

*Nodule Clinic takes lung cancer diagnosis into the airways' distant reaches*

## GOING DEEP TO FIGHT LUNG CANCER

*by Todd Neff*

*New techniques can increase the probability of getting an accurate lung cancer diagnosis from 15 percent to 75 percent or greater.*



*Linderman explores new, minimally invasive techniques for hard-to-reach lung nodules.*

A team of University of Colorado Hospital specialists is harnessing new technologies to take the battle against lung cancer deeper into the airways than ever before.

Their “Nodule Clinic,” which opened its doors last May, combines new bronchoscopic techniques – that is, tools to look into lung passages in minimally invasive ways – with groundbreaking work by a team of lung cancer experts

intent on getting earlier diagnoses of the most lethal form of cancer.

The new clinic makes use of two new medical systems. The first is endobronchial ultrasound to evaluate large lymph nodes for cancer. The second uses a novel system that extends the reach of traditional bronchoscopes to the roughly two-thirds of the lungs whose passageways are otherwise too narrow to navigate.

The latter is the \$180,000 inReach system, made by Israel-based superDimension Ltd. It uses the 1.4-millimeter-wide working channel of a bronchoscope to snake a second probe into the far corners of the lungs. Sophisticated guidance hardware and software combine data from computerized tomography (CT) scans and real-time positioning information to provide physicians a three-dimensional view of the probe’s position relative to suspicious-looking tissue.

Once the unit reaches its destination, the physician removes the thinner probe’s internal guide wire and threads a second wire, this one with tiny jaws that take a bite out of the nodule tissue for later analysis.

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**Early diagnosis the goal.** The aim, say Stephen Malkoski, MD, PhD, and Derek Linderman, MD, both of UC Denver's Division of Pulmonary Sciences and Critical Care Medicine, is earlier diagnosis of lung cancer.



*Malkoski (left) and Linderman were the driving forces behind the creation of the new Nodule Clinic.*

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Pulmonary nodules, also called lung spots or lesions, are by definition three centimeters or less in diameter, or a bit more than an inch across. Such lesions, Malkoski says, are present in perhaps 10 percent to 15 percent of patients who come in for CT scan lung cancer screenings. But malignancy can vary widely, and is much dependent on nodule size. A lesion 0.4 millimeters in diameter has less than a half-percent probability of being cancerous, Linderman says. By comparison, a nodule a centimeter across has a 10 percent chance of being cancerous. The odds get worse from there.

Linderman, who administers both superDimension and endoscopic ultrasound techniques, says the new approaches enable faster, safer and more accurate diagnoses. Prior to the emergence of the superDimension, which UCH bought in mid-2009, lung lesions spotted

on CT scans had to be accessed with a needle poking through the chest into the lung (which risked collapsed lungs and other complications), surgery, or a watch-and-wait approach that required multiple CT scans over time to see whether the nodules were growing.

Diagnostic accuracy, moreover, was dismal, with only 15 percent to 30 percent of diagnoses actually confirming whether a tumor was benign or malignant. With superDimension in the house, that certainty rises to 75 percent or higher, Linderman says.

“When we tell patients it increases the likelihood of getting a diagnosis several-fold, they’re relieved,” Linderman says.

**One-stop shop.** The clinic takes a collaborative approach to care. Linderman, who joined the UC-Denver faculty in July 2007 after completing a UCD fellowship, was interested in newer diagnostic techniques. Malkoski's arrival from Oregon Health & Science University in August 2008 set the wheels in motion for a new clinic.

The team, which now sees three to five patients a week, also includes UCD Thoracic Surgery Department chairman John Mitchell, MD, a lung cancer specialist; Robert Winn, MD, of Pulmonary Sciences and Critical Care; and Pulmonary and Critical Care Fellow Howard Li.

While other major Denver-area hospitals also have the superDimension machine, the Nodule Clinic team aims to establish trials to help advance the diagnostic speed and accuracy of the new technology, Malkoski says. To that end, they've begun

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collecting tissue, blood and urine samples of patients who have nodule samples taken.

“Ideally, in the future we’ll be able to say that people with a nodule and this marker in their blood have cancer, and proceed accordingly,” Malkoski says.

Another benefit of the clinic has been to provide a logical home for a class of cases other-

wise hard to categorize, Linderman says.

“Prior to the formation of this clinic, a lot of primary care providers would get a CT scan, have a nodule show up and wonder, ‘Do I send this to a pulmonologist? A surgeon?’” Linderman said. “This is sort of a one-stop shop, a single entry point to the system.”