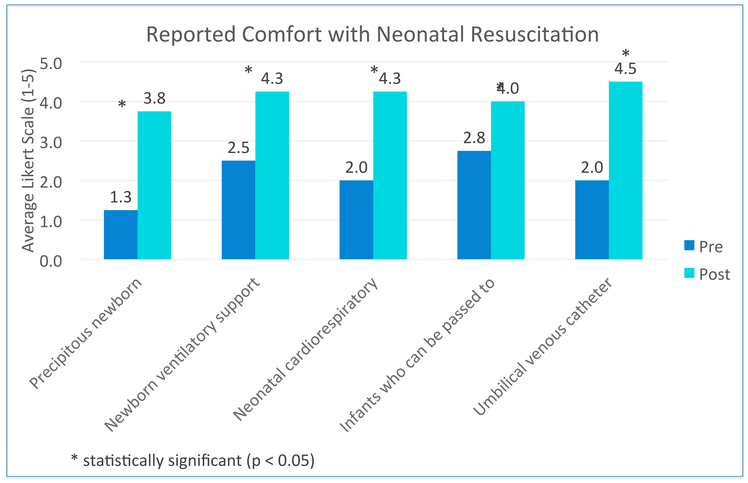

Figure 1: Average Likert Scales for Comfort with Neonatal Resuscitation (majority resident evaluations)

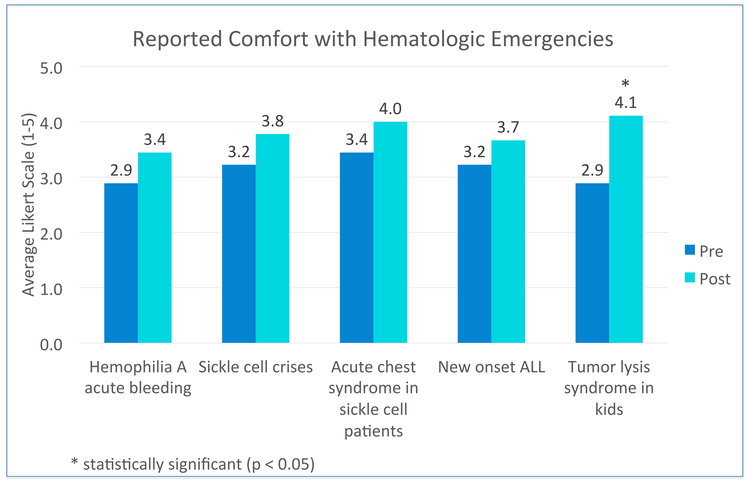

Figure 2: Average Likert Scales for Comfort with Hematologic Emergencies (all resident evaluations)

RESULTS

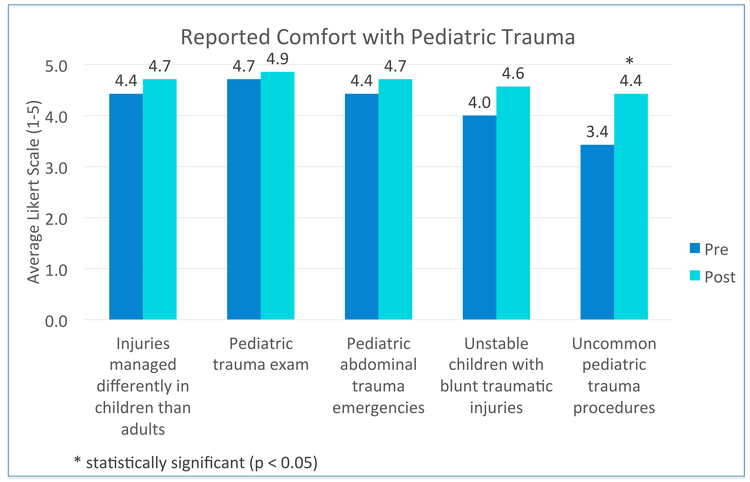

Figure 3: Average Likert Scales for Comfort with Hematologic Emergencies (majority fellow or attending evaluations)

CONCLUSIONS

- The Choose Your Own Adventure curriculum is a novel virtual teaching tool
- This innovation feasibility project was successful
- Suggested areas for improvement:
  - Involve more trainees to allow for robust discussion
  - Develop other teaching topics with this format
- This tool is currently being modified to:
  - Create additional clinical vignettes for virtual didactics
  - Revise modules to allow for more rapid completion
  - Incorporate hybrid virtual or in-person versions

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The development and implementation of a Clinician-Educator track for trainees in the UC San Diego Neurology residency program

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University of California San Diego, Department of Neurosciences

Needs and Objectives

Resident physicians spend 25% of their time teaching.[3]

Neurology residents are in a unique position to:
1) showcase the clinical application of neuroscience
2) dispel "neurophobia,"
3) equip providers with basic neurological principles,
4) recruit learners into the field.

Despite the challenges and intricacies of teaching neurology, there continues to be a paucity of formalized instruction on resident-led teaching in neurology.[2] In 2018, the first curriculum on "Neurology Resident as Comprehensive Educator" was published.[4] In 2019, the American Academy of Neurology recognized Medical Education as an "emerging subspecialty in neurology."[1]

The Clinician-Educator Program

Acquisition of a foundation in education theory and curriculum development to guide education-based intervention

"Curriculum Development in Medical Education" by Thomas & Kern
Development of a needs assessment → creation of educational curricula → evaluation and research analysis focused on intervention outcomes

Classroom

Medical students (preclinical)

Traditional didactics

- Leading "Mind, Brain, Behavior" (MBB) small group sessions
- Guest speaker in lecture hall setting
- Test-question creation

Inpatient Wards

Medical students + residents (internal medicine, psychiatry, anesthesia) + NP students + international scholars

Conventional bedside rounds teaching

- Patient-centered, bedside exam skills
- Mini-attending on the wards during PGY-4 year
- "1-minute preceptor" and/or chalk-talks

Wards conferences

- Creating and leading structured neurology noon reports
- Participation and outreach on multi-specialty case conferences (ex: joint medicine-neurology morning report)

Additional projects on inpatient neurology

- Simulation education
- Assistance in implementation of neurology-focused curriculum for internal medicine residents

Outpatient Clinics

Medical students (clinical)

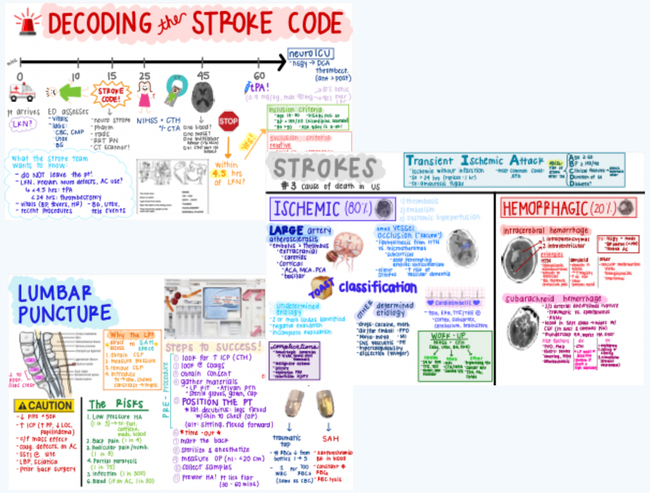
Student observation and personalized teaching

- 1-to-1 teaching in general neurology clinic
- Detailed observation of history and exam

Learner feedback

- Dedicated practice on giving feedback

Example Chalk-Talks



Program Description

In January 2021, we launched the first formal Clinician-Educator program within the UC San Diego Department of Neurosciences.

The program consists of 2 major components:

1) An intensive 3-year longitudinal track (1 resident per post-grad year) focused on curriculum development, education theory, and the application to clinical neurology.
2) A 2-week elective designed for any interested resident to learn, practice, and refine teaching skills in a targeted environment.

Current and future directions

1. Using inpatient quality metrics to identify areas of educational improvement
2. Outcomes-based research on long-term career outcomes of trainees
3. Expansion to reach other audiences (support staff, nursing)

Lessons Learned

1) Strong support from stakeholders and faculty leaders
2) Early planning due to structural scheduling changes
3) Timing of application for residents in 3-year track

References:

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Choose Your Own Adventure: Resident Clinical Informatics Curriculum

Tiranun Rungvivatjarus MD[1,2] and Cynthia Kuelbs[1,2]

[1]University of California – San Diego, San Diego, CA. [2] Rady Children's Hospital, San Diego, CA

Abstract

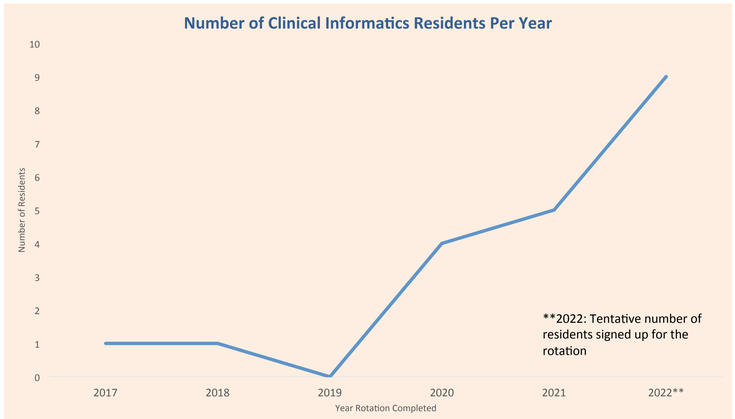
Residents are uniquely positioned to learn from and contribute to informatics. As key electronic health record (EHR) users, they offer practical solutions and feedback. Resident informatics engagement promotes EHR proficiency and accelerates implementation of best practices and quality improvement. Understanding how clinical data are structured creates a foundation for future scientific inquiry using clinical data. Thus, informatics training should be a part of all residency programs. While 21 approved programs exist nationwide for the formal training of clinical informatics fellows, medical and surgical residents and fellows have few opportunities to gain experience in clinical informatics[1]. At Rady Children's, we developed a resident clinical informatics rotation with the goal of teaching residents informatics foundation knowledge and applicable EHR skills.

Program Evolution

- A resident clinical informatics rotation was created in 2017 by a PGY-3 and the Chief Medical Information Officer.
- It was not standardized and resident awareness of the elective was minimal.
- In August 2020, the curriculum was redesigned to solidify informatics knowledge, promote longitudinal learning, and encourage real-world applications.

To date, 11 residents have completed the rotation

Table 1: Number of residents who completed the clinical informatics rotation per year.

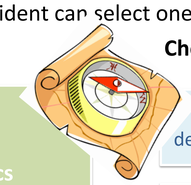


Faculty and Curriculum Design

- Five physician informaticists (2 full and 3 assistant professors) comprise the faculty.
- Two-week and 4-week elective blocks are available. Each resident receives a customized rotation schedule and a 1-on-1 experience with all faculty.
- Residents may pursue EPIC® power user classes or physician builder courses for additional skill training.
- The 2-week rotation includes understanding the role of informatics in health care, EHR structure, data literacy, care/workflow improvements, and patient engagement.

Choose Your Own Adventure

For the 4-week rotation, each resident can select one of the following topics for a customized learning experience



Choose Your Own Adventure (4-week curriculum options)

- Clinical Decision Support development and implementation
- Patient Care Engagement Part 2
- EHR Data Extraction and Reporting
- Provider Efficiency
- Career Path in Informatics

2-Week Curriculum Topics

a. Introduction to Clinical Informatics
b. EMR Structure
c. Data Literacy and Structure
d. Using the EMR to improve care
e. Patient Care Engagement
f. Informatics Project Design, Development, and Implementation

Table 2: Characteristics of residents and their informatics projects

Resident Program	Informatics Project	Scope of Project	Training	Dissemination
Pediatric Categorical	Medication Reconciliation	Operating Plan Goal		Abstract/Journal Publication
Pediatric Categorical	HEADSS/Teen History	Regulatory/21st Century Cures		
Chief Resident	MyChart Activation	Organizational initiative/ COVID		Abstract/Journal Publication
Pediatric Categorical	Shared history	Regulatory/21st Century Cures		
Chief Resident	MyChart Activation	Organizational initiative/ COVID		Abstract Publication
Chief Resident	Resident Clinical Informatics evaluation process	Resident Medical Education		
Pediatric-Neurology	Neurology clinic triage	Division-specific initiative	EPIC physician build certified	
Pediatric-Neurology	Improve DMV form	Division-specific initiative	EPIC physician build certified	
Pediatric Categorical	Food Insecurity	Organizational initiative/ Social Determinants of Health		
Medicine-Pediatric	Improve resident proficiency	Resident Medical Education		
Pediatric Categorical	Continuous Glucose Monitoring	Division-specific initiative		

Evaluation

Pre- and post-rotation surveys assess informatics understanding, EHR skill/ application, and knowledge.

Survey Questions	Yes	No
Would you recommend that other residents do this elective?	100%	
Was this rotation a worthwhile experience	100%	

Rotation Feedbacks

"Flexibility, approachable faculty. Team open to incorporating me to meetings"

"So much teaching! Faculties were SO approachable and loved to teach at all times. I learned so much about SlicerDicer, using Epic reports, and all of the challenges/barriers to implementing changes in the hospital"

"Exposure to a wide variety of areas of hospital administration and mentorship from faculty regarding how to best define and pursue a clinical QI informatics project"

"project flexibility that appeals to our interest, frequent check-ins, follow-through with specific tasks, autonomy, teaching broadly applicable skills"

"Able to tailor the rotation towards my interests, Great intro to the tools available for data gathering"

Conclusion

There is increasing interest in clinical informatics training among residents. Residents report that this elective is valuable. Due to the life cycle of informatics project and training, a longitudinal curriculum model is most effective in educating our residents and could be applied to other trainees (medical students/fellows) in the future.

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Pediatric Resident Bereavement and Debriefing After Patient Death

Varsha Gupta,[1] Maria Huang,[1] Branden Engorn,[1] and Helen Harvey[1]

[1]University of California San Diego/Rady Children's Hospital, San Diego, USA

Introduction

Burnout for physicians can be significantly worse than for counterparts who have similar work hours[1]. Burnout contributes to every aspect of the healthcare system, including job satisfaction, productivity, poor quality of care, and poor patient outcomes[1,4]. Managing grief following a patient death can significantly contribute to burnout amongst healthcare workers[5]. The presence of institutional debriefing procedures has been shown to influence physician burnout symptoms[3]. While there is some research on debriefing for nursing staff[6], there are few published studies on systematic debriefing for physicians, and even less so for resident physicians. Having a structured program or guideline may improve access to desired resources as well as quality of debriefing[2].

Burnout Measure	Average Score
Professionalism	2.65
Medical Errors	2.70
Sense of Personal Fulfillment	2.14
Feelings of Depression	2.16
Feelings of Anxiety	2.27
Emotional Outbursts	2.59
Emotional Exhaustion	1.97
Depersonalization	2.19
Ability to Maintain Personal Relationships	2.54
Physical Health	2.32

Key	
1	Significantly Worsened
2	Worsened
3	Neutral
4	Improved
5	Significantly Improved

Table 1 with Key: Average measures of burnout for residents after poor patient outcome and lack of debrief

Objectives

1. Determine the presence of debriefing models for pediatric resident trainees.
2. Determine the favorability of debriefing methods and their preferred components for pediatric resident trainees
3. Assess the effect of debriefs on burnout markers

Methods

Study design and participants: Cross-sectional survey of pediatric residents at UCSD/Rady Children's.
Data collection: Redcap survey
Survey topics included:

- perceived current debrief model (i.e. formal policy, informal, or no policy).
- debriefing experience
- effect on coping after patient death
- most valuable/desired qualities in a debrief
- effect of a debrief on markers of burnout

Analysis: descriptive statistics

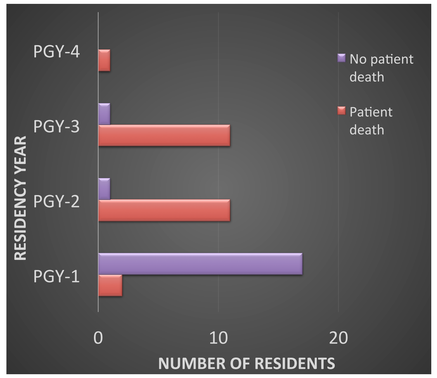


Figure 1: # of Residents Who Have Experienced Death (By Residency Year)

Figure 3: Number of Deaths Experienced by Residency Year

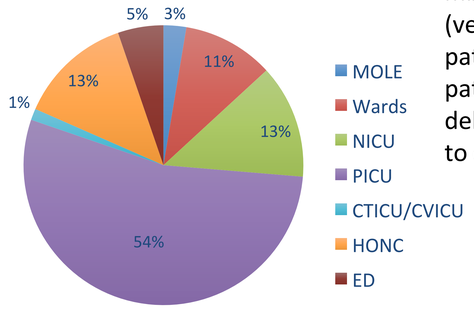


Figure 2: Deaths Experienced by Rotation

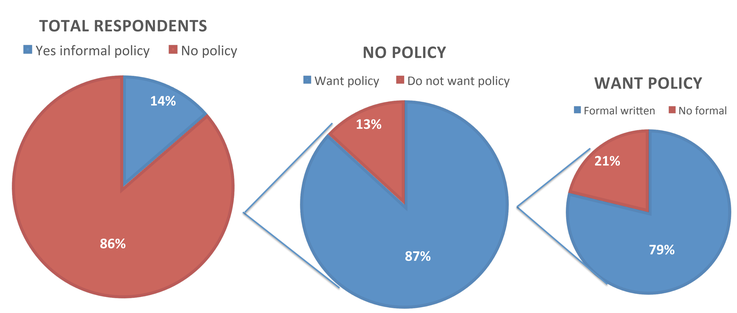
Results

- 44 pediatric residents responded to the survey.
- The majority of PGY-1's had not yet experienced patient death, while most PGY-2's and above had (Figure 1).
- PICU and Heme/Onc accounted for 67% of the total number of patient deaths experienced (Figure 2).
- Average number of deaths experienced was 2-3 and ranged from 1-8 deaths (Figure 3).
- Majority of residents perceived that no debrief policy exists at UCSD/Rady Children's, 14% perceived there to be an informal policy (i.e. one that occurs with every patient death but no formal guide is used).
- Of those that perceived no policy exists, 87% wanted a policy, with the majority desiring a formal written policy (Figure 4).
- 37 respondents (84%) believed that debriefs should occur with each patient death, while the remainder preferred it be on a case-by-case basis.
- 37 respondents indicated how measures of burnout were affected (on a Likert scale of 1-5) when no debrief was performed following poor patient outcomes.
- The burnout marker most affected was emotional exhaustion (average 1.97), and the burnout marker least affected was medical errors (average 2.70) (Table 1).

Conclusion

Patient death is typically experienced during the second year of pediatric training and beyond. Completion of PICU and Heme/Onc rotations, both of which occur during second and third year of residency at UCSD/Rady Children's, accounted for 67% of total deaths experienced. In general, pediatric residents at UCSD/Rady Children's desire a debrief policy to be in place, although there are mixed opinions on whether the policy should be formally written (versus having an informal guide) and implemented with each patient death (as opposed to a case-by-case basis). With over half of patient deaths experienced in the PICU, efforts for implementing debrief models could be focused here, and if successful, expanded to other units.

Figure 4: Perception of Current Policy and Desire for a Formal or Informal Policy



Next Steps

1. Meet with faculty leadership in PICU, Heme/Onc, and NICU to discuss debriefing needs based on resident survey responses
2. Consider a longitudinal survey model to track change in resident responses as more consistent debriefing is implemented
3. Distribute survey to pediatric residency programs across the U.S. to assess breadth of responses and identify institutions that have had success with addressing resident coping following patient death

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A method to improve fairness of clerkship small group evaluations with apparent systemic rater errors

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[1]UCSD School of Medicine, [2]UCSD Department of Medicine, [3]UCSD Department of Family Medicine, [4]UCSD School of Pharmacy

Needs and objectives

- Many medical school courses include a small group component
- Despite evaluation training, there are lenient and stringent graders
- Systematic rater error (a type of construct irrelevant variance) → biased grades if unadjusted scores are used
- Developed method of adjusting scores to minimize this construct irrelevant variance

Setting and participants

- Academic year 2020-2021
- Primary care core clerkship
- 132 3rd year UCSD students divided up into 18 small groups co-led by 36 Family Medicine and Internal Medicine faculty
- Collected and analyzed data from end of year evaluations completed by small group facilitators

Description

- Evaluation form: 10 domains with a scale with anchors
- The 8 anchors for each domain were converted to 4 point scale
- Wide variation in means and standard deviation (SD) among groups
  - One group had a mean of 4 with SD of 0
  - Another group had a mean of 3.2 with SD of 0.5

Evaluation

- Since groups were randomly assigned, we believe each group's average should be similar
- To adjust scores by group, we calculated entire group mean and SD
- Then re-calculated and re-distributed each small group's scores around this group mean and SD
- Integration of these adjusted small group scores into final grades led to changes in 72 grades compared with the original method of using unadjusted scores

Table: Example of re-calculation of scores

Individual unadjusted score	Small group mean (SD)	Individual adjusted score
4.00	4.00 (0.0)	3.78
3.20	3.20 (0.5)	3.78
3.50	3.20 (0.5)	3.97

Overall group mean (SD)= 3.78 (0.32)

Lessons learned

- Plan to integrate more training on completion of evaluations in our course's bi-annual faculty development retreats
- Continued use of this method of adjusting scores to minimize systematic rater error (small group effects) may improve fairness of small group evaluations

Rady Children's Hospital San Diego

Exploratory Study to Increase Knowledge of Medicine-Pediatric Trainees on Transition of Care from Pediatric to Adult Medicine

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Background

- Variations in curricula regarding adolescent transitions of care (TOC) can lead to residents receiving contrasting or incomplete training.[1-6]
- To fill this gap, we developed a curriculum based on the Got Transition Six Core Elements and piloted it at two bicoastal, academic Medicine-Pediatrics (Med-Peds) residency programs.

Purpose

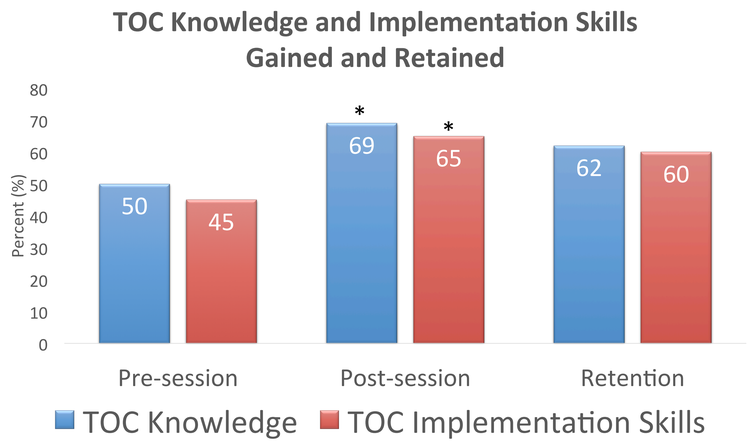
- Increase resident TOC knowledge.
- Increase transition discussion skills.
- Obtain feedback for curriculum improvement.

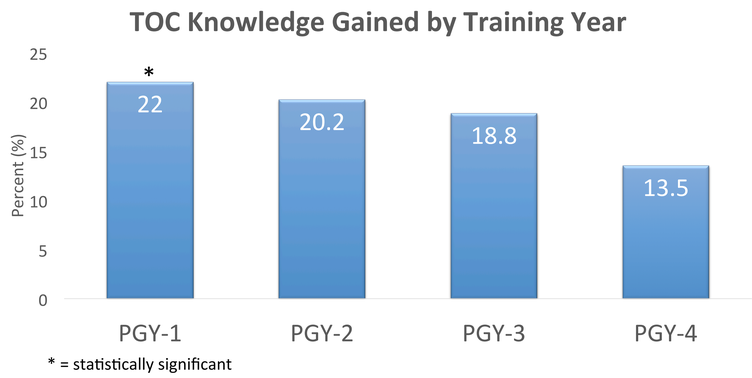
Methods

- Two Internal Medicine-Pediatric residency programs at bi-coastal, large academic institutions participated in this curriculum.
- Two educational sessions were held at each institution either in-person or via virtual platform due to COVID-19 restrictions.
- The first session was held Fall 2020 and the second session was conducted 6 months later.
- Resident-led sessions included a Powerpoint presentation, small group activities, and a guest speaker discussing transition experience.
- Surveys were completed prior to the first session (pre-survey), after the first session (post-survey) and 6 months after the first session (retention survey)
- The information presented was based on Got Transition, a HRSA funded program, and the same educational content was used at both institutions.

Results

- Total of 32 potential participants.
- 66% completed both the pre- and post-session surveys.
- 56% completed both the post-session and retention surveys.





- Residents participating in alternating medicine and pediatric continuity clinics gained more knowledge than those who participate in a combined Med-Peds continuity clinics (p=0.001).
- Comfort increased for both initiating and continuing TOC discussions after the first session.
- Overall comments from residents were positive regarding curriculum content and delivery. Residents enjoyed creating PDSA cycles to improve TOC in their clinics. They felt the guest speaker was beneficial to emphasize the importance of TOC in the lives of patients and families. They recommend that the sessions are closer together for improved continuity.

Discussion

- A standardized TOC curriculum can improve resident knowledge and be easily implemented at multiple institutions.
- Early-in-training residents and those in alternating medicine and pediatric continuity clinics particularly benefit.

Limitations

- Small sample size.
- Unable to assess skill implementation and direct impact on patient care.
- Unable to evaluate effectiveness of in-person versus online platform learning.

Future Directions

- Future studies will improve the curriculum to increase TOC knowledge and skill retention.
- Expand curriculum to other Med-Peds residency programs to evaluate effectiveness and implementation of the curriculum.
- Create an Internal Medicine TOC curriculum to expand the knowledge and comfort of physicians accepting young adults into their practice.

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- The residents at UCSD and MUSC for participating in this study.

Contact Information

- Contact Shannon Kim at sleung@health.ucsd.edu for further information.

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Overall Symposium Evaluation

Please complete the Overall Evaluation in order to receive CME credit

THANK YOU!