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Blowing smoke?

Battery-powered E-cigarettes gaining popularity, but plenty of medical, regulatory questions remain



Endobronchial ultrasound technology — the next step



Link between brain injuries and sleep disruption under the microscope

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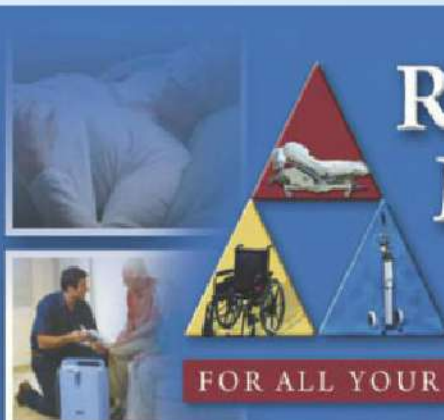
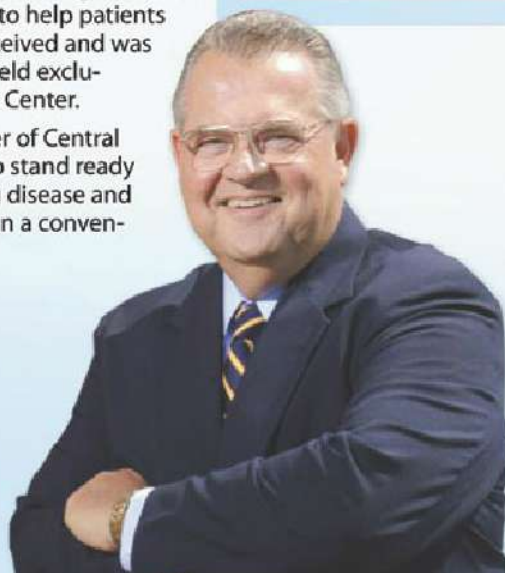
Welcome to the third edition of Breathe Magazine. It is hard to believe that almost three years have gone by since our inaugural edition. The original purpose for this publication was to make the general public aware of the many services available at the Lung Disease Center of Central Pennsylvania, and to spotlight some of the interesting cases and patient issues we see each year. The Lung Cancer Early Detection Program continues to save patients who would otherwise die as a result of this terrible disease. Our Sleep Disorder Network continues to help patients with sleep disorders, and this year we will plan some further collaborative efforts with researchers from Penn State-Altoona directed at patients with traumatic brain injuries.

A new and important technique called endobronchial ultrasound, will be available in 2014 in a collaborative effort with the new UPMC -Altoona Hospital. The hospital has agreed to build a new state-of-the-art bronchoscopy suite particularly suited to specialized studies. Added to the expertise at the Lung Center is Dr. Michael Zlupko, who joined the practice of the Altoona Lung Specialists in July. "Doctor Michael" has been trained at the Cleveland Clinic and is a specialist in this procedure. There will be more information on this exciting addition to our services helping patients avoid the need to travel long distances to get University level pulmonary care.

The Lung Disease Foundation held its first sponsored event in November. As part of our Beacon of Light on Lung Cancer initiative, this free program on smoking cessation and the various methods to help patients quit smoking was well received and was the first of its kind to be held exclusively at the Lung Disease Center.

The Lung Disease Center of Central Pennsylvania continues to stand ready to help patients with lung disease and provide expert level care in a convenient and local setting.

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Lung Disease Center continues to provide the highest quality pulmonary and sleep services

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The Lung Disease Center of Central Pennsylvania continues to provide the highest quality pulmonary and sleep services to the Central Pennsylvania community.

Altoona Lung Specialists this year wished Dr. Craig Hartman the best of luck in his retirement, and welcomed their newest physician, Dr. Michael Zlupko, to their team of experts in pulmonary medicine. Dr. Michael Zlupko joins the practice following a fellowship at Cleveland Clinic, from which he brings a new procedure to the area, Endobronchial Ultrasound, which is outlined in detail in this issue of Breathe. Altoona Lung Specialists continues to welcome new patients to their practice for evaluation and treatment.

The Sleep Disorder Network, the state-of-the-art sleep lab in which Dr. Timothy Lucas and Dr. Alan Kanouff evaluate, diagnose, and treat patients with sleep disorders, continues to see growth. The Sleep Disorder Network is marketing its new Zzz Program, which was created to educate the transportation industry on the importance of sleep testing for those whose day-to-day work involves driving, and the dangers of being undiagnosed with and treated for sleep apnea. In the coming year, the Lung Disease Center hopes to be involved in additional sleep research with Penn State Altoona, including how traumatic brain injury may cause sleep disturbances.

The Lung Cancer Early Detection Program, for patients 55 years of age or older with a 30 pack year smoking history, continues to enroll patients. There are currently more than 230 patients enrolled in the program. The program is based on a large study which showed that the mortality in lung cancer can be reduced by 20% in patients where cancer was detected early. Patients enrolled in the program have a low-dose chest CT annually in an effort to detect cancer at its earliest stages, which improves their potential for treatment and survival. Numerous patients in this program have been diagnosed early enough to receive successful treatment for lung cancer.

The Lung Disease Foundation of Central Pennsylvania, a non-profit corporation, has embarked on its journey to raise funds to inform, empower and educate individuals on all aspects of lung health and the quality of air in an effort to reduce lung disease. You will read more about these efforts in this edition of Breathe.

The physicians and experienced staff of the Center are dedicated to providing the best possible experience for patients when visiting the Lung Center. You will have an opportunity to meet our physicians and staff as part of this edition of Breathe.

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Endobronchial ultrasound technology — the next step

Michael C. Zupko, M.D.
Breathe Magazine

A recent nationally published study of more than 50,000 people showed that annual CT scans of the chest in patients who are 55 years of age or older and who have a 30 pack year smoking history can reduce the mortality from lung cancer by 20 percent. This is an important finding given that lung cancer is the leading cause of cancer death in men and women in the United States. The Lung Cancer Early Detection Program offered at the

Altoona Lung Specialists targets high-risk patients in an effort to find lung cancers at the earliest possible stages when they are most treatable. How-

Electromagnetic navigational bronchoscopy and endobronchial ultrasound (EBUS) allow us to biopsy lung nodules and lymph nodes that may have previously required a surgical approach.

ever, finding suspicious “spots” in the lungs is only one part of the challenge in the diagnosis of lung cancer. The other hurdle comes with successfully biopsying a suspicious mass in the lung or lymph nodes in the chest so that a definitive diagnosis can be made.

The airways of our lungs branch like the branches of a tree getting smaller and smaller as they move from the center of the chest towards our ribs and chest wall.

As physicians, we cannot offer a treatment to a patient if we do not know what we are treating. Fortunately, technology has provided us with 2 advanced techniques, electromagnetic navigational bronchoscopy and endobronchial ultrasound (EBUS), to allow us to biopsy lung nodules and lymph nodes that may have previously required a surgical approach.

Electromagnetic navigational bronchoscopy uses a patient’s CT



scan in combination with GPS-like technology to help us localize and guide the bronchoscope to the abnormal lung mass. It allows us to direct our tools beyond our vision by creating a virtual, three-dimensional map of a patient's airways. Navigational bronchoscopy is literally like having a GPS system for the lungs. The Altoona Lung Specialists have been providing patients with this state-of-the-art diagnostic procedure for the past 2 years with great success in properly selected patients.

Endobronchial ultrasound is another advanced technique that is useful in the diagnosis and management of lung cancer. Lung cancer can often spread within the chest to involve lymph nodes. Lymph nodes are filters that sit on the outside of the airways helping to drain fluid and various material from the lungs. The physician needs to know if cancer spreads to the lymph nodes because this helps to determine if surgery is indicated and if chemotherapy or radiation is necessary. Lymph nodes are a challenge to biopsy because they sit on the outside of the airway blocked from the camera's view. EBUS applies an ultrasound probe that allows the physician to look through the airway wall and directly see any enlarged lymph nodes. A needle can then be inserted through the airway wall into the lymph node and biopsies are obtained. EBUS is becoming the standard of care for evaluating enlarged lymph nodes in the chest in patients with lung cancer. This procedure can spare many patients more aggressive surgical procedures. The Altoona Lung Specialists are working in conjunction with UPMC-Altoona to build a special procedure room that will allow us to bring EBUS technology to the patients in our region.

Lung cancer is the most common form of cancer diagnosed in the United States and remains as the leading cause of cancer-related deaths. Annual CT scanning of the lungs in high-risk patients has been shown to significantly reduce the death rate from lung cancer. In combination with CT scanning, advanced techniques like electromagnetic navigational bronchoscopy and EBUS help the physician to biopsy the lung

and lymph nodes to make a diagnosis and to direct a treatment plan. These techniques often spare patients more invasive, surgical procedures. Navigational bronchoscopy and EBUS are frequently only found at major university centers. The Altoona Lung Specialists are committed to and proud to provide patients with the most current diagnostic advances in lung cancer. ✦

EBUS is becoming the standard of care for evaluating enlarged lymph nodes in the chest in patients with lung cancer. This procedure can spare many patients more aggressive surgical procedures.



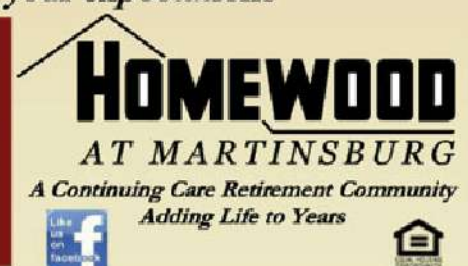
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Link between brain injuries and sleep disruption under the microscope

By Andy Matthews
For Breathe Magazine

In the past several years, the effects of brain injuries have been studied more than ever. Safety precautions are being put in place in professional, college and high school sports to protect players from brain injuries.

"If you look at many of the professional athletes who have had behavioral problems or have committed suicide, you begin to wonder how that could happen," said Dr. George Zlupko of the Lung Disease Center. "When these athletes have their brains examined they find out a lot of times that they have had various

injuries and/or concussions."

Dr. Zlupko and Dr. Robert Matchock, an Associate Professor of Psychology at Penn State Altoona, are working to determine if traumatic brain injuries could disrupt sleep behaviors and impact daily behavior.

"My primary area of interest in this

study is sleep inertia, which is the initial period of grogginess and hypovigilance experienced shortly after awakening," Matchock said. "Essentially nothing is known about how brain injuries affect sleep inertia. It is known that traumatic brain injury can be associated with insomnia and sleep apnea, making this line of inquiry an important area of study."

The military recently began looking into traumatic brain injuries with soldiers who are returning from tours in Afghanistan, Iraq or other areas of conflict. Military personnel who might not have been physically injured but may have been in an accident or near a blast, might experience some sleep dysfunction, according to Dr. Zlupko.

"The military's pursuit of this subject really got me interested," he said. "Basically, it can be a situation where an injury goes away, or seemingly goes away, but the damage that it causes expresses itself as some kind of sleep disorder."

Many times, head injuries during sporting events, car accidents or falls can lead to loss of consciousness, memory deficits and altered mental states at the time of the accident. According to national statistics Dr. Zlupko cited, about 1.7 million people sustain a traumatic brain injury each year, 250,000 of which are hospitalized.



Dr. Kanouff (left) and Dr. Lucas (right) discuss how the Sleep Disorder Network at the Lung Disease Center could help in discovering the connection of brain injuries and sleep disruption.

"Even mild injuries may cause long-term consequences," he said. "Patients with mild traumatic brain injuries may experience insomnia, increased sleepiness or sleep fragmentation. These disorders could cause behavioral disturbances."

Most sleep disorders manifest themselves during the day, meaning the problems occur at night but the symptoms are demonstrated during the day. Symptoms of a sleep disorder can include agitation, feelings of anger or depression, non-communicative behavior and violent behavior.

A former employee of Dr. Zlupko's had a family member that was in an automobile accident and may have experienced some sort of sleep disorder.

"The person got knocked around a lit-

tle bit, but was not knocked unconscious," Dr. Zlupko said. "Following the accident, his behavior was a little iffy. He wasn't himself. He was placed in a psychiatric ward for a little bit. It took this person around six months to rebound from the accident. He did have a con-

cussion and I suspect that some of that behavior could have come from a sleep disorder."

Dr. Zlupko's interest in the area of traumatic brain injuries has him focused on high school athletes.

"In the younger age groups, this may be more common than we think," he said. "It might be good to look at students

that might have behavioral disorders, trouble in their interpersonal relationships or troublesome behavior in school. There may be things we can do for them through treatments." ♦

"Patients with mild traumatic brain injuries may experience insomnia, increased sleepiness or sleep fragmentation."

— Dr. George Zlupko of the Lung Disease Center of Central Pennsylvania

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Blowing

Battery-powered E-cigarettes gaining popularity, but plenty of medical, regulatory questions remain

*By Andy Matthews
For Breathe Magazine*

Think about a smoker. The image that comes to mind likely is of someone inhaling and blowing out smoke. Or extinguishing their cigarette in an ash tray or smothering it with their foot on the ground. Maybe you visualize a smoker tapping the pack, taking out the cigarette, tapping the cigarette and using a favorite lighter to ignite it. Maybe you can conjure the gestures that a smoker makes while holding the cigarette or taking a puff and flicking the ashes. Or perhaps the way the person uses their hands while holding the cigarette or holds the cigarette in their mouth while talking.

These ritualistic behaviors are part of the smoking habit, as well, and sometimes just as addictive as nicotine itself, according to Dr. George Zlupko of the Lung Disease Center of Central Pennsylvania.

"There are two aspects of cigarette addiction," Dr. Zlupko said. "One has to do with the chemical addiction, the nicotine addiction that patients have. However, that addiction is sometimes the smaller of the two. The other factor is the behavioral issue."

Dr. Zlupko says that many patients when discussing quitting smoking, talk about the problems of knowing what to do with their hands. They are used to holding or flicking something or gesturing with something in their hands.

"These are very, very difficult behavior patterns to extinguish," Dr. Zlupko said. "It is not just germane to cigarette smoking, there are other examples, but cigarette smoking has a lot of these habitual behaviors."

There are many products on the market to help smokers kick the habit. There are nicotine replacement products, such

as patches and gums. There also are several prescription drugs, such as Zyban and Chantix, that help smokers cope with the withdrawal symptoms of smoking.

"The nicotine replacements are readily available but the withdrawal drugs have some side effects," Dr. Zlupko said. "Some of these prescriptions may make you sleepy or give you bad dreams. In some cases they may even cause seizures. There are no drugs out there that don't have a risk of a side effect. In general, they are fairly safe to use, but people have had problems."

Now the medical community is looking closely at E-cigarettes and is stopping short of identifying them as a bona fide product to help quit smoking.

E-cigarettes contain nicotine, but they fall through the cracks of the 2009 Tobacco Control Act and are not regulated by the Federal Drug Administration.

"The FDA currently is not regulating this product," Dr. Zlupko said. "A big reason for this is because there are no medical claims being made by the companies that produce them. They are not claiming in their marketing of the products to be an aid to help stop smoking like the patches or the gums. Also, since they are not regulated they are not being tested. In the medical community, we are not sure of the safety of their prolonged use."

E-cigarettes contain a small battery cartridge that is activated by the flow of air. When the user inhales, the battery activates a small heating element which volatilizes the nicotine and a chemical called propylene glycol, which is the carrier of the nicotine. The propylene glycol produces the vapor that is inhaled and exhaled. The batteries can be recharged and the canisters containing the propylene glycol and nicotine can be replaced.

Propylene glycol is a chemical that has been around for a long while and is used

mostly in cosmetics. The medical community recognizes the chemical as one that is safe to rub on your skin, but the effects of it being inhaled into a person's mouth and lungs has yet to be studied. The chemical is most commonly used to create theatrical smoke for special effects on stage.

The question that then has to be asked is: Is inhaling propylene glycol safer than inhaling the chemicals produced by cigarettes?

"We know there are thousands of carcinogens and chemicals in cigarette smoke," Dr. Zlupko said. "There have been reports of approximately 4,000 to 7,000 chemicals found in the cigarette smoke. Is smoking E-cigarettes better than smoking regular cigarettes? The jury is still out on that."

The jury is out for several reasons. One is that there have been no studies to examine the effects of using propylene glycol as an inhalant and there have been no studies to show whether E-cigarettes prevent people from smoking cigarettes.

"Because there are no randomized control studies on the product, the medical community is falling short of saying that E-cigarettes are a safe alternative to cigarettes," Zlupko said. "There are some reasons why they might be better than cigarettes, one being that they don't contain the 4,000 to 7,000 compounds that may be carcinogenic."

"But there are always two sides to every coin. The downside, forgetting about the propylene glycol issue, is if they are considered a safer alternative to smoking, we might find a whole generation hooked on E-cigarettes through both the nicotine and behavioral addictions," Dr. Zlupko said. "If the medical community says that this is a safe cigarette that isn't going to cause cancer, then they would sell like crazy."

Some E-cigarettes come in flavors like

smoke?

Smoking cessation aids courtesy of Dick's Pharmacy and Dick's Homecare, Inc.



The Lung Disease Foundation of Central Pennsylvania's Beacon of Light on Lung Cancer program shines on a particular topic every year. Last year, the program focused on early detection of lung cancer. This year the Beacon of Light is swinging its beam to highlight prevention.

Lung cancer is the most common cancer diagnosed in the United States and it is the leading cause of cancer death. The large majority of patients with lung cancer have been smokers. When focusing on one thing

to help prevent lung cancer, it would be assisting patients with quitting smoking.

There are many smoking cessation aids on the market -- including nicotine patches, nicotine gums and prescription drugs -- to help with withdrawal symptoms, but none of these deal with the behavioral addiction caused by smoking.

New to the market are E-cigarettes, which allow continuation of the habit of smoking while providing nicotine. But there are many unanswered questions

about the product. What are E-cigarettes exactly? Are they a safe alternative to smoking regular cigarettes? How do they work? Like many in the medical community, Dr. George Zlupko has been researching the product and says there is a lot of gray area when examining E-cigarettes.

Note: Smoking cessation aids courtesy of Dick's Pharmacy and Dick's Homecare, Inc.

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blueberry, cherry, vanilla and many more that might appeal to a younger audience, Dr. Zlupko said.

"We know that the earlier you start smoking, the more difficult it is to quit and the earlier you start the more likely you are to develop cancer," he said. "Because this product falls through the cracks of the 2009 Tobacco Control Act, there is really nothing saying that companies can't sell these things to a 12-year-old. The companies have been policing themselves, but technically there are no regulations saying you have to be 18 to purchase these products."

The economic impact of E-cigarettes is growing immensely. Some statistics say that sales are doubling annually and the sales are only cutting into a tiny portion of the smoking market at this time, creating a huge amount of room for growth, according to Zlupko.

"There are about 300 manufacturers of E-cigarettes in the marketplace and about 85 percent of them are sold by three companies. The potential profits from these products are not going unnoticed by Big Tobacco," he said.

Terry Dandrea, vice president of Blair Candy Co. in Altoona, feels there is a lot of room for growth in the E-cigarette market, as well.

"As the product gets better, I think you will see an increase in sales of the E-cigarettes," Dandrea said. "With winter time coming, I think there will be an increase in sales in this market. A lot of people have told me they switched because they don't like to smoke in their house and in the winter it is too cold to go outside and smoke."

Recently, Lorillard Tobacco Company made a \$135-million purchase of the European company Blu, the most popular brand of E-cigarettes on the market.

"Lorillard was the first major company to get into this market and they pushed to get distribution in places that sold cigarettes," Dandrea said. "There are hundreds of different companies. Basically, they are all the same technology in a different package."

Dandrea said that tobacco companies R.J. Reynolds and Philip Morris have products on the test market and he thinks that will make a difference in the landscape of the E-cigarette business.

"As these larger companies get involved and make the product, they will squeeze out a lot of these smaller companies," he said.

Tobacco companies, like Lorillard, are looking at the delivery mechanism of E-cigarettes and working on a way to make nicotine absorption faster, according to Dr. Zlupko.

The way nicotine is absorbed into the body through products like smokeless tobacco, cigars and now E-cigarettes is mostly through the mouth. Absorption this way is very slow and takes several minutes for the nicotine to reach the brain. In regular cigarettes, the nicotine is absorbed into the lungs and allows for rapid transmittal to the brain.

"It takes seconds to get the nicotine to the brain through regular cigarettes. With E-cigarettes you don't get the immediate dopamine rush from the nicotine," Dr. Zlupko said. Most patients that smoke the E-cigarettes also smoke regular cigarettes because they need to get that feeling once in awhile."

Tobacco companies are now looking at delivery systems and are trying to determine if there is a way to deliver the nicotine through the lungs.

When looking at nicotine addiction, it's more complicated than just nicotine withdrawal. Genetically, how a person metabolizes nicotine has a lot to do with the withdrawal symptoms they experience.

"There are slow metabolizers and rapid metabolizers," Dr. Zlupko explained. "If you are someone who breaks nicotine down very quickly then you need that hit more often because your brain craves nicotine more quickly. If you are a slow metabolizer, you take a smoke and it takes a long time for that effect to go away because you don't break down the nicotine so fast."

People who are able to stop smoking more easily are slow metabolizers. They are the people who are able to just throw the pack away. Their withdrawal symptoms occur much more gradually than someone who has big peaks and valleys of withdrawal symptoms.

"The people with the large peaks are the ones that have the real difficulty quitting because they experience highs and lows too often and have trouble dealing with it," Dr. Zlupko said. "E-cigarettes may be helpful in these circumstances."

Dr. Zlupko has been taking that approach with some of his patients that are having trouble breaking the addiction.

"I have a patient that said she had made every effort to stop smoking and I believe her. She said the nicotine patches had worked well but not well enough and she was having trouble getting over the hump with that product," he said.

The patient asked Dr. Zlupko if she could use the E-cigarettes to help and Dr. Zlupko told her to give them a try for three months.

"Her problem very well might be with the behavioral aspect of cigarettes," he said. "I told her we would see how she does for the next several months getting rid of cigarettes entirely and working with the patches and the E-cigarettes."

"It's a judgment call and I can't say that I would recommend that wholly, but when you talk about the benefits of stopping smoking versus the dangers of cigarettes, it's probably worth trying."

Dr. Zlupko emphasized that there is no magic remedy to quit smoking and in order to quit, you have to be willing.

"E-cigarettes may be helpful. I told this patient to try it for three months. If she is sucking on cigarettes every day, how bad can it be to try the E-cigarettes?" he asked. "I think for now we have to keep an open mind and look at E-cigarettes objectively."



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After beginning its journey to pursue charitable efforts to inform, empower, and educate individuals on the improvement of all aspects of lung health, the Lung Disease Foundation of Central Pennsylvania has had a very busy year.

In 2012, the Lung Disease Foundation held the inaugural Beacon of Light on Lung Cancer on November 13th at Penn State Altoona, Shining a Light on Early Detection. The event included fundraising events held prior to the event, and speakers, a light-up ceremony, and a Lighthouse competition on the night of the event.

The first Beacon of Light on Lung Cancer Walk was held in August to kick off Health-O-Rama thanks to the sponsorship of Select Specialty Hospital and the support of the Altoona Mirror.

Throughout the spring and summer months of 2013, the Foundation, in conjunction with the Altoona Curve, sponsored the Giant Jersey promotion with a 15-foot inflatable baseball jersey being displayed at PNG Park for every home game, as well as a few outside appearances at Penn State Altoona and Health-O-Rama. This promotion concluded on September 1st with drawing the name of the winner of the Giant Jersey and an auction which included sports items from the Pittsburgh Steelers, Pirates, and Penguins, Penn State, and the Altoona Curve, some of which were autographed.

On Saturday, November 9, 2013 the Foundation held its second annual Beacon of Light on Lung Cancer by Shining a Light on Smoking Cessation. The event was held at the Lung Disease Center and included seminars given



Dr. George M. Zlupko shown with photo of Altoona Curve Official Giant Jersey.

by Dr. Michael Zlupko and Dr. George Zlupko, free spirometry and Alpha-1 testing, and displays by Dick's Homecare of smoking cessation products, and Rezk Medical.

The Foundation continues to demonstrate the philosophy that "Individuals might accomplish a few things, but groups of people working together can do the really big things."

For more information, to secure lung cancer awareness information, participate in or sponsor the annual Beacon of Light event, or to participate in or volunteer for the Foundation, please contact Sherri L. Stayer, Executive Director, at 814-946-2845 extension 200 or at sherris@altoonalungspecialists.com.



Dr. Michael C. Zlupko speaks with 2013 Health-O-Rama attendees.



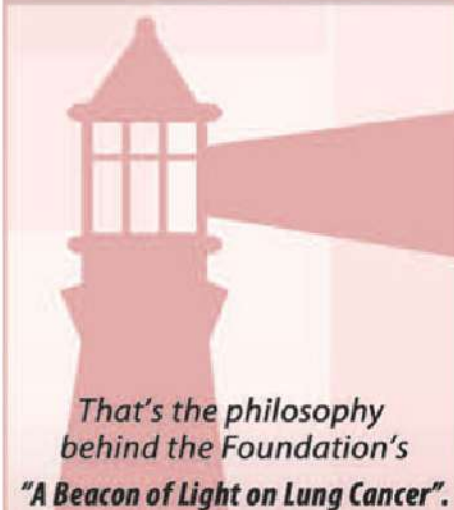
Dr. George M. Zlupko speaks to Penn State Altoona students during Beacon of Light on Lung Cancer.



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**George M. Zlupko, M.D., FCCP,
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**Sherri L. Stayer,
Executive Director**

Pulmonary Arterial Hypertension

The evaluation of a patient complaining of shortness of breath can be as simple as taking a history or as complex as specialized catheterization procedures. The complaint of shortness of breath is a common one for the Altoona Lung Specialists' physicians at the Lung Disease Center. Along with wheezing, coughing and an abnormal chest x-ray or CT scan, shortness of breath makes up about one-fourth of the diagnostic problems walking thru the door. The more common solutions to the question "why am I short of breath" include lung disease such as COPD (Chronic Obstructive Pulmonary Disease) and asthma, heart disease, and poor cardiovascular conditioning. One diagnosis that must be considered in certain patients is called pulmonary arterial hypertension (PAH).

Pulmonary arterial hypertension is not a common disease in general, but it is seen often enough in the evaluation of patients coming to the Lung Disease Center that it needs to be considered in many patients when the diagnosis is not immediately obvious. The hypertension being referred to in this particular disease does not affect the entire body. This disease is not the same as sys-

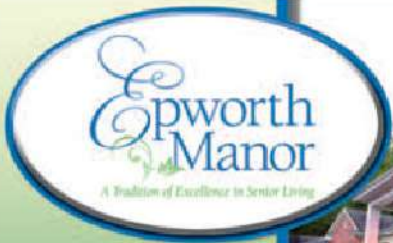

temic hypertension which is very common and does affect the entire body. Pulmonary arterial hypertension involves the blood pressure in the blood vessels of the lungs and has very specific diagnostic criteria. In the workup of patients with shortness of breath this diagnosis may be first suspected when a chest x-ray shows enlargement of the pulmonary vessels or an echocardiogram reveals an estimated high level of pressure in the pulmonary arteries. These initial findings usually prompt a more thorough evaluation to confirm the diagnosis and this is where the situation gets complicated.

Pulmonary arterial hypertension occurs in five general categories. Only the patients in so-called Category I are generally eligible for certain medications and therapies and only if the diagnosis is well established. Category I patients have their disease due to either a specific genetic defect or some type of associated disease such as a collagen vascular disease like scleroderma. Collagen vascular diseases also include rheumatoid arthritis and lupus. The last disease process in this category is called Idiopathic. Idiopathic means we do not know what caused it and it is not asso-

ciated with any other situations we can find. The other four categories contain a variety of diseases and conditions and the treatment for the pulmonary hypertension in those categories is usually the treatment of those diseases and conditions. In Category I patients, a number of effective treatments, most of them oral or inhaled, are available; but, as I mentioned, to get most of these medications the diagnosis must be confirmed.

Although the findings on an echocardiogram may make us suspicious of this disease, it is not reliable enough for establishing the diagnosis. An echocardiogram is a sound wave picture of the heart. It uses the same technique that obstetricians use to see a picture of a developing baby in its mother's uterus. When the echocardiogram is taken certain measurements can usually be made. Unfortunately, the pressures which are estimated in the pulmonary arteries are just that, they are estimates. Data from a number of studies have shown that the estimated pressures do not always correlate with the pressures that are measured. The only way to get an accurate pressure reading is with a catheterization of the right heart and pulmonary arteries. This catheterization is different from the one with which most people are familiar. The catheterization is done thru a vein, not an artery, but the pressures must be measured exactly. This right heart catheterization is not usually done during the more common left heart procedure unless specifically requested. Therefore, it sometimes needs to be done as a special and separate procedure.

Confirming the diagnosis is extremely important since patients with untreated pulmonary hypertension do not do well over a 3-5 year period. Treatments are reasonably easy and tolerable. ♦

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Meet our physicians



**Michael C. Zlupko,
M.D.**



**Timothy A. Lucas,
M.D., FCCP**

The Doctors of the Lung Disease Center represent over 60 years of combined experience in the field of pulmonology. Dr. George M. Zlupko founded Altoona Lung Specialists in 1977 with Dr. Timothy A. Lucas joining the practice in 2000. Together, in 2011, they built the 15,000 square foot Lung Disease Center of Central Pennsylvania. Dr. Alan J. Kanouff joined the team in 2009 followed by Dr. Michael C. Zlupko in 2013.

All of the doctors reside in Blair County and are very active in their communities. In addition to full time practices, they frequently are sought out to speak at events throughout the region as well as presenting at national conventions.

This incredible group of talented physicians has grown to be known as leading specialists in their fields, yet continue providing personal attention to all of their patients. Their slogan "Official Sponsor of Peace of Mind" is more than just words to each of the Lung Disease Center Doctors — it is what you receive as their patient.



**George M. Zlupko,
M.D., FCCP**



**Alan J. Kanouff,
D.O., FCCP**



Sherri L. Stayer,
Practice Manager

The Altoona Lung Specialists Team



RoseMary Rossman,
Registered X-Ray
Technologist



Michele Swander,
Registered X-Ray
Technologist



Toby Malcotti,
RPSGT



Jenice Mock,
RPSGT

Every member of the Altoona Lung Specialists' Team plays an integral part in patient care. The employees of Altoona Lung are an extremely diverse group of individuals when looking at their ages, educational backgrounds, training, and the number of years they have been a member of our team. Each and every one on the team has something very important in common: they are dedicated to being kind, caring, and professional in their effort to ensure that each and every patient of Altoona Lung Specialists receives the best care and customer service available in their given field of expertise.



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Receptionist



Diana Brennan,
Check-In/Check-Out
Receptionist



Sonia Shuler,
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