

# Emergency department CT scans can change physicians' diagnoses and management decisions

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A study from the Massachusetts General Hospital (MGH) Institute for Technology assessment finds that, after viewing CT scan results, physicians in the emergency departments of four major academic medical centers made key changes in clinical decision-making for patients with symptoms frequently seen in emergency rooms. The study that has been published online in the journal *Radiology* adds important information to health policy debates regarding the appropriate use of CT scanning.

"Emergency department [physicians](#) who face increasing pressure to make clinical decisions quickly are sometimes criticized for ordering too many CT scans that may not be clinically justified," says Pari Pandharipande, MD, MPH, director of the MGH Institute of Technology Assessment, who led the study. "We found that - for [patients](#) with abdominal pain, chest pain or shortness of breath, or with headache - physicians' leading diagnoses and management decisions frequently changed after CT and that diagnostic uncertainty felt by physicians was alleviated."

The authors note that the utilization of CT scanning in emergency departments (EDs) has more than tripled in the past 20 years but the benefits of increasing those procedures have not been clear. A 2011 MGH study found that ED CT scans changed the diagnosis and management plans of more than 40 percent of nearly 600 patients who

had come to the hospital's ED with abdominal pain. Since that study focused on treatment of a single symptom at one institution, the current study was designed to take a broader look at the question.

The study was conducted at four [academic medical centers](#) around the U.S. and covered periods of 15 months between July 2012 and January 2014. Participating emergency department physicians - both staff physicians and residents - evaluating patients with abdominal pain, chest pain/shortness of breath, or headache were asked to complete brief surveys after their initial evaluation of the patients and again after receiving CT scan results. Pre-CT surveys asked for their initial diagnosis, their confidence in that diagnosis, any alternative diagnoses that should be ruled out and their current management decisions. Post-CT surveys asked whether the initial diagnosis had changed, whether the CT scan had helped to confirm or rule out alternative diagnoses, and whether [management decisions](#) had changed.

In total, 245 physicians completed both pre- and post-CT surveys for 1,280 patients who comprised the study group. In more than 80 percent of instances, the post-CT survey was completed the same day as the pre-CT survey. Whether participating physicians were attendings or residents did not affect the study results.

After CT, physicians' leading diagnoses changed for 51 percent of patients with [abdominal pain](#), 42 percent of patients with chest pain/shortness of breath and 24 percent of patients with headache. The CT scan helped to confirm or rule out alternative diagnoses 95 to 97 percent of the time, across all symptom groups; and decisions about admitting patients to the hospital were changed 19 to 25 percent of the time.

"Our evaluation of physicians' diagnostic confidence revealed compelling results," says Pandharipande, who is an assistant professor of

Radiology at Harvard Medical School. "While there was a wide spectrum of diagnostic confidence before CT, the greater a physician's initial confidence in a diagnosis, the less likely that diagnosis was to change after CT, indicating that physicians were sound judges of their own diagnostic certainty. But even in instances where physicians' pre-CT confidence in their initial diagnosis was greater than 90 percent, there were still changes in from 4 to 21 percent of cases."

She and her co-authors note that their study focuses on the benefits of emergency department CT scanning and does not address the costs and risks, such as radiation exposures, factors that must be included in a full risk/benefit evaluation. But the size and consistency of the benefits observed in this study indicate that policies solely designed to reduce the use of ED CT scans could compromise patient care. Future research should focus on better methods of identifying patients less likely to benefit from CT scanning - such as the three-quarters of headache patients whose diagnoses did not change - without reducing CT use in patients who would benefit.

Provided by Massachusetts General Hospital

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