FOR PATIENTS, SURVIVORS & THEIR CAREGIVERS

LUNG CANCER

cure®

Cancer Updates, Research & Education®

Be Cautious, Not FEARFUL

Patients should take precautions against COVID-19, but they must also keep up with their cancer care.

ALSO INSIDE

TARGETED DRUGS
Drugs that target certain gene mutations are improving survival for patients with lung cancer.

HEALTH DISPARITIES
Dr. David Cooke discusses racial disparities in lung cancer.

PATIENT STORY
One man discusses traveling more than 1,500 miles for lung cancer treatment.

LUNG CANCER HEROES™
Two physicians, a nurse and two patient advocates were honored.

curetoday.com

LUNG CANCER SPECIAL ISSUE · 11.20

Important Safety Information

TAGRISSO may cause serious side effects, including:

- **lung problems.** TAGRISSO may cause lung problems that may lead to death. Symptoms may be similar to symptoms from lung cancer. Tell your doctor right away if you have any new or worsening lung symptoms, including trouble breathing, shortness of breath, cough, or fever
- **heart problems, including heart failure.** TAGRISSO may cause heart problems that may lead to death. Your doctor should check your heart function before you start taking TAGRISSO and during treatment as needed. Tell your doctor right away if you have any of the following signs and symptoms of a heart problem: feeling like your heart is pounding or racing, shortness of breath, swelling of your ankles and feet, feeling lightheaded
- **eye problems.** TAGRISSO may cause eye problems. Tell your doctor right away if you have symptoms of eye problems which may include watery eyes, sensitivity to light, eye pain, eye redness, or vision changes. Your doctor may send you to see an eye specialist (ophthalmologist) if you get eye problems with TAGRISSO
- **skin problems.** TAGRISSO may cause skin problems. Tell your doctor right away if you develop target lesions (skin reactions that look like rings), severe blistering or peeling of the skin

Before taking TAGRISSO, tell your doctor about all of your medical conditions, including if you:

- have lung or breathing problems
- have heart problems, including a condition called long QTc syndrome
- have problems with your electrolytes, such as sodium, potassium, calcium or magnesium
- have a history of eye problems
- are pregnant or plan to become pregnant. TAGRISSO can harm your unborn baby. Tell your doctor right away if you become pregnant during treatment with TAGRISSO or think you may be pregnant
    - **Females** who are able to become pregnant should use effective birth control during treatment with TAGRISSO and for 6 weeks after the final dose of TAGRISSO
    - **Males** who have female partners that are able to become pregnant should use effective birth control during treatment with TAGRISSO and for 4 months after the final dose of TAGRISSO
- are breastfeeding or plan to breastfeed. It is not known if TAGRISSO passes into your breast milk. Do not breastfeed during treatment with TAGRISSO and for 2 weeks after your final dose of TAGRISSO. Talk to your doctor about the best way to feed your baby during this time

When considering treatment options for your stage 4 EGFR+ non-small cell lung cancer, ask your doctor about TAGRISSO.

TAGRISSO is a targeted therapy. Targeted therapy is not chemotherapy or immunotherapy. TAGRISSO is a once a day pill that you may be able to take at home.

When compared to 2 other EGFR targeted therapies, erlotinib or gefitinib, TAGRISSO was proven to give people more time without their cancer growing or spreading, and help them live significantly longer.

- The median progression-free survival time was 18.9 months for TAGRISSO vs 10.2 months for erlotinib or gefitinib. In the same clinical study, median overall survival time was 38.6 months for TAGRISSO vs 31.8 months for erlotinib or gefitinib.

EGFR=epidermal growth factor receptor.
Median is the middle number in a list of numbers.

1 pill a day
with or without food

Learn more about the **#1 prescribed EGFR TKI*** for stage 4 EGFR+ non-small cell lung cancer (NSCLC) at **TAGRISSO.com.**

TKI = tyrosine kinase inhibitor.

*Data as of July 2019.

Tell your doctor about all the medicines you take, including prescription and over-the-counter medicines, vitamins, or herbal supplements. Especially tell your doctor if you take a heart or blood pressure medicine

The most common side effects of TAGRISSO are:

- diarrhea
- rash
- dry skin
- changes in your nails, including: redness, tenderness, pain, inflammation, brittleness, separation from nailbed, and shedding of nails
- mouth sores
- tiredness
- decreased appetite

Tell your doctor if you have any side effect that bothers you or that does not go away.

These are not all the possible side effects of TAGRISSO. For more information, ask your doctor or pharmacist.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

What is TAGRISSO?

TAGRISSO is a prescription medicine for non-small cell lung cancer (NSCLC) that has spread to other parts of the body (metastatic). TAGRISSO is used:

- as a first treatment if tumors have a certain abnormal epidermal growth factor receptor (EGFR) gene(s)

or

- if you have a certain type of EGFR gene and were previously treated with an EGFR tyrosine kinase inhibitor (TKI) medicine that did not work or is no longer working

Your doctor will perform a test to make sure that TAGRISSO is right for you. It is not known if TAGRISSO is safe and effective in children.

Please see Brief Summary of Prescribing Information on the following page.

If you can't afford your medication, AstraZeneca may be able to help.
TAGRISSO® (osimertinib) 80 mg tablets are available by prescription only.

TAGRISSO is a once-daily pill. Available in 80 mg.
Not actual size.

TAGRISSO®
osimertinib
TAGRISSO.com

AstraZeneca

Patient Information
TAGRISSO® (tuh-GRISS-oh) (osimertinib) tablets

TAGRISSO® osimertinib

What is the most important information I should know about TAGRISSO?

TAGRISSO may cause serious side effects, including:

- **lung problems.** TAGRISSO may cause lung problems that may lead to death. Symptoms may be similar to those symptoms from lung cancer. Tell your doctor right away if you have any new or worsening lung symptoms, including trouble breathing, shortness of breath, cough, or fever.
- **heart problems, including heart failure.** TAGRISSO may cause heart problems that may lead to death. Your doctor should check your heart function before you start taking TAGRISSO and during treatment as needed. Tell your doctor right away if you have any of the following signs and symptoms of a heart problem: feeling like your heart is pounding or racing, shortness of breath, swelling of your ankles and feet, feeling lightheaded.
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See **"What are the possible side effects of TAGRISSO?"** for more information about side effects.

What is TAGRISSO?

TAGRISSO is a prescription medicine used to treat non-small cell lung cancer (NSCLC) that has spread to other parts of the body (metastatic):

- as your first treatment if your tumor has a certain abnormal epidermal growth factor receptor (EGFR) gene(s)

  or
- if you have a certain type of EGFR gene and had previous treatment with an EGFR tyrosine kinase inhibitor (TKI) medicine that did not work or is no longer working.

Your doctor will perform a test to make sure that TAGRISSO is right for you.

It is not known if TAGRISSO is safe and effective in children.

Before taking TAGRISSO, tell your doctor about all of your medical conditions, including if you:

- have lung or breathing problems.
- have heart problems, including a condition called long QTc syndrome.
- have problems with your electrolytes, such as sodium, potassium, calcium or magnesium.
- have a history of eye problems.

(continued)

- are pregnant or plan to become pregnant. TAGRISSO can harm your unborn baby. Tell your doctor right away if you become pregnant during treatment with TAGRISSO or think you may be pregnant.
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Tell your doctor about all the medicines you take, including prescription and over-the-counter medicines, vitamins, or herbal supplements. Especially tell your doctor if you take a heart or blood pressure medicine.

How should I take TAGRISSO?

- Take TAGRISSO exactly as your doctor tells you to take it.
- Your doctor may change your dose, temporarily stop, or permanently stop treatment with TAGRISSO if you have side effects.
- Take TAGRISSO 1 time each day.
- You can take TAGRISSO with or without food.
- If you miss a dose of TAGRISSO, do not make up for the missed dose. Take your next dose at your regular time.
- **If you cannot swallow TAGRISSO tablets whole:**
  - place your dose of TAGRISSO in a container that contains 60 mL (2 ounces) of water. Do not use carbonated water or any other liquids.
  - stir the TAGRISSO tablet and water until the TAGRISSO tablet is in small pieces (the tablet will not completely dissolve). Do not crush, heat, or use ultrasound to prepare the mixture.
  - drink the TAGRISSO and water mixture right away.
  - add 120 mL to 240 mL (4 to 8 ounces) of water into the container and drink to make sure that you take your full dose of TAGRISSO.

What are the possible side effects of TAGRISSO?

TAGRISSO may cause serious side effects, including:

- See "**What is the most important information I should know about TAGRISSO?**"

(continued)

- Severe blistering or peeling of skin – seek medical attention right away if you develop these symptoms.
- Target lesions, which are skin reactions that look like rings – seek medical attention right away if you develop these symptoms.

The most common side effects of TAGRISSO are:

- diarrhea
- rash
- dry skin
- changes in your nails, including: redness, tenderness, pain, inflammation, brittleness, separation from nailbed, and shedding of nails
- mouth sores
- tiredness
- decreased appetite

Tell your doctor if you have any side effect that bothers you or that does not go away.

These are not all the possible side effects of TAGRISSO. For more information, ask your doctor or pharmacist.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

How should I store TAGRISSO?

- Store TAGRISSO at room temperature between 68°F to 77°F (20°C to 25°C).
- Safely throw away medicine that is out of date or that you no longer need.
- **Keep TAGRISSO and all medicines out of the reach of children.**

General information about the safe and effective use of TAGRISSO.

- Medicines are sometimes prescribed for purposes other than those listed in a Patient Information leaflet. Do not use TAGRISSO for a condition for which it was not prescribed. Do not give TAGRISSO to other people, even if they have the same symptoms you have. It may harm them. You can ask your doctor or pharmacist for information about TAGRISSO that is written for a healthcare professional.

What are the ingredients in TAGRISSO?

Active ingredient: osimertinib

Inactive ingredients: mannitol, microcrystalline cellulose, low-substituted hydroxypropyl cellulose, and sodium stearyl fumarate. Tablet coating contains: polyvinyl alcohol, titanium dioxide, macrogol 3350, talc, ferric oxide yellow, ferric oxide red and ferric oxide black.

AstraZeneca

For more information, go to www.Tagrisso.com or call 1-800-236-9933.
Distributed by: AstraZeneca Pharmaceuticals LP, Wilmington, DE 19850
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US-35699 1/20

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Navigating Both Cancer and a Viral Pandemic Is a Difficult Balancing Act

SINCE COVID-19 FIRST BEGAN spreading throughout the United States, we've heard from our bloggers and readers that there are similarities between living through a pandemic and living with cancer.

The sudden need to restrict activities and social excursions rings a bell for those who've been treated for cancer, but even more disturbing for many are the fear and dread associated with an unseen but looming hazard.

CURE® contributor Jane Biehl described the sentiment well in a recent blog (curetoday.com/cancer-covid/1020): "The sleepless nights, unremitting fear and uncertain future are happening all over again. Like the novel coronavirus, the 'big C' is invisible, unrelenting and always surrounding us."

As patients navigate both cancer and the pandemic, they are asking if their disease or its treatments will make them more vulnerable to COVID-19 or its most severe complications. If so, they ask, should they keep visiting cancer centers for therapy, or is the healthier choice to delay care and stay home?

In this special issue, we address those questions in a feature article and note that, although studies indicate that patients with this cancer face an increased rate of severe COVID-19 and death from the virus compared with people in the general population, doctors recommend that patients keep up with cancer treatments as long as they take precautions, such as wearing masks and washing their hands well and frequently.

That advice applies to nearly everyone with a thoracic cancer. Elsewhere in this issue, however, we share insights that affect specific segments of the lung cancer community.

In one such feature, we investigate approved and experimental treatments for mesothelioma, a rare, aggressive cancer that forms in the lining of the lungs, abdomen or heart and is caused by inhaling asbestos fibers. For example, in October 2020, the Food and Drug Administration approved Opdivo (nivolumab) with Yervoy (ipilimumab) to treat malignant pleural mesothelioma that can't be surgically removed — the first approval for the disease in 16 years. We also report on experimental treatments being tested in patients with the disease, including tumor-treating fields, which use low-intensity electrical fields to prevent cancer from growing.

In another article, we examine rare genetic alterations that can make lung cancers treatable with targeted drugs, extending survival. Affecting just 1% to 3% of patients with non-small cell lung cancer, these "glitches" include RET fusions, EGFR T790M mutations, EGFR exon 20 insertion mutations, ROS1 rearrangements, MET amplifications and PIK3CA mutations.

Also in this issue are lung cancer news updates, including details about three treatment regimens that improved patient survival in clinical trials and a number of recently approved drugs.

We hope these articles leave you not only better informed about current and future treatments for lung cancer but also better able to navigate the disease and its treatments during this particularly uncertain time.

MIKE HENNESSY SR.
Chairman and Founder

cure®

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Increased Importance: Rare Genomic Alterations

FOR DECADES, LUNG cancer has been associated with tobacco smoking. Although it is clearly a risk factor, cutting-edge research has led to biologic discoveries that can explain why some people who have never smoked, especially young people, are receiving lung cancer diagnoses.

In understanding the biology of the disease that affects nearly 230,000 people each year in the United States, researchers have learned of both common and rare genomic alterations. A gene alteration is when changes occur in a patient's DNA sequence, which makes up a gene.

For most cancers, there are a handful of common mutations, such as HER2 and RAS. In lung cancer, mutations in the EGFR gene are the most common and, interestingly, seen more often in nonsmokers, women and individuals of Asian descent. New drugs that target EGFR and are mostly effective when the gene is mutated have revolutionized cancer therapy.

But many rare mutations have been more elusive. In this special issue of *CURE®*, you'll learn about several more recently discovered mutations in lung cancer — specifically, RET, ROS1, MET, PIK3CA, MEK1, EGFR T790M and exon 20 insertion mutations. They may look like alphabet soup, but these letters and numbers have great meaning, offering ways to target and attack cancer. Although researchers don't know how to tackle many of them just yet, academic centers and pharmaceutical companies are devoting time, money and resources to learn how they work in the body to mutate cancer cells and to develop custom drugs — antibodies or engineered small molecules — to target the proteins encoded by the mutated genes.

The study of rare mutations, which used to be shunned just 10 years ago by drug companies, has now become more mainstream in helping patients in this subgroup. In addition, the research community is getting better and faster at developing and getting these drugs to the clinic in a timely manner — driving down the costs.

> **"Despite the study of rare genomic alterations being new in lung cancer, it's leading the way in the discovery process."**

At the same time, more and more patients with advanced cancer are having their tumor genes sequenced because the cost of "next generation" sequencing has decreased *and* been made more widely available.

Despite the study of rare genomic alterations being new in lung cancer, it's leading the way in the discovery process. By uncovering these rare mutations that are sometimes shared across different cancer types, researchers can understand their functional significance, targeted medications can be brought to market in one to two years and patients can reap the benefits by receiving a more personalized approach to their treatment regimen.

DEBU TRIPATHY, M.D.
Editor-in-Chief
Professor of Medicine
Chair, Department of Breast Medical Oncology
The University of Texas MD Anderson Cancer Center

MIKE KITADA

New Lung Cancer Precision Medicine Resources Coming Soon

Sign up to be alerted and get a free Lung Association Face Mask*

American Lung Association®

Lung.org/biomarker-testing

*Limited to the first 200 sign-ups

Adding Immunotherapy to Radiotherapy Increases Survival in Patients With Brain Metastases

IMMUNOTHERAPY PLUS radiotherapy increased overall survival for patients with cancer that had spread to their brain compared with patients treated with radiotherapy alone, according to study findings published in *JAMA Network Open*.

The study examined more than 3,000 adult patients with varying types of cancer (melanoma, non-small cell lung, breast, colorectal or kidney) who also had brain metastases. Researchers found that patients treated with immunotherapy alone had improved overall survival compared with those treated without immunotherapy. However, it was the combination of immunotherapy and radiotherapy that stood out to researchers, with the combination showing a significant overall survival improvement.

"Most importantly ... immunotherapy improved the (overall survival) of patients with brain metastases by 7.5 months, regardless of what other treatments they received," the researchers wrote.

When combined with radiotherapy, immunotherapy improved overall survival by 10 months compared with those who received radiotherapy alone.

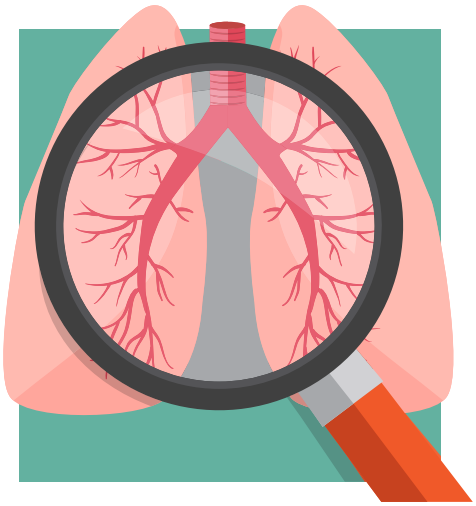
Although this combination has been studied in melanoma, this is the first study to look at patients with other cancers who develop a brain metastasis and have had definitive surgery for their primary tumor, according to the researchers.

Keytruda Doubles Five-Year Survival Rate in Metastatic NSCLC

PATIENTS WITH METASTATIC non-small cell lung cancer (NSCLC) whose tumors expressed levels above 50% of PD-L1, a biomarker, lived longer when treated with Keytruda (pembrolizumab) compared with patients who received chemotherapy, according to phase 3 study results presented during the European Society for Medical Oncology Virtual Congress 2020.

In the study, more than 300 patients were selected randomly to receive either Keytruda or chemotherapy. Researchers discovered that the immunotherapy drug nearly doubled the five-year survival rate for patients — to 31% — versus 16% with chemotherapy.

In addition, median response was 29.1 months with Keytruda versus 6.3 months with chemotherapy, and fewer patients experienced side effects with Keytruda than with chemotherapy, 31.2% versus 53.3%, respectively.



Tagrisso Improves Central Nervous System Disease-Free Survival in Early-Stage NSCLC

THE RISK FOR CENTRAL NERVOUS system (CNS) death or progression was reduced by 82% in patients with early-stage EGFR-mutated non-small cell lung cancer (NSCLC) following complete tumor resection after being treated with Tagrisso (osimertinib), according to findings from the ADAURA clinical trial presented at the European Society for Medical Oncology Virtual Congress 2020 and published in the *New England Journal of Medicine*.

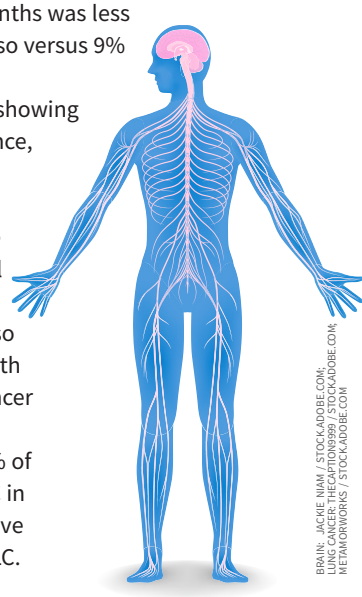
"It's time to change the notion that treatment for early-stage EGFR-mutated lung cancer ends after surgery, since recurrence rates are still very high even after adjuvant chemotherapy," principal researcher Dr. Masahiro Tsuboi said in a news release. Tsuboi is the director of the Department of Thoracic Surgery and Oncology for the National Cancer Center Hospital East in Japan.

The phase 3 trial included 682 patients with primary nonsquamous stage 1b to 3a NSCLC with EGFR mutations, exon 19 deletions or L858R mutations. They received either Tagrisso or placebo for three years or until disease recurrence or discontinuation criteria were met.

Researchers concluded that the estimated probability of observing CNS recurrence at 18 months was less than 1% with Tagrisso versus 9% with placebo.

"These new data showing low rates of recurrence, particularly in the brain, combined with the remarkable disease-free survival benefit clearly demonstrate that Tagrisso provides patients with more time living cancer free," Tsuboi said.

About 10% to 15% of patients with NSCLC in the United States have EGFR-mutated NSCLC.



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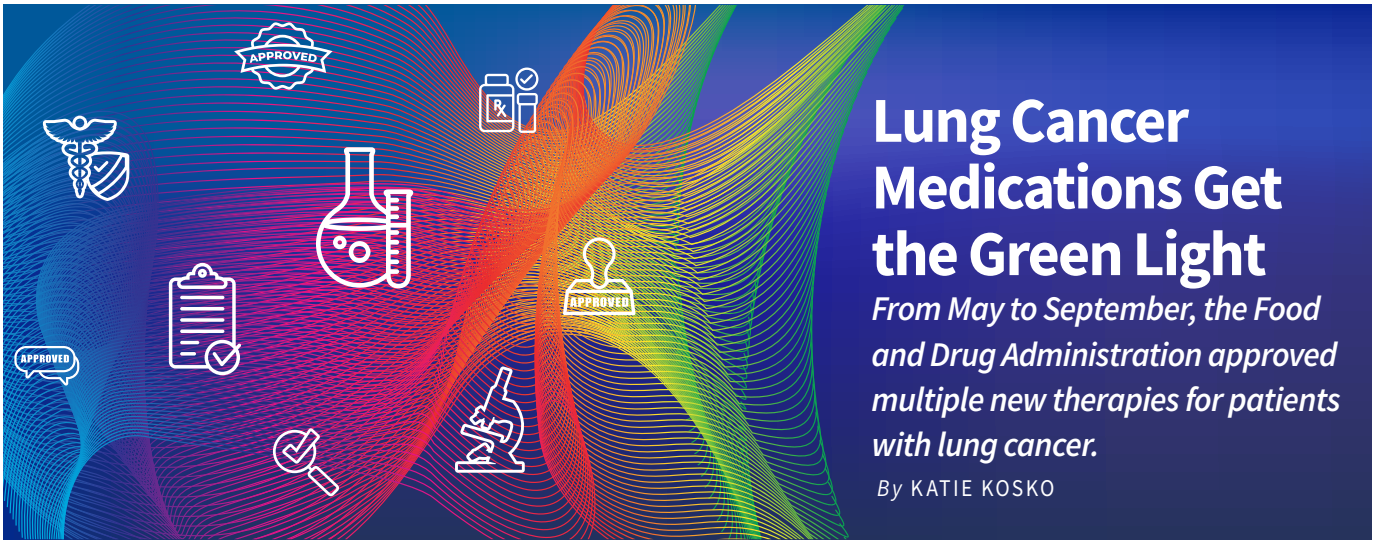


Lung Cancer Medications Get the Green Light

From May to September, the Food and Drug Administration approved multiple new therapies for patients with lung cancer.

By KATIE KOSKO

MAY 2020

MAY 6: Tabrecta (capmatinib), the first targeted drug to treat lung cancer, was approved for adults with metastatic non-small cell lung cancer (NSCLC) whose tumors have a mutation that leads to MET exon 14 skipping.

MAY 8: The FDA approved Retevmo (selpercatinib) to treat adults with metastatic RET fusion-positive NSCLC.

MAY 15: The combination therapy of Opdivo (nivolumab) and Yervoy (ipilimumab) was approved for the first-line treatment of adult patients with metastatic NSCLC whose tumors express PD-L1 greater than or equal to 1%, with no EGFR or ALK mutations.

MAY 18: Tecentriq (atezolizumab) was approved for the first-line treatment of adult patients with metastatic NSCLC whose tumors have high PD-L1 expression with no EGFR or ALK genomic tumor alterations.

MAY 22: The FDA approved Alunbrig (brigatinib) for adult patients with ALK-positive metastatic NSCLC.

MAY 26: The combination of Opdivo and Yervoy was approved with two cycles of platinum-doublet chemotherapy for treatment of patients with metastatic or recurrent NSCLC who have no EGFR or ALK genomic tumor mutations.

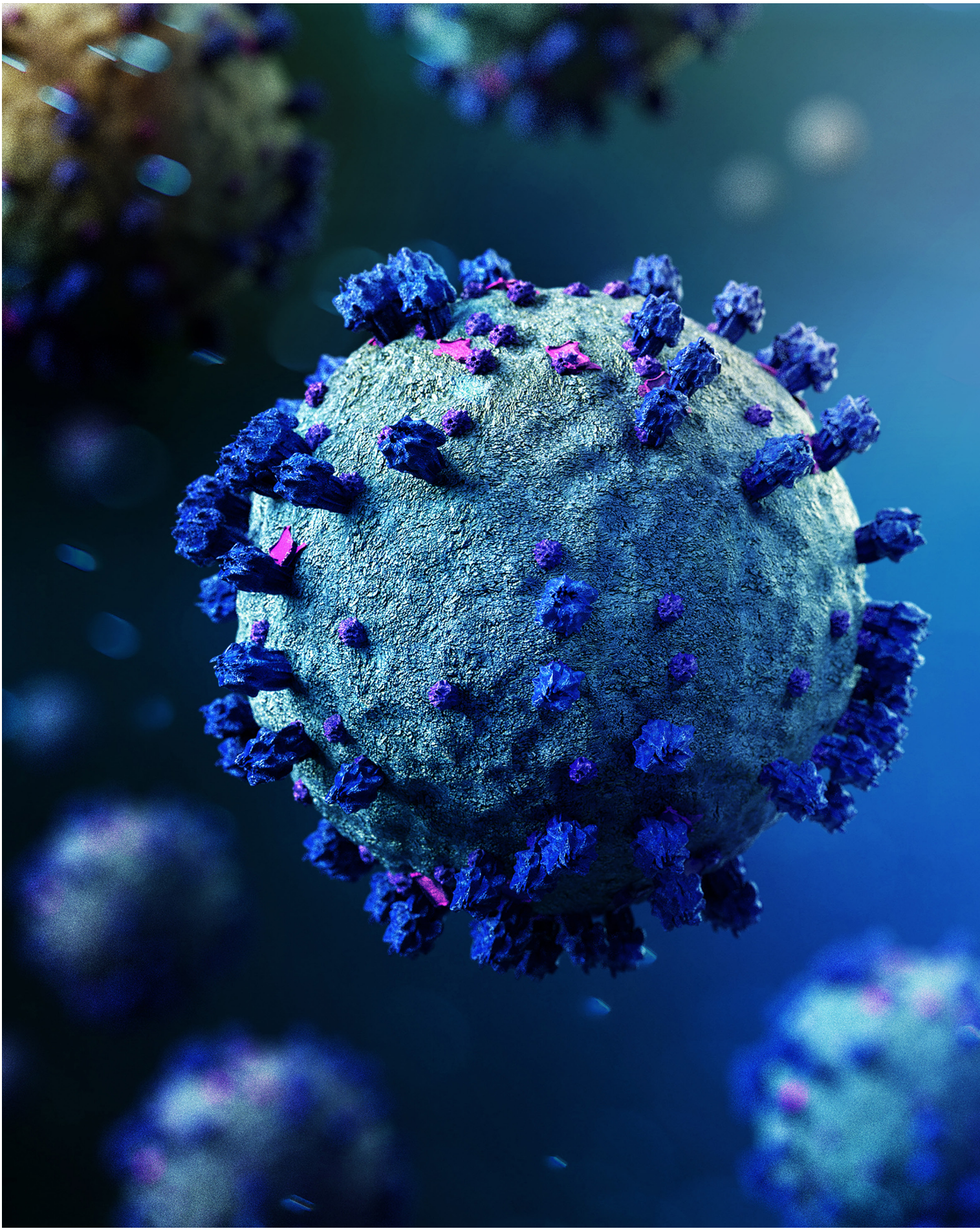
MAY 29: The combination of Cyramza (ramucirumab) with Tarceva (erlotinib) was approved for first-line treatment of metastatic NSCLC with EGFR exon 19 deletions or exon 21 (L858R) mutations.

JUNE 2020

JUNE 15: The FDA approved Zepzelca (lurbinectedin) for adult patients with metastatic small cell lung cancer (SCLC) that progressed on or after platinum-based chemotherapy.

SEPTEMBER 2020

SEPTEMBER 4: Gavreto (pralsetinib) was granted accelerated approval for adult patients with metastatic RET fusion-positive NSCLC.



Be Cautious, *Not Fearful*

Patients with lung cancer should take all recommended precautions against COVID-19, but they must also keep up with their cancer care, doctors advise.

By LEAH LAWRENCE

Alisa Brenes, 63, is a 20-year survivor of lung cancer, and she spends a lot of time worrying about COVID-19.

"I first became aware of COVID-19 through my lung cancer community, which was discussing this new disease and how it affects the lungs," Brenes recalls. "At first, I didn't feel any panic, (as) most of the local cases were in Westchester, (New York), but shortly after that my office told us we were going home and New York City was going on pause."

Brenes, a legal assistant living in Manhattan, is just one of the many hundreds of thousands of people in the United States who have survived lung cancer or are facing a new diagnosis and are trying to understand their risks in what has become the COVID-19 era.

WHAT'S THE RISK?

According to the Centers for Disease Control and Prevention (CDC), COVID-19 is a respiratory illness caused by a virus that can spread from person to person, and its symptoms can range from mild or none to severe illness. The virus cells first infect the respiratory and nasal lining, causing inflammation, explains Dr. David M. Jablons, chief of general thoracic surgery at the University of California, San Francisco and a professor of thoracic oncology at its Helen Diller Family Comprehensive Cancer Center »

ALISA BRENES has been a lung cancer survivor for two decades.

“That is why some patients can get a cough or shortness of breath, and in severe cases, people can develop pneumonia or interstitial lung disease,” a group of disorders that can cause progressive lung scarring, Jablons says.

Everyone is at risk for getting COVID-19, but certain groups, including older adults and those of any age with serious underlying medical conditions, might be at a higher risk for severe illness if they contract the virus, according to the CDC.

Lung cancer itself likely does not put people at increased risk of contracting COVID-19, but some of the other illnesses or treatments associated with the malignancy may increase the severity of the virus, according to Dr. Joshua K. Sabari, a medical oncologist at NYU Langone Health’s Perlmutter Cancer Center and an assistant professor at its NYU Grossman School of Medicine in New York City. One of those conditions is simply age, as the average patient who receives a diagnosis of lung cancer is 70 years old.

“Other pulmonary comorbidities (coexisting illnesses) associated with lung cancer, such as chronic obstructive pulmonary disease and the use of certain cytotoxic chemotherapies to treat lung cancer, may also increase risk compared with targeted therapies or immunotherapy and chemotherapy combined,” Sabari says.

Although chemotherapy leaves patients with lung cancer immunocompromised, meaning that their bodies are more prone to infection, study results have been mixed about whether the treatment contributes to the risk of contracting COVID-19 or having a severe case.

Some of the best data available on the relationship between lung cancer and COVID-19 are from the TERAVOLT global registry study. Recently published data from TERAVOLT showed that patients with stage 4 non-small cell lung cancer face a higher risk of complications and death if they get COVID-19. When various factors were looked at independently, the study showed that older age, treatment with chemotherapy and the presence of comorbidities were associated with an increased risk of death among these patients. However, in an analysis of multiple factors looked at together — typically considered a more accurate measure — only smoking history was associated with an increased risk of death.

Another study, this one conducted by researchers at Memorial Sloan Kettering Cancer Center in New York City, analyzed the cases of 102 patients who had both lung cancer and confirmed COVID-19; they found that the virus was severe in 62% of the patients but accounted for only 11% of the deaths among the group studied. Chronic obstructive pulmonary disease and smoking status were associated with increased severity of COVID-19, but recent chemotherapy was not.

ALISA BRENES BY BEN HIDER

Most patients with early-stage lung cancer found incidentally through screening or on a chest X-ray prior to another surgery are likely not at any increased risk from COVID-19 compared with the general population, Jablons says, adding that he is not aware of any patients with lung cancer at his cancer center who contracted COVID-19 since the pandemic started.

Although her evaluation is anecdotal rather than scientific, Brenes has seen a similar trend: None of her close friends from the lung cancer community have told her they had the virus, and Brenes has heard through the grapevine of only a handful of people within that community who have been sick with the illness.

> **"Some trials halted enrollment at the start of the pandemic, but we are now able to reopen them safely."**
> ***—DR. KONSTANTINOS LEVENTAKOS, Mayo Clinic***

KEEP UP WITH CANCER CARE

One important thing to remember is that cancer will not "shelter in place" when people do, Jablons says.

"In the past few months, there have not been as many incidental early-stage cancers found through screening because people are avoiding going to the hospital or for routine health care," he says. "That may be a bigger risk to someone's long-term survival than COVID-19."

Brenes admits that she delayed some of her regularly scheduled follow-up appointments.

"I was a few months late for my routine low-dose CT (scan)," she says, referring to a screening test for individuals with a history of smoking that checks the lungs for lesions. "I was afraid to go to my cancer center — Mount Sinai in New York — which was a COVID-19 hospital. I was afraid to take mass transportation or to take a cab."

To lower her risk for exposure, Brenes eventually called to have her scans scheduled at a private radiology center within walking distance and asked to have the first appointment of the week after the CT scanner had been out of use for 48 hours over the weekend.

Sabari, who practices in New York City, says he knows of a lot of patients who are fearful of in-person health care visits.

"We definitely missed opportunities to diagnose patients early and cure their disease," Sabari says. "We have also seen a lot of mortality in lung cancer patients from not accessing care or getting the correct care during the pandemic."

Right now, in any area with lower COVID-19 rates, patients should not delay treatment, he says. Even during the peak of the pandemic, he continued to treat patients with stage 2 or 3 disease, for whom the goal of chemotherapy is to cure the cancer.

Even in those areas with higher rates of COVID-19, patients should actively communicate with their health care teams on the best way to approach treatment, according to Dr. Konstantinos Leventakos, a medical oncologist and an assistant professor of medicine and oncology at Mayo Clinic in Rochester, Minnesota.

For some patients with advanced disease, the recommended treatment approach may include enrolling in a clinical trial. Fortunately, most centers have these studies up and running again. »

BRENES said she was afraid to go to her cancer center because of COVID-19.

ALISA BRENES BY BEN HIDER

“Some trials halted enrollment at the start of the pandemic, but we are now able to reopen them safely,” Leventakos says.

The requirements of each clinical trial are different, and some may mandate that patients undergo COVID-19 testing before they receive treatment. Other changes made to the design of some trials during the pandemic aim to make participation more accessible, for instance, by requiring fewer cancer center visits than would otherwise be expected or using televisits or local providers when possible. “We have to constantly balance the risk of potentially life-threatening infection in patients with lung cancer with the short- and long-term consequences of delaying cancer care,” Leventakos says. “That is why good communication with your oncology team is the only way to make the best decision.”

According to Jablons, if required to come onsite, patients are safe at most treatment centers, especially at high-volume centers of excellence where thorough precautions have been put into place to prevent transmission of the virus. If concerns exist, patients should inquire about the safety precautions that are being taken for both employees and patients at the facility.

Tiffany Fagnani, 39, said she has experienced some cancellations or rescheduling of treatment and follow-up appointments at Fox Chase Cancer Center in Philadelphia since the pandemic began, but that she feels safe going in when necessary because the center has been able to maintain a COVID-19-free status.

Fagnani, a nurse case manager living in Pennsylvania, received a diagnosis of stage 4 lung cancer with brain metastases in July 2017. Today, even though the disease is stable, she understands the importance of not delaying care.

“I know that I still have to go in for certain appointments, and for others I am able to talk with my team using telehealth,” Fagnani says. She sees this compromise as the best way to prioritize her care while still being cautious.

TAKING PRECAUTIONS

When Fagnani goes out, she wears a mask and checks to make sure everyone around her is doing the same. If they are not, she avoids going near them. She also avoids crowded spaces where social distancing is not possible.

One challenge for Fagnani was that she was in the process of having a new home built when the pandemic hit.

“When we did walkthroughs, I asked that it only be me, my realtor and the builder,” she says. “We were all masked, and we were all socially distanced.”

In the more crowded setting of New York City, Brenes also takes precautions. “I always wear a mask if I have to leave my apartment or even for the laundry room, to get mail from the lobby or to get a home delivery,” Brenes says.

TIFFANY FAGNANI BY YENMA KOUNLAVONG

"I wear a disposable mask with a reusable lung cancer awareness mask over it."

As many public service announcements have emphasized throughout the pandemic, frequent hand washing and keeping fingers away from the face are also important. Another way to protect health is to keep the lungs and body as healthy as possible, Leventakos says.

"At home, a healthy lifestyle can help overall health: Make healthy choices in order to keep your body strong," Leventakos recommends. "Get enough sleep so that you wake feeling rested. Choose a healthy, balanced diet. Aim to get exercise most days of the week."

Importantly, he says, find healthy ways to reduce stress.

"I do have high anxiety, and it has affected my mental health," Brenes notes. To help manage her anxiety, Brenes has signed up for meditation and chanting classes on Zoom, which help her relax. When she feels anxious, she tries to focus on her breathing. Brenes also turns to the lung cancer community and its Zoom chats to talk about her fears and concerns.

Patients in need of support can turn to online communities like LUNGevity, which offers weekly virtual meetups for patients, survivors and caregivers across the country. Similarly, the GO2 Foundation for Lung Cancer has moved its Lung Cancer Living Room, a monthly patient education and support series, to a virtual platform. Fagnani says that she still sees some friends in person, at least the ones she knows are following all appropriate COVID-19-related precautions. She has also found a renewed joy in cooking.

"I have been doing grocery delivery, and sometimes there are certain things that you can't get," Fagnani says. "I have learned to open the cupboard and see what I have to create a new meal or new recipes. I have really enjoyed that."

BE SAFE, NOT SCARED

As winter months approach, Sabari says that patients with lung cancer should be cautious but not fearful.

"I recommend that all patients get a flu shot, and if you are 65 or older, get the high-dose flu shot," Sabari says. "We can't become complacent. We have to continue to wear masks, wash hands routinely (and) socially isolate and distance when possible."

He also emphasizes that, with all that health care experts have learned about COVID-19 since earlier this year, the benefits of treating lung cancer far outweigh the risks of the virus.

"Take every possible precaution that you can, but until we have a vaccine or until a greater proportion of the population has antibodies, COVID-19 is something that is going to remain with us, and dealing with it has to become a new normal," Sabari says.

Leventakos agrees. He recommends that all patients and their families or caregivers get familiar with the COVID-19 precautions at their clinic or hospital and closely monitor the levels of the virus in their local area.

Finally, he says, it is important to remember that each patient's experience is unique.

"Even though, statistically, COVID-19 might cause more complications in patients with cancer, and lung cancer, specifically, every patient has a different course," Leventakos says. "This is why it is important for patients to communicate any change in their health with their oncology team."

FAGNANI takes precautions when going out in public.

TIFFANY FAGNANI BY YENMA KOUNLAVONG

KEYTRUDA IS A BREAKTHROUGH IMMUNOTHERAPY.

FOR TODAY

KEYTRUDA is a potential first treatment for **3 out of 4 patients** with advanced non–small cell lung cancer (NSCLC).

KEYTRUDA is also used to treat **more patients** with advanced lung cancer than any other immunotherapy.

FOR THE FUTURE

Ongoing clinical trials are exploring if KEYTRUDA can help treat more patients.

KEYTRUDA may be your first treatment for advanced NSCLC, either in combination with chemotherapy or used alone as a chemotherapy-free option.
Ask your doctor if KEYTRUDA is right for you.

KEYTRUDA is a prescription medicine used to treat a kind of lung cancer called non–small cell lung cancer (NSCLC).

- **KEYTRUDA + CHEMOTHERAPY, NONSQUAMOUS**
  It may be used with the chemotherapy medicines pemetrexed and a platinum as your first treatment when your lung cancer has spread (advanced NSCLC) **and** is a type called "nonsquamous" **and** your tumor does not have an abnormal "EGFR" or "ALK" gene.
- **KEYTRUDA + CHEMOTHERAPY, SQUAMOUS**
  It may be used with the chemotherapy medicines carboplatin and either paclitaxel or paclitaxel protein-bound as your first treatment when your lung cancer has spread (advanced NSCLC), **and** is a type called "squamous."
- **KEYTRUDA USED ALONE, PD-L1 POSITIVE**
  It may be used alone as your first treatment when your lung cancer has not spread outside your chest (stage III) and you cannot have surgery or chemotherapy with radiation, **or** your NSCLC has spread to other areas of your body (advanced NSCLC), **and** your tumor tests positive for "PD-L1" **and** does not have an abnormal "EGFR" or "ALK" gene.
- **KEYTRUDA AFTER CHEMOTHERAPY, PD-L1 POSITIVE**
  It may also be used alone for advanced NSCLC if you have tried chemotherapy that contains platinum and it did not work or is no longer working **and**, your tumor tests positive for "PD-L1" **and** if your tumor has an abnormal "EGFR" or "ALK" gene, you have also received an "EGFR" or "ALK" inhibitor medicine that did not work or is no longer working.

PD-L1 = programmed death ligand 1;
EGFR = epidermal growth factor receptor;
ALK = anaplastic lymphoma kinase.

IMPORTANT SAFETY INFORMATION

KEYTRUDA is a medicine that may treat certain cancers by working with your immune system. KEYTRUDA can cause your immune system to attack normal organs and tissues in any area of your body and can affect the way they work. These problems can sometimes become severe or life-threatening and can lead to death. These problems may happen any time during treatment or even after your treatment has ended.

Call or see your doctor right away if you develop any symptoms of the following problems or these symptoms get worse:

- **Lung problems (pneumonitis).** Symptoms of pneumonitis may include shortness of breath, chest pain, or new or worse cough.
- **Intestinal problems (colitis) that can lead to tears or holes in your intestine.** Signs and symptoms of colitis may include diarrhea or more bowel movements than usual; stools that are black, tarry, sticky, or have blood or mucus; or severe stomach-area (abdomen) pain or tenderness.
- **Liver problems, including hepatitis.** Signs and symptoms of liver problems may include yellowing of your skin or the whites of your eyes, nausea or vomiting, pain on the right side of your stomach area (abdomen), dark urine, or bleeding or bruising more easily than normal.
- **Hormone gland problems (especially the thyroid, pituitary, adrenal glands, and pancreas).** Signs and symptoms that your hormone glands are not working properly may include rapid heartbeat, weight loss or weight gain, increased sweating, feeling more hungry or thirsty, urinating more often than usual, hair loss, feeling cold, constipation, your voice gets deeper, muscle aches, feeling very weak, dizziness or fainting, or headaches that will not go away or unusual headache.
- **Kidney problems, including nephritis and kidney failure.** Signs of kidney problems may include change in the amount or color of your urine.
- **Skin problems.** Signs of skin problems may include rash, itching, blisters, peeling or skin sores, or painful sores or ulcers in your mouth or in your nose, throat, or genital area.
- **Problems in other organs.** Signs and symptoms of these problems may include changes in eyesight; severe or persistent muscle or joint pains; severe muscle weakness; low red blood cells (anemia); swollen lymph nodes, rash or tender lumps on skin, cough, shortness of breath, vision changes,

Important Safety Information is continued on the next page.

Roger is a real patient

keytruda.com/lung

IMPORTANT SAFETY INFORMATION *(continued)*

or eye pain (sarcoidosis); confusion, fever, muscle weakness, balance problems, nausea, vomiting, stiff neck, memory problems, or seizures (encephalitis); pain, numbness, tingling, or weakness in the arms or legs; bladder or bowel problems including needing to urinate more frequently, urinary incontinence, difficulty urinating, or constipation (myelitis); and shortness of breath, irregular heartbeat, feeling tired, or chest pain (myocarditis).

- **Infusion (IV) reactions that can sometimes be severe and life-threatening.** Signs and symptoms of infusion reactions may include chills or shaking, shortness of breath or wheezing, itching or rash, flushing, dizziness, fever, or feeling like passing out.
- **Rejection of a transplanted organ.** People who have had an organ transplant may have an increased risk of organ transplant rejection if they are treated with KEYTRUDA.
- **Complications, including graft-versus-host disease (GVHD), in people who have received a bone marrow (stem cell) transplant that uses donor stem cells (allogeneic).** These complications can be severe and can lead to death. These complications may happen if you underwent transplantation either before or after being treated with KEYTRUDA. Your doctor will monitor you for the following signs and symptoms: skin rash, liver inflammation, abdominal pain, and diarrhea.

Getting medical treatment right away may help keep these problems from becoming more serious. Your doctor will check you for these problems during treatment with KEYTRUDA. Your doctor may treat you with corticosteroid or hormone replacement medicines. Your doctor may also need to delay or completely stop treatment with KEYTRUDA if you have severe side effects.

Before you receive KEYTRUDA, tell your doctor if you have immune system problems such as Crohn's disease, ulcerative colitis, or lupus; have had an organ transplant or plan to have or have had a bone marrow (stem cell) transplant that used donor stem cells (allogeneic); have lung or breathing problems; have liver problems; or have any other medical problems.

If you are pregnant or plan to become pregnant, tell your doctor. KEYTRUDA can harm your unborn baby. If you are able to become pregnant, your doctor will give you a pregnancy test before you start treatment.

Use effective birth control during treatment and for at least 4 months after the final dose of KEYTRUDA. Tell your doctor right away if you think you may be pregnant or you become pregnant during treatment with KEYTRUDA.

If you are breastfeeding or plan to breastfeed, tell your doctor. It is not known if KEYTRUDA passes into your breast milk. Do not breastfeed during treatment with KEYTRUDA and for 4 months after your final dose of KEYTRUDA.

Tell your doctor about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements.

Common side effects of KEYTRUDA when used alone include feeling tired; pain, including pain in muscles, bones, or joints and stomach area (abdominal) pain; decreased appetite; itching; diarrhea; nausea; rash; fever; cough; shortness of breath; and constipation.

Common side effects of KEYTRUDA when given with certain chemotherapy medicines include feeling tired or weak; nausea; constipation; diarrhea; decreased appetite; rash; vomiting; cough; trouble breathing; fever; hair loss; inflammation of the nerves that may cause pain, weakness, and paralysis in the arms and legs; swelling of the lining of the mouth, nose, eyes, throat, intestines, or vagina; and mouth sores.

These are not all the possible side effects of KEYTRUDA. Tell your doctor if you have any side effect that bothers you or that does not go away. For more information, ask your doctor or pharmacist.

Please read the adjacent Important Information About KEYTRUDA and discuss it with your oncologist.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch or call 1-800-FDA-1088.

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IT'S TRU. KEYTRUDA® (pembrolizumab) Injection 100 mg

MERCK

Important Information About KEYTRUDA® (pembrolizumab) injection 100 mg. Please speak with your healthcare professional regarding KEYTRUDA (pronounced key-true-duh). Only your healthcare professional knows the specifics of your condition and how KEYTRUDA may work with your overall treatment plan. If you have any questions about KEYTRUDA, speak with your healthcare professional. **℞ONLY**

What is the most important information I should know about KEYTRUDA?

KEYTRUDA is a medicine that may treat certain cancers by working with your immune system. KEYTRUDA can cause your immune system to attack normal organs and tissues in any area of your body and can affect the way they work. These problems can sometimes become severe or life-threatening and can lead to death. These problems may happen anytime during treatment or even after your treatment has ended.

Call or see your doctor right away if you develop any symptoms of the following problems or these symptoms get worse:

Lung problems (pneumonitis). Symptoms of pneumonitis may include:

- shortness of breath
- chest pain
- new or worse cough

Intestinal problems (colitis) that can lead to tears or holes in your intestine. Signs and symptoms of colitis may include:

- diarrhea or more bowel movements than usual
- stools that are black, tarry, sticky, or have blood or mucus
- severe stomach-area (abdomen) pain or tenderness

Liver problems, including hepatitis. Signs and symptoms of liver problems may include:

- yellowing of your skin or the whites of your eyes
- nausea or vomiting
- pain on the right side of your stomach area (abdomen)
- dark urine
- bleeding or bruising more easily than normal

Hormone gland problems (especially the thyroid, pituitary, adrenal glands, and pancreas). Signs and symptoms that your hormone glands are not working properly may include:

- rapid heart beat
- weight loss or weight gain
- increased sweating
- feeling more hungry or thirsty
- urinating more often than usual
- hair loss
- feeling cold
- constipation
- your voice gets deeper
- muscle aches
- feeling very weak
- dizziness or fainting
- headaches that will not go away or unusual headache

Kidney problems, including nephritis and kidney failure. Signs of kidney problems may include:

- change in the amount or color of your urine

Skin problems. Signs of skin problems may include:

- rash
- itching
- blisters, peeling or skin sores
- painful sores or ulcers in your mouth or in your nose, throat, or genital area

Problems in other organs. Signs and symptoms of these problems may include:

- changes in eyesight
- severe or persistent muscle or joint pains
- severe muscle weakness
- low red blood cells (anemia)
- swollen lymph nodes, rash or tender lumps on skin, cough, shortness of breath, vision changes, or eye pain (sarcoidosis)
- confusion, fever, muscle weakness, balance problems, nausea, vomiting, stiff neck, memory problems, or seizures (encephalitis)
- pain, numbness, tingling, or weakness in your arms or legs, or bladder or bowel problems, including the need to urinate more often, leaking of urine, trouble urinating, or constipation (myelitis)
- shortness of breath, irregular heartbeat, feeling tired, or chest pain (myocarditis)

Infusion (IV) reactions that can sometimes be severe and life-threatening. Signs and symptoms of infusion reactions may include:

- chills or shaking
- shortness of breath or wheezing
- itching or rash
- flushing
- dizziness
- fever
- feeling like passing out

Rejection of a transplanted organ. People who have had an organ transplant may have an increased risk of organ transplant rejection. Your doctor should tell you what signs and symptoms you should report and monitor you, depending on the type of organ transplant that you have had.

Complications, including graft-versus-host-disease (GVHD), in people who have received a bone marrow (stem cell) transplant that uses donor stem cells (allogeneic). These complications can be severe and can lead to death. These

Continued on next page.

complications may happen if you underwent transplantation either before or after being treated with KEYTRUDA. Your doctor will monitor you for the following signs and symptoms: skin rash, liver inflammation, stomach-area (abdominal) pain, and diarrhea.

Getting medical treatment right away may help keep these problems from becoming more serious. Your doctor will check you for these problems during treatment with KEYTRUDA. Your doctor may treat you with corticosteroid or hormone replacement medicines. Your doctor may also need to delay or completely stop treatment with KEYTRUDA, if you have severe side effects.

What should I tell my doctor before receiving KEYTRUDA?
Before you receive KEYTRUDA, tell your doctor if you:

- have immune system problems such as Crohn's disease, ulcerative colitis, or lupus
- have received an organ transplant, such as a kidney or liver
- have received or plan to receive a stem cell transplant that uses donor stem cells (allogeneic)
- have lung or breathing problems
- have liver problems
- have any other medical problems
- are pregnant or plan to become pregnant
  - KEYTRUDA can harm your unborn baby.

  Females who are able to become pregnant:
  - Your doctor will give you a pregnancy test before you start treatment with KEYTRUDA.
  - You should use an effective method of birth control during and for at least 4 months after the final dose of KEYTRUDA. Talk to your doctor about birth control methods that you can use during this time.
  - Tell your doctor right away if you think you may be pregnant or if you become pregnant during treatment with KEYTRUDA.
- are breastfeeding or plan to breastfeed.
  - It is not known if KEYTRUDA passes into your breast milk.
  - Do not breastfeed during treatment with KEYTRUDA and for 4 months after your final dose of KEYTRUDA.

Tell your doctor about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements.

Know the medicines you take. Keep a list of them to show your doctor and pharmacist when you get a new medicine.

How will I receive KEYTRUDA?

- Your doctor will give you KEYTRUDA into your vein through an intravenous (IV) line over 30 minutes.
- In adults, KEYTRUDA is usually given every 3 weeks or 6 weeks depending on the dose of KEYTRUDA that you are receiving.
- In children, KEYTRUDA is usually given every 3 weeks.
- Your doctor will decide how many treatments you need.
- Your doctor will do blood tests to check you for side effects.
- If you miss any appointments, call your doctor as soon as possible to reschedule your appointment.

What are the possible side effects of KEYTRUDA?
KEYTRUDA can cause serious side effects. See "What is the most important information I should know about KEYTRUDA?"

Common side effects of KEYTRUDA when used alone include: feeling tired, pain, including pain in muscles, bones or joints and stomach-area (abdominal) pain, decreased appetite, itching, diarrhea, nausea, rash, fever, cough, shortness of breath, and constipation.

Common side effects of KEYTRUDA when given with certain chemotherapy medicines include: feeling tired or weak, nausea, constipation, diarrhea, decreased appetite, rash, vomiting, cough, trouble breathing, fever, hair loss, inflammation of the nerves that may cause pain, weakness, and paralysis in the arms and legs, swelling of the lining of the mouth, nose, eyes, throat, intestines, or vagina, and mouth sores.

Common side effects of KEYTRUDA when given with axitinib include: diarrhea, feeling tired or weak, high blood pressure, liver problems, low levels of thyroid hormone, decreased appetite, blisters or rash on the palms of your hands and soles of your feet, nausea, mouth sores or swelling of the lining of the mouth, nose, eyes, throat, intestines, or vagina, hoarseness, rash, cough, and constipation.

In children, feeling tired, vomiting and stomach-area (abdominal) pain, and increased levels of liver enzymes and decreased levels of salt (sodium) in the blood are more common than in adults.

These are not all the possible side effects of KEYTRUDA. For more information, ask your doctor or pharmacist.

Tell your doctor if you have any side effect that bothers you or that does not go away.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

General information about the safe and effective use of KEYTRUDA

Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. If you would like more information about KEYTRUDA, talk with your doctor. You can ask your doctor or nurse for information about KEYTRUDA that is written for healthcare professionals. For more information, go to www.keytruda.com.

Based on Medication Guide usmg-mk3475-iv-2006r033 as revised June 2020.

MERCK

Rare Genetic Changes Can Make a Big Difference in Non-Small Cell Lung Cancer Survival

Drugs that target certain gene mutations are improving survival rates for patients with lung cancer.

By SONYA COLLINS

When Ginger Head was given a diagnosis of stage 4 non-small cell lung cancer (NSCLC) at age 56 in 2017, an oncologist in Birmingham, Alabama, told her she had less than a year to live. The doctor offered her standard chemotherapy to help keep her alive as long as possible and didn't discuss any other options.

Head, a retired special education teacher, and her husband were stunned. Just days before, she was feeling great, working out five to six times a week. Then, a few days after a biopsy of an unusual lump in her neck, she was given months to live. When the doctor left the room, Head's husband asked the medical resident, who had stayed, what he would do in this situation. The resident told them that Head's tumor had high levels of a protein called PD-L1 that would make her a great candidate for immunotherapy. He recommended they go to The University of Texas MD Anderson Cancer Center in Houston.

During the next two years, Head underwent multiple treatments at MD Anderson. She had Gamma Knife radiosurgery for metastases in her brain, followed by chemotherapy plus an immune checkpoint inhibitor that blocked the PD-L1 protein that was helping her cancer spread. Finally, she had 15 rounds of radiation. At that point, Head's PET scans were clear. But, within a year, the cancer had recurred in her lymph nodes and her brain. Gene sequencing of Head's tumor tissue showed a rare genetic alteration called a RET fusion that was promoting the cancer's growth. That made her eligible for a clinical trial of a drug called Gavreto (pralsetinib) that targets the rare genetic alteration. »

HURCA! / STOCK.ADOBE.COM

“Just getting a coffee cup out of the cabinet every morning made me feel like I was seeing stars. Now I’m back to walking four miles a day with a girlfriend, and I can tell that my lung capacity is getting so much better.” — ***GINGER HEAD***

GINGER HEAD was given a diagnosis of stage 4 NSCLC and less than a year to live.

It’s fairly standard for oncologists to test NSCLC tissue for the gene mutations that most commonly drive the cancer, such as changes in EGFR and ALK genes. But doctors may not always test for less common genetic alterations that could also help the cancer grow and spread. Rare genetic alterations may arise in only 1% to 3% of NSCLC. But drugs on the market or in clinical trials can disable these genes and extend life significantly.

“Some oncologists aren’t testing for these because they are so rare,” says Dr. Jacob Sands, a medical oncologist who specializes in lung cancer at Dana-Farber Cancer Institute in Boston. “But if you’re in that 1%, it makes a huge difference for you. We really need to be doing dramatically better on this.”

Widespread testing for all possible cancer-driving gene alterations would get more people on the best medication for them and help contribute to research of these gene changes. This could help to extend the life of patients with NSCLC.

“Some oncologists aren’t testing for these because they are so rare. But if you’re in that 1%, it makes a huge difference for you.”

— DR. JACOB SANDS, Dana-Farber Cancer Institute

GENETIC ALTERATIONS IN NSCLC

Up to 85% of lung cancers are non-small cell, which includes adenocarcinoma (also called non-squamous cell carcinoma), squamous cell carcinoma and large-cell carcinoma. Overall, NSCLCs are slower growing and less aggressive than the small-cell form of the disease. While the vast majority of all lung cancers are linked to smoking, when nonsmokers get lung cancer, they are more likely to get the non-small cell type.

continued on page 24

GINGER HEAD BY PAULA DAVIS; JACOB SANDS COURTESY OF DANA-FARBER CANCER INSTITUTE

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Empower Everyone.
Ignore No One.

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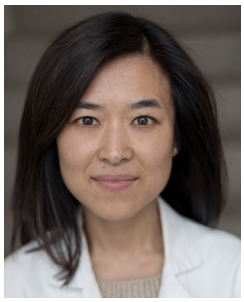
NSCLC, particularly adenocarcinoma, often has genetic changes that may help the cancer progress. The term genetic alteration includes gene mutations as well as other gene-related abnormalities or changes in the cancer cells. Gene mutations are changes in a single, specific gene. But other alterations to longer stretches of DNA can aid and abet cancer growth, too. These changes include rearrangements, deletions, duplications and fusions of segments of DNA. The terms driver mutation, driver gene and driver oncogene also describe these gene alterations that help cancer cells survive. Up to 60% of adenocarcinomas have these genetic alterations.



DR. CHRISTINA BAIK

Genetic alterations are even more common among people who develop this type of cancer before the age of 40. As many as three out of four people who get adenocarcinoma before age 40 have gene changes in their tumors that drugs could target. "Anyone who gets lung cancer before the age of 40, any young people, should get tested for these," Sands says.

People who have never smoked, such as Head, or who have smoked very little also are more likely to have lung cancers with driver mutations.

"No matter what kind of lung cancer they have, if they have no smoking history or a minimal smoking history, those patients should definitely get comprehensive genetic testing of their tumor," says Dr. Christina Baik, a medical oncologist who specializes in lung cancer at Seattle Cancer Care Alliance in Washington.

These gene alterations matter so much because in metastatic NSCLC, certain medications — some on the market, others currently in clinical trials — can attack and disable the very alterations that help the cancer advance. Most of these medications are pills that patients can take every day at home.

"Identifying a driver oncogene in a cancer and getting treatment for that particular genetic change can improve people's survival," Baik says.

GINGER HEAD's cancer had a RET fusion, making her eligible for a clinical trial.

HOW DOCTORS FIND GENETIC ALTERATIONS

Doctors may test for genetic alterations in a couple of ways.

A polymerase chain reaction (PCR) test is a fast and inexpensive way to look for specific alterations by analyzing certain segments of tumor DNA. Doctors might order this type of test for specific commonmutations, such as EGFR and ALK. However, a separate test is required for each mutation. Testing for numerous mutations through this method could require multiple biopsies.

Next-generation sequencing, a more expensive test that may not be covered by all insurance plans, decodes the entire genetic code of the tumor. This type of test will uncover any genetic alteration that may be of interest in determining the care plan, which can make a significant difference in prognosis.

"Every lung cancer patient has to have genetic screening," says Dr. Anne S. Tsao, a medical oncologist who specializes in lung cancer at MD Anderson. "Those mutations are out there, but if we don't screen you, you may not get optimal care and we may never know what we might've been able to do for you."

Some people will need a second round of genetic testing after treatment has begun. "Tumors evolve over time," Tsao says. "They can be sensitive to a particular drug for a while and then develop secondary mutations that make them resistant to the drug." When a person progresses on a targeted drug, a new genetic test can help doctors determine which drug to use next.

RARE GENETIC ALTERATIONS IN NSCLC

Some of the less common genetic alterations that can drive NSCLCs include RET fusions, which Head has; EGFR T790M mutations and EGFR exon 20 insertion mutations; ROS1 rearrangements; MET amplifications and PIK3CA mutations. This is not an exhaustive list. Each of these alterations respectively may arise in 1% to 3%, maybe more, of NSCLCs. That may seem small, but combined, these alterations represent a substantial proportion of patients with lung cancer.

GINGER HEAD BY PAULA DAVIS; CHRISTINA BAIK COURTESY OF SEATTLE CANCER CARE ALLIANCE

> “I just try my best to live like this cancer never happened.”
>
> — *J.D. WALK, lung cancer survivor*

» **J.D. WALK** received a diagnosis of stage 4 NSCLC at the age of 39.

JD WALK BY NEYSSA LEE

RET FUSIONS

RET fusions are very rare genetic alterations. The Food and Drug Administration (FDA) has approved two drugs to target the alteration: Retevmo (selpercatinib) and Gavreto. The latter received approval in September 2020 based on results from the ARROW trial, where 57% of patients previously treated with platinum-based chemotherapy responded to the drug, and just under 6% had a complete response. Among individuals who hadn’t yet received any treatment, 70% responded and 11% had a complete response. Many trial participants, including Head, were still responding to the drug after the trial ended.

Head takes four pills every morning at 3 a.m. “They want you to be good and empty when you take it, so I’ve just gotten accustomed to waking up in the middle of the night, taking my four pills and going right back to sleep,” she says.

The most common side effects of the drug, which occur in about 20% to 35% of patients, include liver damage, anemia, constipation, high blood pressure and low white blood cell counts. Head didn’t experience any of these, only extreme fatigue during the first month on the medication.

“Just getting a coffee cup out of the cabinet every morning made me feel like I was seeing stars,” she says. “Now I’m back to walking four miles a day with a girlfriend, and I can tell that my lung capacity is getting so much better.”

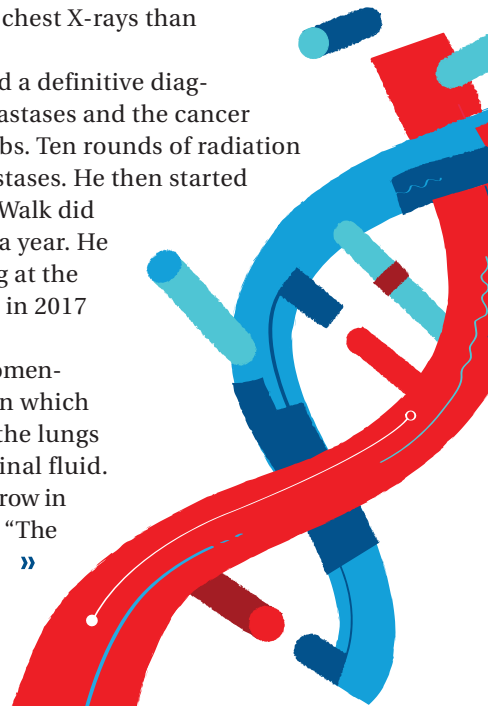
EGFR T790M AND OTHER MODES OF RESISTANCE

EGFR T790M mutations are usually responsible when people progress on inhibitors such as Iressa (gefitinib) or Tarceva (erlotinib). “About 60% of patients who have progression on those drugs have T790M as that resistance mutation. Then Tagrisso (osimertinib) is the standard of care,” Sands says.

J.D. Walk of Ravensdale, Washington, received Tarceva when he first started treatment for stage 4 EGFR-positive NSCLC at age 39 in 2016. He had shown signs of lung cancer for at least a year prior to his diagnosis, but his doctor insisted for many months that it was pneumonia. For a man his age who had never smoked and was in excellent physical health, pneumonia was the more likely interpretation of the chest X-rays than lung cancer.

By the time Walk received a definitive diagnosis, he had 39 brain metastases and the cancer had destroyed one of his ribs. Ten rounds of radiation eliminated the brain metastases. He then started the targeted drug Tarceva. Walk did well on the drug for about a year. He was back to weight training at the gym, but during a workout in 2017 he passed out.

Walk had developed leptomeningeal disease, a condition in which cancer cells migrate from the lungs and get into the cerebrospinal fluid. From there, the cells can grow in the spinal cord or the brain. “The doctors told me when most »



people get leptomeningeal disease it's three weeks to three months before they pass away, and it looked like I'd already had it for a month or so."

By that calculation, Walk may have only had a number of days or weeks left. But he still had treatment options ahead of him. He received an Ommaya reservoir, a port that delivers chemotherapy directly to the ventricles in the brain where cerebrospinal fluid is made. The treatment left him in such a fog that he doesn't remember much from the time the treatment started until about six months after it was finished. He was on disability and couldn't do his job as an account manager at Siemens. He couldn't drive; he could barely walk. What was worse was that, although he had outlived his previous prognosis, his doctor told him that he wasn't getting any better.

Tagrisso also received approval for people whose metastatic EGFR T790M-positive NSCLC had progressed on another EGFR inhibitor.

"Within a couple weeks after I started Tagrisso, the leptomeningeal disease was almost gone," he says. By the time Walk's short-term disability had run out, he was able to go back to work.

Three years later, Walk still takes Tagrisso. Though it was rare to survive a single bout of leptomeningeal disease, Walk survived it a second time last summer. Now the cancer is concentrated in his lungs, where it remains stable. He has no other metastases in his ribs, lymph nodes or brain. Walk, a husband and father of four daughters, says, "I just try my best to live like this cancer never happened."

In recent studies, Tagrisso has slashed recurrence rates and risk of later brain metastases in early stage EGFR-positive disease as well.

EGFR-positive lung cancers may also become resistant to EGFR inhibitors through another alteration called an exon 20 insertion. These mutations may be harder to target with a drug because the exact mutation can vary greatly from one person to the next. These differences can affect a person's response to treatment. Some drugs in development may be helpful in the future.

OTHER TARGETABLE MUTATIONS

About 1% to 2% of NSCLC have a ROS1 rearrangement. The FDA has approved four drugs that target ROS1: Xalkori (crizotinib), Zykadia (ceritinib), Lorbrena (lorlatinib) and Rozlytrek (entrectinib). The former two target the more common ALK alterations as well.

MET amplifications are a type of alteration in the MET gene. Nearly 4% of people with non-small cell lung cancer have some change in this gene. For just more than 1% of them, it's an amplification, which means there are additional copies of a portion of this gene. Some targeted drugs, including Gilotrif (afatinib), Xalkori, Vizimpro (dacomitinib), Tarceva, gefitinib and Tagrisso, which are already approved for lung cancers with other genetic profiles, have also shown promise in tumors with this particular alteration.

> **"Having what is essentially a designer treatment for you … is going to reduce the risk of unnecessary side effects, improve your outcome and improve your survival."**
>
> *— DR. ANNE TSAO, The University of Texas MD Anderson Cancer Center*

The phase 2 ORCHARD trial looks at gefitinib, among numerous other drugs, as a treatment for non-small cell lung cancer that has progressed on Tagrisso. One of the common ways these EGFR-positive lung cancers seem to develop resistance to Tagrisso is through a MET amplification. Another phase 2 trial in progress examines the benefits of Xalkori in people with MET amplifications who have had previous treatment with another drug.

PIK3CA, a more common alteration, is altered in just under 7% of non-small cell carcinomas. These alterations often come along with one of the more common EGFR, BRAF, ALK or KRAS mutations. Clinical trials are in progress to identify drugs that may target PIK3CA and extend survival.

LOOKING AHEAD

Medical oncologists envision a day when metastatic lung cancer can be treated as a chronic disease with a pill a day throughout life. But far more genetic testing of lung tumors is necessary to get these tailor-made treatments to everyone and to learn about other gene alterations that may respond to targeted drugs.

"Having what is essentially a designer treatment for you, an optimized treatment for you," Tsao says, "is going to reduce the risk of unnecessary side effects, improve your outcome and improve your survival."

ANNE TSAO COURTESY OF MD ANDERSON

CANCER

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It Takes TWO

Patients with mesothelioma are living longer thanks to new drug combinations – including the first FDA-approved regimen in 15 years.

By KATIE KOSKO

KATTY2016 / STOCK.ADOBE.COM

RUSSELL LAMKINS enrolled in a clinical trial to treat his malignant mesothelioma.

RUSSELL LAMKINS BY NATASHA CUEVAS

In August 2014, Russell Lamkins was given six months to a year to live after learning he had malignant mesothelioma. More than six years later, he is traveling the country in his motor home with his wife and, although the cancer has slowed him down, he says he feels good.

Lamkins credits this success to the care he has been receiving on a clinical trial at Moffitt Cancer Center in Tampa, Florida, which is about two hours north of his home in Bonita Springs.

"(Moffitt) never promised anything. They explained that it was all experimental," recalls Lamkins, now 74. "My wife and I went back to the cancer specialist in town and all he could say was, 'If you want to be a guinea pig … fine, or we can start chemotherapy next week.'" »

RUSSELL LAMKINS and his wife, **SANDRA.**

Lamkins stuck with Moffitt and was the second patient to enroll in a clinical trial in 2016 that offered transarterial chemoperfusion, a therapy that involves delivering a high concentration of medicine to the diseased tissue lining in the lungs. He began this after his disease progressed despite standard chemotherapy and immunotherapy.

"I thought, what did I have to lose? Maybe this is the miracle drug. If not, it's going to help someone down the line," he says.

RISKY BUSINESS

Mesothelioma is an aggressive type of cancer that forms in the lining of the lungs, abdomen or heart. Considered rare, the number of mesothelioma cases diagnosed in the United States is about 3,000 each year.

It's most commonly seen in men, white or Hispanic people and those who are older. The biggest risk factor for developing mesothelioma is exposure to asbestos, a group of minerals that occur naturally as bundles of tiny fibers that are found in the earth's soil and rocks. Those fibers become dangerous when inhaled, as abestos is a known carcinogen.

People most at risk for asbestos exposure include miners, factory workers, shipbuilders, insulation manufacturers and installers, railroad workers and construction workers. Lamkins had been in construction since he got out of the Marine Corps in 1967.

"We did all phases of construction … roofing, drywall, insulating, and then remodeling of homes which involved tearing things apart that we later found out had asbestos in it," he says.

Other potential risk factors include exposure to zeolites, minerals chemically related to asbestos; high doses of radiation to the chest or abdomen for other cancer treatment; and a mutation in the BAP1 gene, however, this is rare, according to the American Cancer Society.

Although Lamkins didn't experience any symptoms, people with mesothelioma may show signs such as fever, excessive sweating, fatigue, weight loss and loss of appetite. However, symptoms can vary depending on the type of disease. Pleural mesothelioma, occurring in the chest, is most common, making up 70% of cases, said Dr. Jacques Fontaine, a medical oncologist at Moffitt Cancer Center. Peritoneal mesotheliomas begin in the abdomen and, very rarely, mesotheliomas can occur in the covering the heart or in the covering layer of the testicles. For patients whose disease starts in the chest, signs may appear as shortness of breath, cough, pain inside the chest or lower back, hoarseness and trouble swallowing.

In cases where the disease arises in the abdomen, patients may experience belly pain or swelling. Francine Shuman thought her protruding belly was a sign of old age. Her belly began to swell and she dropped 20 pounds quickly. "I had all the symptoms," says Shuman, 67, of Augusta, Georgia. Not thinking it was cancer, Shuman ended up in the emergency room from dehydration brought on by not eating because of sciatica pain. A 4-centimeter lump was discovered and a biopsy revealed peritoneal mesothelioma, which she believes was a result of inhaling talcum powder that she used on her three daughters when they were babies. "I was told that only 600 people a year get this," says Shuman.

> **"I thought, what did I have to lose? Maybe this is the miracle drug. If not, it's going to help someone down the line."** — *RUSSELL LAMKINS, mesothelioma survivor*

Talc is located in close proximity to asbestos, therefore the talc could be contaminated with asbestos fibers. In recent years, there has been contrversy surrounding talcum products and cancer risk, including mesothelioma.

Receiving a proper diagnosis can be challenging for patients since mesothelioma can mimic other diseases and is often

RUSSELL LAMKINS BY NATASHA CUEVAS

mistaken for lung cancer, according to Fontaine. "It can take four to six months at the time of presentation to diagnose."

Patients need to understand the importance of being seen at a high-volume cancer center, where more cases of mesothelioma are seen, says Dr. Daniel Sterman, director of the pulmonary oncology program at NYU Langone Health. He suggests interviewing a few oncologists before making a decision on where to be treated.

"This is a disease for which we have no cure," Sterman says. "Even at its earliest stages, there is no proven curative therapy but that doesn't mean therapies aren't effective."

SURGERY, COMBINATIONS AND TUMOR TREATING FIELDS

Since staging of mesothelioma is complex, patients may undergo not only a CT or PET scan, but also an MRI of the chest, lymph node scanning and exploratory surgery, Sterman explains. Three major cell types can affect a person's treatment regimen — epithelioid, sarcomatoid or a combination of both. More than half of cases are epithelioid and these patients respond best to chemotherapy. They also have the best prognosis.

About 10% to 20% of cases are sarcomatoid, which has the worst prognosis. While chemotherapy shows little response with this type of cell, immunotherapy is proving to be effective.

The type of treatment will depend on a patient's stage, location of the cancer, subtype, whether it has spread and performance status or level of fitness. Surgery or systemic therapy, such as chemotherapy and immunotherapy, with or without radiation are treatment options for patients. Some may also choose no therapy at all, but rather receive palliative care to improve quality of life and control pain. About 25% of patients, those who are typically older with other health issues, opt for this, explains Fontaine.

Surgery to debulk mesothelioma is aggressive. "We cut the ribs and go in to remove the lining around the heart and then rebuild it with synthetic mesh," says Fontaine. "It takes several hours of surgery plus a week stay in the hospital and a long time to recover."

In addition, surgery alone may not be able to completely remove the cancer. Therefore, combining surgery with chemotherapy, immunotherapy, or a combination of both, either before or after surgery should be considered, Sterman suggests.

Following her diagnosis in February, Shuman received eight chemotherapy treatments and gained 32 pounds from the steroids she was put on. "It made me depressed," she says. "By the eighth chemo treatment I could barely walk. This broke me down. I didn't want to live anymore." Shuman will soon undergo surgery to help get rid of her cancer.

"Although many patients with early-stage mesothelioma are referred for surgical resection, we still don't know that surgical resection is the right thing to do," Sterman says.

The MARS 2 clinical trial will examine how effective surgery is alone versus surgery and systemic therapy in more than 300 patients. Enrolling participants in the United Kingdom, researchers will investigate overall survival, safety, quality of life and cost in patients with pleural mesothelioma.

"After enrollment is complete, there will be two years of follow up so the results of the trial will be available at the end of 2022," says chief investigator Dr. Eric Lim, a thoracic surgeon at Royal Brompton Hospital in London. "We don't know if there is any benefit to the operation and that's why this trial is important."

Most exciting in the treatment of mesothelioma is the October approval by the Food and Drug Administration (FDA) of Opdivo (nivolumab) and Yervoy (ipilimumab), two types of immunotherapies, to treat adult patients with malignant pleural mesothelioma that can't be removed by surgery — the first regimen approved for mesothelioma in 16 years.

The approval was based on the findings of a phase 3 clinical trial that included more than 600 patients »

FRANCINE SCHUMAN just thought her bloating was a sign of old age.

FRANCINE SHUMAN BY EVALIZ SÁNZ

» FRANCINE SHUMAN holding photographs of her grandchildren.

who either received the immunotherapy combination or standard of care chemotherapy. Researchers saw a median overall survival of 18.1 months with the combination compared with 14.1 months with chemotherapy. The two-drug combination also reduced the risk of death by 26%.

“So far these are the most impressive results achieved,” Lim says. “All the other treatments have shown to be ineffective, so to reduce the risk of death by 26% is huge.”

Immunotherapy is an attractive option as it may have fewer side effects than chemotherapy. Patients who receive it have less vomiting and fewer kidney problems. It also doesn’t require a patient to sit for hours in an infusion center. However, patients who have immune diseases, such as arthritis, lupus and thyroid disease, can’t receive it.

In addition, data from the phase 2 DREAM trial based in Australia is promising for patients with pleural mesothelioma. In more than 50 patients, immunotherapy combined with chemotherapy was superior to chemotherapy alone.

The phase 2 clinical trial that Lamkins is part of was presented during the Society of Interventional Radiology 2020 Annual Scientific Meeting. Interim results of the study showed a median overall survival rate of 8.5 months, a disease control rate of 70.3% and minor side effects, such as mild nausea, with transarterial chemoperfusion.

A potential new second- or third-line treatment option is being studied in the form of gene therapy. The INFINITE trial is looking at an investigational drug in combination with anti-inflammatory and chemotherapy drugs. The therapy is called Adenovirus-Delivered Interferon Alpha-2b, and in earlier clinical trials it extended patients’ lives by 17 months. “This is what I’ve been working on for the last almost 25 years of my career … what are other ways to stimulate immune responses which can synergize with chemotherapy and immunotherapy,” Sterman says.

There also is excitement in Tumor Treating Fields (TTFields), which uses low-voltage electricity to prevent the cancer from growing. It’s FDA approved in combination with Alimta (pemetrexed) with cisplatin or carboplatin. “It’s like a magnet. These electrical currents screw up polarization and the cells can’t grow or duplicate,” Fontaine says.

Chimeric antigen receptor (CAR)-T cell therapy and PARP inhibitors are being explored for the treatment of mesothelioma, but these clinical trials are very early.

“There has been tremendous scientific progress. Although we don’t have a cure, I remind patients that for people with high blood pressure, rheumatoid arthritis and diabetes, we don’t cure those diseases either,” Sterman says. “We manage them. We turn them into chronic diseases. We can prolong and improve quality of life with these advances.”

Despite feeling beat down by chemotherapy, Shuman remained positive for her daughters, 13 grandchildren and one great-grandchild. She also turned to her faith. “I believe in the power of prayer. I always have,” she says. “Had I known these were symptoms of cancer, I would have seen my doctor sooner.”

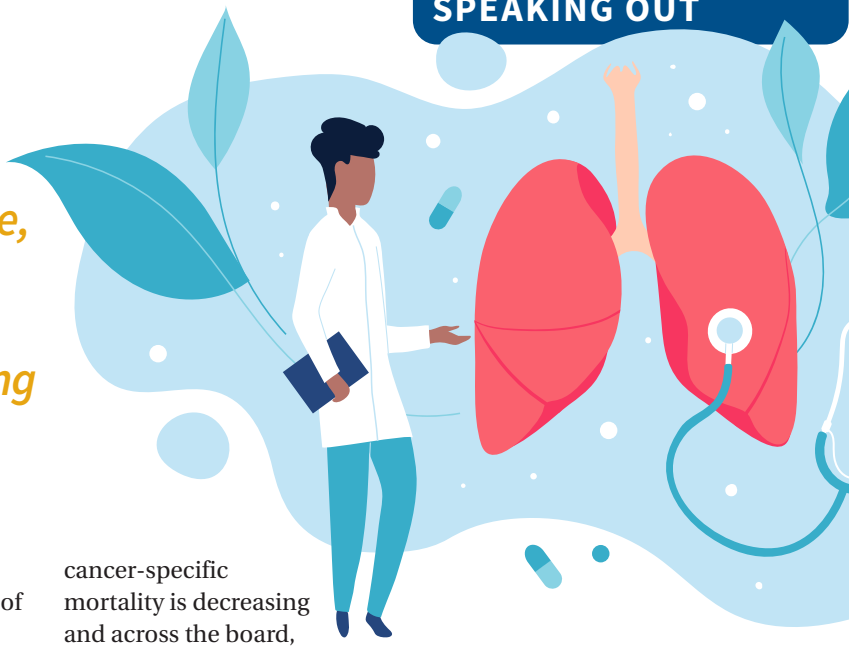
Lamkins continues to travel, hitting all but two of the 50 states — Hawaii and Alaska — and changed his diet by eating organic and eliminating sugar. His goal is to outlive a man who lived for 11 years after a mesothelioma diagnosis. Plus, Lamkins joked, “I have a list of stuff that my wife tells me I have to get done, so as long as I have a list, I’ve got to keep chugging along.”

FRANCINE SHUMAN BY EVALIZ SÁNZ

Education First

CURE® spoke with Dr. David Cooke, on behalf of the American Lung Association, on addressing racial disparities in lung cancer screening and care.

By KRISTIE L. KAHL



ALTHOUGH THE RATE OF lung cancer mortality has significantly declined in the last 30 years, lower amounts of screening and limited access to treatment still persist.

On behalf of the American Lung Association, *CURE®* spoke with Dr. David Cooke, head of the section of general thoracic surgery at UC Davis Health, about racial disparities in lung cancer and how the community can help to negate access to care issues.

Q: *CURE®*: What is the rate of lung cancer diagnoses, in particular amongst African Americans?

A: Cooke: Lung cancer is the number one cancer killer of all Americans. It kills more men and women than breast cancer, colon cancer and prostate cancer combined. But lung cancer is the number one cancer killer for African Americans as well.

Q: We‘ve seen these rates among Black patients are dropping faster compared with white patients since 1990. What can we attribute to these rates dropping faster?

A: Luckily, lung cancer mortality has decreased in the last several years. We see that in the upcoming 2020 American Lung Association Stage of Lung Cancer Report from the American Cancer Society's journal. Lung cancer-specific mortality is decreasing and across the board, both for African Americans as well as for white Americans.

> **"One thing that is important for us to understand is that race/ethnicity is a social construct, and not a genetic manifestation. So when we look at those disparities, we have to look at our health care structure and how it provides access to people of color."**
>
> *— DR. DAVID COOKE, UC DAVIS HEALTH*

However, the rate of lung cancer death is still higher in communities of color, specifically Black and African Americans compared with white Americans. And there are reasons for that.

On the positive side, the reasons for the decrease in mortality for lung cancer is multifactorial. We have things like lung cancer screening, we have interventions like smoking cessation programs, policy measures throughout our regions for increasing the age of tobacco use from 18 to 21 and also flavored tobacco bans in our communities. In regards to therapies, we have better surgery, more minimally-invasive surgery — about 80% of board-certified thoracic surgeons who are doing lung resection for cancer are performing surgery as minimally invasively. And we have new, really exciting therapeutics, specifically in precision medicine, as well as immunotherapy. When you take the constellation of those interventions, we see a decrease in mortality.

However, when we look at our Black and African American communities, we find that those communities that are diagnosed at later stages are less likely to undergo lung cancer screening and less likely to undergo specific therapeutic interventions such as surgery as well as enrollment into therapy to clinical trials.

Q: What are we doing to negate these challenges moving forward?

A: One thing that is important for us to understand is that race/ethnicity is a social construct, and not a genetic manifestation. So, when we look at those disparities, we have to look at our health care structure and how it provides access to people of color. We find that if you take something like lung cancer screening, per what the American Lung Association in Lung Cancer Report shows in 2019, of the 8 million Americans, regardless of race, who were eligible for lung cancer screening, only about 4% gets screened. »

That varies between states. For instance, where I practice in California, only 2% of eligible Californians get screened. When you compare that to mammography for breast cancer, about 70% of women who are eligible for breast cancer get screened. The upcoming 2020 report shows that that lung cancer screening number will be a little bit higher than 4%, which is still markedly lower than what it should be.

We do know that African Americans are screened less than white Americans. So how can we fix that? One is through education of our care providers. The American Lung Association's lung barometer found only 15% of individuals knew that lung cancer screening was an essential health benefit to them. We need to empower our primary care providers to enroll their patients in lung cancer screening.

Also, patients themselves need to understand that this is a benefit for them. At UC Davis Comprehensive Cancer Center, we partnered with private industry to really increase that awareness amongst our African American communities in our Sacramento region. That includes billboards on highways and roads in the African American communities, and also advertisements in areas such as public transportation, as we know that people of color utilize public transportation more than other communities. So those types of interventions for lung cancer screening are just one example.

Another example of how we can reduce those disparities is really on the policy side. For instance, in our Sacramento area, we had legislation that banned flavored tobacco products. And we do know that the tobacco industry has targeted the African American community with flavored tobacco, specifically menthol. The idea is that banning those flavored products not only helps our youth but also helps our targeted communities of color.

Q: What would you say is your biggest piece of advice for an individual who is facing any of these challenges?

A: My recommendation to individuals would be to be informed. Ask your care provider: What's the standard of care treatment for me? If you are a former smoker, ask your care provider: Can I undergo lung cancer screening with a low-dose CT scan? If you're diagnosed with lung cancer, ask your care provider: Is there a clinical trial that's open to me? Where near me? Are there clinical trials that could benefit me? Am I a surgical candidate? Can I undergo surgery to remove this lung cancer from my body?

There are many ways for our communities to be well informed. They could go to the American Lung Association website, lung.org. They could go to the National Cancer Institute's website, cancer.gov. Or they could look to see if there's a comprehensive cancer center within their community and seek to obtain care at that center of excellence.

CURE®'s Inaugural Lung Cancer Heroes™ Program Honors Individuals Who Dedicated Their Lives and Careers to Improving Care for Patients

Two physicians, a nurse and two patient advocates were honored during CURE®'s first Lung Cancer Heroes™ program. By RYAN MCDONALD

ACCOMPLISHMENTS THAT OCCUR IN the lung cancer space deserve to be celebrated because those developments are impacting lives, former NFL player Chris Draft said during *CURE*®'s inaugural Lung Cancer Heroes™ program in October.

"The idea of celebrating the victories is not just that we are moving forward but recognizing that to be able to move forward there (are) a lot of people that put in work," said Draft during his keynote speech. "There are people that made choices, like my wife, that stood up and fought for those changes to happen so that when we celebrate this community, we have to be willing to celebrate the people that have taken an extra step. And they've got out in front to make things happen. And then also, at the same time, recognize that without them doing that, and without other people following, …it's not going to change. So, it's not about just hoping it will change, but recognizing that there are people that we have to support, that we have to encourage, that are willing to go to work every day. And that's why we made the changes. That's why we have the progress, (it's) because of the people."

Draft created the Team Draft initiative with his late wife, Keasha during her year-long journey with stage 4 lung cancer to raise awareness of lung cancer and increase research funding by debunking the misconception that it is only a disease of smokers. He thanked all the award recipients for their dedication.

CHRIS DRAFT

"Thank you for your commitment," he said to the heroes. "Team Draft was started with my wife's commitment to standing up. We know that's how things change, so thank you for being a part of the change. I know that we're moving forward. It's important with this celebration that we continue to let people know that we're not building off of something that is not moving, but something that is already accelerating. Hopefully, after this hero celebration, …everyone feels a little bit better, they feel a little bit more excitement. But not just excitement, but because of all of you guys, they understand what is actually happening."

During the inaugural virtual event, four individuals — two physicians, a nurse and a patient turned advocate — were awarded for their contributions to the lung cancer community. The program also recognized one Lifetime Achievement award winner.

BONNIE J. ADDARIO

A special Lifetime Achievement award was presented to 16-year lung cancer survivor Bonnie J. Addario, who cofounded the GO2 Foundation for Lung Cancer and for which she serves as board chair. The foundation is dedicated to saving, extending and improving the lives of those diagnosed with lung cancer who are vulnerable and at risk. In 2004, Addario received a stage 3b lung cancer diagnosis and realized there was a need for education and support for people with the disease. She and her family founded the Bonnie J. Addario Lung Cancer Foundation in 2006, then merged with the Lung Cancer Alliance in 2019 to create GO2. Throughout her advocacy work, Addario has helped dozens of patients get the best treatment possible through the right connections and has served as a lifeline of support herself.

Addario acts as an adviser to industry leaders, clinicians and policy makers, and is a member of the Personalized Medicine Coalition board. In 2008, she founded the Addario Lung Cancer Medical Institute, which powers collaborative initiatives in genetic (molecular) testing, therapeutic discoveries, targeted treatments and early detection of lung cancer.

"As I considered speaking to you all today, I wondered, how can I put 17 years of living and working in this realm of lung cancer into a 10-minute speech," said Addario as she accepted her award. "It didn't take long for my answer to come to mind — it's about the patients. My mission and »

» **CHRIS DRAFT** served as the keynote speaker at the inaugural Lung Cancer Heroes™ program.

my greatest achievement have always been and always will be about bringing the patient voice to the table where they now firmly are and permanently sit, as it should be."

DRIVING LUNG CANCER SCREENINGS

Carolyn Baggett, a registered nurse and a lung cancer screening program coordinator at Baptist MD Anderson Cancer Center in Jacksonville, Florida, was nominated by Bethany Webb, who titled her essay "An Incredible Hero — With No Cape." The two are connected through the American Lung Association, for which Baggett serves as a cabinet member and Webb as North Florida development manager.

"In the words of one of Carolyn's former patients, 'she's the voice after the doctor leaves to make sure I fully understand everything,'" explained Webb in her essay.

Baggett began her work as an oncology nurse navigator at Baptist MD Anderson Cancer Center in 2014 working with patients who had stage 4 lung cancer. She became motivated to develop a screening program in 2013 following a recommendation by the U.S. Preventive Services Task Force. "The lung cancer screening effort was really initiated and driven forward by Carolyn – practically single-handedly," Baptist MD Anderson Medical Director Dr. Bill Putnam said in the nomination essay.

» CAROLYN BAGGET

» DR. JENNIFER GARST

Since its creation in 2015 up to July 2020, the program has completed almost 10,000 screenings at 10 locations. Nearly 130 cases of lung cancers have been found — almost 70% of them early stage.

TREMENDOUS IMPACT ON PATIENTS WITH LUNG CANCER

Compassionate, empathetic and dedicated — those are the words Paige Humble used to describe her nominee, Dr. Jennifer Garst, a thoracic medical oncologist and professor of medicine at Duke Cancer Center Raleigh in North Carolina. The two have worked together at the Lung Cancer Initiative (LCI) of North Carolina, which Garst helped found with a small grassroots group in 2008. Her work with LCI has been to ensure that the organization's research program funds younger research fellows and investigators. She also supports programs such as one that provides gas cards to make sure patients can have access to care and treatment.

Having a keen interest in gender differences in lung cancer, Garst was also a founding member of Women Against Lung Cancer, now known as the Lung Cancer Research Foundation.

"The impact of Dr. Jennifer Garst is known and felt across the lung cancer community in North Carolina and nationally," Humble wrote. "Most importantly, however, is the way that she

has individually impacted each of her patients through her thoughtful and steadfast pursuit of bringing the very best care and treatment options to them."

Humble included a quote in her essay from Angela Nicholson, the wife of one of Garst's patients. "My husband was diagnosed with stage 4 non-small cell adenocarcinoma lung cancer in June 2014. We were completely blindsided by this news, and the next steps unfolded quickly," Nicholson said. "… While we have not been successful in confirming the cause of his cancer, we have never felt that the treatment plan was not well thought out and intentional. The results speak for themselves: after four surgeries and two-and-a-half years of chemotherapy, we are blessed to report that my husband shows no evidence of disease. We could not be more thankful for the care and expertise that Dr. Garst provided."

INSTRUMENTAL IN FURTHERING LUNG CANCER DEVELOPMENTS

Dr. Fred R. Hirsch, executive director of the Center for Thoracic Oncology in The Tisch Cancer Institute (TCI) at Mount Sinai and the Richard Stein, Joe Lowe and Louis Price Professor of Medicine at Icahn School of Medicine at Mount Sinai in New York, New York, was recognized for his landmark scientific and organizational developments in lung cancer.

For more than 40 years, he has been instrumental in developing global collaborations, education and scientific exchanges through the International Association for the Study of Lung Cancer, a global nonprofit organization. He has made contributions to therapy for small cell lung cancer — the more aggressive and fast-growing type of the disease — and in developing biomarkers for new targeted therapies in lung cancer, particularly EGFR.

DR. FRED R. HIRSCH, The Tisch Cancer Institute

Hirsch has contributed efforts to the National Cancer Institute, the Translational Medicine Committee in the SWOG Lung Cancer group and the American Society of Clinical Oncology.

In addition, his nominator and colleague at the Icahn School of Medicine, Dr. Ramon Parsons, wrote in his nomination essay that, "… his care for patients has always been in the center and, as a cancer survivor himself, he will always have the patient care in the center. At Mount Sinai, Dr. Hirsch also plans to develop a lung cancer survivorship program in conjunction with the other cancer survivorship programs within TCI and is also leading development of survivorship programs for industry partners."

> **"… as a cancer survivor himself, he will always have the patient care in the center."** — DR. RAMON PARSONS

TIRELESS EFFORTS TO HELP LUNG CANCER SURVIVORS

Seven years ago, Deborah Pickworth's life was forever changed. She learned she had stage 4 lung cancer at 43 years old — a disease that had taken both her mother and grandmother's lives.

Pickworth has been tireless in her efforts to help other lung cancer survivors, raising money and trying to erase the stigma associated with the disease. She runs a lung cancer support group, is an Imerman Angels mentor and continues to advocate for herself and others in the lung cancer community. She is also a member of the International Association for the Study of Lung Cancer and the American Lung Association Patient Advisory Group. "Team Pickworth" has raised more than $17,300 over the past six years as part of the annual Lung Force Walk in Detroit. She resides in Garden City, Michigan.

"On her arm, you'll find a tattoo with a special message that reads, 'I was given this life because I'm strong enough to handle it.' Debbie's true strength can be seen in the support and impact she makes for those diagnosed with lung cancer," wrote her nominator Maureen Rovas.

Erik Lohrmann, vice president of oncology at CURE Media Group, thanked everyone who attended the inaugural virtual event.

"MJH Life Sciences™ and *CURE*® magazine, with support from Takeda, are honored to recognize five individuals who have dedicated their lives and careers to improving care for lung cancer patients," said Lohrmann during the event. "To Takeda, on behalf of MJH Life Sciences™, *CURE*® and our heroes, thank you for making (this event) possible. Lastly, our heroes. You've each gone above and beyond in your own unique way and are truly the embodiment of what the heroes award represents."

all are welcome

Bonnie Addario, a 16-year lung cancer survivor, shares a message of hope and invites you to 'The Living Room.'

BY KATIE KOSKO

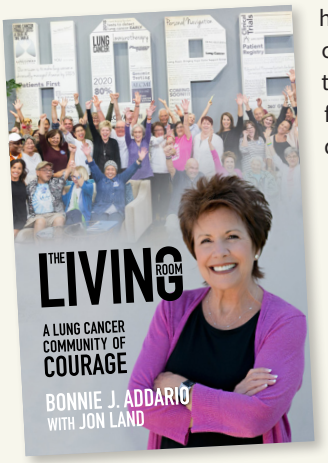
HOPE, KNOWLEDGE AND direction. Bonnie Addario's goal is to make sure every newly diagnosed patient with lung cancer has all three to empower themselves and their caregivers.

In 2004, Addario received a stage 3b lung cancer diagnosis. As a wife, mother and grandmother, she didn't want to give up — despite being given a 16% chance to live. For months, she received a chemotherapy regimen weekly and radiation daily to shrink her tumor. Then she underwent a 14-hour surgery performed by three surgeons — thoracic, heart and vascular — each taking his turn along the way, followed by more radiation. Addario was then declared cancer free. Two years later, she was invited to speak with others like herself at a support group — and what she saw was life changing.

"Picture a large room with gray walls, gray carpeting, gray drapes and gray folding chairs positioned around a gray, oblong table — everything looked gray beneath the dull lighting. Even the people sitting there before me appeared gray. Nobody was living in that room," wrote Addario in her upcoming book, "The Living Room: A Lung Cancer Community of Courage."

"Instead of offering the support they'd come for, this place only reinforced the fact that they were dying. A support-group setting should be a place where patients come to live, not die."

The book has been a life project for Addario, who is all about taking a personal approach to cancer care. Throughout the pages of her book, readers get to know 21 people who have survived advanced lung cancer, including a husband and wife both diagnosed with lung cancer, a man who rode 3,400 miles on his bike in honor of his mother who died from the disease in 2017 and a young woman who fought for her life after having no risk factors or family history of lung cancer. Their stories tell how they managed to find the courage, resources, spirit and faith to keep momentum while fighting a devastating disease.



ADDARIO's book, "The Living Room: A Lung Cancer Community of Courage," will be available on Amazon.com on May 4, 2021.

Addario also shares in the book very personal details of her life and diagnosis, along with words of wisdom from some of the world's leading lung cancer experts on various topics such as screening.

After that support group, Addario also realized that she wanted to create a cheerful place for thrivers to come together. And she did just that, developing a real-life Lung Cancer Living Room that offers education and support and has helped countless patients with lung cancer find hope.

"They are my new heroes, the very definition of what it means to be brave," wrote Addario, a fierce advocate for lung cancer survivors through the GO2 Foundation for Lung Cancer. "They don't give in and they don't give up, men and women who come to the Living Room hopeless and leave hopeful. So come right in. Join us and make yourself comfortable. Our session is about to begin."

LEARN MORE ONLINE

To visit ADDARIO's Lung Cancer Living Room, go to go2foundation.org/resources-and-support/lung-cancer-living-room/.

PHOTO COURTESY OF ADDARIO

Satisfied By a Second Opinion

One man discusses traveling more than 1,500 miles for lung cancer treatment.

By KATIE KOSKO

LARRY WHIPPLE IS PROOF that today's lung cancer treatment is helping people live longer. In September 2017, he received a stage 3b lung cancer diagnosis following a positron emission tomography scan and a biopsy of his lung.

Years before, a chest X-ray showed what Whipple described as a spec on his lung, but his primary care physician wasn't worried. Upon looking at his file in January 2017, a different doctor at the practice suggested he see a lung specialist just to be safe. That specialist is the person who determined the "spec" was cancer.

In an interview with *CURE*®, Whipple, 75, opens up about his reaction to his diagnosis and the importance of a second opinion — one he received more than 1,500 miles away.

Q: *CURE*®: What was your immediate thought after being told that you had lung cancer?

A: Whipple: I was with my wife when we received that news. I mean, the image of death, the image of long-term suffering, the image of putting my family through misery ran through my mind because my brother-in-law had died in October 2016 of pancreatic cancer. He was diagnosed in May and he was dead in October.

The first thing we did was call our daughter who's a nurse who lives in North Carolina and then called our son who lives and works in northern New Jersey — not even 20 minutes from the hospital where I was at. We met for lunch. And by the time my son arrived — he's very resourceful and thankfully a very successful father, husband and business guy — he had me on the phone with the head of oncology research at Tel Aviv University (School of Medicine) in Israel, who talks to me about all kinds of testing. But over lunch, my son recalled that one of his close friends, an eight-year survivor of pancreatic cancer, had used Dr. Frank Fossella at (The University of Texas) MD Anderson Cancer Center in Houston, so I said, 'This is the guy that I want to see if I can see him.'

> **"I believe that it was very much a miracle drug, phenomenal doctors and a lot of prayer that carried me through this."**
>
> — LARRY WHIPPLE

Q: What happened at the second-opinion appointment?

A: They took my blood and blood pressure in advance of my meeting the next morning with Dr. Fossella. I had never seen anything like that in my life — although the people in New Jersey told me that I was going to (need) a brain scan because (they said) the first place lung cancer spreads is to the brain. Well, that night at 11 o'clock, I had a brain scan done at MD Anderson. By the next morning, the doctor had laid out a treatment plan that confirmed the diagnosis of stage 3b lung cancer and survival rates. In addition to the chemotherapy, he recommended I take the immunotherapy drug Keytruda (pembrolizumab). He gave me some encouragement (by saying) that 80% of lung cancer patients have this kind of lung cancer and that (it) has been the subject of some very successful treatment plans. He (also) said there's no guarantee and was very candid with me.

Q: What was it like traveling back and forth more than 15 times for treatment?

A: I found out that wearing a mask gets you through airports very quickly. It was a practice that I had followed for several months not knowing that I was being prepared for (what came next). The chemotherapy (severely weakens) your immune system. Once the chemo started, I literally was quarantined for about six months. Seriously, I mean, I didn't go out of the home. My wife and »

LARRY WHIPPLE traveled from New Jersey to Texas for lung cancer treatment.

I didn't do any socializing. We saw my son and daughter-in-law once in a while. They have four children. We didn't really want to be exposed in any way. The isolation was very difficult. The actual treatment was a cakewalk. It had absolutely zero effect.

I've learned in life that happiness and contentment are related to what your expectations are. So if you manage your expectations and you manage them effectively, you can be a pretty happy and content person because you're not disappointed.

They found that in just three weeks with this treatment, the tumors ... had been reduced to about 90% of their original size. So they determined that whatever (was) happening within my body with these medicines was working. And then the same thing happened in the next session right after Christmas. I was told that the tumors were reduced to about 40% of their original size. In February 2018, it was like another Christmas morning experience: My wife and I sat with a doctor in Houston and were told there was no sign of cancer. I just got goosebumps again, just saying that and recollecting how significant a message like that was and what an impact it had on our lives.

Q: And so you went on to have radiation therapy?

A: I did. I went through it for six weeks, five days a week. Each treatment was about 20 minutes. I would (say it) was very difficult because it really interfered with my digestive practice and my swallowing. Throughout at least a couple of sessions during the radiation, I continued to receive Keytruda and one of the other chemotherapy drugs.

I believe that it was very much a miracle drug, phenomenal doctors and a lot of prayer that kind of carried me through this. That's a major illnesses, but I'm healthy as a horse. I had a major heart surgery 25 years ago that was supposed to last 10 years. I'm trying to figure out why I survived this cancer battle. I'm like a cat with nine lives.

Q: What advice do you have for others who have recently received a diagnosis?

A: Try to find the best people who do what they do that will benefit you. I determined based upon a lot of research and a lot of things that I had read, recommendations of doctors, that these were (top-notch) facilities. Do not delay if you've just been diagnosed.

Then it's a question of making sure that the therapies that you are (going to receive) are best for you. And there's a ton of research, and there's a ton of support groups. If you don't have a laptop, get access to one so you can go online and study the things that are written by organizations such as *CURE*® or the American Cancer Society. (This) at least gives you some sort of a knowledge base from which you can then operate and go forward.

Who's your extraordinary healer?

We want to hear from *you*!

CURE® is now accepting essay nominations for the 2021 Extraordinary Healer® Award for Oncology Nursing. We invite you to describe the compassion, expertise and helpfulness a special oncology nurse has exhibited in caring for patients. Patients (current or former), caregivers or peers may submit nominations.

Submit yours by January 15, 2021!

Celebrate with us!
Three essay finalists, along with the nurses they nominated, will be honored at a special reception in conjunction with the Oncology Nursing Society's 46th Annual Congress to be held in Spring 2021.

Christie Santure, B.S.N., RN, OCN
Winner of 2020
Extraordinary Healer Award

Submit your essay today at
curetoday.com/EH21

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