

# Amid global shortage, study shows how to cut contrast dye use by 83%

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As a worldwide shortage of contrast dye for medical imaging continues, a new UC San Francisco research letter in *JAMA* quantified strategies medical facilities can employ to safely reduce dye use in computed

tomography (CT) by up to 83%. CT is the most common use for the dye.

The three [conservation strategies](#) are weight-based (rather than fixed) dosing, reducing contrast dose while reducing tube voltage on scanners, and replacing contrast-enhanced CT with nonenhanced CT when it will minimally affect diagnostic accuracy.

That third strategy—forgoing the dye in some cases of CT when it would result in only small impact on diagnostic accuracy—yielded the most dramatic reduction of dye use: 78%.

"Contrast is essential in any situation where we need to assess the [blood vessels](#)—for example, for some [trauma patients](#) or those with a suspected acute gastrointestinal bleed—and it is also needed for evaluation of certain cancers, such as in the liver or pancreas," said senior study author Rebecca Smith-Bindman, MD, UCSF professor in the Department of Epidemiology and Biostatistics.

"However, most CT scans are done for less specific indications such as [abdominal pain](#) in a patient with suspected appendicitis," Smith-Bindman added. "These can and should be done without contrast during the shortage, because the loss of information in these patients will be acceptable for most patients."

The global shortage of [contrast dye](#), which began in April with a COVID-related supply chain disruption of GE Healthcare in Shanghai, is expected to last at least several more weeks. More than 54 million diagnostic imaging exams that use contrast are conducted in the U.S. each year—a majority of them CT—and these conservation methods could continue past the current shortage to reduce the use of contrast dye in general, the authors noted.

## Referring clinicians are key to conservation

Researchers modeled the three strategies individually and in combination using a sample of 1.04 million CT exams in the UCSF International CT Dose Registry from January 2015 to March 2021. The registry includes CT scan data from 161 imaging facilities associated with 27 health care organizations.

On its own, weight-based dosing for abdomen, chest, cardiac, spine and extremity imaging reduced dye use by 10%; reducing the tube voltage in appropriate patients allowed a dye reduction of 25%. These two measures combined with using non-dye CT when possible led to a total reduction of 83%.

Some facilities may not be able to execute all three strategies at once, but each can help conserve supply, Smith-Bindman said. And it is not just radiologists who need to know about them.

"Given the acute shortage, it's important that clinicians who order imaging exams coordinate with radiology to cancel scans that aren't absolutely necessary, postpone exams that can be safely delayed, replace CT with MRI and ultrasound where possible, and order an unenhanced scan where possible. Further, clinicians should communicate with their patients about why this is necessary. It is crucial that contrast be conserved for clinical situations where its use is essential for accurate diagnosis," said Smith-Bindman.

When the contrast shortage subsides, [medical facilities](#) should consider continuing some of these practices that conserve contrast dye, she added. For example, reducing the tube voltage not only allows reducing the contrast volume that must be used, but also results in significantly lower radiation doses to patients. Tailoring doses to each patient's weight allows lower dosing volumes for many patients.

In addition, Smith-Bindman noted that this analysis highlights the large amount of contrast that is wasted when single-dose vials are used to deliver contrast. Hospitals and imaging centers that routinely use single-dose dye vials should consider using larger multi-dose vials, which allows for exact dosing and obviates the need to discard unused portions, she said.

"By carrying some of these practices forward, we can mitigate future supply-chain risk and reduce overall waste," said Smith-Bindman.

**More information:** Matthew S. Davenport et al, Comparison of Strategies to Conserve Iodinated Intravascular Contrast Media for Computed Tomography During a Shortage, *JAMA* (2022). [DOI: 10.1001/jama.2022.9879](https://doi.org/10.1001/jama.2022.9879)

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