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Emergency Medicine Foundations: A Comprehensive Open Access Flipped Classroom Curriculum For Intern Learners

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competency based benchmarks. Although there are various methods utilized to evaluate a resident, one issue encountered is difficulty in evaluating the procedural competency of a resident. This is secondary to both resident noncompliance in logging procedures and most faculty feedback given in real time as opposed to through written evaluation. Oftentimes, milestones are assessed based on total number of procedures logged with direct observation by only a few committee members. To address these issues, we introduced a fast and easy method for residents to log their procedures as well as for faculty to evaluate their competency by using Quick Response (QR) codes placed in the Emergency Room.

Educational Objectives: The main objectives were to obtain more thorough faculty feedback for each resident’s procedural competency, and to increase resident compliance with logging procedures by utilizing QR codes in the emergency department.

Curricular Design: To achieve these educational objectives, we created specific QR codes for intubations and central venous access and placed them at the physician stations at our institution. QR codes were chosen as many other fields such as business and technology use these codes as rapid ways to access and log information. The resident QR codes were linked to a Google Form in which the resident would select their name as well as answer questions about the procedure that correlated to milestone PC10-Airway Management for intubations, or milestones PC9 (General Approach to Procedures) and PC14 (Vascular Access) for central venous access. A similar form was linked for the faculty QR code, and upper level residents were allowed to fill out the form if no attending physician was present. No PHI are saved on these forms, and this process was deemed exempt by our institutional IRB.

Impact/Effectiveness: Compared to the previous year, procedure logging by the intern class for intubations and central venous access has increased by 52%. The feedback rate from our faculty is currently 42% and this is the first time where these procedural milestones have been consistently logged for review by the clinical competency committee.

Best of the Best Innovation Abstract from 2017

Emergency Medicine Foundations: A Comprehensive Open Access Flipped Classroom Curriculum For Intern Learners

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Background: The tide is turning in Emergency Medicine (EM) residency education from traditional hour-long lectures to more interactive approaches geared towards adult millennials. One challenge lies in teaching residents to be informed learners as online content expands, often without peer review. The flipped

classroom approach relies on self-directed learning backed by in-person instructional time for higher order critical thinking. Medical educators must also learn to customize teaching content for learners at different levels.

Educational Objectives: Emergency Medicine Foundations (EMF) is a year-long flipped classroom curriculum designed for EM PGY1 residents. It provides a comprehensive framework for understanding cardinal presentations, “can’t miss” diagnoses, and essential management strategies within the EM Model. Other specific aims include asynchronous content catered to diverse learning styles, easy implementation at satellite sites, and open access to all resources on the curriculum website.

Curricular Design: EMF is organized with a systems-based approach into 30 units (Table 1). Using Foundations Learning Pathways (Traditional Text, High-Yield Text, Multimedia), residents can choose assignments for self-directed review of core content. During weekly Foundations Meetings, interns participate in small groups to complete oral-boards style cases led by senior resident or faculty. Meetings provide the opportunity for assessment of intern knowledge, directed feedback and review of key learning points.

Table 1. Curriculum overview

Emergency Medicine Foundations Course Schedule					
Unit	General Topics	Case 1	Case 2	Case 3	
1	Abd/GI I	Acute Abdomen, Anorectal	Hernia/SBO	Isochemic Bowel	Volvulus
2	Abd/GI II	GIB, Eso and Stomach Do	Boerhaave's	Perforation	Variceal Bleed
3	Abd/GI III	Biliary, Liver, GI Infections	Cholecystitis	Diarhea/HUS	SBP
4	Cards I	Dysrhythmias	Torsades	Bradycardia	SVT
5	Cards II	ACS, CHF	Inferior/RV MI	CHF	VT 2/2 MI
6	Cards III	Valvular disease, Carditis	Pericarditis	PC Tamponade	Endocarditis
7	Vascular	Dissection, Aneurysm, DVT & HTN	Ao Dissection	Ruptured AAA	HTN Emerg
8	Pulm I	Non-infectious Pulmonary Disease	Asthma	PE	Hemoptysis
9	Pulm II	Infectious Pulmonary Disease	CAP with SIRS	Miliary TB	ARDS
10	Trauma I	Common Traumatic Injuries	Subdural	Tension PTX	Splenic Rupture
11	Trauma II	Specialized Traumatic Injuries	Facial Trauma	Neurogenic Shock	Multi-fracture
12	Trauma III	Specialized Trauma	Thermal Burn	PC Tamponade	PM C-section
13	Peds I	Peds Resus, Neonatal Emerg	SIDS / Arrest	Aortic Coarc	NEC
14	Peds II	Pediatric Pulm, Infections	Neonatal Sepsis	Kawasaki Disease	FB Aspiration
15	Peds III	Other Peds, Child Abuse	Febrile Seizure	Intussusception	Abuse
16	HEENT	Eye, Ear, Nose & Throat Emerg	Glaucoma	Ludwig's Angina	CRAO
17	ID	Infectious Emergencies	RMSF	HIV Pneumonia	Pulm Anthrax
18	Neuro I	Brain Emergencies	AMS/ICH	Meningitis	Seizure
19	Neuro / MSK	Nerve and MSK Emergencies	GBS	Cauda Equina	Septic Arthritis
20	Ortho	Traumatic Orthopedic Injuries	20 Ortho Mini-Cases		
21	Tox I	Toxidromes and Poisoning I	ASA toxicity	TCA Overdose	Ethylene Glycol
22	Tox II	Toxidromes and Poisoning II	Tylenol	OP	CCB Overdose
23	Enviro	Environmental Exposures	Snake Bite	HACE	Hypothermia
24	GYN	Ovarian and Uterine Disease, Gyn ID	Ovarian Torsion	TOA	Sexual Assault
25	OB	Pregnancy Emergencies	Ectopic Preg	Pre-eclampsia	Appy in Preg
26	Psych	Psychiatric Emergencies	Agitation	ETOH Withdrawal	Psychosis
27	Renal / GU	Renal and Urologic Emergencies	Test. Torsion	Fournier's	Priapism
28	Endo / Met	Endo, Metabolic and Nutritional Do	Hyperkalemia	DKA	Thyrototoxicosis
29	Heme / Onc	Heme, Malignancy Emergencies	TTP	Acute Chest	Tumor Lysis
30	Immuno / Derm	Immune, Skin Emergencies	SJS	Anaphylaxis	SSS
Open access to curriculum content is available on the course website: www.emergencymedicinefoundations.com					

Impact/Effectiveness: Foundations was piloted at two large training programs for the 2015-2016 academic year. In May 2016, these 36 residents were anonymously surveyed. Thirty of 39 residents completed the survey (83%). Results (Table 2) showed high levels of learner satisfaction regarding the curriculum's relevance and high perceived impact on clinical performance.

Feedback from pilot sites was incorporated for the 2016-2017 academic year with expanded total enrollment to 250+ residents and 20 institutions using full or modified versions of EMF. Resident satisfaction surveys and assessment of learner knowledge will be collected. The Foundations approach may have future benefit for other EM programs, other level learners and other specialties.

Table 2. Pilot survey data

Survey Item (1- Strongly Disagree, 3- Neutral, 5- Strongly Agree)	Agree or Strongly Agree	Mean
Overall I am highly satisfied with the EM Foundations course.	28/30	4.17
I believe EM Foundations was beneficial to my development as an EM practitioner.	28/30	4.33
I believe EM Foundations course content was appropriate for my level of learning.	30/30	4.57
I prefer small group oral boards style cases over traditional lecture or powerpoint review of equivalent course content.	24/30	4.17
Practice oral boards cases were relevant and helpful for learning fundamental knowledge within our specialty.	29/30	4.53
Case teaching points were relevant and helpful for learning fundamental knowledge within our specialty.	29/30	4.60
Foundations meetings were engaging and enjoyable.	28/30	4.47
Practice oral boards cases had a positive impact on my clinical performance.	25/30	4.13
Case Teaching Points had a positive impact on my clinical performance.	27/30	4.10