

# Yale CANCER CENTER answers

WNPR Connecticut Public Radio



## *Hosts*

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of Therapeutic Radiology

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Professor of Medical Oncology

## Thoracic Interventional Program

### Guest Expert:

**Jonathan Puchalski, MD**

Assistant Professor of Pulmonary Medicine  
and Director of the Thoracic Interventional  
Program at Yale.

**Yale Cancer Center Answers**

is a weekly broadcast on

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Sunday Evenings at 6:00 PM

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Welcome to Yale Cancer Center Answers with doctors Francine Foss and Lynn Wilson. Dr. Foss is a Professor of Medical Oncology and Dermatology, specializing in the treatment of lymphomas. Dr. Wilson is a Professor of Therapeutic Radiology and an expert in the use of radiation to treat lung cancers and cutaneous lymphomas. If you would like to join the conversation, you can contact the doctors directly. The address is [canceranswers@yale.edu](mailto:canceranswers@yale.edu) and the phone number is 1888-234-4YCC. This week, Dr. Foss welcomes Dr. Jonathan Puchalski. Dr. Puchalski is an Assistant Professor of Pulmonary Medicine and Director of the Thoracic Interventional Program (TIP) at Yale. Here is Francine Foss.

Foss Can you start off by telling us a little bit about what TIP is?

Puchalski It is a joint effort between pulmonology and thoracic surgery to provide minimally invasive mechanisms of dealing with diseases in the chest. I am an interventional pulmonologist by training, which is a fairly new subspecialty in pulmonary and critical care, and in joining Yale and the Thoracic Oncology Program at Yale, we have sought ways to enrich the diagnosis and treatment of various conditions in the chest.

Foss Can you tell us what an interventional pulmonologist does?

Puchalski I do a lot with several different types of procedures either within the lungs or in the area surrounding the lungs. Those procedures mainly involve bronchoscopy, which is similar to a colonoscopy which more people are familiar with. Bronchoscopy is taking an instrument with a camera into the lungs, taking a look around and being able to biopsy different areas, or perhaps in the cases of cancers that cause obstruction or difficulty breathing, we may be able to relieve that obstruction with some of the different tools we have. I also spend a lot of time with something called the pleura, or the lining around the lungs that can be affected by cancer or other conditions where fluid may build up and cause effusions that ultimately relate to the patient feeling short of breath.

Foss Is this whole area of interventional pulmonology a new area?

Puchalski It is within the past decade. Most people probably started thinking about it 10 years ago, but it has really grown within the past five years to become an outright subspecialty in and of itself, and that has been the result of new technologies which have revolutionized the whole field of pulmonary medicine.

Foss Can you tell us a little bit about what those technologies are?

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Puchalski    Ultrasound is one of the biggest advances in terms of diagnostic strategies, so when people have abnormal spots in their lungs or when they have enlarged lymph nodes in the center of their chest, even if they are diagnosed with a lung cancer, the advent of ultrasound has enabled us to accurately and in a minimally invasive way diagnose what may be going on either with those lymph nodes or those nodules. There is something called endobronchial ultrasound, or EBUS, which has really grown and in fact, has replaced in many ways our older ways of findings out what these things are. Through the bronchoscope, we can advance a small ultrasound and look for nodules or masses and then on the bronchoscopy itself there is an ultrasound that we can use to biopsy the lymph nodes in the center of the chest, as I mentioned, and so that has changed how things are done. In the past, more invasive modalities like mediastinoscopy or surgeries in the lungs were necessary to find out what was going on within the lung itself, but now many times as a first step these ultrasound guided bronchoscopic techniques are feasible. They are done as an outpatient with contrast sedation, often times avoiding the operating room and it has really helped patients have these tests with minimal complications with a high degree of accuracy, and that is just one area. There are navigational tools through the bronchoscope, something called electromagnetic navigation, which is very similar to the GPS we use in our cars. We can use computers to help us locate nodules in the lungs and with those computers and with these programs, this electromagnetic navigation, or EMN, we are actually able to advance the bronchoscope and biopsy tools out into the lungs themselves to find nodules which may be in very difficult places and otherwise very difficult to diagnose accurately. Through this EMN we are able to do this as an outpatient procedure in a minimally invasive way to diagnose problems that are found on x-rays or CAT scans.

Foss    How does a patient know if he or she is a candidate for this approach, as opposed to say a standard bronchoscopy or biopsy?

Puchalski    That is like a great question. A lot of that will be driven by their physician, but all of the many, many studies done recently have shown that these techniques enhance our diagnostic abilities, so whereas in the past a traditional bronchoscopy was used, its diagnostic accuracy varied between 25%, 50% and at the most in the 60% range. These days with endobronchial ultrasound or EMN, diagnostic yield is much much higher, and I think for nodules and for smaller size masses the use of endobronchial ultrasound and electromagnetic navigation should be almost routine when bronchoscopy is considered. When we are talking about lymph nodes in the center of the chest and staging of potential lung cancer or looking at other diagnoses which may or may not be cancers at all, the use of endobronchial ultrasound has replaced what we'll call conventional ways of biopsying this, it is called transbronchial needle aspiration, or TBNA. But conventional TBNA, because we could not see the lymph nodes, was not really feasible for what we are doing these

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days. We have been able to look with the ultrasound, see what we are biopsying, and EBUS has more or less completely replaced the conventional TBNA that was so popular only five years ago.

Foss Are there increased risks to these procedures compared to the traditional procedures?

Puchalski No, actually the risks are less. If a person has a lung cancer, for example, and there is a nodule or a mass in the lung, but there is also evidence of enlarged lymph nodes in the center of the chest, we can do EBUS of these lymph nodes, obtain a diagnosis and often times not even have to biopsy the mass itself, we are able to get the diagnosis and stage all through this type of mechanism and the complication rate of EBUS is actually so rare, in medicine we call it a case report, so the rate is actually 0.015% for complications which is actually amazing for such a highly accurate technology.

Foss So what you are saying is that in some cases this may prevent a patient from undergoing a surgical procedure?

Puchalski That is correct. It is a minimally invasive way to establish a diagnosis, particularly when surgery should not be performed, it is not going to be a therapeutic option, so in these diagnostic approaches this technique many times can replace the surgical options.

Foss What are the most common outcomes from this procedure, from your point of view? Patients being spared from surgery is one of them, but does it cost less, it is easier to get, or is it quicker to get this procedure done?

Puchalski Because it is not performed in the operating room and because it is generally performed with conscious sedation, it is cheaper. It is certainly easier for the patient, there is basically no recovery time compared to surgical procedures, and at least here at Yale, we really try to get patients in as quickly as possible and so our approach is always to have any new referral or somebody with a new problem that wants to be seen, be seen within a week and we can often, in particular circumstances where people have to come a long way, we may invite them to come both to meet them, but also with preparations to perform the procedure on the same day so that everything can be taken care of in one fell swoop without needing to come back and forth multiple times, particularly if it's from a distance.

Foss Jonathan, you talked a little bit about lung cancer, but are there diseases or other types of cancers that you commonly see?

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Puchalski I actually see people with almost every type of cancer. The lungs happens to be a common place for cancers to spread to, what we call metastases, and so the patient may have a mass in the lung or enlarged lymph nodes in the center of the chest or fluid around the lung that may actually be the result of cancers from elsewhere, and so I have the opportunity to meet with and participate in the care of people with any type of cancer, ultimately.

Foss Jonathan, we are going to take a break now for a medical minute.

*Medical  
Minute*

*It is estimated that nearly 200,000 men in the US will be diagnosed with prostate cancer this year and one in six American men will develop prostate cancer in the course of his lifetime. Fortunately, major advances in the detection and treatment of prostate cancer have dramatically decreased the number of men who die from the disease. Screening for prostate cancer can be performed quickly and easily in a physician's office using two simple tests, a physical exam and a blood test. With screening, early detection and a healthy lifestyle, prostate cancer can be defeated. Clinical trials are currently underway at federally designated comprehensive cancer centers like the one at Yale to test innovative new treatments for prostate cancer. The Da Vinci Robotic Surgical System is an option available for the patients at Yale that uses three dimensional imaging to enable the surgeon to perform a prostatectomy without the need for a large incision. This has been a Medical Minute, and more information is available at [yalecancercenter.org](http://yalecancercenter.org). You are listening to the WNPR Health Forum on the Connecticut Public Broadcasting Network.*

Foss Welcome back to Yale Cancer Center Answers. This is Dr. Francine Foss and I am joined by my guest tonight, Dr. Jonathan Puchalski. Jonathan, we talked a lot in the first half about the procedures that are done through the bronchoscope, and you also do another set of procedures through another instrument called a pleuroscope. Could you talk a little bit about that?

Puchalski As we mentioned, several diseases cause fluid to build up around the lungs and sometimes we do not understand where that fluid is coming from, or the fluid is there and we need to find ways to get rid of it once and for all, and so we can perform something called pleuroscopy or thoracoscopy, which again is a scope very similar to the bronchoscope. This one goes into the area outside of the lungs in what we call the pleural space and with that we can help to diagnose the causes of pleural effusions which in many cases are related to cancer, although not always, and while we are in there we can also provide therapy so that the fluid does not come back, something called pleurodesis, and this is different than a video-assisted thoracoscopic surgery (VATS) and is certainly different than an open thoracotomy which is a much more extensive surgery for these conditions and so we are able to have the patient come in, perform the procedure in a very short period of time, again outside of the operating room in a clean and sterile environment. We can help make a diagnosis of

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what is causing this pleural effusion and then perform pleurodesis in the same setting and so it's been a nice advancement for patients who have pleural effusion, shortness of breath as a result of this pleural effusion, to help them and give them relief from the symptoms they are having.

Foss To go back for our audience, the other options for those patients would be the VATS procedure or a surgical procedure to get rid of that fluid?

Puchalski That is correct. I spend probably half my day dealing with pleural effusions and the fluid that builds up and that is a very common scenario for people both in and outside the hospital. We can remove the fluid through a simple procedure called a thoracentesis, but when that fluid keeps coming back, often times we want to go to the next step and either provide pleurodesis, which more or less glues the outside of the lung to the chest so that fluid cannot build up, or we can do another minimally invasive procedure called a tunneled pleural catheter, or PleurX catheter, and can accomplish the same goal of removing that fluid without the need for recurrent thoracentesis. So compared to the past, there are a whole variety of procedures that can be done to diagnose and treat this fluid, from a simple thoracentesis, and then when the fluid comes back, we could do medical pleuroscopy, thoracoscopy, VATS, or thoracotomy, and each of those procedures have increasing risks or morbidities associated with the procedure.

Foss For a number of patients with fluid accumulation, you can handle it outside of the hospital with very little complication?

Puchalski Yes.

Foss And that is huge for patients?

Puchalski It really is. The other important thing about it is that shortness of breath isn't something to take lightly, we are very serious about treating these effusions as quickly as possible and so for people with malignant effusions, often we can have them come to the office either the same day or the next and perform one of these procedures quickly, so that they can go about their normal day-to-day life without needing to spend time in the hospital.

Foss Jonathan, you also do a number of other therapeutic procedures to open up parts of people's lungs that are collapsed and have tumors. Can you talk a little bit about those types of procedures?

Puchalski There is a whole area of therapeutic bronchoscopy, similar to the diagnostic advances that we had over the past decade, that have also really grown such that through specialized training and specialized instruments, we can now perform what I call therapeutic bronchoscopy. It's

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predominantly indicated when people have a cancer that is in the main airways of the lungs. So if you imagine the lungs like a tree, the main trunk of the tree and the first several branches can sometimes be affected by different cancers, or other conditions that block those airways. Through a bronchoscope, we have several tools available that can remove those tumors, remove those growths, or at least provide ways to reopen those airways; some of those are lasers. There are other heat-type therapies called argon plasma coagulation, electrocautery, and there are cold therapies called cryotherapy, but the important point is to realize through a bronchoscope we are able to use these advanced tools to reopen blocked airways and that can be a very significant benefit to patients. The patients who may be having profound respiratory problems can seemingly instantaneously have that reversed if we can remove that part of the tumor within the airways. We can go further and place stents in the airways to keep them open. I think most people have heard of stents in coronary artery disease to help keep the blood vessels around the heart open, and this is the same way of thinking, that we can keep the airways open by placing these stents, and it can be a very difficult and precise procedure that certainly requires training and expertise, but we have that through these new technologies and these advances and it really requires a special interest team and it's certainly not commonly available. When somebody has this scenario, it requires a lot of thinking about where to receive that care. We actually have a lot of people come here from other hospitals; they get referred because of the complexity that is potentially involved when this scenario arises.

Foss            Are you using any new and sophisticated imaging techniques in addition to the actual procedure itself?

Puchalski      We have actually been able to avoid some imaging techniques, replace them with new imaging techniques, meaning that when we use a laser or when we place stents, we do not often use fluoroscopy and radiation exposure fluoroscopy during those procedures anymore. We will do them with direct visualization and the bronchial ultrasound, as I mentioned earlier, which can help explain how far some of these areas go and so it improves our ability to be precise when we need to place stents. There are other technologies always on the horizon, there is something called confocal microscopy, or alveoloscopy, which is probably several years down the line, but it helps us look into the farthest areas of the lung to get a better sense of what is going on there and again other technologies that are being developed but are not quite primetime yet.

Foss            Confocal microscopy sounds like you put a little microscope into the lung.

Puchalski      Yes. It is a very small microscope almost, but through this technology, and I alluded to the lungs being like a tree earlier and we talked about the main trunk and the branches, now we are talking

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about being all the way out into the leaves, and being able to see with a small microscope what is going on inside the smallest air sacs in the lungs. A lot more research is needed but that may be on the horizon.

Foss            Almost sounds like science fiction.

Puchalski    Yeah. The images are fascinating and in many ways it's like you are watching a movie when you can see that far out.

Foss            You are doing a lot of exciting stuff it sounds like, but can you talk with us about the group that you involved with, the multimodality clinic that you are involved with, and how you interact with the other partners?

Puchalski    I mentioned at the beginning that the Thoracic Interventional Program is really a joint effort with thoracic surgeons, but our whole philosophy in the Thoracic Oncology Program (TOP) is really that multiple minds and multiple ways of thinking are always better than one, and so in our clinic, for example, when patients are seen on an outpatient visit with their physician in the same setting where I am practicing, right in the adjacent rooms, I will have several thoracic surgeons, medical oncologists, radiation oncologists, and other pulmonologists, and having these multiple disciplines within the same area allows us to coordinate care in ways that we believe enhance the patient's experience. You can imagine coming for an appointment where you need to see people in different subspecialties and being able to do that all in one setting, and beyond these groups of physicians, we also have other people who are in our clinic that include social workers, which are astronomically helpful that include a whole team dedicated to smoking cessation or helping people to quit smoking which is extremely challenging to do individually. So, in the Thoracic Oncology Program, we strive to provide a team effort that helps patients get a comprehensive evaluation and treatment all in the same setting.

*Dr. Jonathan Puchalski is Assistant Professor of Pulmonary Medicine and Director of the Thoracic Interventional Program at Yale. If you have questions or you would like to add your comments, visit [YaleCancerCenter.org](http://YaleCancerCenter.org), where you can also get the podcast and find written transcripts of past programs. You are listening to the WNPR Health Forum on the Connecticut Public Broadcasting Network.*