



## UNIVERSITY OF VIRGINIA (UVA) HEALTH REDUCES LOW-DOSE LUNG SCREENING PATIENT DOSE BY 50% WITH NO DEGRADATION IN IMAGE QUALITY

UVA Health has been able to lower the average patient dose exposure in their low-dose lung screening program by 50% and routinely scan patients at 1.2mSv.

### BACKGROUND AND CHALLENGES

UVA Health is a nationally recognized cancer center and academic health system with facilities located across central Virginia. They operate one of the largest lung cancer programs in the region. After its launch in 2015, they now perform an average of 1,100 screening CTs annually.

Low-dose CT for lung screening is currently the only recommended procedure for lung screening by the CDC. Low-dose CTs can reduce radiation exposure by 50% or more compared to standard CT exams. However, there is a direct and proportionate correlation between CT image quality and radiation dose exposure. Lower-dose lung CT screening exams produce higher 'noise' images than normal CT dose exams. The lower the dose, the higher the noise—which leads to lower quality images. High noise/low quality images can have a number of negative repercussions, such as decreasing the conspicuity of small nodules that may represent early-stage cancer. Such a situation would negate some of the benefits of lung cancer screening with CT, where the goal is to identify cancer in the very early stages when it can be treated.

Even when following medical guidelines for low-dose CT lung screening, the cumulative effects of repeated x-ray exposure may cause irreversible damage. Therefore, low-dose lung screening programs must use a low enough dose so that patients who receive repeat CT screening exams are not exposed to an increased risk of ill effects from the screening exam itself. UVA's low-dose CT lung screening program started at the standard guidance levels of 2.5mSv. However, finding ways to further reduce dose and thereby increase patient safety was top of mind at UVA.

## REDUCING DOSE WHILE IMPROVING IMAGE QUALITY

In 2018, UVA Health deployed PixelShine® by AlgoMedica across six hospital based and outpatient facilities where low-dose CT lung screening procedures are performed. This includes eight CT scanners of varying ages, manufactured by GE and Siemens. Over time, UVA has been able to lower the average patient radiation dose exposure by 50% and routinely scan patients at only 1.2mSv. This 1.2mSv dose level achieved the best balance between very low radiation dose and clinically optimized image quality for the UVA low-dose lung screening patient population.

Today, the majority of low-dose lung screening CT exams at UVA Health are being processed by PixelShine. Radiologists have confirmed that image quality has improved significantly, image noise and scatter artifacts have been reduced for all patients, and nodules are more conspicuous. Of particular benefit was the noted improvement in image quality without the need for increased dose in obese patients, which represents a common demographic among older lung screening patients.

“We’ve been using the PixelShine process consistently since we installed it, and the general consensus of the chest section is that it performs very well in removing a lot of noise that’s otherwise inherent to the low-dose technique,” stated Dr. Michael B. Sneider, Section Head of Thoracic Imaging at UVA. “I personally prefer to read the PixelShine images over the original images; I’ve compared the original images to those run through PixelShine and am confident that PixelShine images do not mask any important clinical information that would otherwise need to be called.”

## SEAMLESS IMPLEMENTATION

Because PixelShine is a vendor-agnostic solution that works with any CT scanner, it was universally applied to all UVA’s five distinct models of CT scanners from GE and Siemens. Furthermore, because PixelShine is easy to implement and works automatically, CT technologist workflow was not disrupted or made more complicated.

## PATIENTS WANT TO KNOW

Like many low-dose lung screening programs, UVA Health actively reports their dose levels to a national dose registry for benchmarking and comparison of their performance to other lung screening programs around the country. Aimee Strong, DNP, AGACNP-BC Nurse Practitioner, Lung Cancer Screening Program, points out: “Because I care about the dose my patients receive, I discuss this topic with all my patients. I’ve noticed that patients are becoming increasingly aware and sensitive to dose exposure and the negative effects of radiation. They often bring it up themselves as a concern.”

The lung screening team is also working with the UVA Health marketing team to help get the word out to their local communities—as part of their effort to educate eligible candidates, as well as referring physicians. This is particularly important now that eligibility requirements for low-dose lung screening have been expanded.

UVA Health has made great strides in reducing radiation dose exposure to the lowest possible amount—well below that of traditional low-dose exams—therefore increasing patient safety and confidence in UVA’s luminary lung screening program. With PixelShine, they were able to reduce patient dose to less than 50% of their original lung screening protocol dose.