

Efficacy of Implementing a Combined Online and Hands-on Basic Ultrasound Curriculum for 3rd Year Medical Students



Wulfestieg D.O., Tim¹, Rooks M.D., Veronica², Kao M.D., Steve³, Lustik M.S., Michael⁴

1,2,3</sup>Tripler Army Medical Center Dept. of Radiology, ¹Chief Resident, ²Chief of Ultrasonography, ³Program Director, ⁴Statistician, Dept of Clinical Investigation

Presented by: Tim Wulfestieg, DO |CPT, MC, USA|

Ultrasound (US) is prevalent and clinically useful, however the majority of American medical schools lack a formal curriculum.

"[173] medical schools were contacted, and 48 (27.7%) reported having a formal USMED curriculum."

Integration of Ultrasound in Medical Education at United States
Medical Schools

A National Survey of Directors' Experiences

Vi Am Dinh, MD, RDMS, RDCS, Jasmine Y. Fu, BS, Samantha Lu, BS, Alan Chiem, MD, MPH,
J. Christian Fox, MD, RDMS, Michael Blaivas, MD

Objectives—Despite the rise of ultrasound in medical education (USMED), multip barriers impede the implementation of such curricula in medical schools. No studiest date have surveyed individuals who are successfully championing USMED program. This study aimed to investigate the experiences with ultrasound integration as perceive by active USMED directors across the United States.

Methods—In 2014, all allopathic and osteopathic medical schools in the United States were contacted regarding their status with ultrasound education. For schools with required point-of-care ultrasound curricula, we identified the USMED directors in charge of the ultrasound programs and sent them a 27-question survey. The surve included background information about the directors, ultrasound program details, the barriers directors faced toward implementation, and the directors' attitudes toward ultrasound curricula, we identified the USMED directors across the United States.

Methods—In 2014, all allopathic and osteopathic medical schools in the United States were contacted, and 48 (27.7% charged for the ultrasound programs and sent them a 27-question survey. The surve included background information about the directors, ultrasound education.

Results—One-hundred seventy-three medical schools were contacted, and 48 (27.7% california (LG.): popartment of Emergency Medicine, University of California, Ios Angeles, California, CAC): Department of Emergency Medicine, University of California, Ios Angeles, California (LG.): part perment of Emergency Medicine, University of South Carolina, Columbia, South, California (LG.): and Department of Emergency Medicine, University of California, Ios Angeles, California, Ios Angeles, California, Ios Angeles, California, Ios Angeles, California, Ios

he value of point-of-care ultrasound in modern medicine i

safely and accurately performing invasive procedures as well as eval-

uating unstable patients.^{4–7} Recently, point-of-care ultrasound has been shown to have diagnostic equivalence to computed tomograohy in diseases such as nephrolithiasis.⁸ As ultrasound technology

ecoming evident. Ultrasound allows physicians to quickly

assess patients' anatomic and physiologic characteristics at the bedside.^{2,3} Ultrasound is also becoming the standard of care for

and Tammy Phan, CCRP, for helping with this study. This study was presented as an oral presentation at the American Institute of Ultrasound in Medicine Annual Convention; March 23, 2015;

Center, 11234 Anderson St, A108, Loma Linda

E-mail: vadinh@llu.edu

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Medical Schools as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis. As ultrasound technology phy in diseases such as nephrolithiasis.

LOCAL PROBLEM: The regional medical school lacked a basic US curriculum, which impacted medical students when rotating through the study's tertiary care center.

GOAL: Implement a novel basic US curriculum based upon the following 2014 guidelines:

National Ultrasound Curriculum for Medical Students Ulrike M. Hamper, MD, MBA, ** Maria A. Manning, MD, †† Levon N. Nazarian, MD, *‡‡ Janet A. Neutze, MD, §§ Miriam Romero, MD, || Jason W. Stephenson, MD, ¶¶ bility, and relatively low cost. It carries none of the potential risks of the power of this tool have sought to incorporate it into the medical school curriculum. The basic question that educators should ask mselves is: "What should a student graduating from medical stethoscope of the 21st century." The use of US beyond its lliance of Medical School Educators in Radiology have collaborated in the design of a US curriculum for medical students. The plementation of such a curriculum will vary from institution to nstitution, depending on the resources of the medical school and space in the overall curriculum. Two different examples of how US can be incorporated vertically or horizontally into a curriculum are escribed, along with an explanation as to how this curriculum isfies the Accreditation Council for Graduate Medical Education ncies, modified for the education of our future physicians. how to utilize the diagnostic capability of US most effectively and in addition are best able to direct the clinician to other chool and Dana Farber Cancer Institute/Brigham and Women's Hospital, clinically useful (ACR Appropriateness Criteria®).8 Accordledicine, New Haven, CT; §Mayo Clinic College of Medicine and Mayo

ollary, students also need to learn the limitations of US and

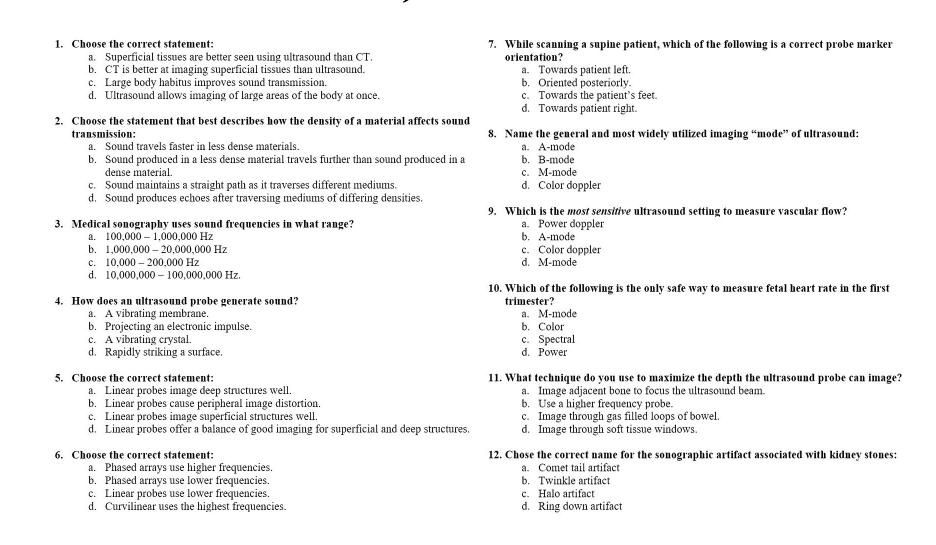
Baltarowich, Oksana H., et al. "National ultrasound curriculum for medical students." Ultrasound quarterly 30.1 (2014): 13-19.

SETTING: Tripler Army Medical Center, Honolulu, HI, a tertiary military hospital, serving 260,000 soldiers, family members and retirees. **POPULATION:** 83 MS3 medical students from the Hawaii state medical school on Oahu, as taught over two iterations in 2020 and 2021.

PLAN:

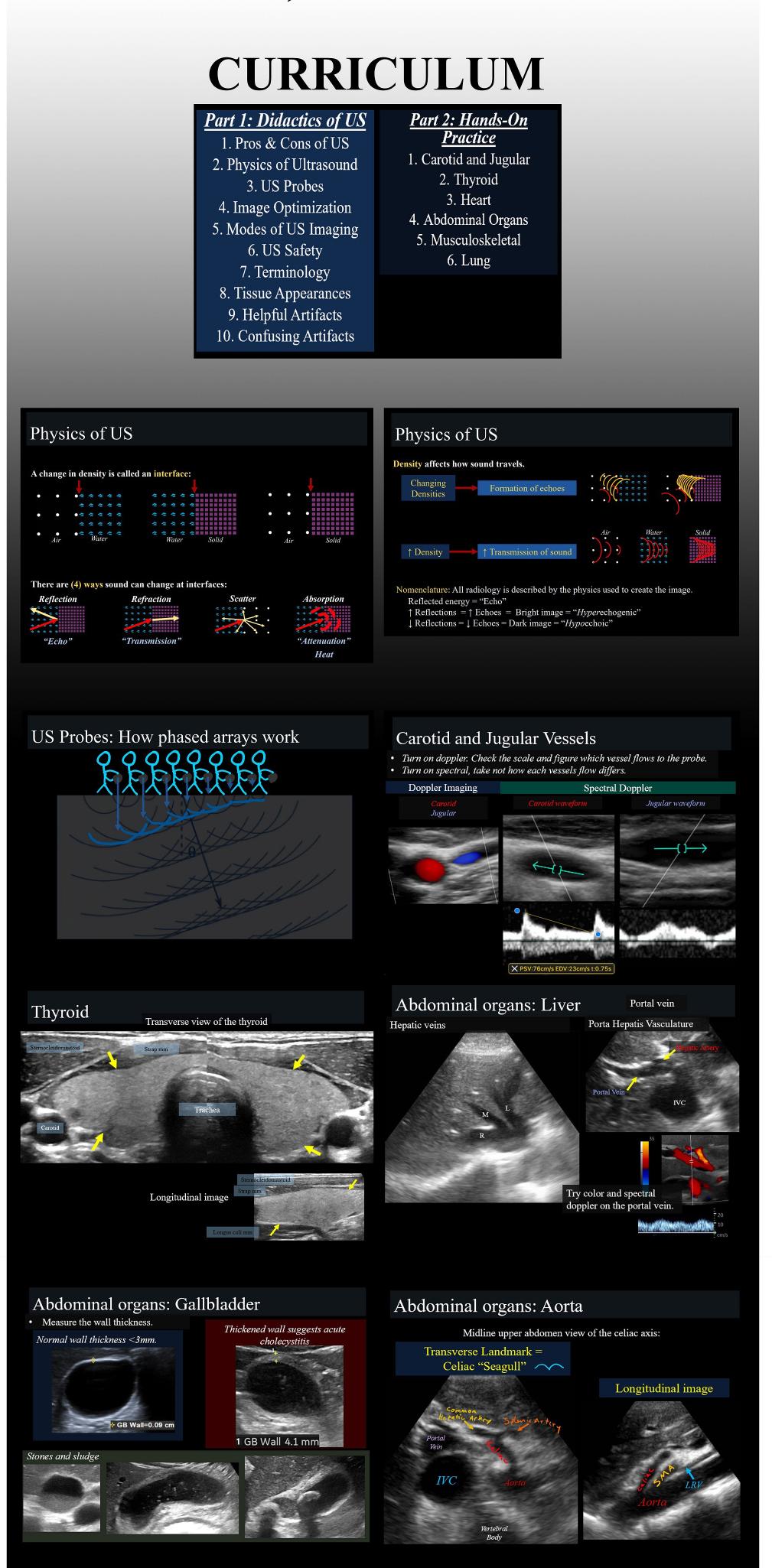
- 1. Create a quality improvement (QI) project of teaching a basic US curriculum, as created and taught by residents.
- 2. Utilize pre and post-tests to assess learning.

CURRICULAR SEQUENCE 1) Pre-test



- 2) Teleconference Didactic
- 3) Small group live demonstrations

4) Post-test



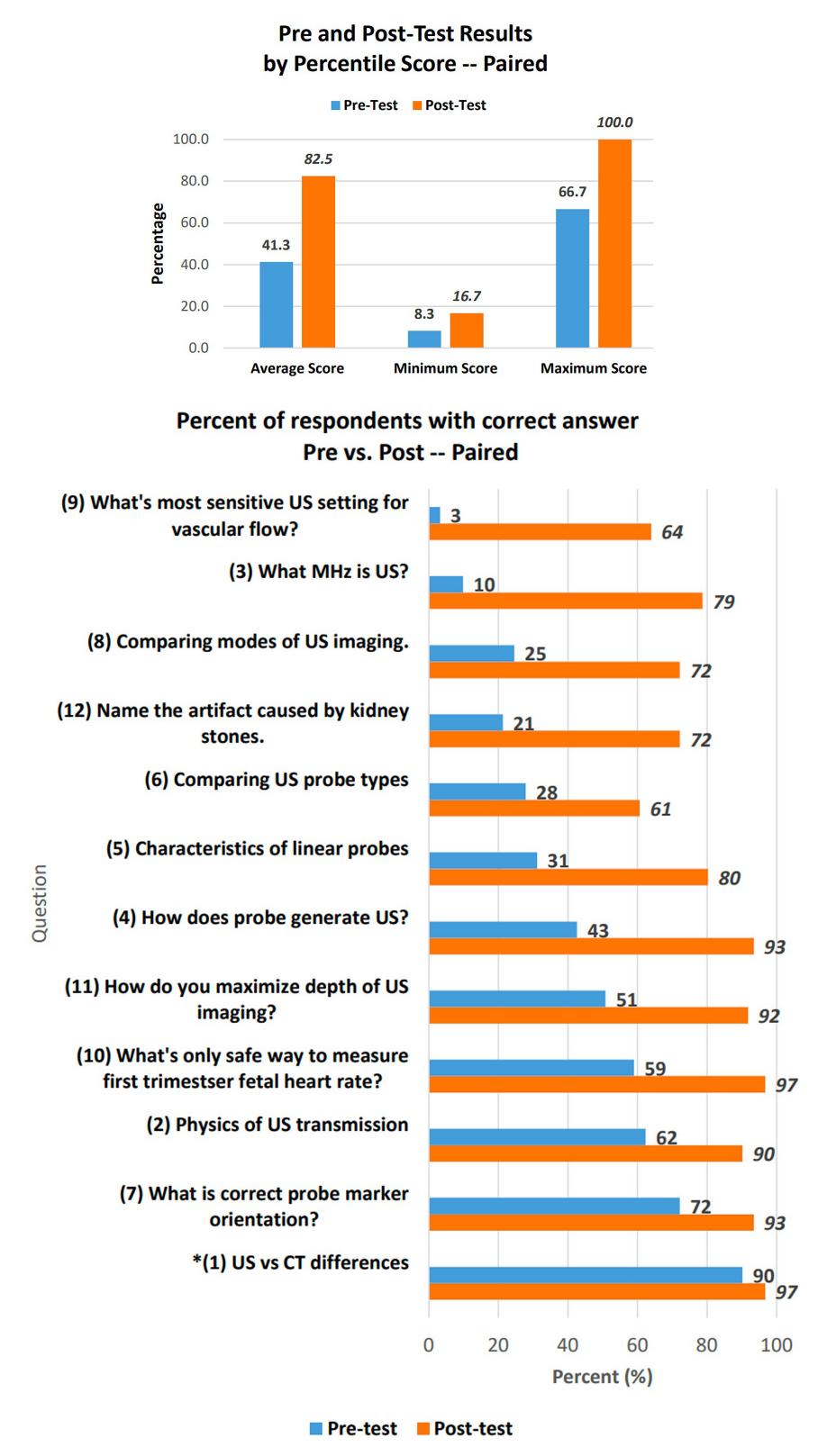
RESULTS:

- 83 students completed pre-tests.
- 61 students completed both pre and post-tests.
- Average score increased 41.3% to 82.5%.
- With a max score of 12, pre-test no student scored 10-12 points, however post-test 41 students (67%) scored this level.
- Pre-test questions with worse performance included which US modality was most sensitive to vascular flow and which sonographic frequences are utilized for medical imaging.

 Limitations: The following limitations occured as a result of offering this optional curriculum without imposing additional burdens on student's existing schedules and required classwork:
 - Same questions utilized for pre-test and post-test.
 - Only 12 questions utilized, which limits robustness of results.

Data below represents the 61 pre and post matched cohort.

All results are statistically significant with p-values < 0.05, except for the single entry marked with an asterix.



CONCLUSION:

This project demonstrates the efficacy of a basic hands-on US curriculum as implemented by residents in a mixed format of both online lecture and small group hands-on sessions. The methods and results are relevant in a recent global environment where distance learning has become more common.

The views expressed in this abstract/manuscript are those of the author(s) and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the US Government.