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Prefilled Syringes: Optimize Workflow,  
Increase Productivity and Staff Satisfaction  
While Ensuring Patient Safety



# A Growing Number of CT Departments Are Making the Switch to Prefilled Syringes to Optimize Patient Care

Claudette Lew

“...I remember thinking, ‘Why isn’t the contrast already in the syringe?’ And that was how I felt 20 years ago.”

*Don Owens,  
Director of Imaging,  
TriHealth, Cincinnati,  
Ohio*

There are a variety of ways to improve workflow in radiology departments, from bringing in newer and more powerful imaging equipment with better functionality, to utilizing more sophisticated post-processing with intuitive operating systems and computer-aided diagnostic tools. While undeniably beneficial for improving clinical outcomes, these changes often require significant capital expenditures and additional staff training. Sometimes, however, the key to optimizing a process is making one small, yet fundamental change that can ripple throughout the care chain, from provider to patient.

A growing number of radiology departments are doing just that by switching to Ultraject™ prefilled contrast syringes for their computed tomography (CT) procedures.

Indeed, by making this small but pivotal change to their workflows, these departments are giving their radiologic technologists more time to potentially focus on delivering high-quality imaging, on adhering to patient safety protocols and on delivering a positive patient experience.

In a professional environment where technologist burnout is a reality, healthcare providers from a cross-section of facilities in the U.S. recently weighed in on how switching to prefilled syringes is helping them to achieve productivity gains, optimize patient care, reduce stress and lead to happier, more engaged technologists.

## Human Factors

The user-centric design of prefilled contrast syringes, by definition, promises a compelling user experience because it automates a portion of the technologist’s workflow in a way that is intuitive, easy to use, and desirable by the technicians. Using prefilled syringes in combination with compatible injectors offers technologists a closed, sterile system that’s designed to work together and streamline workflow.

“I’ve been a CT tech for almost 20 years, and have worked extensively with different power injectors and syringes. To me, it was always very cumbersome and I remember thinking, ‘Why isn’t the contrast already in the syringe?’ And that was how I felt 20 years ago,” remarked Don Owens, Director of Imaging at TriHealth in Cincinnati, Ohio.

*Ms. Lew is a freelance medical writer.*



*Integrated with OptiVantage and OptiStar injectors, prefilled contrast syringes have been designed to streamline the technologist's workflow.*

As Imaging Director, Owens saw the introduction of prefilled contrast syringes as an opportunity to make what he described as an important change to radiology at TriHealth. Prior to making the switch, he surveyed his staff of technologists.

"We had about 40 techs, and we surveyed them about the injectors we were using at the time. We asked them if they thought the loading of the injectors is safe. Is it efficient? Is it user-friendly? Using an answer scale of strongly agree, agree, undecided, disagree and strongly disagree, we saw a lot of disagrees and undecideds," Owens reported.

After TriHealth switched to prefilled contrast syringes, the same poll was taken.

"After we converted, the responses changed to mostly strongly agrees, with just a couple of agrees. It was a huge tech satisfier," Owens said. "It completely eliminated this multi-step process where you have to get all these different supplies, and it decreased the time you spent doing that. Not that it makes the test go any faster, but it gives the technologist more meaningful time with the patient where they're not fiddling around

**"By switching to prefilled, we achieved productivity gains ... by eliminating the steps ... needed to fill 25,000 syringes per year, which is about 800 FTE hours—on the conservative side."**

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with taking the lid off a bottle and putting a straw in. It just looks like a ridiculous process, I'm sure to the patients, as well. After we switched, not a single tech said, 'wait, I want to go back to the old way.'"

## Time is Money

Owens not only surveyed the technologist staff before and after the switch to prefilled syringes, he also observed and recorded the time they spent on contrast administration in both environments. Pre-conversion, median preparation time was about 90 seconds, but ranged from 60 seconds to 3 minutes, depending on the technologist.

"After we went to the prefilled [syringes], it was 30 seconds. The workflow discrepancy was completely eliminated and everyone's workflow was the same," reported Owens.

The radiology leadership team at Hackensack Meridian *Health* Hackensack University Medical Center also commented on the productivity gains they achieved by switching to prefilled contrast syringes. As a high-volume facility serving residents of New Jersey and the New York Metropolitan area, Hackensack University Medical Center provides roughly 75,000 CT scans per year, about a third of which require IV contrast, according to Mike Horton, Administrative Director of Clinical Services at Hackensack University Medical Center. They similarly concluded a technologist would normally take up to 3 minutes to manually fill a syringe.

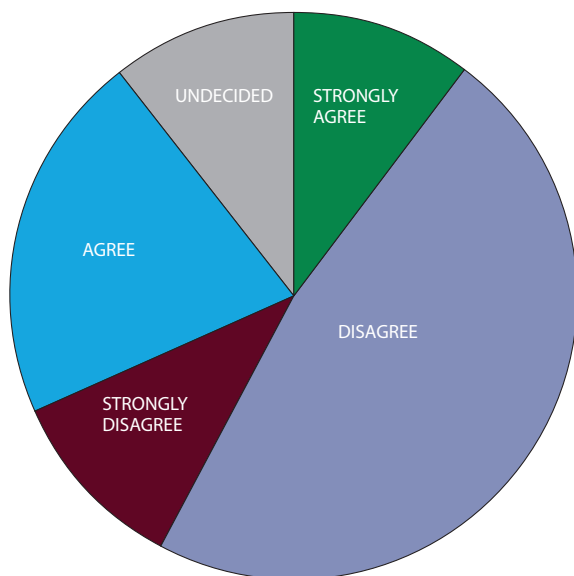
"For us, the move to prefilled [contrast syringes] was based upon productivity," Horton said. "Prior to the switch, we had a full-time CT technologist spending an hour or two each night just filling syringes



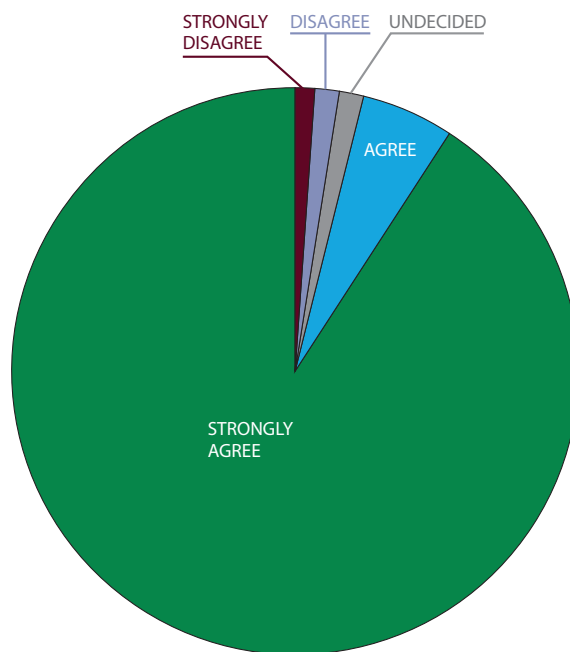
## Technologist Satisfaction Surveys

Technologists were asked their degree of agreement with the following statement:

**The current loading of the injector is an efficient practice.**



PRIOR TO CONVERSION TO PREFILLED SYRINGES



AFTER CONVERSION TO PREFILLED SYRINGES

Survey courtesy of TriHealth, Cincinnati, Ohio.

**"...we ended up saving about \$130,000 the first year by reducing what we were using..."**

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Administrative Director,  
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for the day shift. By switching to prefilled, we achieved productivity gains in terms of staffing by eliminating the steps that were needed to fill 25,000 syringes per year, which is about 800 FTE hours—on the conservative side."

Despite the savings in FTE hours, Horton pointed out the convenience of using prefilled syringes costs a little more than the sum total of inventory needed to fill them manually, but taking into account the cost of labor, the costs balance each other.

"You're saving money on the FTE productivity side to the tune of roughly \$25,000, or in our case, about \$1 or \$2 per injection. The cost of the product increases, but you're saving the equivalent amount of money in terms of productivity, so you could say that it's almost cost neutral," he concluded.

The operation at TriHealth consists of 23 imaging facilities that house 19 CT scanners and 17 MRI scanners. Prior to the switch, Owens said, managing the complex inventory of about 30 different supplies required to manually fill the syringes was no longer worth the cost savings.

"Our previous injectors each used different syringes, so when we ran out of syringes for an injector, we couldn't just use our other inventory of syringes. We needed much more space to store things and the sheer number of products and inventory was difficult to manage. If something didn't get ordered, it would cause a lot of grief. After we switched to LF injectors and prefilled syringes, we are seeing syringe compatibility with all the injectors and it's very easy for just-in-time ordering."

Guerbet's Ultraject prefilled syringes were specifically designed with compatibility parameters built in, and can be used with all Liebel-Flarsheim injectors in CT and MR.

## RFID: Working Smarter

Optimizing hospital inventory management isn't as simple as finding the lowest prices for supplies. While supply costs remain a primary target to slow the climb in healthcare expenditures, real improvements require a dedicated effort to determine the best ways to take full advantage of technological advances in inventory management that will improve efficiencies and generate savings for the long term.

Radiofrequency identification, or RFID, is an automatic identification method that works by storing and remotely retrieving data using devices called RFID tags or transponders. The use of RFID technology is on the rise in inventory management, often being adopted as a replacement for barcode technologies. Known for simplifying inventory processes and reducing inventory inaccuracies, RFID systems have recently been introduced to contrast delivery systems in the radiology department.

Fully integrated into the Optivan-tage DH contrast delivery system and in the prefilled syringe, the RFID technology creates an intelligent interface that captures, stores and transmits data between the injector

and the syringe using RFID tags, or transponders.

This novel use of RFID technology creates a system designed to enhance patient safety by helping to reduce the risk of medical errors in the radiology department.

### A fail-safe system

"Once you've loaded your syringes, it's kind of like a fail-proof system because it won't let you inject your saline first," explained Erica Gates, CT Division Manager at Cincinnati Children's Hospital. "For instance, if you programmed it to inject the contrast first, it just reiterates and will not deviate from your protocol. If you somehow loaded your saline in your contrast side without the RFID system, it will just inject your saline, not knowing that it wasn't the contrast. With RFID, it ensures that it's the contrast that's going in first. It gives you a sense of security."

In addition to the failsafe, RFID technology will also alert the user if the syringe has passed its expiration date, or if a used syringe is left in the powerhead and an attempt is made to use it in another procedure. In those cases, the injector will not enable.



The RFID system compares the syringe label information with the exam protocol that was programmed into the injector to verify the prescribed drug and dose. If there is any inconsistency in volume, the user will receive a warning message.

### Automatic exam results

One of the most important benefits of RFID's application to radiology is that the RFID system automatically transfers the prefilled syringe drug label information and the achieved exam protocol onto a printed exam results label that can be attached directly to the patient record and also updates the inventory management system. The adoption of RFID into radiology is a revolutionary step toward fully integrated radiology technology.

Owens also explained that with prefilled contrast syringes, TriHealth has been able to revamp its protocols and has actually reduced the amount of contrast they're using. They've standardized contrast administration across all locations and have eliminated unused contrast waste.

"All said and done, we ended up saving about \$130,000 the first year by reducing what we were using, compared with not using the prefilled method," he said.

### More Valuable than Money

In addition to cost savings, users pointed out that prefilled contrast syringes bring intangible benefits. For example, the increased workflow speeds achieved by using prefilled syringes can save valuable time in critical situations.

"Hackensack University Medical Center is a trauma center and a primary care stroke center," explained Gavin Minore, CT Section Head at Hackensack University Medical Center. "You might get a

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*A more efficient workflow can offer technologists more time to engage with patients.*

patient in straight off the ambulance, and the trauma team may decide to scan the patient with IV contrast. In our trauma center, you just take the syringe, drop it right into the injector and keep going. Those seconds and minutes matter to our staff who might have to rush a patient up to the OR or for CTA, and we really value having prefilled contrast syringes in these types of situations.”

At Cincinnati Children’s Hospital, the decision to go with prefilled contrast syringes was intended to improve technologists’ workflow and give them more time to focus on scanner preparation, protocol preparation, and most importantly, spending more time with patients and their families.

“As a pediatric facility, the time savings we gain by using prefilled syringes offers our technologists more time to spend with families,” explained Erica Gates, CT Division Manager at the hospital.

### **The Importance of Safety and Sterility**

Another major benefit of prefilled contrast syringes is reduced risk of contamination. Whether a facility completes 100 CT scans per day, or just ten, dedicated pediatric scans, all radiology technologists are equally concerned about patient safety and the sterility of the imaging environment.

“When you’re just opening the box and putting it in the injector, you don’t have to be concerned about sterility,” explained Louis Longabardo, Special Imaging Manager at Hackensack University Medical Center. “There might have been some sterility issues before, when someone was prefilling at night. The more you handle the syringe, the more incidences you could have surrounding infection control. For whatever reason the sterility of the syringe could be compromised. These are the types of things you would worry about.”

"But certainly, with the prefilled," added Horton, "they're already labeled, which helps with the compliance with anything that's a manual process on the part of the staff. It's tough to ever have 100 percent compliance. You can get 99.9 percent, but that leaves open a vulnerability when it comes to The Joint Commission. So when it's prefilled and automatically labeled, it gives you a better compliance rate."

Prefilled syringes also eliminate the possibility of accidental spills that comes with manually filling syringes.

"There's a lot of opportunity for risk there," explained Owens. "Using prefilled syringes, there's no risk. It's already in the container, and if you drop it, the plastic container doesn't typically shatter. I can't tell you how many of the old glass bottles slipped out of my hands before we switched. The glass shatters and there's contrast everywhere. Or you pop the lid off, take a plastic straw and put in in the contrast, hook it on the injector and you pull the contrast up. Anything could happen there."

"Using prefilled syringes takes away all the risk that comes with using a multi-dose vial. The idea of using a multi-dose vial is not attractive in the eyes of our Infection Prevention, Joint Commission, and Department of Health teams. All sorts of red flags are going off for them. Though there isn't a formal Joint Commission statement about it, we are always commended by them about using prefilled contrast syringes because there's less chance of errors."

Gates agreed, saying, "a big benefit is the syringes are labeled right out of the box. Typically, when you draw up contrast and you draw up saline, by the looks of what's in the syringes, it looks the same. So it's good security. And despite a slightly higher cost, you can't really put a price on safety."

**"Staff satisfaction is a big benefit."**

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Administrative Director,  
Clinical Services,  
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## Improving Staff Satisfaction to Enable a Better Patient Experience

Linking prefilled syringes to greater staff engagement and improved patient satisfaction can be a tough sell, but all of the users here agreed that using prefilled syringes gives technologists more time--more time to focus on acquiring high-quality images, more time to spend one-on-one engaging with patients and their families, and maybe even more time just to breathe easier because a once-manual task has become automated.

"Staff satisfaction is a big benefit," explained Horton. "Anything that can get our techs more time in front of the patients and more things that can be done automatically is very valuable to them. We're doing much more complicated exams now, and they can spend more time doing post-processing rather than loading syringes. Anything that can give them more time is appreciated."

"Clearly," Owens said. "We did a survey. They felt it's a safer practice. They felt it made their work more efficient. They felt it was easier to use. All of those things make your job easier, and so why wouldn't they be happier?"





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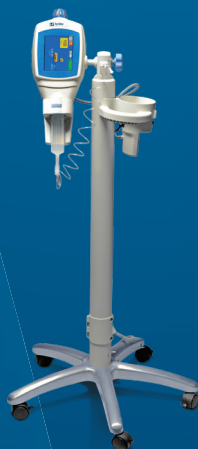
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