

How One Healthcare System Is Improving Emergency CT with Multipatient Contrast Injectors

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As a Level I trauma center, Parkland Health and Hospital System in Dallas, Texas, holds the distinction of hosting the busiest emergency department in the nation. According to Becker's Hospital Review, Parkland handled 235,893 ED visits in 2024, 20,000 more than the second-most visited ER at Florida's Lakeland Regional Medical Center.¹

Not surprisingly, that case volume filters through to Parkland's radiology department. Besides X-rays and other imaging exams, the team performs thousands of emergency CT scans each month, mostly for head and abdominal injuries, says Shawn Grady, the system's director of radiology operations.

"We get a ton of volume through our emergency department," says Grady, acknowledging that managing that volume while maintaining diagnostic accuracy, patient safety, and cost efficiency is an ongoing challenge.

"We're always looking for ways to improve efficiencies because of that workload," he says. One of the ways he and his team are doing that is by using multipatient CT injectors (MPIs).

Identifying the Challenge

Like many CT departments across the country, Parkland's for many years relied on traditional single-use syringe systems. Each exam required the technologist to

load a new syringe of contrast material for each patient, slowing down workflows and generating substantial waste in materials and money. The approach, Grady explained, "would take five to seven minutes per patient."

With 6,000 emergency CT scans monthly, even small delays resulting from single-use syringe systems create backlogs during peak times, notes James Collins, Parkland's manager of CT. The process also yields considerable contrast waste, as technologists are forced to load 100 mL syringes but use only about 80 mL of contrast. "With every 100 mL syringe, about 20 percent—20 cc—was being thrown away," Collins says.

With patient volume climbing, staff were stretched thin, and the inefficiencies extended beyond lost time and contrast waste.

Finding the Solution

Recognizing the need to streamline CT operations to meet demand, Grady says, his team about a year ago began seeking ways to improve workflow efficiency, reduce contrast and other consumables waste, and enhance patient care—all without compromising safety or image quality.

At first, he says, the team sought smaller, incremental changes. This consisted mainly of purchasing 500 mL contrast

bottles instead of 100 mL units to reduce the number of swaps per shift.

"That was one of the first steps we took to create a more efficient and less wasteful environment," Grady recalls. David Mays, RT (R) (CT), lead advanced CT applications technologist, says that change was "always something that we pushed for as technologists, to just have more contrast available so that we don't have to stop and open extra bottles of contrast."

Despite the gains from this process shift, the team realized that ultimately, they would need a more comprehensive, automated solution to continue to meet demand. The department began exploring MPIs as "a way to improve efficiencies in our ED," Collins says. "The cost savings, of course, is significant—about a 25 percent reduction per patient."

Implementation: Transitioning to a New Workflow

Parkland began vetting several MPI systems, beginning with the most important criterion in their decision tree, "making sure [it] was safe for patients," says Mays.

The second factor they evaluated was reliability. Due to the volume of patients that Parkland sees, "it's really important that these [injectors] ... not go down," Grady says.

In April 2025, Parkland acquired two, piston-based, multipatient CT contrast

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injectors, one for each CT scanner in the hospital's ED. The injectors feature three cylinders in a day set — one for saline and two for contrast. The team made the decision to move directly to the new units rather than running them in parallel with the old, single-patient injectors. While the change was nerve-racking at first, “they’ve been pretty reliable for us,” Grady acknowledges.

Product representatives were on-site for a couple of days to provide essential training and facilitate the transition. For CT technologist Brandi McCullough, RT (CT), there “wasn’t a huge learning curve, but it was different than what we were used to in everyday practice,” she said, noting that adapting to the new workflow was seamless for most technologists. “It just depended on the person.”

Enjoying the Results

Six months after installation, the improvements were evident. According to Collins, the average setup time per patient fell from five to seven minutes, to just one to two minutes, significantly accelerating patient throughput.

“With the multipatient injector, turn-around time is faster,” McCullough adds. “We’re able to get more scans done because instead of waiting for the injectors

to load, put your syringes on them, and set everything up, you just get the patient off the table, plug in the connector, and you’re ready for the next one.”

In addition to faster workflow, the department has achieved measurable cost savings. “A single syringe is probably \$14 per patient, and with the [multipatient] system, it’s about \$10 per patient,” Collins says.

Contrast waste, meanwhile, has been virtually eliminated. “With this system, we use every last drop,” Collins says. “If we use 80 mL for one patient, the remaining 20 mL can still be used for the next one.”

The system also improves data tracking. “It’s more robust with the data analytics piece,” Grady says. “We can pull reports from the injector and monitor use patterns.”

Technologists have also noticed significant differences that make their daily workload easier to handle. “It’s taken away a lot of repetitive tasks,” McCullough says. “When you’re in the ER and you don’t have to load those syringes for every patient, it makes the transition between patients so much better.”

In addition, from a sustainability standpoint, less contrast waste and fewer consumables mean lower environmental impact—a benefit that aligns with Parkland’s broader operational goals.

“We’re wasting less plastic; we’re wasting less contrast. It’s opened up storage space for us. So, there’s multiple advantages there,” says Collins.

Looking Ahead

Grady and his team believe their implementation of multipatient injectors demonstrates how operational innovation can directly enhance patient care in high-demand environments. By moving from single injectors to MPIs, the hospital has improved workflow efficiency, reduced costs and waste, and supported its frontline technologists—all while maintaining a focus on reliability and patient safety.

In fact, following the success of the MPIs in the emergency department, Grady says he plans to expand their use to Parkland’s outpatient imaging center and inpatient CT suites.

“We started in the ED just due to the sheer volume and efficiencies we were trying to gain there. Now we’re trying to expand to all the other scanners as well.”

Reference

1) <https://www.beckershospitalreview.com/rankings-and-ratings/hospitals-with-the-most-ed-visits-in-2024/>