

Haiti Acute and Emergency Care Conference: descriptive analysis of an acute care continuing medical education program

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Background Several disasters over the past decade have highlighted the need for strong acute-care systems in Haiti. As part of a multifaceted approach to improving national acute-care training, the Research and Education consortium for Acute Care in Haiti (REACH) launched the inaugural Haiti Acute and Emergency Care Conference (HA ECC).

Methods REACH is a Haitian-led, multinational collaboration based out of Saint Luc Hospital in Port-au-Prince. The first HA ECC was held in April, 2017. Pre- and post-course evaluation consisted of subjective and objective components. Differences between pre- and post-responses were determined using McNemar's test of paired proportions.

Results 57 participants from 21 hospitals in five Haitian departments were included. The majority (37/58, 63.8%) were physicians. Most (33/57, 57.9%) had no prior training in acute or emergency care, but 8/57 (14.0%) had taken ATLS/ACLS, 11/57 (19.3%) had taken a formal course not internationally recognized, and only 1/57 (1.8%) had completed acute care specialty training. 43.7% (25/57) reported routine access to point-of-care ultrasound. Following course completion, participants felt significantly more comfortable managing basic emergency conditions (up to 25/57, 43.9% increase, $P < 0.01$) and using ultrasound (up to 30/57, 52.6% increase, $P < 0.01$), but improvements on objective testing were not significant (ranging from -2 (-3.5%, $P = 1.00$) to +5 (8.7%, $P = 0.15$) change).

Conclusions While continued quality review is necessary for future iterations of the conference, the inaugural HA ECC provided a useful "first pass" for current front-line providers in Haiti.

Haiti has the lowest health indices in the Western Hemisphere and, in the past decade, has experienced major strains on its the health care system due to natural disasters (earthquake, hurricanes) and epidemics (cholera, zika, chikungunya). Separate from these occurrences is a baseline high burden of critical

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and emergency illness typical of many low-middle income countries (LMICs) (1). Yet, Haiti lacks an integrated emergency medical system (2). These discrepancies have highlighted the need for strong acute care (defined as emergency and critical care) systems in Haiti.

The historical misconception that acute care is neither appropriate nor cost-effective for LMICs has been challenged by a growing body of evidence demonstrating otherwise. Traditional thinking prioritizes preventive care over acute care for LMICs (3, 4). The literature, however, shows not only a strong medical necessity in LMICs for comprehensive acute care systems (5), but also a positive impact on population health and a reduced burden of disease when implemented effectively and efficiently in a cost-effective manner (5-9). Moreover, the implementation of targeted evidence- or guideline-based acute care interventions in LMICs can improve patient outcomes and enhance processes of care (10, 11).

While the tangible benefits remain clear, numerous barriers to establishing robust acute care systems in LMICs still exist. Limitations in infrastructure, equipment, human resources and postgraduate training are common (1, 2, 12, 13). In Haiti, there is currently only one certified Emergency Medicine residency program (14) and no formal intensive care program. There is also no requirement for continuing medical education (CME; personal communication, Dr. Marc Augustin).

As part of a comprehensive, multifaceted approach to improving acute care training and providing acute care CME in Haiti, the Research and Education consortium for Acute Care in Haiti (REACH) launched the inaugural Haiti Acute and Emergency Care National Conference in 2017.

METHODS

REACH is a Haitian-led, multinational collaboration based out of Saint Lùc Hospital in Port-au-Prince. A group of Haitian, Canadian, and American acute care nurses and physicians, all with extensive clinical experience in Haiti, designed a two-day course emphasizing management of common emergency conditions, point-of-care ultrasound, and basic procedural skills. Evaluation of course effectiveness was determined by pre- and post-course assessments.

The inaugural Haiti Acute and Emergency Care Conference (HAECC) was held on April 28-29th, 2017. Physicians, nurses and trainees from 22 institutions around the country were invited to participate for a nominal fee. The course curriculum, consisting of 13 didactic sessions and 12 small group sessions with skills stations (Table 1), was developed by consensus. Several nursing-specific sessions were held. Ten of thirteen lectures were presented exclusively by Haitian physicians. Each lecture was reviewed a priori for accuracy and visual aesthetics by a paired Haitian and North American expert. All lectures were posted on a purpose-built website (<http://haecc.org/>).

Pre- and post-course evaluation consisted of subjective and objective components. Topics for subjective assessment included comfort with image interpretation, point-of-care ultrasound, and management of common emergency conditions. Level of comfort was determined by 5-point Likert scale with responses subsequently dichotomized to “comfortable” and “not com-

Table 1. Topics covered in acute care conference and teaching format

DAY 1			
Pretest			
Lectures			
1 – Ultrasound Basics			
2 – Hypotension and Shock Part 1			
3 – Approach to the Acute Patient			
SMALL GROUP SESSION 1			
	1	2	3
Sonography – Cardiac	Group A	Group C	Group B
CXR	Group B	Group A	Group C
EKG/Telemetry	Group C	Group B	Group A
Lectures			
4 – Acute Respiratory Failure			
5 – Hypertensive Crisis			
6 – Acute Coronary Syndrome			
SMALL GROUP SESSION 2			
	1	2	3
Sonography – Respiratory Failure	Group A	Group C	Group B
Basic Airway Management	Group B	Group A	Group C
CPAP – Ventilator Support	Group C	Group B	Group A
DAY 2			
Lectures			
7 – Sepsis in Haiti			
8 – Approach to acute abdominal pain			
9 – Massive Hemorrhage			
SMALL GROUP SESSION 3			
	1	2	3
Sonography – eFAST	Group A	Group C	Group B
Tourniquet	Group B	Group A	Group C
Nursing Documentation	Group C	Group B	Group A
Lectures			
10 – Glucose Related Emergencies			
11 – Team Approach to Care			
12 – Status Asthmaticus			
13 – Shock Part 2			
SMALL GROUP SESSION 4			
	1	2	3
Sonography – RUSH	Group A	Group C	Group B
Intraosseous Access	Group B	Group A	Group C
Mock Code	Group C	Group B	Group A
Post Test			

fortable.” Topics for objective knowledge assessment emphasized management of common emergency conditions, EKG and chest x-ray interpretation. Questions were in multiple choice and free text formats with responses dichotomized into “correct” or “not correct,” as determined by four REACH faculty members. Disagreement was resolved by consensus. Differences between pre- and post-conference responses were determined using McNemar’s test of paired proportions. Statistical significance was defined as $P < 0.05$. All statistical analyses were performed with Stata MP Statistical Software (Release 11, College Station, TX, 2009).

RESULTS

A total of 58 participants, representing 21 hospitals, from five administrative departments in Haiti, participated in the course. The majority (37/58, 63.8%; 16 general doctors, 11 internists, 2 generalists, 1 emergency medicine, 1 pulmonologist, 1 urologist, 5 medical students) were physicians or physicians-in-training. Sixteen (27.6%) were nurses or nurses-in-training. The remainder did not identify their background. Fifty-seven participants completed pre- and post-course surveys and were included in the analysis. Most (33/57, 57.9%) had no prior training in acute or emergency care, but 8/57 (14.0%) had taken ATLS/ACLS, 11/57 (19.3%) had taken a formal course not internationally recognized, and only 1/57 (1.8%) had completed acute care specialty training. Significant minorities reported routine access to point-of-care ultrasound (25/57, 43.7%) and x-ray (22/57, 38.6%), but none to CT scanners. Reliable access ranged widely to intravenous fluids (40/57, 70.2%), intravenous antibiotics (37/57, 64.9%), blood products (10/57, 17.5%), mechanical ventilators (10/57, 17.5%), and noninvasive ventilation (3/57, 5.26%). Only 15/57 (26.32%) reported reliable electricity, and 14/57 (24.56%) reliable internet access.

Following course completion, participants felt significantly more comfortable using point of care ultrasound, specifically in the skill domains of bedside echo (26/57 (43.9% increase), $P < 0.01$), gaining vascular access (25/57 (43.9% increase), $P < 0.01$), differentiating causes of hypotension (14/57 (19.3% increase), $P < 0.01$), and using it for a FAST exam (34/57 (52.6% increase), $P < 0.01$). Participants also felt more comfortable managing a number of emergency conditions post course, such as cardiac arrest (34/57 (43.9% increase), $P < 0.01$), acute coronary syndrome (40/57 (40.2% increase), $P < 0.01$), and sepsis (49/57 (43.9% increase), $P < 0.01$). They also felt significantly more comfortable utilizing other therapeutics and diagnostics such as invasive and noninvasive ventilation. Please see [Table 2](#) for details. Improvements on objective testing regarding diagnosis and management of various causes of critical illness, such as different causes of shock (ranging from -2, +5 (-3.5%, 8.7%) change, $P = 0.15$, $P = 1.0$), trauma (28/57, 0% increase, $P = 1.0$), and sepsis (31/57 (2.7% increase, $P = 0.7$)) were not significant ([Table 2](#)).

Participants had variable feelings toward gearing future course content toward international best practice guidelines (14/57, 24.6%), or to evidence primarily from LMICs (10/57, 17.5%), or both (12/57, 21.1% both). The vast majority of participants expressed interest in conducting research (55/57, 96.5%) and establishing a website (55/57, 96.5%) for communication and information sharing related to the course.

DISCUSSION

Haiti’s health care system is a complex mixture of public and private health care institutions, many with multi-national or foreign non-governmental support, constantly in flux pending the availability of funding, staff, and the changing face of infrastructure. Compounded by poverty, vulnerability to severely disruptive natural disasters, and an overwhelming majority of physicians trained in Haiti leaving the country within 5 years of graduating medical school (15), these factors make building a robust acute care system in Haiti both difficult and imperative.

Table 2. Pre- and post-test assessment of level of comfort and objective knowledge difference

	PRE-COURSE N (%)	POST-COURSE N (%)	PERCENT CHANGE %	P-VALUE
Subjective skills assessment				
Comfortable using an ultrasound for echo	1 (1.8)	26 (45.6)	43.8	<0.01
Comfortable using ultrasound for hypotension	3 (5.3)	14 (24.6)	19.3	<0.01
Comfortable using ultrasound for FAST	4 (7.0)	34 (59.6)	52.6	<0.01
Comfortable using ultrasound for vascular access	0 (0%)	25 (43.9)	43.9	<0.01
Comfortable interpreting an EKG	15 (26.3)	28 (49.1)	22.8	<0.01
Comfortable interpreting an CXR	25 (43.7)	44 (77.2)	33.5	<0.01
Comfortable using NIPPV	2 (3.5)	30 (52.6)	49.1	<0.01
Comfortable intubating	10 (17.5)	28 (49.1)	31.6	<0.01
Comfortable managing a ventilator	5 (8.8)	28 (49.1)	40.3	<0.01
Comfortable performing ACLS	9 (15.8)	34 (59.6)	43.8	<0.01
Comfortable managing abdominal pain	35 (61.4)	42 (73.7)	12.3	0.05
Comfortable managing hypertensive crisis	46 (80.7)	52 (91.2)	10.5	0.09
Comfortable managing glucose emergency	46 (80.7)	54 (94.7)	14.0	0.01
Comfortable managing hemorrhage	35 (61.4)	48 (84.2)	22.8	<0.01
Comfortable managing Acute Coronary Syndrome	17 (29.8)	40 (70.2)	40.4	<0.01
Comfortable managing respiratory failure	27 (47.3)	46 (80.7)	33.4	<0.01
Comfortable managing sepsis	29 (50.9)	49 (86.0)	35.0	<0.01
Comfortable managing hock	32 (56.1)	52 (91.2)	35.1	<0.01
Objective assessment: correct diagnosis*				
Septic shock	45 (79.0)	45 (79.0)	0	0.74
Hemorrhagic shock	51 (89.5)	49 (86.0)	-3.5	1.00
Cardiogenic shock	45 (79.0)	50 (87.7)	8.7	0.15
Identify MI (all)	19 (33.0)	24 (42.1)	9.1	0.09
Identify MI (doctors)	19 (51.4)	23 (62.2)	10.8	0.15
Identify PTX (all)	7 (12.3)	19 (33.0)	20.7	<0.01
Identify PTX (doctors)	7 (18.9)	17 (46.0)	27.1	<0.01
Objective assessment: correct management (doctors only)*				
Sepsis	30 (81.1)	31 (83.8)	2.7	0.70
Respiratory distress	17 (46.0)	21 (56.8)	10.8	0.48
Trauma	28 (75.68)	28 (75.68)	0	1.0
Chest pain	23 (62.2)	28 (73.0)	10.8	0.16

MI – myocardial infarction, PTX – pneumothorax

*Answers marked correct if at least 2/3 responses accepted by four REACH instructors.

Training a cadre of specialized acute care providers will be an essential component of a sustainable health care system in Haiti. The Emergency Medicine residency recently developed in Haiti's Central Plateau is a very positive first step in this direction. However, only 51% of Haitians live within 50 kilometers of a tertiary care hospital (16), so increasing the capacity of non-acute care clinicians to provide time-sensitive emergency interventions has the potential to significantly improve acute care outcomes throughout Haiti. In a recent review of trauma care systems in LMICs, task shifting and targeted training of non-specialty providers were identified as a potential key mechanism for addressing human resource limitations in LMICs (3).

This two-day course allowed for significantly improved subjective comfort with managing common emergency conditions and use of point-of-care ultrasound, a modality that is much more common than CT scanners and even x-rays in the majority of Haitian healthcare facilities.

Participants specifically increased their level of comfort utilizing ultrasound for bedside echo, differentiation of hypotension, vascular access, and FAST exam in trauma. While ultrasound availability has been increasing dramatically in LMICs, and as evidenced by the relatively high rates of ultrasound access reported by the participants, the routine use of ultrasound in the clinical setting has been primarily limited by lack of adequate training (17). In addition to this intensive two-day course, participants have access to an open access course website (HAecc.org) where all lectures including those on ultrasound are available for them for ref-

erence and review. While more in-depth training and continued quality review are necessary for incorporating ultrasound education into clinical practice in Haiti, this course provided a useful first course for many of the participants. Participants also felt significantly more comfortable diagnosing and managing a range of acute disease processes, from cardiac arrest and respiratory failure to sepsis and abdominal pain. Increasing their ability to comfortably manage these acute illnesses may provide better outcomes for patients, however further study would need to be conducted.

Objective knowledge gain was not significant, however, perhaps reflecting the small sample size. Participants were given open access to course content to facilitate asynchronous didactic learning. Our findings also highlight that participants seek content relevant to both high-income and low-income country settings. Best practice guidelines for LMICs are limited by a paucity of evidence, but there exists a strong appetite amongst Haitian clinicians for conducting clinical research (96% in our cohort).

A key to this conference's success was Haitian leadership and participation, which provided legitimacy and context-appropriate course content. International partners largely played a support role. Moreover, the emphasis on nursing developed the team-building potential for empowering nurses to recognize and manage common acute care conditions, which may be especially relevant in situations where physicians are not always available (18).

While LMICs reflect great heterogeneity in the availability of acute and emergency care education, the majority have a profound need for context-specific instruction for their front-line practitioners. The success of the first HAECC refutes the commonly espoused dogma that principles, techniques, and technology of "high tech" medical care is irrelevant to the resource-limited setting. The goal of the REACH collaborative is to establish a consistently high-quality didactic framework that not only will be sustainable over time in Haiti, but that can provide a template for similar sustainable programs in other LMICs.

There were several limitations of the course and the resulting evaluation. The HAECC was primarily geared towards and taught by physicians, though over 30% of the learners were nurses. With subjective responses, it is possible the subjects would be biased to respond in the affirmative with regards to their comfort level in the skills assessed. It is also possible given the small sample size that by chance we happened to reach subjects particularly adept at this form of learning. However, there is no systematic reason to believe that is the case. Moreover, the inaugural course lacked formal endorsement by the Haitian Ministry of Health, an issue being addressed for future conferences. Lastly, long-term knowledge retention and skill acquisition were not assessed.

CONCLUSIONS

While formal Haitian Emergency Medicine or Critical Care postgraduate training will eventually provide the foundation for a comprehensive, national acute care system, the inaugural HAECC provided a useful "first pass" for current front-line providers of acute care in Haiti. Continued quality review is necessary for future iterations, but this conference serves as an important first step towards establishing formal acute care CME programs in Haiti.

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