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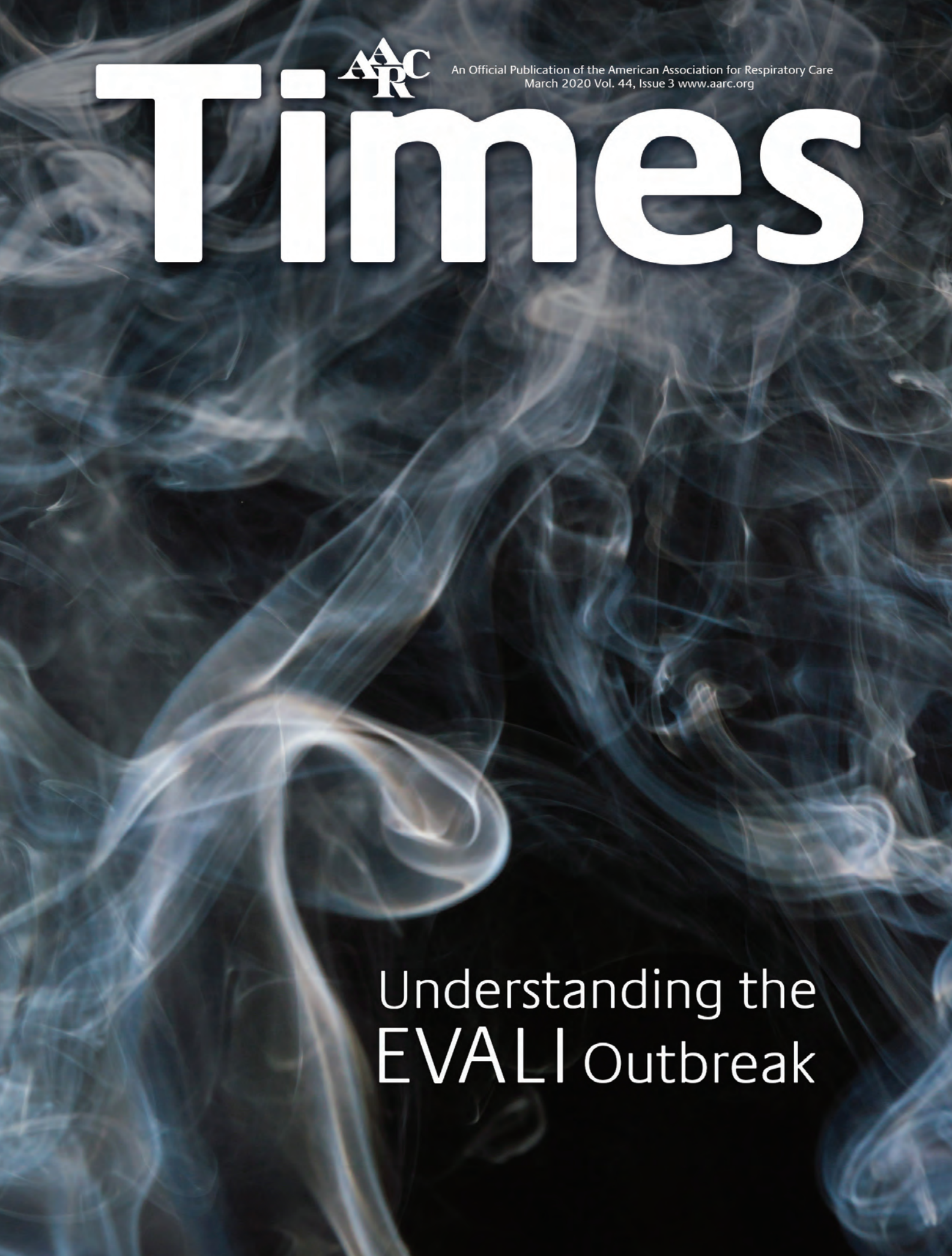

Understanding the EVALI Outbreak

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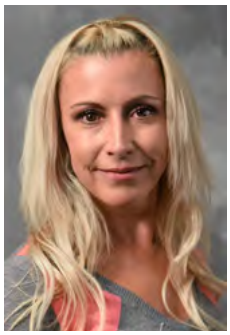

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E-cigarette or Vaping Product Use–Associated Lung Injury

by Thomas D. Berlin, DHSc, MSc, RRT

In July 2019, the Wisconsin Department of Health Services received multiple reports of adolescent patients admitted to the hospital with cough, hypoxemia, and dyspnea of unknown etiology. Chest imaging revealed bilateral opacities in the lower lobes, with diffuse ground-glass appearance on computed tomography. Some patients progressed to respiratory failure, necessitating endotracheal intubation and mechanical ventilation. In each case, exploration for infectious etiology was negative, but there was a recent history of e-cigarette or related product use.[1] After issuing a public health alert,[2] cases began to be reported from Illinois as well, prompting the Illinois Department of Public Health to issue an alert of its own on August 2, 2019.[3] The two agencies coordinated an investigation and consulted the Centers for Disease Control and Prevention (CDC) for epidemiologic assistance.[1] The CDC issued a nationwide health advisory on August 30, providing initial recommendations for clinicians, public health officials, and the public at large.[4] The term e-cigarette or vaping product use–associated lung injury (EVALI) was first noted in *Morbidity and Mortality Weekly Report* on Oct. 11, 2019.[5]

Epidemiology

As of December 27, 2019, 2,561 patients hospitalized for EVALI have been reported to the CDC from all 50 states, the District of Columbia, and the U.S. territories of Puerto Rico and U.S. Virgin Islands.[6] It has been estimated that 96% of all cases have been hospitalized, and 22% of patients have been intubated and placed on mechanical ventilation.[5] Fifty-five deaths have been confirmed in 27 states and Washington, DC,[6] with the median age of decedents being 52 years. Demographically, 67% of reported patients were male, and the median age was 24 years, with 78% of patients reported to be under the age of 35.[6] CDC data suggest the number of newly reported cases peaked the week of September 15.[7]

Products containing tetrahydrocannabinol (THC), the psychoactive component of the marijuana plant, were reportedly used in 80% of hospitalized cases; 13% of cases reported exclusive use of nicotine products, 12% reported exclusively using cannabidiol (CBD) products, and 40% reported use of both THC and nicotine.[6] In a comparison of 4,631 survey respondents who used e-cigarette or vaping products, patients with EVALI either exclusively used or more frequently used THC products, and those products were more frequently obtained from illicit sources.[8] The most commonly reported THC-containing product brand used by EVALI patients nationwide is Dank Vapes (56%), with regional variances noted.[9]

Etiology

Causative agents for the national EVALI outbreak have not yet been determined. Blount et al[10], reporting for the Lung Injury Response Laboratory Working Group, found vitamin E acetate in fluid obtained from bronchoalveolar lavage of the lungs in 48 of 51 patients with EVALI from 16 states. This contrasted with no vitamin E acetate found in bronchoalveolar lavage fluid from a healthy comparison group.[10] Although this finding appears to be associative, the CDC cautions that other substances and product sources are being investigated and notes that there may be more than one cause.[10] To further suspicion, Food and Drug Administration (FDA) investigators examined the chemical content of e-cigarette or vaping fluids and found that 49% of THC-containing products tested positive for vitamin E acetate, with other toxic agents found in a smaller percentage of test samples.[11]

Two hypotheses surround the possible mechanism of lung toxicity from vitamin E acetate. First, the chemical structure facilitates molecular alignment with surfactant phospholipids. Phosphatidylcholine, an active component of surfactant, reacts in the presence of tocopherols, such as vitamin E, changing the gel state to that of liquid crystal. This diminishes surfactant-mediated reduction in fluid surface tension, leading to alveolar collapse.[10] The second possible causative effect of vitamin E acetate may occur as a result of being heated in a vaping device. Heating the compound may disassociate acetate to form ketene, which may be a lung irritant. This mechanism is currently under investigation.[10]

Inexpensive diluents such as vitamin E acetate (known as vitamin E oil) are used primarily by manufacturers of illicit vape cartridges to dilute THC oil to reduce production expense while maintaining desired viscosity. This is a leading justification for warnings from the CDC and the FDA to avoid using illicit and unregulated vaping products.[12]

Diagnosis and management

EVALI remains a diagnosis of exclusion because no confirmative diagnostic test exists.[6] EVALI should be considered when patients present with fever, cough, sore throat, shortness of breath, fatigue, muscle aches, nausea, or vomiting in the presence of a history of e-cigarette use or vaping within 90 days of symptom onset.[13] Hospitalization is recommended if the patient displays respiratory distress or S_{pO2} less than 95% on room air, or has comorbidities or social circumstance that may increase risk. Pulmonary infiltrate on chest radiography may be indicative, and infectious processes such as influenza and community-acquired pneumonia must be ruled out.[13]

If the patient is hospitalized, computed tomography — even in the presence of a normal chest radiograph — and appropriate subspecialty consultation (eg, pulmonary, critical care, etc.) should be considered.[13] Bronchoalveolar lavage or lung biopsy may be indicated in conjunction with a pulmonary consultation.[14] Foamy macrophages and pneumocyte vacuolization have been noted on biopsy.[15]
For clinical management, the CDC advises discontinuance of all e-cigarette and vaping product use. Several case reports note rapid improvement with systemic corticosteroids, and empiric antimicrobials or antivirals should be considered according to guidelines for community-acquired pneumonia and influenza.[13] Supportive respiratory care should be provided as indicated, which may include management of oxygenation and the airway, secretion mobilization, lung volume enhancement, and noninvasive or invasive mechanical ventilation. Education and assistance with nicotine cessation and marijuana use disorder should be provided as indicated.[14]

On December 20, 2019, the CDC released an update to the EVALI Clinical Guidance statement to reduce risk of rehospitalization or death following hospital discharge.[14] Recommendations include confirmation of stable vital signs for at least 24–48 hours prior to discharge, planning for post-discharge care, and

ensuring outpatient follow-up within 48 hours, which may include social services, specialty care, behavioral health, and medication adherence.[14]

Considerations for respiratory therapists

In addition to the therapeutic interventions listed above, respiratory therapists should provide leadership and vigilance in the recognition and care of patients presenting with possible EVALI. This includes maintaining a high level of suspicion, particularly when working in the emergency department or clinical setting. When confronted with such patients, the respiratory therapist should collaborate with other clinicians managing the case and reference the updated, public access information provided by the CDC. Respiratory therapists should also be prepared to provide patient education and counseling regarding vaping risk and avoidance, as well as nicotine replacement and cessation counseling. Finally, we should work to educate colleagues and other members of the health care team on how to recognize and manage EVALI patients.

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Vaping for Tobacco Cessation: What Does the Evidence Say?

by Georgianna Sergakis, PhD, RRT, AE-C, FAARC, is an associate professor and program director at The Ohio State University

The increasing attention on e-cigarette use, or vaping, has probably affected you in your role as a respiratory therapist (RT). This recent attention on the topic is our professional opportunity to step up and share our cardiopulmonary expertise to assist e-cigarette users on the basis of evidence-based practice. Think of it as a professional call to arms — though I suppose it's more of a smoke signal in the shape of a vape cloud.

You may have been inspired to seek out more education on vaping because of the recent reports of e-cigarette or vaping product use-associated lung injury (EVALI). According to the Centers for Disease Control and Prevention (CDC), there were a total of 2,602 hospitalizations or deaths due to EVALI in the United States at the beginning of 2020.[1] At the writing of this article, there were 57 deaths related to e-cigarette use (confirmed in 27 states and the District of Columbia).[1] The CDC and the American Association for Respiratory Care have published several resources, position statements, and stories on the topic, advocating for our patients' health.[2-5] These documents and resources are grounded in the evidence and warn RTs of the known adverse health effects and safety concerns regarding e-cigarettes. There are several reports of RTs leveraging their roles to assist in improving in vaping-related community health.[6] By the time this article is published, we will probably have additional evidence to digest related to the topic. Two resources for frequently updated information are the American Association for Respiratory Care (www.aarc.org) and the Centers for Disease Control and Prevention (www.cdc.gov).

Electronic Cigarette

In line with its mission as a patient advocate and in order to ensure patient safety. The American Association for Respiratory Care (AARC) opposes the use of the electronic cigarette (e-cigarette). Even though concept of using the e-cigarettes for smoking cessation is attractive, they have not been fully studied and the use among adolescents is increasing year after year. There is no evidence as to the amount of nicotine or other potentially harmful chemicals being inhaled during use or if there are any benefits associated with using these products. The effects of nicotine on the body are known to be harmful and this does not change when ingested in a smokeless route. Additional safety concerns are emerging concerning ingestion of the Liquid Nicotine Solution (LNS) by young children as poison control centers report a continual increase in calls as e-cigarettes become more popular.

Effective 04/2014
Revised 12/2014
Revised 11/2015

Figure 1– Excerpt from the AARC Position Statement

Prevalence of vaping

In the United States, the prevalence of current (past 30 days) e-cigarette use in 2018 was 3.2% (8.1 million) of adults overall; when you break this down by age group, that's 4.2% of adults age 25–44 and 2.1% of adults 45–64.[7] The 2014–2016 National Health Interview Surveys regarding ever e-cigarette use (whether the individual has ever used e-cigarettes) estimated that 52% of current smokers reported e-cigarette use and more than 16% of former smokers reported e-cigarette use, which stood in contrast to the 5.7% of never-smokers who have ever used an e-cigarette.[8] Perhaps the combustible tobacco smoker sees vaping as less harmful than combustible tobacco or shares the public misconception that the e-cigarette is "just flavored water vapor"; either way, combustible tobacco smokers comprise a large market for e-cigarettes. There have been an increasing number of adult smokers who use e-cigarettes in conjunction with combustible cigarettes (ie, dual users), which often results in quitting neither type of nicotine delivery device.[9]

Dual use

Dual use of both combustible tobacco cigarettes and e-cigarettes allows the nicotine-dependent individual to tailor their nicotine dose to the situation. For example, if smoking combustible tobacco is

prohibited, the dual user might turn to their e-cigarette for their nicotine dose because there are not the same negative consequences associated with the use of the vaping device (bad smell and residual smoke in the air). In an recent examination of the longitudinal association between e-cigarette use and respiratory disease (controlling for combustible tobacco use), e-cigarettes were an independent risk factor and dual use increased the odds of developing respiratory disease over either product used alone.[10] The dual user might be able to use their USB-like device discretely — consider the use of these devices by middle and high school students (JUUL is an example of an e-cigarette that can be used discretely) (ADD PIC). This adolescent uptake has reached what is now being referred to as epidemic levels.

Adolescent epidemic

The use of e-cigarettes is growing exponentially in youth. The sales of JUUL Labs products increased by 641% from 2016 to 2017.[11] In 2019, 28% (up from 12% in 2017) of high school students and 11% of middle school students reported e-cigarette use.[12] Commercial e-cigarette accessory products have proliferated to allow adolescents to disguise their vaping devices as pens, smart watches, hoodies, and backpacks (there is even a company that makes vaping devices in the shape of metered-dose inhalers for asthma!). A potential gateway effect has been illustrated in studies in the literature, as there is increased risk that e-cigarette use will lead to cigarette smoking. A systematic review and meta-analysis of longitudinal studies supported the association between e-cigarette use and use of other tobacco products in several studies.[13-14]Other concerns about adolescent use relate to the known adverse effects that have been demonstrated particularly in this specific population, the marketing of flavorings attractive to adolescents, harm to the developing brain of adolescents, and the potential "re"-normalization of smoking behavior.[15]

Safety

The National Academies of Sciences, Engineering, and Medicine highlight in their 2018 report that there is conclusive evidence to support the rationale for adverse health concerns related to e-cigarette use.[16] The highest-level evidence is considered to be conclusive, and the report illustrates there is definitive evidence that we might share with our patients and communities. Table 1 outlines the evidence related to the device variability, safety concerns, and harm-reducing nature of switching to e-cigarettes from combustible tobacco products.

Table 1. Conclusive Evidence from the National Academies of Sciences, Engineering, and Medicine Report

Conclusive Evidence: *There are many supportive findings from good-quality controlled studies (including randomized and non-randomized controlled trials) with no credible opposing findings. A firm conclusion can be made, and the limitations to the evidence, including chance, bias, and confounding factors, can be ruled out with reasonable confidence.*

Conclusion 3-1. There is conclusive evidence that e-cigarette use increases airborne concentrations of particulate matter and nicotine in indoor environments compared with background levels.

Conclusion 4-1. There is conclusive evidence that exposure to nicotine from e-cigarettes is highly variable and depends on product characteristics (including device and e-liquid characteristics) and how the device is operated.

Conclusion 5-1. There is conclusive evidence that, in addition to nicotine, most e-cigarette products contain and emit numerous potentially toxic substances.

Conclusion 5-2. There is conclusive evidence that, other than nicotine, the number, quantity, and characteristics of potentially toxic substances emitted from e-cigarettes are highly variable and depend on product characteristics (including device and e-liquid characteristics) and how the device is operated.

Conclusion 14-1. There is conclusive evidence that e-cigarette devices can explode and cause burns and projectile injuries. Such risk is significantly increased when batteries are of poor quality, stored improperly, or modified by users.

Conclusion 14-2. There is conclusive evidence that intentional or accidental exposure to e-liquids (from drinking, eye contact, or dermal contact) can result in adverse health effects including but not limited to seizures, anoxic brain injury, vomiting, and lactic acidosis.

Conclusion 14-3. There is conclusive evidence that intentionally or unintentionally drinking or injecting e-liquids can be fatal.

Conclusion 18-1. There is conclusive evidence that completely substituting e-cigarettes for combustible tobacco cigarettes reduces users' exposure to numerous toxicants and carcinogens present in combustible tobacco cigarettes.

* https://www.nap.edu/resource/24952/012318ecigaretteConclusionsbyEvidence.pdf

Harm-free?

For individuals with known lung disease, the e-cigarette may appear to provide safer alternatives to continued tobacco use. In contrast to the over 7,000 harmful chemicals contained in combustible cigarettes, the components of the e-cigarette do represent a possible harm reduction and have the potential to assist the current tobacco user.[16] When an individual is considering the concept of harm reduction, we should be clear that there are known health concerns, and vaping is not harm free.. The scientific literature supports the idea that there is evidence that these devices cause adverse (respiratory-related) health effects and contain and emit toxic substances. The constituents of e-cigarettes have been found to include nicotine, flavorings, additives such as vitamin E oil (linked to EVALI), volatile organic compounds, cancer-causing chemicals, and heavy metals such as nickel, tin, and lead.[15] In contrast, there is still so much about the e-cigarettes and vaping that we do not know (limited to no evidence) (TABLE 2).

Table 2. No Available Evidence from the National Academies of Sciences, Engineering, and Medicine Report

Conclusion 9-1. There is no available evidence whether or not e-cigarette use is associated with clinical cardiovascular outcomes (coronary heart disease, stroke, and

peripheral artery disease) and subclinical atherosclerosis (carotid intima-media thickness and coronary artery calcification).

Conclusion 10-1. There is no available evidence whether or not e-cigarette use is associated with intermediate cancer endpoints in humans. This holds true for e-cigarette use compared with use of combustible tobacco cigarettes and e-cigarette use compared with no use of tobacco products.

Conclusion 11-1. There is no available evidence whether or not e-cigarettes cause respiratory diseases in humans.

Conclusion 13-1. There is no available evidence whether or not e-cigarettes affect pregnancy outcomes.

Conclusion 18-3. There is no available evidence whether or not long-term e-cigarette use among smokers (dual use) changes morbidity or mortality compared with those who only smoke combustible tobacco cigarettes

* https://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=24952

Efficacy in assistance with Quitting

As RTs, we must not miss the opportunity to deliver the important message that nothing foreign should ever be inhaled into the lungs. Remember, complete abstinence is the goal. As responsible clinicians providing evidence-based care, we should first recommend the seven evidence-based, FDA-approved pharmacotherapies for nicotine cessation. These evidence-based pharmacotherapies include five nicotine replacement therapies (NRTs) as well as bupropion and varenicline.[17]

The FDA-approved nicotine inhaler most closely resembles the e-cigarette in terms of function and delivery design. However, the device has been studied in terms of user preferences and is favored less by smokers. Regulation of the e-cigarette, much like the FDA-approved inhaler, might allow the contents to be standardized and may have great promise in the safer delivery of nicotine to address nicotine addiction and to aid in cessation. There is still a dearth of evidence to support the use of the e-cigarette for cessation, so e-cigarettes have not joined the list of FDA-approved strategies for smoking cessation. More randomized controlled trials are needed to expand the limited data available to date.[16]

RT role

The emphasis of recommending FDA-approved treatments for these individuals is essential as RTs interact with nicotine-dependent individuals and dual users. If an individual is still interested in using e-cigarettes, make them aware of the conclusive and substantial evidence of the risks associated with use. Share with your patients and clients that we still do not have evidence of their impact on health long-term.[16] As an evidenced-based professional RT, seek opportunities for additional training and stay up to date on the most recent evidence. The AARC has many resources to help meet this goal (www.aarc.org).

Conclusion

Whether you are responding to the call to action as a speaker at a high school or middle school assembly, discussing vaping with your pediatric asthmatic patient, or assisting a smoker to develop a quit plan, the

topic of e-cigarettes should be grounded in the evidence, to which we are all ethically obligated. For now, the simple truth is that there is so much that we still do NOT know. Perhaps, for now, the smoke signal cloud is shaped like a question mark.

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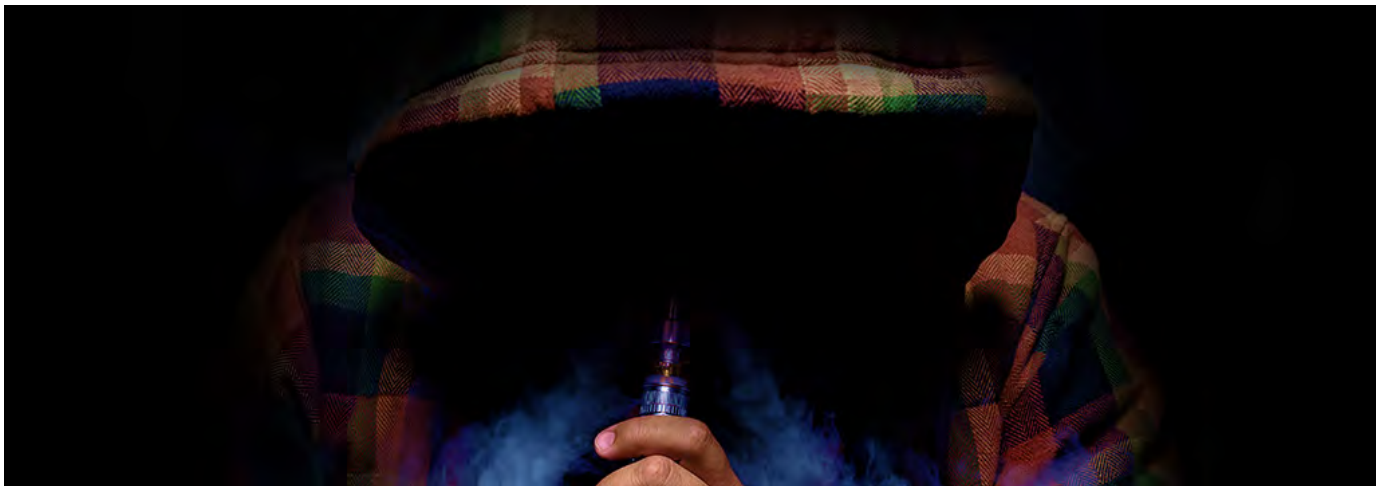
Adolescent Nicotine Dependence

by Mary P. Martinasek PhD, CPH, MCHES, RRT and Briana Lipski



Addiction is defined as "a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual's life experiences. People with addiction use substances or engage in behaviors that become compulsive and often continue despite harmful consequences."[1] The development of nicotine dependence with traditional cigarettes has typically started with a first cigarette during adolescence, followed by occasional use leading into heavy use, which is becomes sustained use in adulthood.[2] Over time, a tolerance to substances may develop that results in increased usage to obtain the desired effects, such as reduced stress, improved mood, or feelings of pleasure. Nicotine addiction occurs when there is reliance on tobacco products to obtained either these desired effects and/or to combat withdrawal symptoms.[3]

One of the most widely used substance of addiction is nicotine. Nicotine, from tobacco plants, is the addictive chemical that is found in conventional cigarettes, pipes, chew tobacco, cigars, and vaping devices. The amount of nicotine varies by product, and there are concerns that labeling of contents in these devices is inconsistent with actual contents when it comes to vaping devices. This inconsistency provides a challenge when trying to determine the best dosage of pharmacological treatment using nicotine replacement. It is suggested that to determine appropriate replacement may require obtaining a person's cotinine level. Cotinine is a biomarker for nicotine in the body and can be obtained from saliva, urine and hair.[4]

When nicotine enters the body, it is absorbed in the blood, where it can stimulate the adrenal glands. This causes the adrenal glands to release epinephrine, a hormone that is better known as adrenaline. After epinephrine is released, it can increase heart rate, blood pressure, and breathing. Like other drugs, nicotine can access the brain's reward system and provide positive feelings desired by the user.[5] Nicotine self-administration produces increased numbers of high-affinity nicotinic cholinergic receptors in the brain. The brain's reward system reinforces these positive feelings with dopamine release, creating the cycle of addiction. Withdrawal occurs as a result of addiction. Withdrawal symptoms may include depression, stress, anxiety, hunger, sleep disturbances, irritability, and cognitive and attention deficits. Many of the known addictive substances can cause harmful effects on the brain. Repeated exposure to nicotine, in particular, disrupts the circuitry in the brain associated with learning, memory, and self-control.[2]

Vaping nicotine has become a bit of a social norm among teens and young adults. It's estimated that more than 5 million middle and high school students vape (ie, use electronic delivery systems).[6] For these individuals, the negative consequences on the brain is increased as compared to adults. The last part of the brain to develop completely is the prefrontal cortex at around 25 years of age. This part of the brain is responsible for motor skills, memory, attention, and executive functioning; smoking and vaping as an adolescent or young adult creates a greater risk for impairment. Because nicotine is a psychoactive drug, it directly effects the prefrontal cortex and increases the risk of developing long-term mental disorders, cognitive impairment, and attention deficits in adolescents.[7]

Treatment options

There are several drugs and therapies approved by the FDA for the treatment of nicotine addiction in adults. Of these, three nicotine replacement therapies (NRT) are available over the counter: gum, patch, and lozenge. Other NRTs, such as an inhaler and a nasal spray, require a prescription. Nicotine replacement therapies are a common strategy used for nicotine addiction. The goal with NRTs is to slowly wean the patient off nicotine while helping to reduce the urge to vape/smoke. Although these are nicotine products, they do not have the added chemicals and carcinogens found in vaping devices and other tobacco products. There are two non-nicotine prescription medications commonly used: bupropion (Zyban) and varenicline (Chantix).

Currently, NRTs are not approved by the FDA as a cessation method for individuals under 18 years of age. However, the American Academy of Pediatrics (AAP) recently provided pediatricians with information on utilizing NRTs in adolescents. The AAP suggests that NRTs are safer than cigarettes and vaping devices. A prescription is required for youth to obtain NRT, thereby, allowing medical personnel the ability to review current patient medications and conditions prior to use. The AAP recommends pairing a long-acting NRT (i.e., patch) with a short-acting NRT (ie, gum or lozenge), depending on the frequency of current tobacco/nicotine use. Clinicians should be aware that lozenges should not be utilized in patients allergic to soya, and caution must be used with patients who have underlying cardiovascular disease, diabetes, or hyperthyroidism. Due to relapse, follow-up of patients is recommended. Providing behavioral counseling with medication/NRTs has proven to be the most successful method to treat nicotine addiction. Behavioral counseling often utilizes motivational interviewing or cognitive behavior therapy as a counseling method.[8] Of these available methods, behavioral counseling is an important adjunct to NRT and is recommended for adolescents and young adults because it taps into their own motivations to quit nicotine, identifies triggers, and teaches them skills to prevent relapse.[2,9] There is not enough evidence to support the use of medications such as Zyban and Chantix in youth cessation efforts.[10]

Suggested role for respiratory therapists

Respiratory therapists should approach adolescent nicotine addiction from multiple angles. First and foremost is to encourage smoking/vaping cessation at every patient encounter. By intervening, RTs have the ability to help their patients improve their daily quality of life and their general life span.[11] Providing this information to patients prior to discharge can potentially sustain their quit or planned quit efforts. For focused benefits, the RT can explain to their patients (adolescent or adult) the short-term effects of quitting, such as return of blood pressure to normal and reduction of carbon monoxide levels to normal within just 48 hours. There are cessation CPT codes for even a three-minute intervention (see Resources).

RTs can support policies that are aimed to decrease usage in adolescents and young adults, as well as efforts to restrict marketing of nicotine products through active involvement with statewide respiratory care organizations and our national organization. Support of and involvement in advocacy are crucial for a systems approach. Next, RTs should be aware of supported youth prevention campaigns and cessation resources in their community and state. RTs can partner with local schools and YMCA programs to be the

trusted source of information, thereby providing a valuable community service through primary prevention efforts.

Resources

Catch My Breath Prevention Program for Grades K–12:
https://catchinfo.org/modules/e-cigarettes/
American Academy of Pediatrics: Nicotine Replacement Therapy and Adolescents:
https://downloads.aap.org/RCE/NRT_and_Adolescents_Pediatrician_Guidance_factsheet.pdf
“Ditch Juul” text message campaign:
https://truthinitiative.org/thisisquitting
Apps such as “I am sober” are popular with college students; the students can select the product they are addicted to and it provides a community of support:
https://apps.apple.com/us/app/i-am-sober/id672904239
Surgeon General’s Tip Sheet for Parents:
https://e-cigarettes.surgeongeneral.gov/resources.html
Coding for Tobacco use and Cessation Counseling:
https://www.acog.org/-/media/Departments/Toolkits-for-Health-Care-Providers/Smoking-Cessation-Toolkit/Smoking-Cessation-Tool-Coding.pdf?dmc=1&ts=20200104T0238507160

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The Vaping Epidemic

A Respiratory Therapy Department's Experience with Providing Education on Vaping

by Linda Hopper, BS, RRT, RRT-ACCS

Concern over vaping and its impact on health has gained national media attention during recent months. News about vaping-related illnesses and deaths has challenged respiratory therapy departments to provide up-to-date information and education on this subject. UCHealth Memorial Hospital's respiratory therapy department was moved to begin education when the 2017 Colorado Healthy Kids Survey revealed that middle and high school children in Colorado vaped at double the national rate (27% vs 13%).[1] Recent data now show a national teen vaping rate of 27%.[2] Although the 2019 Colorado data are not yet available, this alarming increase in the national rate drove us to act.

The goal

Our initial goal was to provide information to health care professionals. We started by presenting a vaping lecture during our 2018 Colorado Society of Respiratory Care Southern Colorado Symposium. Interest in the subject led to a presentation during Grand Rounds at UCHealth Memorial Hospital. The response from health care providers was overwhelming. The lecture hall, with a capacity of 90, was filled beyond capacity and the hall outside was completely full, requiring us to provide a loudspeaker in the hallway. The rounds were repeated to meet the demand — in all, we had 227 attendees.

Kevin McQueen presenting at the Colorado Safe School Summit.

Word of the vaping presentation and its interest spread to our hospital marketing department. The marketing team provided information to our local news outlets, which was quickly picked up by local and national outlets for NBC, ABC, CBS, and FOX news broadcasts. Due to public interest in this subject, the news directors allowed significant time for the interviews. UCHealth Director, Kevin McQueen, offered to provide free education to schools in southern Colorado. He was contacted by school principals, health/safety officers, and Parent-Teacher Associations, all asking to schedule presentations. The original aim was to begin with southern Colorado, but demand quickly spread state-wide.

Audience members stated how much they appreciated receiving the information. Several were concerned about recent vaping-related illnesses and deaths. Teens expressed concern for classmates who vape. One young man reported that his friends who vape were no longer able to keep up with him while playing basketball. Other teens related that they felt the vaping rate was much higher than our data, perhaps as high as four in 10 students. Teachers and parents were interested in how to recognize vaping products. Parents asked for guidance on how to talk to their children about vaping.

In addition to the offerings above, public health officials and local fire departments reached out to ask us to collaborate with them to get this message out. City council members invited Mr. McQueen to present the information during a council meeting held to consider the need for further legislation regarding vaping.

To date, the presentation has been provided to more than 1,800 students, teachers, parents, and community members. Social media postings have led to more than 500 likes and shares, including multiple requests for the vaping presentation materials, some coming from respiratory therapy departments as far away as Ontario, Canada.

What we are teaching

It is important to understand that information to be provided must be updated weekly! New research and data are published frequently, which requires diligent review. The Centers for Disease Control and Prevention (CDC) provide updated information on a frequent basis, as do many other reliable sources.[3] We first describe what vaping is—i.e., an aerosol that is produced by heating a liquid. The devices include many classifications, and new devices become available at a rapid rate. Many devices are made to resemble everyday objects. One popular device, the Juul, resembles a flash drive and can be charged in a USB port. Stealth and Incognito websites provide devices that resemble metered-dose inhalers, coffee mugs, breath mint packages, and permanent markers, and some are even incorporated into clothing such as hoodies.

Kevin McQueen speaking to firefighters at the Manitou Springs, CO Community presentation.

The contents of the e-liquid are of great interest. The majority of liquids contain freebase nicotine or nicotine salts. The nicotine salts version found in Juul devices allows the nicotine to be more readily absorbed into the bloodstream, and the vapor is less harsh, so it is easier to inhale more nicotine for

longer periods of time.[4] Juul pods also contain benzoic acid to increase the potency of the nicotine salts. Benzoic acid has been known to cause coughing, wheezing, and shortness of breath when inhaled.[5] These e-liquids also contain potentially harmful substances such as heavy metals, propylene glycol, glycerin, acrolien, vitamin E acetate, and flavorings.[6,7] Recent studies have shown that some flavors may be particularly harmful.[8] The e-liquids may also contain tetrahydrocannabinol (THC), cannabidiol (CBD) oils, or blends of nicotine and THC. These liquids are available from major manufacturers, or they can be made at home or obtained from black market sources.

Safety is a concern

Although many adults vape, our major concern is with youth. In 2019, the CDC reported 5.3 million middle and high school students had vaped within the last 30 days. This was an increase from 4.9 million reported in the 2018 survey, and this figure has continued to climb. Most teens begin vaping because of the flavors, and many do not realize that the liquid contains nicotine. The adolescent brain is highly sensitive to nicotine, and this chemical can affect attention, memory, and cognitive ability.[9] Withdrawal symptoms may occur much earlier in adolescents as well, even prior to daily use.[9] Teen vaping patterns are different from those of adults in terms of how much and how often they vape. One Juul pod contains 200 puffs, which is equivalent to a pack of cigarettes. Some teens have reported using one pod in a single hour or up to four pods per day.

As of December 3, 2019, 2,291 cases of e-cigarette, or vaping, product use–associated lung injury (EVALI) have been reported to the CDC from all 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands), and 48 deaths have been confirmed in 25 states and the District of Columbia.[10] EVALI or severe vaping-related lung injury symptoms include many that are common to other illnesses such as the flu. Patients have reported coughing, shortness of breath, fever, chills, and gastrointestinal symptoms. Lung injury associated with severe EVALI was first thought to resemble a lipoid pneumonia, but two recent publications reported that the injury is similar to a severe chemical burn.[11,12]

Vaping devices have also led to unintended injuries. Battery explosions have caused fires and serious burns or tissue damage to the face, eyes, and extremities. Children under the age of five have been accidentally poisoned by ingesting e-liquid or by absorbing it through their skin or eyes.[13,14].

Lead the way!

As respiratory therapists, we have a responsibility to be informed and to provide needed education to other health care workers, teachers, parents, students, and the community. Parents need to be taught what to look for in their children's behavior, how to recognize vaping devices, and how to approach their child about addiction. There are exceptional resources to educate yourself on this subject, including the CDC, the U.S. Surgeon General, and the Food and Drug Administration.

Once you are well informed, get started in your local area. Reach out to other RTs in your place of work, and contact your state society and respiratory therapy programs. Develop a working group willing to provide education. Write or call schools, public health departments, and other organizations offering to provide free education about vaping. Reach out to respiratory therapy programs to educate and to recruit RT students to help. Promote your efforts by engaging your employer's marketing departments, who often have relationships with local news stations. Identify an RT who is willing to be interviewed, offer to provide free education, then be ready to mobilize your group! We are willing to share our presentation with others. If you are interested, contact us using the provided information.

Together our respiratory therapy community will have an impact on the health of future generations.

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Shifting Toward Nicotine Cessation

by Gabrielle N. Davis, MPH, RRT, RRT-ACCS, NPS, CTTS, CHES

Tobacco use is the leading cause of preventable death in the United States.[1] This statistic has remained uncontested for years and will likely continue in the foreseeable future. Furthermore, COPD is the third leading cause of death, and 75% of those individuals have COPD due to nicotine addiction.[2] With the addition of electronic nicotine delivery systems (ENDS) — also known as vaping — 40.8% of people using tobacco products now also use an ENDS device.[3] Dual users have an increased morbidity and mortality risk associated with nicotine addiction separate from chewable or combustible tobacco.

Our academic programs and credentialing examinations have highlighted the importance of prevention, cessation, pathology, and disease management related to tobacco products. While these areas are integral to successful patient outcomes, we have failed to place importance on the reason for continued tobacco use despite the known detrimental outcomes — addiction. Detailed knowledge of nicotine devices, cessation, and counseling techniques are essential in this context, though these content areas are not routinely covered in academic programs.[4] Respiratory therapists must know how to complete a patient interview, obtain a tobacco-use history, and provide tobacco cessation education. To be successful in these efforts, RTs must also understand the important role addiction plays in cessation. Educational curricula often approach cessation through the lens of disease prevention; this focus must expand to include the biopsychosocial aspects of addiction so credentialed practitioners are able to provide proper cessation counseling in clinical practice. The impact of sustained nicotine use is often observed decades after the addiction began. With proper use of nicotine replacement therapy, pharmacologic interventions, and counseling, we might transform the statistics around preventable deaths attributable to nicotine addiction.

Respiratory therapists treat patients for acute and chronic diseases related to their regular nicotine use. In 2018, it was reported that in the United States, there were more than 34 million people currently smoking cigarettes and more than 16 million people living with a smoking-related illness.[5] Chewing tobacco rates have decreased to 3.4% among adults.[6] Within these statistics, marginalized groups such as communities of color, LGBTQIA+ communities, people with lower socioeconomic status, and people with psychological conditions are disproportionately affected. Data from 2019 reveal that 27.5% of high school aged youth currently use an ENDS device.[7] These statistics are startling — numbers haven't been that high among youth for two decades! Of those who reported using ENDS devices, 34.2% admit to using it daily for no less than 20 days per month.[7] While the use of cigarettes has decreased in recent years,

(not including dual users of both cigarettes and ENDS), we have an entire population of people using nicotine (via ENDS devices) who would have likely never used cigarettes based on statistics and predicted growth.[7] RTs are uniquely situated to manage patients afflicted with both addiction and lung disease. Because we hold this privileged position, and usually a captive audience, it is imperative that we are armed with the appropriate and affirming information to help individuals be successful with both disease management and nicotine cessation.

When we explore other addictive substances such as alcohol, opiates, methamphetamines, marijuana, or cocaine, we often see symptoms of their excessive use immediately: euphoria, nodding, belligerence, or overdose. Once these symptoms of addiction are known, caregivers can step in, if afforded the opportunity, to offer assistance. Symptoms of tobacco use are not as easily recognized. Outcomes of sustained tobacco use are seen in diseases such as COPD, lung cancer, and other lung diseases that manifest later in life. As health care professionals, if we find out a patient is using tobacco, we are taught and trained to inform them that these products are detrimental to their health and offer resources (if we have them) to assist with cessation. Simply sharing the negative outcomes associated with tobacco use can be viewed as a fear-based tactic and should not be used in cessation efforts. Furthermore, individuals who use ENDS devices are using products that include much more than just nicotine. It is for these reasons and more that the conversation must shift from tobacco cessation to nicotine cessation. As cardiopulmonary experts, RTs regularly treat the outcomes of these addictions firsthand. Our wide variety of experiences paired with our role in direct patient care makes us best equipped to provide nicotine cessation education to those affected.

There are five FDA-approved nicotine-replacement therapies for tobacco cessation: the nicotine patch, gum, lozenges, inhaler, and nasal spray. Chantix and Zyban are the only non-nicotine replacement, FDA-approved medications for smoking cessation.[8] None of these medications or therapies have been studied specifically with ENDS use. Because there are no adjuncts currently approved to assist with nicotine cessation involving ENDS devices or other non-tobacco nicotine products, we must rely on behavioral interventions commonly used with cessation.

Brief interventions using motivational interviewing and the transtheoretical model of change have been proven to assist in cessation.[9] These strategies are commonly used in addiction to increase the likelihood of changed behaviors. Using these models to elicit change or the desire to change allows the patient to be involved in their cessation, which can also serve as a motivator to quit.[10] It is important for RTs to avoid fear- or guilt-based tactics when attempting to lead a patient toward cessation. No evidence-based studies support purposeful fear- or guilt-based strategies in the continuous cessation of nicotine. We must work to remove the shame and stigma associated with nicotine use and give the same attention to those addicted to nicotine as someone addicted to other substances.

To better understand addiction, we must explore mental health and the standards of care. The Diagnostic and Statistical Manual of Mental Disorders (DSM) V describes a condition called tobacco use disorder. This disorder is described as a problematic pattern of tobacco use leading to clinically significant impairment or distress.[11] Cardiovascular disease, cancer, and COPD are the most common smoking-related diseases. These diseases are roughly 3-8 times as likely to occur in individuals who are addicted to nicotine.[11] Fortunately, RT's have the knowledge and skillset required to treat these conditions.

Hospitals and facilities staffed with respiratory therapists are already equipped with the perfect professional to provide nicotine-cessation education. To truly shine as nicotine-cessation advocates, we must understand that addiction is a disease and treat it with the urgency it requires.

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A Stone's Throw Away

by Karen S. Schell, AARC President, DHSc, RRT, RRT-NPS, RRT-SDS, RPFT, RPSGT, AE-C, CTTS

"I alone cannot change the world, but I can cast a stone across the waters to create many ripples."

Mother Teresa

People who are around us sense our atmosphere — our energy, mood, outlook — and are affected by it. Our thoughts and feelings, both mental and emotional, create our atmosphere. This determines people's attitudes toward us.

Know the direction you want to go

Quality of life will never be better than the quality of choices. Choices to make change begin with motivation.

Before change occurs, we must consider in which direction we want to go. We could continue as is, make immediate and dramatic changes, or move slowly into the change. The amount of time and effort we put into making the change represents the decision to change. Dedication to the decision to make the change will become the motivation.

Being completely dedicated to the direction and decision will ensure that we have the motivation needed to change. Motivation to change must have a consistent effort to do everything possible to achieve the goals. In every person lives a different motivation. Internal and positive motivation comes from strength and security, and it inspires success, fulfillment, challenge, passion, and satisfaction.

Making ripples

The AARC and its members are making ripples in the water. The work ahead is to help us reach our potential.

It is easy to say we want to change, but it is much more difficult to make it happen. Our efforts must match our goals and ensure that we reach our goals; we must do the work. Not just a few, but all of us. Our efforts must take us beyond the point that is inspiring and instead lead to actions that are necessary

to make meaningful change. We must accept it as part of the deal in working toward a better profession. We can say we are motivated to change, but we need to act now to achieve our goals.

Leading the way

We have been sorting through who we are — our values, strengths, gifts, and talents. Clarifying these areas leads us to have confidence in pointing us in the right direction. Knowing who we are will help us pursue what is right for the profession. This clarity makes it easier to stay on track and to make decisions wisely. Changes from the heart will not change people or circumstances, but they can help us respond more positively and productively to nurture the right environment for change.

Whatever effort we put into change is what we will get out of it. Our efforts are reflected in our motivation. We have changes ahead, and we have been preparing to make those changes with persistence, deliberate actions, and perseverance in overcoming obstacles.

Time to grow

Success comes first from growing ourselves, and then it is all about helping others grow. What is the motivation that drives you? What can you contribute? Are you able to make efforts toward change that really count? We are a stone's throw away from this change and growth! Do you have your stones ready to make ripples in the water?

It is time to move forward, and you are needed to be part of the process. We need you to create an atmosphere that allows us to make the changes needed for the profession.

about the author…

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The Lawyer as Your Anti-Smoking Advocate

by Anthony L. DeWitt, JD, RRT, FAARC

In 1998, I began one of the most exciting missions of my life, working on the state of Missouri's Tobacco Trial Team. Our team, along with a group of other capable and notable attorneys, were preparing to hold Big Tobacco accountable for what we saw as marketing a slow and painful death through addiction. While, in the end, the attorneys general of the states involved pulled the rug from under us by agreeing to a woefully inadequate settlement, and the state legislators breached their implied promise to use the funds to combat smoking and other addictions, it was still a big victory for every respiratory therapist. Why? Cigarettes went up in price, and that alone caused thousands to reconsider a dangerous, deadly, and expensive addiction. It's worth noting that tobacco companies called it a "habit" or an "adult pleasure." These are merely rhetorical camouflage for "addiction." Over the past 22 years, smoking has disappeared from public venues all over the country, in large part due to the exposure of company secrets that came about through litigation. No longer do you have to sit in an office and endure the smoke of others. Imagine that: a lawyer is your friend!

When most people, particularly those who work in health care, think about the members of the "public health team," they rarely think about lawyers. And there are probably good reasons for that. Most of the time when health care workers deal with lawyers, they either hear "No, you can't do that," or "Will the defendant please rise?" The relationship between doctors and lawyers is frequently tense. But much in the manner of the old adage "the enemy of my enemy is my friend," in the public health arena, lawyers and respiratory therapists share common enemies. They are pushing in the same direction.

One of those common enemies is $C_{10}H_{14}N_2$ — also known as nicotine. Nicotine is a dose-dependent organic alkaloid poison. In fact, nicotine has been used as an insecticide for decades, and there are even recipes for a nicotine-based insecticide on the internet.[1] When consumed in large enough quantities, nicotine is highly toxic. It can cause convulsions, paralysis, and death. According to WebMD.com, as little as 60 mg of nicotine is a lethal dose for a 150-pound person. This compares to a 3,000 mg/kg non-lethal dose of THC (the psychoactive substance in marijuana), which is equivalent to smoking 43 pounds of the plant at one sitting (which would probably produce CO poisoning before THC caused negative effects). However, marijuana3 is highly regulated and, in many places, illegal, whereas tobacco and nicotine are legal. Please note that I take no position on the use of THC, although I do suggest that smoking anything is probably bad for you.

The U.S. Congress has shown zero interest in regulating tobacco with any degree of effectiveness, and the only progress in reducing the smoking rate and returning several billion dollars in smoking-related costs came twenty-two years ago when the Tobacco Settlement was reached.

For respiratory therapists, it was no surprise that when tobacco became more highly regulated, someone would take the therapist's long-revered instrument — the ultrasonic nebulizer — and turn it into a device for consuming nicotine. With a small rechargeable battery, a pricy cartridge that could be refilled, and the promise of direct ingestion of nicotine without having to inhale the byproducts of combustion, it was sure to be a winner. And it certainly has been.

Dozens of big and small manufacturers got into the game, allegedly taking aim at the high school crowd, marketing their devices (according to lawsuits on file) with abandon as some safer way to ingest an addictive alkaloid poison.[2] In my home of Auburn, Alabama, a woman posted on social media that she found a vaping device in her 12-year-old daughter's school backpack. One study found that nearly 30% of high school students engage in vaping. The FDA has since warned companies about marketing to teens.[3] Tobacco and other nicotine providers have been counting on youth and inexperience for their marketing for scores of years.

The FDA announced plans to regulate vaping devices, but those makers who got their devices to market before the FDA has finalized its regulations were essentially grandfathered for several years and escaped evaluation of their formulas. Vaping device manufacturers did not completely escape regulation, however. They must retroactively apply for FDA approval by May 2020. Approval hinges on proving that their devices provide a "net benefit to public health." Doubtless, there are dozens of highly paid marketers and pseudo-science professionals already scheming to show how getting people addicted to an addictive poison actually benefits the public health.

While the vaping industry is playing Rope-A-Dope with federal regulators, however, there's a new sheriff in town: private lawyers. There are currently at least 50 federal and state lawsuits targeting the industry, not only for deaths related to the nebulized oils in the products but also for addiction to nicotine. Using the same model that drove the tobacco settlements in the late 1990s, the Center for Environmental Health litigated a case to settlement that prohibits promoting Juul on Facebook and other social media platforms and puts in place other important restrictions.[4] Wrongful death and other lawsuits are piling up, and just as lawsuits increased the price of cigarettes, they will increase the price of vaping products as manufacturers pay increasing insurance premiums for defense of multiple multi-million-dollar lawsuits.

It might be argued, of course, that there are lawyers working on the other side too, and that is true. While it is important to point out that smoking, vaping, and the ingestion of nicotine is a public health hazard, it is also important to note that it is completely legal, and a defendant is entitled to a defense; lawyers get paid to provide that, even if they don't use the products. Many of those lawyers believe that the ability of the public to decide these matters for themselves is the essence of freedom. I am not one of them.

Generally speaking, when products hurt consumers, lawyers stand ready to hold people accountable. So, the next time someone berates lawyers, maybe point out that at least with regard to smoking and health, they've had a net positive effect.

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Key Findings From the Surgeon General Report

by Anne Marie Hummel

The AARC was among the select number of invitation-only organizations to attend the Surgeon General's press conference held in the Humbert H. Humphrey Building in Washington, DC, on Jan. 23, 2020, to announce his most recent report, The Health Benefits of Smoking Cessation. The key findings of the 700-page report, compiled by 150 experts, are based on the latest scientific evidence on the health benefits of quitting smoking. It has been three decades since the first report on smoking cessation was released in 1990, and the subject is particularly personal to this Surgeon General as both of his grandfathers died from smoking-related diseases.

10 key findings

1. Smoking cessation is beneficial at any age. Smoking cessation improves health status and enhances quality of life.
2. Smoking cessation reduces the risk of premature death and can add as much as a decade to life expectancy.
3. Smoking places a substantial financial burden on smokers, health care systems, and society. Smoking cessation reduces this burden, including smoking-attributable health care expenditures.
4. Smoking cessation reduces the risk of many adverse health effects. Quitting smoking is also beneficial to those who have been diagnosed with heart disease and COPD.
5. More than three out of five U.S. adults who have ever smoked cigarettes have quit. Although a majority attempt to quit each year, less than one-third use approved medications or behavioral counseling to support quit attempts.
6. Considerable disparities exist in the prevalence of smoking across the U.S. population. Similarly, the prevalence of key indicators of smoking cessation also varies, with a lower prevalence in some subgroups.
7. Smoking cessation medications approved by the Food and Drug Administration and behavioral counseling are cost-effective cessation strategies. When used in combination, they can increase the likelihood of successfully quitting smoking. Using combinations of nicotine-replacement therapies can further increase the likelihood of quitting.
8. Insurance coverage for smoking cessation treatment that is comprehensive, barrier-free, and widely promoted increases the use of these treatment services, leads to higher rates of successful quitting, and is cost-effective.
9. E-cigarettes, a continually changing and heterogeneous group of products, are used in a variety of ways. Consequently, it is difficult to make a generalization about efficacy for cessation based on clinical trials

involving a particular e-cigarette, and there is presently inadequate evidence to conclude that e-cigarettes, in general, increase smoking cessation.

10. Smoking cessation can be increased by raising the price of cigarettes, adopting comprehensive smoke-free policies, implementing mass media campaigns, requiring pictorial health warnings, and maintaining comprehensive statewide tobacco control programs.

What does this new report mean for respiratory therapists?
One of the takeaways reported by the Surgeon General in his remarks was this: Although advice from health professionals has increased since 2000, 40% of individuals who smoke and see a health care professional did not receive advice to quit.

We know what works, but folks are not getting it, and that's where you come in. Your patients with respiratory disease are among the most vulnerable, and you see every day the devastating effects that smoking can have on their health and quality of life. Continue your efforts to provide smoking cessation counseling, and use some of the findings from the Surgeon General's report to emphasize the importance of quitting smoking.

Time with the Surgeon General
After the press conference, the Surgeon General stayed to talk with those in attendance and to take pictures. AARC's Associate Executive Director for Advocacy and Government Affairs Anne Marie Hummel was able to spend a few minutes with him. When she said she was from the AARC, his eyes lit up and a big smile came over his face.

He talked with her about the beginning of his medical career as an anesthesiologist and praised the work of the respiratory therapists whom he was fortunate to work with, especially in the ICU. Hummel emphasized the timeliness of the new report and how RTs with their expertise could help improve the numbers of those who quit smoking.

So, the ball is in your court — don't let the Surgeon General down!

about the author…

Anne Marie Hummel is an associate executive director for the AARC who oversees state and federal legislative and regulatory issues impacting respiratory therapists, the RT profession, and the pulmonary patient.

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Giving Back: A Little Effort Can Go a Long Way!

by Teresa A. Volsko, MBA, MHHS, RRT, CMTE, FAARC

Respiratory care practitioners are an integral part of the interprofessional bedside team and can question assumptions, erase boundaries, and create solutions that engage the patient and family in a partnership to—transform care. The talents of respiratory therapists extend well beyond the bedside and are instrumental in educating and mentoring aspiring clinicians through research and implementation of evidence-based practice. Resources are an essential element in advancing our profession through education and research. The American Respiratory Care Foundation (ARCF), through its mission, is dedicated to supporting research, education, and patient-focused philanthropic activities. The ACRF has an outstanding team, who, in concert with the support of its donors and sponsors, fulfills its mission by providing the structure and leadership necessary to support changes in practice by funding advanced educational opportunities, research endeavors, and health care innovation through scholarships, grants, and journal conferences.

It may be difficult to imagine how a respiratory therapist can give back at a local level to a foundation. The ARCF provides respiratory care professionals with the resources to develop professionally, advance our science, and create innovative solutions to the education and care of patients. Giving back can take many forms.

Individual respiratory therapists can support the Foundation by attending the ACRF annual fundraiser on the evening before the AARC Annual Congress, by making a personal monetary donation, or by sharing their collective talents to raise money for our foundation and to increase awareness about the respiratory care profession and the importance of supporting the ACRF. All it really takes is a little inspiration and a willingness to give back and collaborate to make a difference. Commitment is the spark that can ignite work efforts that profoundly impact our profession and the communities in which we live and work.

A small group of respiratory therapists from Ohio proved how sharing time and talent could demonstrate their passion for the profession, raise funds for the ACRF, and celebrate our history as a profession. Since the AARC was celebrating its 70th Anniversary, it seemed befitting to honor the occasion with a fundraising celebration at the Dittrick Museum of Medical History. This museum, housed on the campus of Case Western Reserve University in Cleveland, Ohio, is home to medical memorabilia chronicling the evolution of everything from anatomy, endoscopy, microscopy, and contraception to obstetrics and gynecology, surgery, and respiratory care diagnostic and therapeutic instrumentation. This museum is home to the Rainbow Jet, a high-frequency jet ventilator and humidification system developed by respiratory therapists Rob Chatburn and Marvin Lough, as well as an extensive collection of respiratory-related medical photography donated by Steve DeGenaro. The

museum's curator was so enamored with the prospect of holding a reception to honor the AARC's 70th anniversary that he committed to a special exhibit highlighting the history of respiratory care through medical device displays and photography for a one-month period of time. The celebration kicked off with a small gathering of respiratory therapists, including current and former leaders in the Ohio Society for Respiratory Care. The excitement for this event grew and was shared by the leadership from the executive office of the AARC who, along with AARC's historian, traveled from Dallas to Cleveland, Ohio for the event.

The reception allowed respiratory therapists who recently entered the profession the opportunity to mingle, share stories, and learn about where their profession had been as well as discuss our promise for a bright future. The event also attracted local political leaders from Cleveland and Youngstown, solidifying the importance of respiratory care to an important audience. Ohio Senator Rob Portman officially recognized the event in a letter sent to the AARC, stating: "I applaud the dedication of you and your members to promoting the importance of respiratory therapists and the Association. I commend the opportunity for people to learn from the exhibit and engage in such an educational experience." The Cleveland City Council provided a special proclamation, noting that the council "takes great pride in recognizing the American Association for Respiratory Care on the noteworthy occasion of its 70th Anniversary" and applauding "the entire respiratory care community of physicians, therapists, and all others involved in the field for maintaining the highest ethical and professional standards of pulmonary care." Cleveland City Council Member Anthony Brancatelli presented our respiratory community with a Resolution of Congratulations at the event.

The non-respiratory care community also joined in the festivities. Local restaurants provided food and beverages at a nominal cost, while others donated food for the event. Funds for the ACRF were also raised from generous donations made by local industry sponsors, who collectively committed more than $10,000 to support this fundraising event for the ACRF foundation. In a little less than 2 months of planning, a few respiratory therapists were able to raise a significant amount of money in support of the ACRF, celebrate our history, and promote our profession.

By making a small commitment of time and talent, you too can provide the spark that ignites an effort to make a difference by supporting the mission and vision of the ARCF in the communities in which you live and work.

The ARCF is dedicated to promoting respiratory health through research, education, and patient-focused philanthropic activities. Learn more about the ARCF at arcfoundation.org.

about the author…

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RC Currents

IN THE NEWS

E-Cigarette Use Skyrockets in Young Teens

Researchers from the University of Michigan who looked at data on 26,662 teenagers between the ages of 16 and 17 who took part in the National Youth Tobacco Survey have found that the percentage of teens who say they started vaping at age 14 or younger has more than tripled in the past five years, going from about 9% in 2014 to 28% in 2018. The increase occurred at a time when the use of other tobacco-related products remained about the same. The study was supported by the National Cancer Institute and National Institute on Drug Abuse and published by the American Journal of Public Health late last year.

New Target for Mesothelioma Treatment
Working with colleagues in Spain, investigators from Thomas Jefferson University have identified a potential new treatment target for patients with mesothelioma, a type of cancer caused by inhaling asbestos fibers. The novel targetable axis is based on a clinically relevant association between two important inhibitors of one of the cell's major phosphatase, PP2A, and the cell cycle cyclins/CDK complexes.

"The critical components of this newly identified axis appear overexpressed in mesothelioma patients," Raffaella Pippa, study author, noted. "We hypothesize that we can improve patients' survival by targeting both cyclin/CDKs and PP2A inhibitors."

The investigators hope their discovery will one day benefit patients with other types of cancer as well. The findings were published in a recent edition of the Journal of Cellular Physiology.

How Air Pollution Raises the Risk for Chronic Lung Disease
Two new studies from researchers at Johns Hopkins show how exposure to ozone and other forms of pollution raise the risk for chronic lung diseases like COPD.

In the first study, investigators used data on participants from the SPIROMICS air pollution study. All were former or current smokers ages 40–80. After adjusting for demographic and socioeconomic factors, as well as smoking status and pack-years, the researchers found that people who had been exposed to higher levels of ozone over the previous 10 years were more likely to have COPD.

In the second trial, the authors studied data on 8,500 adults enrolled in the National Health and Nutrition Examination Surveys, 2007–2012. Of the participants, 19.5% resided in rural areas and 29.6% in urban areas. Rural areas, with a 12% prevalence of COPD, had more than double the disease burden seen in urban communities, where the prevalence stood at 5.9%. By analyzing differences between urban and

rural communities that might affect COPD risk, the team discovered that a 1% increase in the number of homes using wood as the primary heating source was linked to a 12% higher odds of COPD among people who had never smoked.

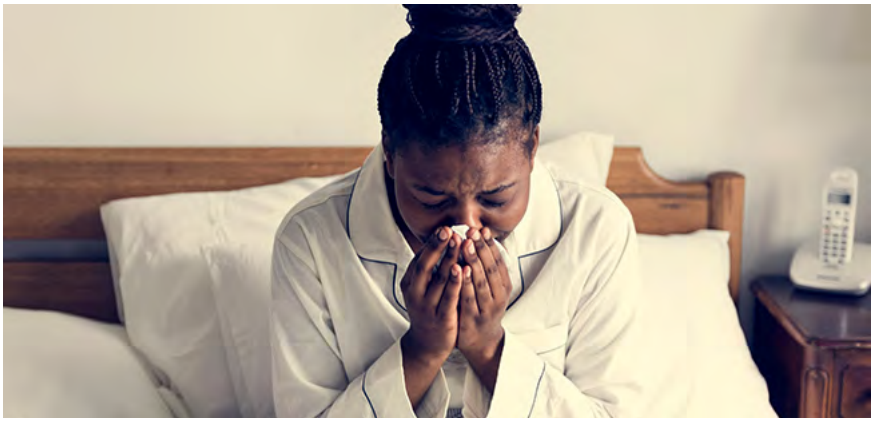
The first study appeared in JAMA Internal Medicine. The second was published in the American Journal of Respiratory and Critical Care Medicine.

New Hope for ALS

An international team of investigators headed up by researchers from the University of California San Diego School of Medicine have discovered a new way to effectively deliver a gene-silencing vector to adult mice with amyotrophic lateral sclerosis (ALS). The treatment resulted in long-term suppression of the degenerative motor neuron disorder when delivered prior to disease onset, as well as blockage of disease progression when initiated after symptoms had already appeared.

The research builds on earlier studies that attempted to introduce the silencing vector intravenously or into cerebrospinal fluid in early symptomatic mice. In those studies, disease progression was delayed, but it continued and the mice soon died. In the new study, a single subpial injection markedly mitigated neurodegeneration in presymptomatic mice, which displayed normal neurological function with no detectable disease onset. The functional effect corresponded with near-complete protection of motor neurons and other cells, including the junctions between neurons and muscle fibers.

In adult mice already displaying ALS-like symptoms, the injection effectively blocked further disease progression and degeneration of motor neurons. In both approaches, the affected mice lived without negative side effects for the length of the study. The study appeared in Nature Medicine.



First Flu Strain Sets the Stage

Why do some people suffer more with the flu than others? According to researchers from the University of Arizona, the reason can be traced back to the initial flu strain a person contracted early in life.

The idea that the first bout of flu sets the stage for subsequent bouts first came in 2016 when the investigators published a paper outlining a premise called immunological imprinting to explain the connection. In a new study published in PLoS Pathogens late last year, they set out to investigate whether immunological imprinting could explain people's response to flu strains already circulating in the human population and to what extent it could account for observed discrepancies in how severely the seasonal flu affects different age groups.

The team analyzed health records obtained by the Arizona Department of Health Services to track flu cases and see how different strains of the flu virus common over the past few years have affected people at different ages. The health record data revealed a pattern: People first exposed to H1N1 during childhood were less likely to end up hospitalized if they encountered H1N1 again later in life compared to people who were first exposed to H3N2 and encountered H1N1 later in life. Conversely, those first exposed to H3N2 enjoyed extra protection against H3N2 later in life.

To understand these findings, the researchers dug into the evolutionary relationships between influenza virus strains. H1N1 and H3N2, it turned out, belong to two separate branches, or groups, on the influenza "family tree." While infection with one does result in the immune system being better prepared to fight a future infection with the other, the protection against future infections is much stronger when the immune system is exposed to strains from the same group it has battled before.

Another pattern identified by the study, however, was more difficult to explain: People whose first childhood exposure was to H2N2, a close cousin of H1N1, did not have a protective advantage when they later encountered H1N1. The investigators concluded that our ability to fight off the flu virus is determined not only by the subtypes we have encountered over the course of our lives, but also by the sequence in which we have encountered them.

The authors hope their findings will one day help health officials predict which people will be most affected by which strains of the flu.

E-Cig Vapor Increases Harmful Bacteria

According to researchers from Queen's University of Belfast, Northern Ireland, bacteria commonly associated with lung disease become more harmful when exposed to both cigarette smoke and e-cigarette vape. Indeed, in some cases inflammatory and other changes noted in bacteria exposed to e-cigarette vapor exceeded those observed following bacterial exposure to cigarette smoke, suggesting that there is little difference between cigarette smoke and e-cigarette vapor when it comes to promoting lung infections.

Said study author Dr. Deirdre Gilpin, “This study shows us that vaping may carry the same risk as cigarette smoke in increasing the susceptibility to bacterial infection.”

The investigators published their findings in a recent edition of Respiratory Research.

Antibiotic Combo Clears Latent TB
A new study from researchers at the Southwest National Primate Research Center in San Antonio, Texas, and Yerkes National Primate Research Center in Druid Hills, Georgia, reports that two classes of antibiotics can keep latent tuberculosis (TB) infection from developing into symptomatic TB.

The investigators first gave nonhuman primates enough TB to create a latent infection, then treated half of the animals with a once-weekly combination of isoniazid and rifapentine for three months. The other half received no treatment and served as controls. All the animals were then infected with simian immunodeficiency virus (SIV), which mimics HIV in humans, to test whether the drug treatment cleared bacteria from their lungs. Among the animals that were not treated for latent TB, 70% developed active TB after SIV infection. None of the monkeys that had the three-month course of antibiotics developed active TB after SIV infection, suggesting that the treatment cleared the bacteria and prevented reactivation.

The authors noted that the drug combination tested in their study, which was published by the American Journal for Respiratory Clinical Care Medicine late last year, is now being recommended for the treatment of latent TB in humans by the Centers for Disease Control and Prevention.

More Teens Using E-Cigs to Deliver Marijuana
The number of teens who are using marijuana in e-cigarettes is climbing, report Nebraska Medical Center researchers publishing in a recent edition of JAMA. Their observational study found that the proportion

of students saying they had used marijuana in e-cigarettes climbed from 11.1% in 2017 to 14.7% in 2018. In 2018, 42.7% of students who said they had ever used e-cigarettes had used the devices to deliver marijuana. The same was true for 53.5% of students who reported current e-cigarette use and for 71.6% of students who reported using multiple tobacco products.

“These statistics are very concerning as marijuana use in adolescence could lead to adverse effects in brain development, mental health, and academic performance,” said study author Hongying “Daisy” Dai, PhD. “Our other concern is e-cigarette use has also been related to severe respiratory diseases.”

According to Dr. Dai, about 77% of the 2,290 vaping-related lung injury cases reported by Nov. 20, 2019, occurred in people with a history of vaping products that contained THC, the key mind-alerting ingredient in the cannabis plant.

Upper Airway Microbiome Linked to Asthma Severity in Children
Could the type of bacteria that live in the upper airway help explain the severity of asthma symptoms in children with mild to moderate asthma? Researchers from Washington University School of Medicine in St. Louis believe the answer may be yes.

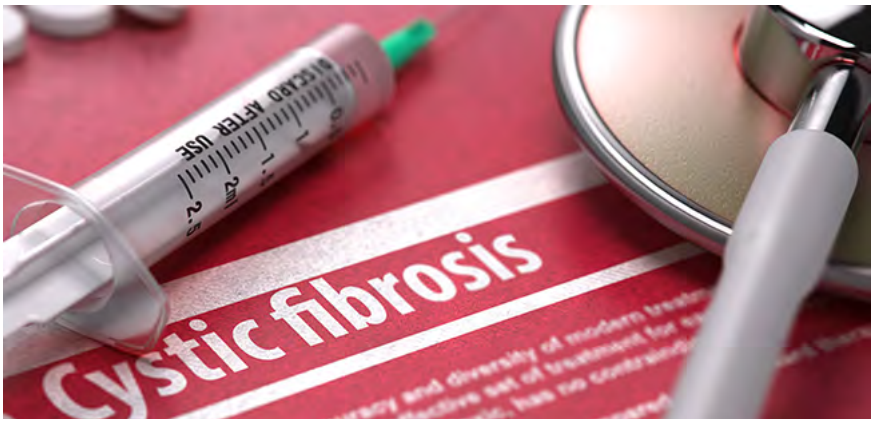
The study was conducted among 214 children between the ages of five and 11 who were taking part in a larger study. Nasal mucus samples were collected at the beginning of the trial when all the participants had controlled asthma, as well as at the first early signs that asthma control was slipping. The investigators found that children who experienced early warning signs that their asthma was going to flare up were more likely to have bacteria in their nasal mucus samples associated with the Staphylococcus, Streptococcus, and Moraxella groups. In contrast, airway microbes dominated by Corynebacterium and Dolosigranulum bacteria were associated with periods of good health when asthma was well controlled. Children whose airway microbial communities switched from being dominated by Corynebacterium and Dolosigranulum bacteria to being dominated by Moraxella bacteria were at the highest risk of worsening asthma symptoms compared with children whose microbial communities made any other kind of shift.

“Our data demonstrated a rapid change of the airway microbiome in the children who transitioned from respiratory health to disease,” said first author Yanjiao Zhou, MD, PhD. “It is also intriguing to find that the microbiome changing pattern could play an important role in asthma exacerbation. We are planning future studies to explore this possibility.”

The study appeared in the Dec. 16 edition of Nature Communications.

Ease of Use Matters in Intubation

Researchers who found that the laryngeal tube increased 72-h survival rates in adult cardiac arrest patients when compared to standard intubation in a previous study now believe they know why the newer tube resulted in better outcomes: its ease of use results in a significantly higher first-time success rate. According to the authors, the more straightforward procedure used with the laryngeal tube allows first responders, who are often working in cramped or dark conditions, to intubate the patient without having to see down the throat to aim for the vocal cords; the tip of the tube naturally lands in the esophagus so that oxygen can flow through ventilation openings into the trachea. In their new study, the investigators found that the odds of 72-h survival were 35% higher for patients who had their airways successfully established on the first attempt. The authors received a best abstract award for their study at the American Heart Association's Resuscitation Science Symposium 2019.



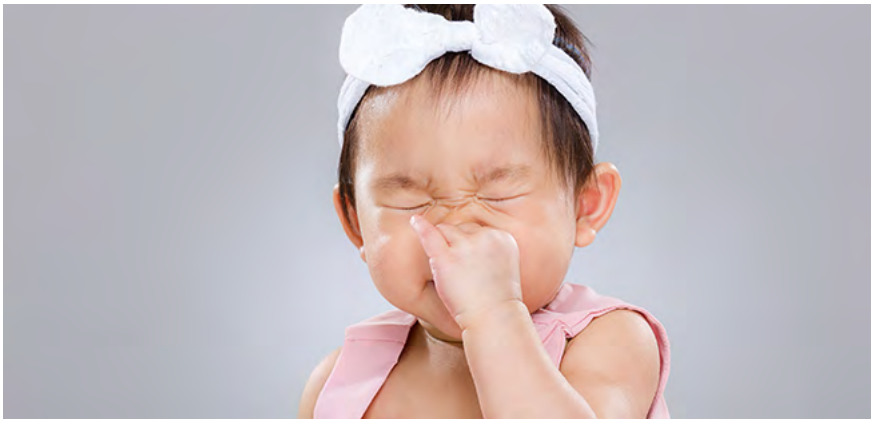
Modifier Gene May Impact Severity of CF

The mutation in the cystic fibrosis transmembrane conductance regulator (*CFTR*) gene responsible for cystic fibrosis (CF) may be tempered somewhat by genetic variations that dampen expression of another gene called *RNF5*, report researchers from the University of California San Diego School of Medicine. Their study reported that people with CF who carry specific genetic variants lowering expression of *RNF5* have more mutant CFTR protein on their cell surfaces. Even if the CFTR protein isn't totally functional, it's likely better than having none and may explain why some people with the disease don't develop lung infections as early or as frequently as others. The research was published late last year by eLife.

Antibiotic Exposure in the Womb May Impact Lung Development
A new study conducted in mice suggests that exposure to antibiotics while in the womb may increase the risk of impaired lung development in newborns. Investigators publishing in the American Journal of Physiology—Lung Cellular and Molecular Physiology exposed one group of pregnant mice to penicillin by putting it in their drinking water. A control group received plain drinking water. After the babies were born, the research team used a cross-over experimental model to assess the effects of antibiotics on the offspring in combination with oxygen treatment. They looked at four groups:

- One group was exposed to penicillin before birth and was fed by treated mothers.
- One group was exposed to penicillin before birth and was fed by control mothers.
- One group was not exposed before birth and was fed by treated mothers.
- One group was not exposed before birth and was fed by control mothers.

Mice that were exposed to antibiotics before birth and fed by control mothers had more fibrosis with oxygen treatment than mice exposed to antibiotics only after birth. Offspring exposed to penicillin in the womb also had lower body mass and reduced capillary size, along with altered levels of proteins that promote inflammation and immune function, as well as those that affect microbial signaling in the lungs.



Early Exposure to Air Pollutants Results in More Allergies at Age Two
Early exposure to air pollutants raises the risk for allergic sensitivity in two-year-olds, say researchers who published their findings in a recent edition of the Annals of Allergy, Asthma and Immunology. The study followed 108 mother-child pairs from birth to age two. Exposure to air pollutants like air fresheners, candles, mold, cats, dogs, carpet, and environmental tobacco smoke was assessed during the prenatal period and again at six months, one year, and two years of age.

At age two, both the children and their mothers had a skin prick test (SPT) to measure allergic sensitivity. Results indicated that prenatal exposure to candles, six-month exposure to cats, and two-year exposure to environmental tobacco smoke significantly increased the chance of a positive SPT at age two. Children with a positive SPT at age two were more likely to have been exposed to more forms of air pollution prenatally and at the one- and two-year time points when compared to children with a negative SPT. The percentage of children with a positive SPT increased with the increasing number of exposures.

"Risky" Donors May Not Be So Risky After All

It may be just fine to offer new lungs to patients in need that came from donors considered at high or increased risk for certain infectious diseases. According to researchers from the Cleveland Clinic, one-year survival rates are about the same regardless of the risk level of the donor, and rejection and graft survival rates are similar as well.

The study compared outcomes for 18,490 patients who were transplanted before and after the U.S. Public Health Service loosened its requirements for donors, adding those with non-medical intravenous drug use and sexual contact with a person known or suspected to have HIV, hepatitis B, or hepatitis C infections to a new category called "increased risk." The broadened definition also encompasses donors whose medical or behavioral history cannot be obtained. Prior to the changes, about 8% of organs were considered "high risk"; after the changes, about 22% fell under the new designation of "increased risk."

In this study, 64% of the patients were transplanted during the high-risk designation period and 36% during the increased-risk period. The authors believe their findings are important because statistics indicate that up to 78% of waitlist candidates refuse organs considered at increased risk.

"Our findings raise the question of the utility of the designation of 'increased risk' for donor lungs since there is no impact on outcomes," said study author Carli Lehr, MD, MS. "Forgoing the designation, treating all donors as potentially at risk, and using appropriate post-transplant screening for infectious diseases may increase overall organ utilization and lessen deaths on the waitlist."

The study appeared in a recent edition of the Journal of Thoracic and Cardiovascular Surgery.

Determining High Blood Pressure Risk during Sleep
Researchers from the University of Missouri School of Medicine believe they have found a way to identify patients with obstructive sleep apnea (OSA) who are at risk for elevated blood pressure during sleep. A simple blood test that assesses cell messages sent through microscopic packages called exosomes can differentiate between those who will see their blood pressure rise once they nod off and those who won't.

"We found that the cell messages coming from participants with nighttime elevated blood pressure were different than those transmitted in subjects with normal blood pressure," said study author David Gozal, MD. "The altered messages caused the cells that line the blood vessels to become dysfunctional. Those disturbed vessels allowed inflammatory cells to enter the vessels' walls, causing hardening of those vessels and leading to cardiovascular disease."

Dr. Gozal and his colleagues hope that administering the blood test prior to a sleep study will help clinicians customize treatment. They also plan to conduct additional studies to see if CPAP compliance can reduce blood pressure during sleep or normalize the cell messages used to determine patient risk. The study was published by the European Respiratory Journal late last year.

Peanut Allergy Vaccine on the Horizon
A new vaccine for peanut allergy is in the works at the University of South Australia. The vaccine is formulated by packaging bits of peanut proteins into the Sementis Copenhagen-vectored virus platform developed at the university, and it works by tricking the immune system into viewing peanut allergens in a new way, essentially making it possible for the body to respond to them normally rather than with an allergic reaction.

"Already, the vaccine is showing signs of success, shifting peanut-specific immune responses in mouse models of peanut allergy, and in preliminary in vitro vaccination-like studies using human blood samples from clinically-confirmed peanut-allergic people," said Professor John Hayball, who is one of the key

developers of the vaccine. “The next steps are to gain further human samples and confirm the efficacy of the vaccine. This will demonstrate human translational capacity and will significantly increase the chances of success in future clinical trials.”

Public Health Wins Big With Air Pollution Reduction
Reducing air pollution levels really does make a big difference in public health, report researchers from the Environmental Committee of the Forum of International Respiratory Societies. Their review of interventions from around the world found these standout examples —

- Starting just one week after a smoking ban was put into place in Ireland, there was a 13% drop in all-cause mortality, a 26% reduction in ischemic heart disease, a 32% reduction in stroke, and a 38% reduction in COPD (with the greatest effect seen in nonsmokers).
- In the United States, a 13-month closure of a steel mill in Utah led to a reduction in hospitalizations for pneumonia, pleurisy, bronchitis, and asthma by half. School absenteeism decreased by 40%, and daily mortality fell by 16% for every 100 $\mu g/m^3$ decrease in particulate matter 10 μm or less in diameter noted. Women who were pregnant during the mill closing were less likely to have premature births.
- A 17-day “transportation strategy” implemented in Atlanta, Georgia, during the 1996 Olympic Games, which closed parts of the city to help athletes make it to their events on time, greatly decreased air pollution. In the following four weeks, children’s visits to clinics for the treatment of asthma dropped by more than 40%, and asthma-related trips to emergency departments declined by 11%. Hospitalizations for asthma decreased by 19%.
- When China imposed factory and travel restrictions for the Beijing Olympics, lung function improved within two months, with fewer asthma-related physician visits and less cardiovascular mortality.
- In Nigeria, families who had clean cookstoves that reduced indoor air pollution during a nine-month pregnancy term saw higher birthweights, greater gestational age at delivery, and less perinatal mortality.
- Twenty-five years after the enactment of the Clean Air Act of 1963 in the United States, the Environmental Protection Agency estimated that the health benefits exceeded the cost by 32:1, saving $2 trillion. Emissions of major pollutants were reduced by 73% between 1990 and 2015, while the U.S. gross domestic product grew by more than 250%.

The report was published in a recent edition of the Annals of the American Thoracic Society.

Strange but True . . .

Message received: How can health officials convince young people to get vaccinated against the flu? Show them the consequences of their actions via virtual reality. U.S. researchers randomly assigned 171 18- to 49-year-olds to either a virtual reality experience showing how not getting vaccinated harms them and others or other less intense interventions. They noted that the virtual reality experience significantly increased the participants' concerns about transmitting the flu to others.

No sleep for the weary: In the first large population-based study of its kind, researchers from Switzerland have found a new reason for the higher burden of cardiovascular disease in the economically disadvantaged. Blame it on lack of sleep. According to the authors, short sleep explained 13.4% of the link between occupation and coronary heart disease in men.

Contribute to the AARC "Transitions" Column

The AARC "Transitions" column is devoted to sharing news about the passing of AARC members. Submit news about your colleagues' recent passing using our Transitions online form. Please provide any information about the member's recent death, such as an obituary, so that we can share it with our members and pay tribute.

Tell Your Story

Every therapist has a story to tell about a favorite or most memorable patient that would interest others in the profession. Maybe it was an "aha moment" when you knew you had made the right professional decision for that patient. Maybe it was when you first realized how much difference you were making in the lives of that patient and his family. Or maybe it was just something the patient said or did that made you laugh or cry or just be inspired to be a better RT. Our "Storytellers" column is the place to share them. Send your story to mailto:heather.willden@aarc.org.

Industry Watch

NIH grant funds study on pollution-sensing genes
Scientists from the University of Utah Health have received a five-year, $3 million grant from the NIH to investigate how variations in pollutant-sensing genes in the lungs could influence air pollution's effects on children who have asthma. The investigators hope their findings will lead to the development of personalized medical interventions capable of treating or even preventing the condition. The team will focus on genetic variations in what they call "particle sensor" genes. These genes encode transient receptor potential channels, which, when activated, lead to airway/lung irritation and inflammation.

Breath test for esophageal cancer in the works
Research that will evaluate the accuracy of a breath test for detecting esophageal cancer is getting underway at Virginia Mason Medical Center. The project, supported by a grant from the Salgi Esophageal Cancer Research Foundation, is being led by Donald Low, MD, who specializes in esophageal and thoracic surgery at Virginia Mason, and George Hanna, PhD, of St. Mary's Hospital in London. The project will involve as many as 50 patients at Virginia Mason over the next 12 to 18 months. The research will attempt to build on findings from recent research into a potential breath test for esophageal cancer conducted in England.

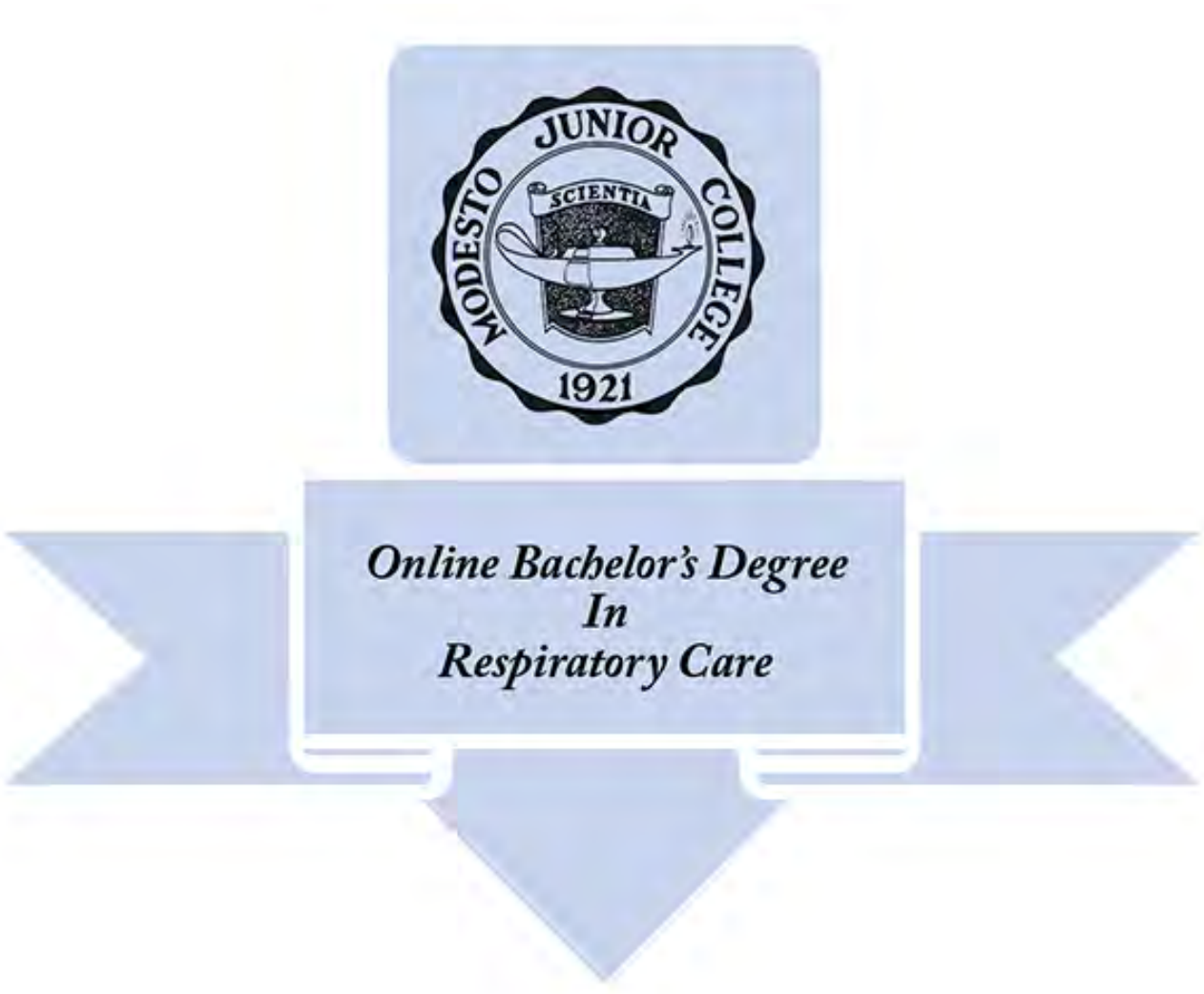
Taking lung cancer screening into the underserved community
A $2.75 million, three-year grant from the Bristol-Myers Squibb Foundation will allow researchers from Case Western Reserve University to lead a community-wide initiative to create and apply innovative methods to prevent and detect lung cancer in underserved residents in Northeast Ohio. The Community Collaborative for Lung Health Equity, directed by Professor Monica Webb Hooper, is aimed at increasing access to lung cancer screening among eligible individuals and to help them navigate treatment and support services. "Dr. Webb Hooper has assembled an exceptional team to address patient engagement for vulnerable populations that will help increase prevention and early detection of lung cancer," said John Damonti, president of the Bristol-Myers Squibb Foundation. "We are proud of what these partners will do to support patients in benefitting from potentially life-saving screening."

Vaping prevention program study goes under the microscope

Researchers at the University of Texas Health Science Center at Houston (UTHealth) have received a $3.1 million grant from the NIH to conduct the first-ever assessment on the long-term results of a nationwide nicotine vaping prevention program for youth called CATCH My Breath. Developed by experts at UTHealth School of Public Health, with input from school administrators, health education coordinators, and tobacco prevention educators, as well as teachers, students, and parents, CATCH My Breath emphasizes active, student-centered learning led by fellow classmates and includes group discussions, goal setting, interviews, skills development, and analyzing mass media coverage of the epidemic of vaping. The program has been implemented in more than 1,500 schools across all 50 states, with a targeted reach of one million students by the end of the 2019–2020 school year.

New online BS degree completion program in California

Modesto Junior College has announced that the college's bachelor's of science degree program in respiratory care is now being offered completely online in an accelerated, eight-week format. Program courses total 40 units, and participants must also complete the required 39 California State University General Education units. The degree program is designed for working professionals who have already completed an associate degree and have a registered respiratory therapist credential.



Study looks at allergic inflammation in the airways

Hoth Therapeutics, Inc., is teaming up with North Carolina State University on a preclinical study for the treatment of asthma and allergic inflammation. The goal of the study is to determine the best approach for targeting allergic inflammation in the airways with splice-switching oligonucleotides. The researchers

will also attempt to establish proof of principle by providing preclinical mouse data to inform consequent toxicology; absorption, distribution, metabolism, and excretion; and pharmacokinetics. "This study will not only allow us to identify and advance drug candidates for asthma and other allergic diseases, but it will also play a key role in reversing the progression of allergic reactions in patients," said Hoth Therapeutics CEO Robb Knie.

Nasal congestion treatment device shows good results

According to Healthy Humming, LLC, positive topline data from a prospective outcomes study assessing the safety and efficacy of the SinuSonic, a nasal congestion treatment device that combines nasal acoustic vibration with oscillating expiratory pressure, have been released. Researchers from the Medical University of South Carolina have reported that patients exhibited significant increases in peak nasal inspiratory flow (PNIF) within five minutes of using the device, and after two weeks of twice-daily use, PNIF scores increased more than 30% versus initial baseline — the mean improvement was 25.0 L/min — which was both statistically and clinically significant. At study completion, 87.5% of the subjects noted they would recommend SinuSonic to a friend or family member.

Study tackles treatment-resistant NSCLC

The GO_2 Foundation for Lung Cancer has awarded $250,000 toward the identification and development of novel strategies to address treatment resistance in non-small cell lung cancer (NSCLC) to researchers from Rutgers Cancer Institute of New Jersey and Princeton University. Working under the premise that cancer cell metabolism impacts the tumor microenvironment and function, thus leading to an impaired anti-tumor immune response, the team is examining the metabolism of different cell types in a *KRAS*-mutant lung tumor environment, targeting tumor metabolism to improve the response of immunotherapy for patients with *KRAS* mutations. The aim is to develop strategies to overcome immunotherapy treatment resistance.

Program to screen cancer patients for opioid use disorders

The University of Illinois at Chicago (UIC) has received a grant from the Coleman Foundation to develop a screening process for prescribing opioids and managing opioid use disorders in cancer patients who receive care at UI Health, UIC's clinical health enterprise. The $300,000 grant-funded program will be initiated in UI Health's lung, head, and neck oncology clinic because those patients have a higher rate of previous or current substance use disorders. The investigators will develop a process to screen patients for opioid use disorder in partnership with addiction experts at UI Health Mile Square Health Center, a network of federally funded community health centers. Patients who are at risk or currently using opioids will be connected with trained health care professionals at Mile Square who can provide addiction services alongside primary care.

BLVR now covered by UnitedHealthcare

According to Olympus, UnitedHealthcare is now providing coverage for eligible patients treated with endobronchial valves for bronchoscopic lung volume reduction (BLVR). Serving nearly 50 million medical members worldwide, UnitedHealthcare joins other payers in the United States in covering this minimally invasive treatment for people suffering from severe emphysema. Endobronchial valves used for BLVR are removable devices placed into select airways of emphysematous lung during a short bronchoscopic procedure. Once in place, the valves redirect air from diseased parts of the lung, allowing healthier lung tissue to expand and function more effectively. Reducing lung volume has been shown to allow patients to breathe more easily and experience improvement in their quality of life. Olympus makes the Spiration Valve System for BLVR.

Xolair may be approved for treatment of nasal polyps

Novartis reports that the FDA has accepted the company's supplemental Biologics License Application (sBLA) for Xolair (omalizumab) for the treatment of nasal polyps in adult patients 18 years of age and older with inadequate response to intranasal corticosteroids. If approved, Xolair would become the first antibody to help reduce the size of nasal polyps and help improve symptoms through targeting and blocking immunoglobulin E. The FDA is expected to decide on approval for this indication by Q3 2020. "The FDA's acceptance of this sBLA is an important step on our path to continually reimagining medicine and understanding the full potential of Xolair across allergic, respiratory, and inflammatory conditions and associated comorbidities," said Victor Bultó, president of Novartis Pharmaceuticals Corporation.

Grant supports study of small molecule candidate for the treatment of CF infection

Antabio SAS has been awarded up to $4.4 million in a second tranche funding from CARB-X, the global non-profit partnership dedicated to tackling the rising global threat of drug-resistant bacteria. The funding will support the development of Antabio's novel small molecule candidate for the treatment of *Pseudomonas aeruginosa* infections in patients with cystic fibrosis (CF). The additional funding recognizes Antabio's successful completion of project milestones during the first contractual period, leading to the identification of a preclinical candidate. "We believe that this program has the potential to deliver new molecules that will enhance the effects of current antibiotics and improve the treatment of infections in CF patients," said Antobio CEO Marc Lemonnier. "Antabio is committed to developing new, truly innovative treatment options that can address the growing global issue of antimicrobial resistance and which can deliver potentially significant life-saving clinical benefits to patients."