Study shows sensor technology may help improve accuracy of clinical breast exams

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Sensor technology has the potential to significantly improve the teaching of proper technique for clinical breast exams (CBE), according to a new study by researchers at the University of Wisconsin School of Medicine and Public Health.

The results of the study were published in a correspondence today in the *New England Journal of Medicine*.

Carla Pugh, director of patient safety and education at the University of Wisconsin Hospital and Clinics and principal investigator of the study, says the use of sensors allows a level of critical analysis unavailable to clinicians until recently.

"Variations in palpable force used during a CBE cannot be reliably measured by human observation alone," Pugh says. "Our findings revealed that 15 percent of the physicians we tested were using a technique that put them at significant risk of missing deep tissue lesions near the chest wall. This research underscores the potential for sensor technology to be used not only to improve clinical performance, but to also allow for objective evidence-based training, assessment and credentialing."

For the study, Pugh and her team asked 553 practicing physicians during annual clinical meetings of the American Society of Breast Surgeons, American Academy of Family Physicians and American College of Obstetricians to perform simulated CBE under conditions that mimic an office visit for a symptomatic patient. Participants completed a demographic survey, reviewed a clinical scenario, performed the CBE on a sensor-enabled breast model, and then documented their findings. The goal was to capture CBE technique while clinicians were purposefully seeking a mass.

The sensor data revealed that physicians who palpated fewer than 10 newtons (a common measurement of force) were able to find two superficial masses on the breast model but missed the two deeper ones. The physicians who increased the amount of palpation pressure improved the probability that they would identify the deeper lesions. The study suggests that the optimal palpable force for deeper lesions is between 12 and 17 newtons.

"I want to spark a serious conversation about the potential for high-end, mastery training in the health care profession," Pugh says. "Health care is at a critical juncture where there are huge opportunities for major information exchanges that can empower physicians and patients. Both patients and physicians will benefit from clinical-skills performance data."

In 2011, Pugh received the Presidential Early Career Award for Scientists and Engineers (PECASE) for her research on the sensor device used in the study. Other researchers on this project include Shlomi Laufer, a research fellow in Pugh's lab, and Anne-Lise D'Angelo, a resident in the division of general surgery at the UW Hospitals and Clinics and a graduate student in educational psychology at UW-Madison.

Provided by University of Wisconsin-Madison

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