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## MODALITIES &amp; PRACTICE MANAGEMENT

## Emergency Solution

PUBLISHED ON OCTOBER 20, 2008

**CT scanners and ultrasound are ubiquitous in hospital EDs across the nation. Experts say ED imaging is saving lives, but managing overutilization remains a challenge.**



The emergency department (ED) has always been about saving lives, but, today more than ever, medical imaging equipment is playing a greater role in ED success. Because of its portability, faster response, and more accurate readings, urban and rural hospitals alike are making imaging equipment a cornerstone within their EDs.

In fact, a recent survey highlights the growing trend toward placing imaging equipment permanently in EDs. Last year, a group of physicians, led by assistant professor John Thomas, MD, at Duke University Medical Center, Durham, NC, conducted an online, 9-month survey of 678 radiology groups to determine the kinds of imaging equipment being moved into and utilized by EDs across the country.

The survey found, among other things, that new imaging practices are emerging in EDs, with 41 groups having designated emergency radiology divisions. "By and large, CT scanning and ultrasound are the main players in the overall management of ED patients," Thomas said. "Will this be sustained, or is it just a passing trend? We don't know the answer yet."

Despite the revealing results, Thomas and his co-authors received criticism that the survey was too broad. "But we wanted it that way," he said. "We wanted a snapshot of the many groups out there and what they were doing. We just threw it out to the community of radiologists and said, 'Hey, what do you think?'"

## Convenience and Expediency

Stuart Markowitz, MD, chairman of the department of radiology at Hartford Hospital, Hartford, Conn, thinks the need to rapidly evaluate and diagnose patients in the ED is what is partly behind the trend. "Major trauma centers and hospitals can no longer afford to keep patients in the emergency department for any longer than they absolutely need to," he said.

Hartford Hospital, a large, urban, level I trauma center with just under 900 beds, opened a new trauma center 8 years ago, complete with CT scanners, x-ray machines, and computed radiography (CR) housed

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## POLLS

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directly in the ED. "We're the largest hospital in Connecticut," said Keith Crosby, senior radiology engineer at Hartford. "We have two CRs dedicated to five trauma rooms, and we put the CR equipment right into the control area, so that when we are in the heat of battle, we can process an image and have it available on a computer monitor for the physician in less than a minute."

Even smaller, rural hospitals are leveling the playing field by purchasing and moving sophisticated imaging equipment into their EDs. "We are a community hospital with a busy ER because we are the only hospital in the county," said Sandy D'Arrigo, director of diagnostic imaging services at Carroll Hospital, based in Westminster, Md. "We budget anywhere from 130 to 150 emergency department visits in a 24-hour period, and we probably image 65% to 70% of those patients."

Since building a new bed tower in 2004, complete with a new ED, the small rural hospital has expanded from 15 to 45 beds, including dedicated diagnostic rooms, a 64-slice CT scanner, and an ultrasound suite, proving that big things can come in small packages. The hospital is now paperless and filmless, and uses direct radiography (DR) almost exclusively in the ED.

Hartford and Carroll, like so many large and small hospitals, are relying more on imaging equipment as essential in the ED, adding CT scans, CRs, ultrasound, and, in many cases, DRs. "I think we are starting to see this equipment in Level II trauma centers," Markowitz said.

Take ultrasound, for example, which has seen a surge within EDs within the last few years. Because of its portability, "ultrasound can be brought to the emergency room or to the hospital floor," said Werner Rosshirt, director of ED radiology at Hartford Hospital. "Emergency medicine doctors are also starting to do their own ultrasounds, so they have their own equipment that they can wheel into the patient's room and use at the emergency room bedside."

Rosshirt has seen the addition of CT scanners in Hartford's ED boost the convenience and expediency of treating patients, especially those experiencing trauma. "Years ago, patients would have to be transported to the second floor to be scanned," he said. "But now, the CT scanner is based right in the emergency room."

CR equipment has also become more portable and faster. "We have seen a drastic change in the size of CR equipment and the speed of processing that has allowed us to place the equipment closer to the need," Crosby said. "The doctors are able to get their images in a matter of seconds and make their medical decisions because it's all happening right in front of them."

☐ No

☐ No, but we plan to in 2014

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### Patient Impact

The positive effect of this equipment on patients in the ED, especially trauma patients, cannot be denied. For a large hospital such as Hartford, which treats hundreds of patients per week through its ED, timing is critical. "They are very sick patients that often need imaging very quickly to determine if they have anything life-threatening, or anything that might need emergency surgery, so those patients need to be scanned quickly," Rosshirt said.

This becomes all the more crucial when treating stroke patients. "Being a major trauma and stroke center, we need to have this type of equipment available," Crosby said. "Stroke is the magic 3 hours to have your best outcome, so time is of the essence. If it took them an hour to get here, then we only have 2 hours to treat them."

D'Arrigo has seen the importance of imaging equipment in Carroll's EDs and the impact on patients. "If you don't have the equipment on hand, that just adds to the wait time," she said. And because of malpractice concerns, D'Arrigo said ED physicians order a battery of diagnostic tests, making Carroll a high-end user of CT equipment. "Between 7 pm and 7 am, we can do as many as 45 CTs alone," she said. "It's perceived to be one of the most accurate, all-encompassing tests."

And for smaller hospitals like Carroll, this equipment may be the only one of its kind for miles around. "We are 20 miles from a major level I trauma center in Baltimore," D'Arrigo said. Still smaller hospitals may find the need to justify the expense of the higher-end equipment. To justify the cost of Carroll's two new DR units, D'Arrigo conducted a benchmark time and motion study of procedures to measure the overall effect on patients. "We measured from the time a patient was brought into the imaging department, how long it took us to do the procedure, until we were done," she said. "We did it with the analog equipment prior to the installation of the DR, and then we repeated it twice after the installation of the DR. On

average, we reduced our procedure time by 50%—even with patients that were not ambulatory.”

### Patient Knowledge

As patients become more informed, they are demanding state-of-the-art imaging and diagnostic equipment, no matter what size the hospital, and hospitals are responding. Markowitz now sees patients who are much more educated about what is available in medical imaging and are voicing their expectations as to the kinds of care they expect to receive. “I think it’s still a small, but growing percentage who are becoming aware that different emergency treatment centers and hospitals have different levels of care in their emergency departments,” he said.

Carroll’s D’Arrigo agreed. “I think there are some parts of the country where the consumer is well-educated and well-informed as to what’s available,” she said. “Where there is an educated consumer, there probably is an expectation. If people think it’s the best, they want it.”

### Staffing Up

No matter what size hospital, staffing can always be a challenge. And like many hospitals, both Hartford and Carroll have had to shuffle staff to cover the operation of diagnostic equipment at odd hours. Anyone who has ever had to schedule around machinery’s possible use knows that doing it effectively requires part art and part science. “Hospitals are feeling their way through this,” Markowitz said. “Many of the level I centers, and some of the level II centers, are keeping CT techs around the clock, 24 hours a day. With the advancing utilization of CT, most hospitals are staying pretty busy all night long, servicing not only the emergency population, but also their in-house population.”

Hartford, he said, has taken to closing down the upstairs main department at night and relocating inpatient and outpatient care to the ED. “We make the emergency department the center of all of our diagnostic imaging for the rest of the night, so we shuffle staff geographically,” Markowitz said. Carroll Hospital staffs “all modalities,” except for nuclear medicine, 24 hours per day, 7 days per week, according to D’Arrigo.

### Facing Challenges

While the movement of imaging equipment into hospital EDs has had some very positive effects, the trend has also created some challenges, specifically in overutilization.

“The first year that we had a CT scanner based in the emergency department, the number of CT scans that were performed rose by over 30%,” Hartford’s Rosshirt said.

“Now that’s partly because of the immediate availability, but it’s also because the indications for the use of CT scans increased as well. So we’re using CT scans for the evaluation of certain disease processes that we used to use other modalities for.”

Markowitz acknowledges that overutilization needs to be balanced with the potential for saving lives. “A lot of the high-end imaging equipment comes with quicker scanning times and better images, but it also comes with a higher radiation dose,” he said. “There are technological advances that are decreasing radiation dosage on a lot of the higher-end, high-splice scanners, so we have to balance that



[exposure] with the fact that it does save lives and helps provide better medical care.”

Overall, D’Arrigo thinks the movement of imaging equipment into the ED has been positive, especially for smaller EDs contending with longer patient wait times due to higher usage, fewer resources, and less staff. “In any emergency department across the nation, turnaround time and wait time is a big issue,” she said. “More people are utilizing emergency departments because they either don’t have insurance, don’t have a primary care doctor, or can’t afford to pay their deductible.”

### The Future Outlook

As hospitals are remodeled or newly constructed, Markowitz sees the relocation of radiology departments closer to EDs as a continuing trend. “We’re going to see radiology departments having one foot in the emergency department and maybe the rest of the main department actually situated adjacent to it, because there’s so much volume for radiology that comes through the emergency setting,” he said.

No matter how they configure it, Thomas foresees hospitals, large or small, urban or rural, as having a radiology outpost next to, or within, the ED. “There’s no way you can function in the emergency department today without it,” he said.

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