Project Title: Enhancement of medical student delivery room skills using online modules
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I. Specific educational aims:
The assessment and care of newborn infants is an integral part of pediatric practice, and acquisition of adequate delivery room experience poses a specific logistical challenge. Knowing how to resuscitate babies is a key skill residents need to achieve, and arguably one that all medical students should have. Over the past few years, COMSEP (Committee on Medical Student Education in Pediatrics) has been exploring the AAMC's (Association of American Medical College) Core Entrustable Professional Activities (EPA) for Entering Residency – and the role of the pediatrics clerkship in ensuring that residents are adequately prepared to perform the core EPAs on graduation from medical school. As part of this discussion, the Executive Committee has specifically considered the immediate steps in neonatal resuscitation (warming, drying, stimulating the newborn after delivery) as a fundamental element of patient care that should be understood by all graduating medical students, regardless of planned career path. I feel that an introductory online curriculum would be beneficial in supplementing Stanford's Medical School curriculum by offering practical modules to prepare students for clinical practice.

II. Project rationale:
In a 2009 study of resident attendance at deliveries (1), there was a dramatic drop in % attendance by residents in 2002-2003, presumed to be the impact from duty hour changes. In a subsequent study in 2010, the relationship between number of deliveries attended and confidence in resuscitation skills was studies, and findings suggested that residents' confidence was higher when more deliveries were attended (2). Only ~50% of Stanford students have the chance to attend a delivery during their core pediatric clerkship. Therefore, many graduating Stanford medical students will never have been present at a delivery in the role of a pediatric provider. Currently, there is no formal curriculum to teach pediatric medical students about basic delivery room resuscitation skills. I would like to teach introductory concepts regarding basic delivery room skills to medical students (and new interns) via online modules.

III. Approach:
For the intervention, I will create brief online modules (3-5 minutes each) paired with an immediate assessment tool. Using these modules, I hope to offer an engaging method of enhancing student skills and confidence in the delivery room. Based on a 2014 empirical study on MOOCs and student engagement, my goal is to invest heavily in pre- and post-production editing to keep the modules short and engaging, and will include screen-casting similar to the style of Khan Academy modules plus additional video components (3). Pre- and post-intervention outcomes measured will include confidence regarding these skills, as well as objective scores from online quizzes in both control and intervention groups.

IV. Timeline and plan for implementation:
Control group data will be collected through the year (pre- and post- assessments without intervention). My goal is to plan and develop one online module approximately every 6 weeks (soliciting feedback from faculty and trainees between development of each module in order to improve the next), with a goal to produce 4-5 high-quality modules between October 1, 2017 and April 30, 2018. Intervention group data collection (pre/post assessments with intervention) and comparison of data sets will take place beginning in May of 2018.

V. Anticipated work product:
I will create an introductory medical student delivery room curriculum using online modules based on standard of care and established neonatal resuscitation program (NRP) guidelines.

The video modules will include a variety of topics and situations, all directed at fulfilling our specific learning objective of having medical students and interns acquire confidence, familiarity, and an increased knowledge base regarding basic delivery room resuscitation. The online modules may include the following topics: equipment set-up, equipment troubleshooting, delayed cord clamping, vacuum assisted delivery, forceps-assisted delivery, basic resuscitation on mother's abdomen, basic resuscitation on radiant warmer, indications for and use of PPV, indications and use of CPAP. This list is not exhaustive. These modules will focus on a provider's role at a delivery, including equipment set-up, gathering information prior to delivery, and steps to take once the baby is delivered. Learners access these online modules at their convenience, and review and practice cases to cement concepts. My goal is for these modules to become widely available beyond the audience of Stanford medical students and interns, and if helpful, I hope to continue to develop additional modules to supplement existing knowledge and challenge those who seek additional practice.

VI. Evaluation plan:
STUDY
1. Pre-clerkship assessment of prior delivery room experience and baseline knowledge of NRP - BOTH GROUPS (already in progress)
2. Participation in online modules - INTERVENTION ONLY
3. Post-clerkship assessment of newly attained experience and knowledge base via confidence surveys and quizzes - BOTH GROUPS
4. Provision of modules to students once pre- and post- assessments are completed - BOTH GROUPS
5. Feedback survey about online modules – BOTH GROUPS
*Control group is composed of all pediatric clerkship students who complete their clerkship prior to rolling out the modules. Intervention group is composed of all pediatric clerkship students who have access to the modules while completing their pediatric clerkship.

I will study impact by conducting a case-control prospective study, and hope to assess and improve medical student knowledge, confidence, and skills in neonatal resuscitation.

VII. Dissemination of results:
1. Submit to Council on Medical Student Education in Pediatrics (COMSEP) annual conference, Spring 2017: presentation of module development techniques
2. Submit for presentation at Stanford Innovations in Medical Education Conference,
3. Submit to Association of Pediatric Program Directors (APPD) and/or Pediatric Academic Societies (PAS) and/or Pediatric Hospital Medicine (PHM) in 2018 (module development techniques) and/or 2019 (intervention data)
4. Med Ed Seminar series presentation at Stanford
5. Publication in MedEd Portal
6. Stanford website made freely available

References
1. Lee HC, Rhee CJ, Sectish TC, Hintz SR. Changes in attendance at deliveries by pediatric residents 2000 to 2005. Am J Perinatol 2009;26:129-34.
2. Lee HC, Chitkara R, Halamek LP, Hintz SR. A national survey of pediatric residents and delivery room training experience. J Pediatr. 2010 Jul;157(1):158-161.e3.
3. Guo PJ, Kim J, and Robin R (2014). How video production affects student engagement: An empirical study of MOOC videos. ACM Conference on Learning at Scale (L@S 2014)

VIII. Budget and justification:
Much thought has gone into keeping costs as low as possible. I will be using my personal laptop (MacBook Pro) and video equipment, and request minimum supplemental equipment (tablet and microphone) as well as appropriate (recommended) software. The primary cost will be time, which I have estimated to be approximately 20 hours/module to plan, record, develop, implement, and study the results.

	Item	Justification	Amount
Compensation			
Investigator time	~100 hours (~5% FTE)	Investigator's time to plan, write, film videos, create, implement, and study online modules	$9653
		Total compensation	$9653
Non-compensation			
Equipment	Wacom Intuos Draw CTL490DW Digital Drawing and Graphics Tablet	To ensure production of professional-quality video and sound	$87.12 (Amazon)
	Blue Yeti USB Microphone	Recommended for quality audio in screencasting	$140.61 (Amazon)
Software	Camtasia Studio	Khan Academy recommended software for screen capture; allows for considerable editing after the video is recorded	$169 (educational pricing)
	Pixelmator	Software for on screen writing, drawing and image editing	$29.99
		Total non-comp	$426.72
		Total	**$10079.72**