

# Yale CANCER CENTER answers

WNPR Connecticut Public Radio



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## **Screening Guidelines for Lung Cancer**

### **Guest Expert: Lynn Tanoue, MD**

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*Welcome to Yale Cancer Center Answers with your hosts doctors Anees Chagpar, Susan Higgins and Steven Gore. Dr. Chagpar is Associate Professor of Surgical Oncology and Director of the Breast Center at Smilow Cancer Hospital. Dr. Higgins is Professor of Therapeutic Radiology and of Obstetrics, Gynecology and Reproductive Sciences and Dr. Gore is Director of Hematological Malignancies at Smilow and an expert on Myelodysplastic Syndromes. Yale Cancer Center Answers features weekly conversations about the research diagnosis and treatment of cancer and if you would like to join the conversation, you can e-mail your questions and comments to [canceranswers@yale.edu](mailto:canceranswers@yale.edu) or you can leave a voicemail message at 888-234-4YCC. This week it is a conversation about lung cancer screening guidelines with Dr. Lynn Tanoue. Dr. Tanoue is Professor of Pulmonary Medicine at Yale School of Medicine. Here is Dr. Steven Gore.*

Gore Lynn you are a pulmonologist by training, is that right?

Tanoue That is correct.

Gore People do not necessarily know what pulmonologists do or what they are in general, could you explain for us?

Tanoue A pulmonologist is a physician who specializes in lung diseases and it is maybe a little bit unusual for a pulmonologist to be so involved in lung cancer. Except, I think that it is becoming more common because many people with lung cancer are diagnosed by pulmonologists and lung physicians are really an important part of the multidisciplinary team of any patient who has lung cancer.

Gore Have you been involved with lung cancer issues throughout your career or is it something you have grown into?

Tanoue I evolved into this maybe 15 years ago. I was increasingly concerned that the care of my patients was scattered when I was diagnosing them with a lung cancer and so at a time when they were really physically and emotionally stressed about a new diagnosis, that was pretty scary, they were running around trying to see all these different doctors and have all these different tests and the care at that time was not really coordinated, that was maybe 12 years ago, and the School of Medicine and Yale-New Haven Hospital awarded me a grant to put together a lung cancer multidisciplinary program and that has evolved, it evolved very quickly, into the Yale Cancer Center Thoracic Oncology Program which I still co-direct.

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- Gore This was well before Dr. Lynch had come and hired so many people into the lung cancer program from the medical oncology point of view, right?
- Tanoue Yes, that is right. Dr. Edelson was Cancer Center Director at that time, and I think that the School of Medicine and Yale-New Haven Hospital really appreciated that the care of this particular group of patients, and at that time the number of lung cancer cases was still increasing in the country, required a team effort and there was a great commitment made at that time to develop a section of thoracic surgery which was still living in cardiothoracic surgery and I think really the vision for the Cancer Center growing into what it is now and what it will be in the future was really beginning at that time to take form and so perhaps thoracic oncology was one of the earliest programs.
- Gore Fascinating, so most people do not have a pulmonologist like you have a cardiologist, like some people have a cardiologist, I guess unless you have obstructive pulmonary disease or asthma or something, I mean I do not have a pulmonologist.
- Tanoue Hopefully, you do not have lung disease.
- Gore I mean how would I get to you for lung cancer screening, for example?
- Tanoue Lots of people have a pulmonologist the way they have a cardiologist because they have pulmonary diseases and pulmonary diseases are really common and people may think of lung disease as primarily COPD or asthma.
- Gore Emphysema too.
- Tanoue There are lots and lots of other pulmonary conditions for which we have a whole chest clinic.
- Gore So I am showing my ignorance.
- Tanoue The Winchester Chest Clinic really is a center for not just general pulmonary diseases but has specialty centers in obstructive lung disease, asthma, pulmonary vascular disease, cystic fibrosis, tuberculosis, and interstitial lung disease. And then we have a big general pulmonary clinic because most people do not show up necessarily with a diagnosis unless they are coming from another pulmonologist or maybe an internist or another specialist, they come with shortness of breath or chest pain or cough and in the process of evaluating those symptoms, we hopefully arrive at a reason that hopefully is treatable, so many people with lung cancer present with pulmonary symptoms.
- Gore I see.

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Tanoue They have cough or chest pain. They are coughing up blood or they are short of breath and so the route to a pulmonologist sometimes is very quick, sometimes not so quick, and because we see patients who we take care of longitudinally, we are sort of a natural group to think about screening as are the primary care providers.

Gore You have talked about some of these people who are having chest pain or bloody sputum, and that sounds to me like there are probably going to be more advanced lung tumors than we hope to diagnose, am I wrong about that?

Tanoue No you are correct, so in a typical scenario without screening, the majority of patients who present with lung cancer do have advanced stage. They do not have a little spot in their lung. Those little spots are typically without any symptoms and so for a cancer to have gotten to the point where it is creating symptoms, maybe 2/3 of those are actually advanced, a fair number of them though are still localized and it just happens that they are in an area where they are causing symptoms, but they have not progressed outside the chest.

Gore So finding small little spots that you are talking about that is what really happens during screening is that right?

Tanoue Right, screening is all about early detection and by definition, you screen people who are healthy and who have no symptoms. If you have symptoms you are by definition not being screened, you are being evaluated for symptoms or for a disease, so if you look at the background, really up until the present time where 2/3 of people who are diagnosed with lung cancer are diagnosed at advanced stage, we really need a method of early detection since the opportunity to cure patients with lung cancer really exists in patients with early stage disease and the challenge has been that early stage disease generally has no symptoms and we have been, up until just recently, without an effective screening test for lung cancer.

Gore How is that changing?

Tanoue You can be screened now if you meet certain criteria, with a chest CT scan, and as opposed to a plain chest x-ray which for years was hoped to be an effective screening tool, CT scan is actually effective. Back in the 70s and 80s, there were huge studies done in the United States looking at chest x-ray as a screening test and all of those studies failed to show any benefit in terms of saving lives because the gold standard is, is the screening test effective? Does it save lives from that disease? And in your and my medical training, 20 and 30 years ago, we really never screened anybody for lung cancer but meanwhile, the other common solid tumors, breast, prostate, colorectal, now all have screening methodologies and while I think there is a fair amount of controversy about how effective those are and

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whether they should be used as broadly as they are, the bottom-line is they are embedded in practice and people are used to having that kind of screening done and so a lot of those cancers now are diagnosed early when effective treatment is readily available. There was a huge study done in the United States in the 2000s called the National Lung Screening Trial, the NLST, and 50 something thousand Americans volunteered in that study.

Gore Wow.

Tanoue And it compared chest CT done with very low radiation dose to chest x-ray in terms of whether either of them was going to be an effective tool for screening and to be a participant in the National Lung Screening Trial, you had to have been a recently heavy smoker, so 30-pack years meaning either you smoked one pack of cigarettes a day for 30 years or you smoked 2 pack of cigarettes a day for 15 years, that is the math, and you had to be currently smoking or you had to have quit within the previous 15 years.

Gore Okay.

Tanoue And the study selected a very high risk population since we know that smoking is the major risk factor for lung cancer and at the end of the day, what that study demonstrated, and this was published back in 2011, was that screening with low-dose CT actually saved more lives than screening with chest x-ray. It also picked up more lung cancers because it is a much more sensitive radiology test. There was another study going on at the same time which is still going on called the prostate, lung, colon and ovarian screening trial, the PLCO and the PLCO design which was done years before NLST actually looked again at chest x-ray and in that same year, the PLCO came out with the results for lung cancer that chest x-ray really was no better than nothing for picking up early stage lung cancers, so by extrapolation, the National Lung Screening Trial demonstrated that screening with low-dose radiation chest CT is more effective than not screening at all and it definitely saves life in that population.

Gore For our audience, if you have not picked up on this by now, we physicians like to abbreviate or make acronyms often into nice little words, so far your acronyms do not spell nice little words, but we like to call our clinical trials by different letters. One of the things you mentioned that got my attention is that in this high risk population that was eligible for this CT screening study you included people who could have quit as recently as 15 years ago. I think that as a relative lay person in this field, I would have thought that 15 years, wow! You congratulate people that they have quit smoking and they have abstained from smoking all those years but they are still at risk, right?

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Tanoue Well you should keep congratulating those people.

Gore It is a great thing.

Tanoue And quitting smoking is a really important but very difficult thing to do so everybody who quit smoking should be congratulated. The more time you are away from your last cigarette, the lower your cancer risk gets and also the lower other risks like vascular disease, the risk of stroke and heart attack also decreases. Your risk never becomes that of a never smoker although it gets pretty close and the 15-year window was chosen arbitrarily.

Gore Got it.

Tanoue The bottom line was that a population that was considered at pretty high risk for lung cancer was chosen so that if there were benefits from screening it could be seen.

Gore You needed to have people who were going to turn out to have early cancer to know that the test was working, is that right?

Tanoue Right, and so in that population of individuals who volunteer to participate in the National Lung Screening Trial, the risk of lung cancer over the 6 years that they were monitored was about 2-3%.

Gore Still pretty low.

Tanoue Pretty low, although pretty significant.

Gore I mean it was not like 10% or 20% but I guess 3% of 50,000 is a lot.

Tanoue Right and lung cancer still kills more people in the United States than breast, colon, prostate, and pancreatic cancers all combined and so even though the risk may sound low, it was sufficient to prove the benefit of screening.

Gore Of course, I was not trying to minimize that, I was just a little surprised that it was not higher and relieved a little bit I guess.

Tanoue I think if you had chosen even a higher risk population which would have been possible because we have models now to predict lung cancer risk over time, the benefit would have been even greater but then you would probably be restricting screening much more to a very tight population.

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Gore Got it. Well this is a really important topic and I am going to want to pick up on this after the break, but right now, we are going to take a short break for a medical minute. Please stay tuned to learn more information about lung cancer screening guidelines with Dr. Lynn Tanoue.

*Medical*

*Minute Breast cancer is the most common cancer in women. In Connecticut alone approximately 3000 women will be diagnosed with breast cancer this year and nearly 200,000 nationwide but thanks to earlier detection, noninvasive treatments and novel therapies, there are more options for patients to fight breast cancer than ever before. Women should schedule a baseline mammogram beginning at age 40 or earlier if they have risk factors associated with breast cancer. Clinical trials are currently underway at federally designated comprehensive cancer centers such as Yale Cancer Center and at Smilow Cancer Hospital at Yale-New Haven to make innovative new treatments available to patients. Digital breast tomosynthesis or 3D mammography is transforming breast screening by significantly reducing unnecessary procedures while picking up more cancers and eliminating some of the fear and anxiety many women experience. This has been a medical minute brought to you as a public service by Yale Cancer Center and Smilow Cancer Hospital at Yale-New Haven. More information is available at [yalecancercenter.org](http://yalecancercenter.org). You are listening to WNPR, Connecticut's Public Media Source for news and ideas.*

Gore Welcome back to Yale Cancer Center Answers. This is Dr. Steven Gore and I am talking tonight with my guest, Dr. Lynn Tanoue about lung cancer screening guidelines. Lynn, before the break you were sharing with me about this big 50,000 patient screening study with CT scans and you have talked about a 3% incidence of cancer that was discovered in the 6-year follow up. You said that it proved or demonstrated that lives were saved, so what is the magnitude of that benefit or can you not quantify that?

Tanoue It can be quantified on average if you look at that 2-3% incidence rate of lung cancer in that screening population, you save about 3 out of every 20 deaths from lung cancer and that is a difficult concept to grasp. What that means is that the majority of the people diagnosed with cancer are still going to succumb.

Gore Even in this early stage findings?

Tanoue Most of the cancers that are diagnosed with screening are early stage. In fact, the numbers flip, so I have said before 2/3 of cancers diagnosed by symptom or by accident are advanced and if you look at the screening trials, it is the opposite, so 2/3 of the cancers that are diagnosed by screening are early stage and typically that means they are quite treatable and since the people are by definition healthy, if they are undergoing a screening, they should be healthy enough then to have treatment.

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Gore Which is surgery usually?

Tanoue It might be surgery, might be radiation, might still involve chemotherapy or targeted biologic therapy. A third of cancers that are diagnosed by screening are still advanced stage.

Gore Wow.

Tanoue And so most lung cancers do not move quickly like wildfire; we do not catch all of them in an interval of a yearly screen, so between one year to a next, it has been clear in all of the studies that some people develop cancers that can become advanced in that one year or probably they are unable to be seen by CT because they were still too small and for whatever reason those cancers have a propensity to spread. We certainly understand that no cancers are one disease. Lung cancer is a very mixed population of cancers, some of which grow really slowly and some of which grow unfortunately quite quickly and most lung cancers are on the slower end as opposed to the rapid end but we will never be able to catch all of those cancers unless we develop a better tool than a CT scan.

Gore Is there any promise for other kinds of tools?

Tanoue Yes, I think that maybe within a decade there will absolutely be other tests that we can use, maybe to identify a population of individuals who are at high enough risk that they should get a CAT scan, so right now the definition of that population of risk only includes smoking and age and yet we know there are lots of other risk factors for lung cancer. 15% of lung cancers in women occur in women who never smoked, but they have a family member who had lung cancer, there are lots of carcinogens that are domestic like radon or in other parts of the world, biomass fuel use in the home and occupational carcinogens like asbestos. If you have had another cancer yourself, it is clear that your risk for having a second cancer is higher and so there are these other groups of people that may not fit into the tight criteria that have been currently defined for lung cancer screening where we really need a better tool and that tool probably involves genomic evaluation, meaning looking at specific genes and right now that field is at the point where we can pick out risk if you have a test like a bronchoscopy, which means I put a lighted camera at the end of a long flexible tube into your lung and I take samples, that is pretty invasive and we would not use that as a screening tool, though we do colonoscopy screening.

Gore I know right.

Tanoue And we have gotten used to that, but a bronchoscopy is a little bit more involved than a colonoscopy and I do not think that that is a reasonable tool to use as a widespread screening tool in a healthy population, but at some point, hopefully in the not too distant future, we will be looking at blood, in

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that you can see genomic patterns in blood which is easily obtainable and actually our lung cancer screening program is collecting samples on people who want to be screened in the hopes that we will someday have enough in our Biorepository that we can do those sorts of studies.

Gore That is fascinating. Who do the guidelines recommend be screened nowadays and which of our listeners should be thinking about it? Maybe I should ask my doctor about this?

Tanoue Right now the United States Preventive Services Task Force which is the body that makes recommendations to Medicare about screening, on its website the recommendations are if you are aged 55-80 and you have at least a 30-pack year history of smoking and you are currently smoking or have quit within the past 15 years.

Gore Just like your study.

Tanoue You should be screened and that is because the risk of you having lung cancer and the benefit then of an early detection of your lung cancer outweighs any harms that are related to the screening and while people may not think about harms related to screening, there are harms because we are looking at an imaging study, we are not really looking in the lung tissue itself. We pick up all sorts of things that are not lung cancers but cause worry.

Gore Little ditzels?

Tanoue Ditzels, and a ditzel is the proper radiologic term for a spot that is less than 4 mm and the CT scans are so good that we can pick up things that are 1 or 2 mm.

Gore That is crazy.

Tanoue And so if I send 100 people who smoked to that degree that the United States Preventive Services Task Force thinks should be screened and they are of the proper age, maybe a quarter of them, 25% of them will have an abnormality on that CT scan in the lung and these are predominantly little spots and we know that about 96 or 97% of those little spots are actually not cancers.

Gore Wow.

Tanoue But we have to figure out which few are cancers and we really do not want to do a lot more tests and certainly we do not want to do biopsies and surgeries on people who have little spots that are not cancers.

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Gore So what do you do?

Tanoue One of the most important parts of screening is that it should be done in a program so that an individual who is going to get a CT scan for the purposes of screening understands what they are getting into and in our program if you have your screening CT scan done at Yale-New Haven Hospital, you will actually see Polly Sather who is our advanced practice nurse practitioner who is completely trained in this and she actually sits down with each individual and goes through a risk-benefit discussion for that individual based on their own personalized risk and we have a discussion about the likelihood that an abnormality may be found if not on the first screening, then on the second or third or nth screen because these little spots tend to come and go and we know from the National Lung Screening Trial that 17-26% of people having a scan in a given year will have a new spot and again, the vast minority of those are cancers, and so then a lot of these people come to see me to figure out which spots need to be dealt with and which spots should be left alone and if you consider that 96 or 97% of people who have an abnormality really should be left alone because they are actually fine, they have to have a discussion about that, anticipate that going into the screening study and then have a means of having an evaluation if there is an abnormality found and so the American College of Chest Physicians and the American Thoracic Society in their policy statement about lung cancer screening outlines a very comprehensive program that if you follow that roadmap you will come out with a quality screening program that will invoke the most benefit and hopefully the least amount of harm and our screening program was one of the prototypes for that policy statement.

Gore Wow, it is a lot more complicated than I had really thought about. Let's say I see my internist in Branford, and fortunately I have never been a smoker, but let us say I met these criteria and I am of a certain age that would probably meet these screening criteria, I guess he has the option of sending me for a CT scan or he could send me to the screening program, how does that work? Does he set me up for a CT scan at Yale and I automatically get plugged in or do I need to get referred to the Yale-New Haven Screening Program?

Tanoue You can do a number of those things. You could be referred straight to our screening program, your internist can also order a screening low dose chest CT scan through our electronic health record and if your internist did that, a little questionnaire would pop up to make sure that you fit the criteria that meet that high risk population and if you did meet those criteria and the study was then scheduled, you would automatically be referred to see our advanced practice nurse to have a decision support visit before the scan and we try to set that up so that visit occurs just before the CT is done.

Gore It might be the same day or is it going to require two trips?

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Tanoue It is usually the same day. There has to be a lot of quality control also around the CT scan because it is done in a very specific way to use as little radiation as possible. It is a very small amount of radiation and we want to make sure that it is that very small amount of radiation. The pictures then are not as crisp as if you were having a regular CT because you were having a diagnostic evaluation, but they are more than sufficient for screening and so your doctor can also request the screening CT scan, verify that you meet the criteria and then you would enter the program there. Once you have your scan done, if you have an abnormality, that result goes back to your internist. Our screening program makes sure that your internist gets that report and then your internist could chose to have you circle back to see us because the back end of our screening program is the nodule program, and nodule is the fancy word for spot.

Gore Bigger than a ditzel.

Tanoue Sometimes ditzels, sometimes spots bigger than 4 mm and what I realize is that lots of people are having CTs done maybe for screening purposes, but they do not have the backup then of the nodule piece and then they can still be referred to us even if they have had their screening somewhere else, we are happy to provide pulmonary evaluation for the nodule.

Gore In some of these people you will decide to observe, is that correct?

Tanoue Most of them can be observed safely.

Gore And do you find that there are some patients who are so anxious about this nodule that they are just not satisfied with that? I can imagine this must cause a great deal of anxiety for some people.

Tanoue It can cause a great deal of anxiety and I think that is where the nodule program is so important, that you do not just get a piece of paper with your report or see you in a year, you have a spot, do not worry about it. We actually will sit down with the patients and talk to them and actually that evaluation is very important because some of those ditzels are more worrisome than others and it really takes somebody who sees a lot of them to decide which ones are important enough or worrisome enough to pursue even if they are small, maybe not 2 mm, but things that are 6, 7 or 8 mm that is the size of a pencil eraser, but some of those may be worrisome enough in the context of an individual patient to pursue, so a lot of these are discussed actually in our Tumor Board and the ones that raise concern that came through our screening program are actually presented there.

*Dr. Lynn Tanoue is Professor of Pulmonary Medicine at Yale School of Medicine. We invite you to share your questions and comments, you can send them to [canceranswers@yale.edu](mailto:canceranswers@yale.edu) or you can leave a voicemail message at 888-234-4YCC and as an additional resource, archived programs are available in both audio and written form at [yalecancercenter.org](http://yalecancercenter.org). I am Bruce Barber hoping you will join us again next Sunday evening at 6:00 for another edition of Yale Cancer Center Answers here on WNPR, Connecticut's Public Media Source for news and ideas.*