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Climbing for a Cause

Chase Hinckley Pushes the Limit To Raise Awareness of COPD

Mechanical Ventilation of the Patient with COPD

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Ventilation for Life

Mechanical Ventilation of the COPD Patient: A Brief Review

by David M. Wheeler, MEd, RRT-NPS, FAARC, and Jared Blevins BSRT, RRT-ACCS

The intention of this article is to review the current thought in the invasive mechanical ventilation of patients with chronic obstructive pulmonary disease. COPD is a disease that is a major health challenge worldwide. The mechanical ventilation of the COPD patient is problematic because individual presentations of the disease may manifest clinically in ways difficult to ascertain by the bedside clinician.[1]

The fundamental concerns with mechanically ventilated COPD patients reside in airway expiratory flow limitations, dynamic hyperinflation, and elevated end expiratory pressure.[2] Generally speaking, in the mechanical ventilation of patients with COPD, the expiratory phase of the breath will be of greater concern than the inspiratory phase. In order to fully comprehend the sequelae of mechanical ventilation in COPD, we must review a few essential concepts of airway design and function: the pulmonary time constant and the fractal nature of the conducting airways.

The pulmonary time constant is the product of the airways resistance multiplied by the static lung compliance in seconds. The time constant is the natural consequence of the lungs inherent tendency for expansion under pressure, elastic recoil, and reduction of airflow. The time constant will fluctuate in response to changes in resistance and compliance.

In non-homogenous presentations such as COPD, the time constants will display significant regional variance and contribute to instabilities in regional end expiratory volume and pressure. Lung units with high compliance — as in COPD — will have a longer time constant, as will lung units with high airway resistance. Conversely, lung units with low compliance and low airway resistance will have a shorter time constant. Indeed, gas moves into and out of the lung at a rate and fashion that is conditioned by the collective impedance of *individual* lung units.

The time constant of any individual lung unit may alter with the phase of ventilation and will vary with changes in the patient-ventilator system. (*Think locally but treat globally*.) Three to five time constants are required for adequate pressure equilibration within the patient-ventilator system. The long expiratory time constant in COPD will be the most significant factor in the potential creation of dynamic hyperinflation and auto-positive end-expiratory pressure.

The conducting airway architecture is an astonishing structure with fractal airway distribution up to the 24th generation.[3] This conducting architecture "branches" in a self-similar, self-replicating pattern of daughter airways that terminate along different axes.[4] This is a flawless system in the transport of gas and the reduction of airflow velocity through a 3D space (the thorax), using one dimensional tubes (the airways).[5] The problem in COPD is that this fractal system becomes a chaotic nonhomogeneous flow inhibitor where its very design contributes to the alteration in expiratory flow. In patients with COPD, the structure of the conducting airways is fundamentally altered with an amplified tendency for premature airway collapse. This results in the distortion of expiratory airflow that contributes to air-trapping, dynamic hyperinflation, and heightened end expiratory volume and pressure.[6] The combined effect of airflow obstruction, altered

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hyper-compliance, low elastic recoil, elevated ventilatory demand, and a very exaggerated time constant result in a perfect lung environment for air trapping. The result is hyperinflation, which further contributes to skewed time constants with regional maldistribution of gas.[2]

What is the bedside clinician to do? Clearly one must treat each patient in a mindful fashion, being aware of the disease process and the interventions we plan. With the mechanically ventilated COPD patient, we must be aware of the regional nature of gas distribution, global time constant, work of breathing, and changes in pulmonary mechanics. You may ask, "Is that all?"

Indeed, COPD patients receiving invasive mechanical ventilation pose serious concerns. However, there are essentially three primary objectives in the optimization of mechanical ventilation in COPD: lung protection, mitigation of dynamic hyperinflation, and achieving patient/ventilator synchrony. This discussion will brush very generally over the important concerns when initiating mechanical ventilation; please bear in mind that every patient presentation is unique.[7]

It is imperative that a lung-protective stratagem be employed for every patient experiencing mechanical ventilation. The optimal tidal volume for patients with acute respiratory failure complicated by COPD is unknown and is largely determined by the etiology of respiratory failure; however, a tidal volume of 6-8 ml/kg ideal body weight, (IBW) should be applied in order to avoid overdistension, dynamic hyperinflation, and lung injury in these patients who are already at risk for these complications.[7] This patient population will have higher than average minute ventilation requirements and generally enhanced CO_2 retention. The initial ventilator settings should be adjusted to satisfy the patient minute ventilation requirement while keeping in mind normalizing acid-base status.[8]

Respiratory rate must be adjusted or lowered based on gas exchange values or the number of spontaneous efforts by the patient. One note of caution regarding the set respiratory rate is to be mindful of auto-PEEP. Increases in the set respiratory rate can decrease time allowed for exhalation and contribute to auto-PEEP. If the measure auto-PEEP is greater than or equal to 5, adjustments should be made to reduce this number.[9] Ideally, the clinician should aim for a respiratory rate of 8-20 breaths per minute. However, the rate should allow for an expiratory time equal to 3-5 time constants.

The attenuation of dynamic hyperinflation in patients with COPD is essential. The application of extrinsic PEEP up to 80% of intrinsic PEEP is often practiced to facilitate breath cycling and promote optimal gas exchange.[10] The extrinsic PEEP should not exceed intrinsic PEEP. Initial PEEP settings of 5-10 cm H_2O are generally acceptable and can be adjusted according to the patient's pulmonary mechanics.[10]

The importance of I:E ratio cannot be overstated. An expiratory time equal to 3-5 time constants is essential in this patient population. An initial I:E of no less than 1:3 should be initiated and increased to 1:5 if necessary.[11] This will allow the patient to spend more time in the expiratory phase, mitigating dynamic hyperinflation. In the spontaneously breathing patient, inspiratory flow should be terminated at 40-60% of peak inspiratory flow.

Patient/ventilator synchrony may be the most important aspect of the mechanical ventilation of patients with COPD. The effective and synchronous interaction of patient-ventilator system is associated with better patient outcomes. Realizing patient-ventilator synchrony decreases the patient work of breathing, optimizes ventilation, and expedites liberation from ventilation. Breath actuation, trigger sensitivity, I:E, and flow profile contribute to synchronization.[12]

In the spontaneously breathing stable patient presentation, frequent spontaneous breathing trials must be initiated.[13] The best way to treat patients with COPD is to rapidly move them to a trial of extubation. In the rapid extubation strategy, a post-extubation non-invasive alternative must be considered.[14]

The mindful practice of mechanical ventilation of patients with COPD requires special attention to the singular patient presentation. The analysis of patient pulmonary mechanics and the response of the lung to our interventions is essential. Excesses in volume and inspiratory time are to be avoided as are high FiO_2. Expiratory time must exceed the 3-5 TC criterion and, whenever possible, try non-invasive alternatives to intubation. We trust this brief note will guide you to other more detailed guides for this difficult patient population. ■

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Chronic Disease Manager

Continuum of Care for the Chronic Pulmonary Disease Patient

by Jeffrey Davis, BS, RRT

The Patient Protection and Affordable Care Act (PPACA) was signed into law on March 23, 2010, and is designed to provide full-spectrum reform of the continuum of care. Hospitals and health care facility administrators see the fragmentation of the continuum of primary, acute, rehabilitative, long term, and home care and are competing to discover the right pathway to reconnect this system. At stake is the health and well-being of our patients.[1]

Chronic obstructive pulmonary disease (COPD) is currently the third leading cause of death in this nation. This really shouldn't surprise anyone. While deaths from coronary heart disease and stroke have decreased dramatically from 1965 to 1998, deaths from COPD have dramatically risen.

Figure 1 is old information, but it is very dramatic information, which means we have seen this coming for decades. To address this, Medicare has now included COPD in the readmission penalty program. Readmissions are costly and are perceived as a result of poor quality of care, thus the Medicare focus. Readmissions within 30 days have been shown to cost taxpayers upwards of $17 billion per year.[2]

COPD gives a unique challenge to health care providers attempting to educate their patients on managing their disease. Many factors, including cognitive dysfunction, behavior, socioeconomic status, and age-related challenges add layers of complexity in educating our patients to manage and control their disease with the goal of keeping them out of the hospital.[2] Limitations begin with the short time frame we have as caregivers in the hospital and the challenge of understanding our patients' cognitive ability while they are hospitalized. Retention is poor, especially in our elderly patients. After discharge, follow-up appointments with their primary care physician are paramount. It is also necessary to review the importance of medication administration and the understanding of their disease. This was detailed over three years ago by Robert Messenger in his article reviewing readmissions in the COPD population.[2] Our challenge is to change the way patients, especially our COPD patients, are cared for throughout the continuum of care.

One answer has been the development of accountable care organizations (ACOs). The Centers for Medicare and Medicaid Services website defines ACOs as "groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high-quality care to their Medicare patients. The goal of coordinated care is to ensure that patients, especially the chronically ill, get the right care at the right time, while avoiding unnecessary duplication of services and preventing medical errors."[3] This is an effort to restructure the continuum of care to realign and create a more functional process. Health care organizations must find the way, and we are learning that, to fix the problem, we need to own the problem. Patients are still our responsibility after discharge, and the sooner we accept that fact, the sooner the solution will present itself. This is a whole new way of thinking. No longer are hospitals discharging patients and leaving the care to the next level to manage. If hospitals are held accountable for what happens with their patients 30 days after discharge, then we must take charge and manage those patients throughout their entire medical course, both in the hospital and after discharge.

I believe that ACOs are beginning to realize that pulmonary disease case managers are one such solution. Hospitals around the country are beginning to see the value of the respiratory therapist in this role. One such facility, Ventura County Medical Center in Ventura, CA, has such a role. This organization saw how case managers were working with respiratory therapists to facilitate dis-

about the author...

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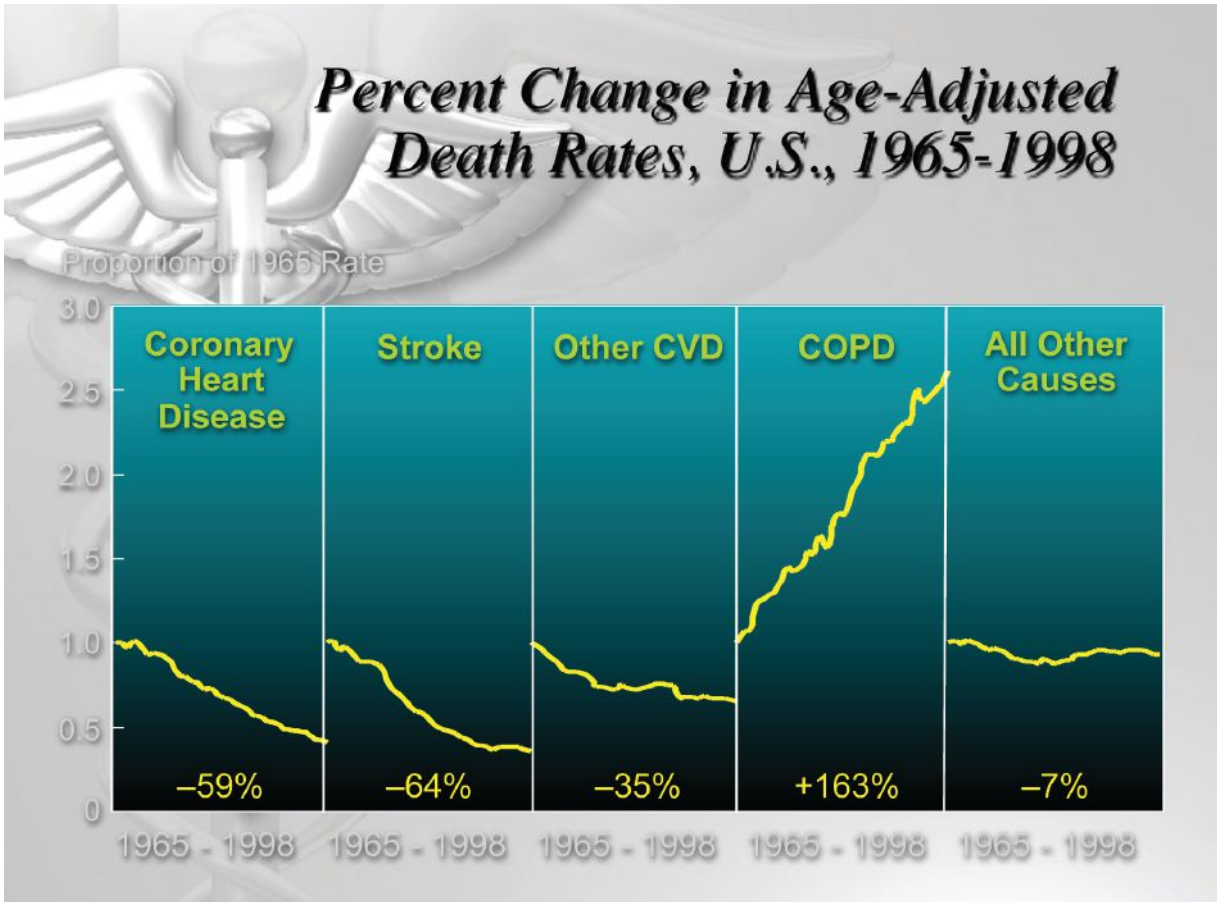

Figure 1

charge. Why use two people when a respiratory therapist is well qualified and licensed to do the job? So, Melinda Hofmeister, RRT, manager of respiratory therapy, and Wendy Lyons, RRT, CCM, formulated a plan. Wendy, while fulfilling her duties as a bedside respiratory therapist, also worked side-by-side with a clinical case manager for a year, learning the workflow and the rules to becoming a case manager. Once she achieved the required practical hours, and as a licensed respiratory therapist, she qualified to sit for the exam to become a certified case manager (CCM) through the Commission for Case Manager Certification. Wendy now works with all pulmonary patients in the hospital. These patients receive an initial assessment and follow-up. Wendy reviews the treatment plan and advises physicians on appropriate plans following the Global Initiative for Chronic Obstructive Lung Disease Guidelines. She makes sure the patient is fully prepared for discharge by ensuring they have their prescriptions filled, they are trained in their medications and why they are important, and they have been educated on the importance of nutritional support. Wendy follows this pre-discharge education with a follow-up call to the home. If ambulatory care support is required, Wendy coordinates services through the Ventura County Health Care Agency's COPD Access to Community Health program, which is funded from a $4.1 million grant from the Centers for Medicaid and Medicare Services over three years, through August 2017.[4]

Like it or not, the American health care system has been in dire need of reform. The PPACA was the first effort to mandate this change. ACOs are embracing this change and implementing new and innovative processes to defragment the continuum of care and provide safe, efficient, and cost-effective care for our patients. Respiratory therapists should be at the forefront of full continuum of care for our pulmonary disease patients. This is our expertise, and these patients are our passion. ■

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What the New Physician Payment System Can Mean for RTs

by Anne Marie Hummel

You might be wondering why we would write an article about physician payment as this is not a topic respiratory therapists generally think about. You would be surprised, however, by the changes that are beginning to take place and what they can mean for you in terms of new opportunities and new ways to care for your patients.

The Medicare Access and CHIP Reauthorization Act of 2015 repealed the sustainable growth rate formula used to determine physician payments and replaced it with a new Merit-based Incentive Program System (MIPS) or "Quality Payment Program." The new payment system becomes effective January 1, 2019; however, the baseline year for establishing performance begins ***January 1, 2017***.

A key element of the new program is the provision of the law that streamlines the current incentive payment reporting programs, that is, the Physician Quality Reporting Program, Value-Based Payment Modifier, and the Medicare Electronic Health Records Incentive Program, into one reporting system that includes four performance categories: quality, resource use, clinical practice improvement activities (CPIA), and advancing care information. Each physician is given a performance score depending on various requirements they must meet, and that score determines whether they receive an incentive payment or not. Although there are numerous measures to choose from, MIPS offer eligible clinicians the flexibility to choose those measures and reporting mechanisms they feel best demonstrate performance relative to their practice. To that end, we would look to pulmonologists rather than primary care physicians to report quality measures that deal with respiratory conditions because their practice centers around patients with chronic lung disease.

So what does this have to do with you? There are numerous respiratory quality measures that physicians can choose from to report to the Centers for Medicare & Medicaid Services (CMS) that can help their performance score and give them a leg up on getting an incentive payment. And if they have respiratory therapists working for them — even on a part-time basis — you, as the expert in pulmonary care, can help improve your patients' outcomes and ensure that they are receiving the highest quality care possible, because quality is a key focus of the new system.

Let's look at some examples. The following table, which is a composite of some of the tables used by CMS in its proposed rule on MIPS [81 FR 28161-28686], is a sample of individual respiratory measures, specialty measure sets, and episode-based measures that CMS has proposed for the baseline year. It will give you an idea of the challenges physicians face as they move to a Quality Payment Program. See the table on the next page.

In addition to these quality measures, the clinical practice improvement activities category includes various domains that offer physicians the opportunity to improve performance. This is where RTs can offer a more hands-on approach to helping their respiratory patients because it involves beneficiary engagement, population management, patient safety practice assessment, and care coordination, among other things. And what does that really mean? According to the Medicare folks who have developed the system, it can mean:

- Monitoring health conditions and providing timely intervention

about the author...

Anne Marie Hummel serves as the AARC's director of regulatory affairs and is based in the Washington, DC, area.

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Table: Examples of Proposed Quality Measures Under the Merit-Based Incentive Payment System

COPD Spirometry Evaluation	Percentage of patients aged 18 years and older with a diagnosis of COPD who had spirometry results documented.	
COPD Inhaled Bronchodilator Therapy	Percentage of patients aged 18 years and older who were prescribed an inhaled bronchodilator with a diagnosis of COPD, an FEV1 less than 60% predicted, and symptoms.	
Medication Management for People with Asthma	Percentage of patients 5-64 years of age during the measurement year who were identified as having persistent asthma and were dispensed appropriate medications that they remained on during the treatment period.	Two rates are reported: • Percentage of patients who remained on an asthma controller mediation for at least 50% of their treatment period. • Percentage of patients who remained on an asthma controller medication for at least 75% of their treatment period.
Smoking Cessation Counseling	Percentage of patients aged 18 years and older who were screened for tobacco use one or more times within 24 months AND who received cessation counseling intervention if identified as a tobacco user.	
Appropriate Treatment for Children with Upper Respiratory Infection (URI)	Percentage of children 3 months through 18 years of age who were diagnosed with URI and were not dispensed an antibiotic prescription on or 3 days after the episode.	
Sleep Apnea: Positive Airway Pressure Therapy Prescribed	Percentage of patients aged 18 years and older with a diagnosis of moderate or severe obstructive sleep apnea who were prescribed positive airway pressure therapy.	
Asthma/COPD, Acute Exacerbation	Acute [exacerbation of] asthma/COPD (COPD Acute) episode is triggered by an inpatient hospital claim with a principal diagnosis of any COPD-Acute trigger codes.	

- Timely exchange of clinical information with patients and providers
- Use of remote monitoring and telehealth
- Establishing care plans for complex patients
- Beneficiary self-management assessment and training
- Use of clinical safety checklists
- Shared decision-making

In addition to the current quality measures proposed by CMS in its latest update on the new payment system, AARC has taken the lead to recommend consideration of additional critical elements we believe should be included in the final rule or addressed in future rulemaking. This includes adding an additional measure for spirometry evaluation to ensure it conforms to the standard of care when it comes to measuring airflow obstruction for the diagnosis and management of chronic obstructive pulmonary disease (COPD).

Most important, one critical element that is missing from CMS' quality measures list is pulmonary rehabilitation. We have recommended the addition of two measures developed by the American Association for Cardiovascular and Pulmonary Rehabilitation and endorsed by the National Quality Forum that would address the percentage of COPD patients enrolled in pulmonary rehabilitation who have increased their health-related quality-of-life scores and functional capacity.

Least of all, we don't want to forget our patients who require long-term oxygen therapy. To that end, AARC recommended that CMS add a new element under its population management domain in the CPIA category to include proactive management of patients with chronic lung disease in need of long-term oxygen therapy using evidence-based guidelines, such as AARC's Clinical Practice Guideline on Oxygen Therapy, or integrating respiratory therapists as part of the care team to improve oxygen utilization and medication adherence, as well as conduct self-management education and training. Either way, respiratory therapists have a chance to make a difference! We encourage you to consider part-time employment in the physician practice as a way to improve your patients' outcomes as well as add experience to your career.

The health care delivery system is changing every day and new opportunities exist that were not available in the past. Have you thought about:

- Working outside the acute care setting?
- Working part-time?
- Working under a contractual arrangement?
- Gaining new experiences that can benefit you, as a health care professional, and your patients?

Remember, AARC has developed a toolkit to help you market yourself to the physician practice. Go to the AARC website at http://www.aarc.org/resources/programs-projects/toolkit-for-respiratory-therapists/ and check it out. You can even download the free toolkit. There's no time like the present. ■

Pulmonary Rehabilitation's Role in End-of-Life Issues

by Deborah Bennett, RRT, BS

Pulmonary rehabilitation (PR) is an integral component in the treatment of individuals with chronic lung diseases (CLDs). The Official American Thoracic Society / European Respiratory Society Statement defines PR as a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies, which include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and promote the long-term adherence of health-enhancing behaviors."[1] Emphasis on education and behavior change are key because they have the potential to enhance one's transition to palliative care (PC) and end-of-life (EOL) preparation. EOL and advanced care planning (ACP) discussions should sit squarely within the educational aspect of PR. The reduction of symptoms, championing independence, and improving health-related quality of life (HRQL) are some goals of pulmonary rehabilitation.[1] These objectives are linked to matters of EOL and PC. This article will focus on how pulmonary rehabilitation could impact PC and preparation for EOL through application of certain skills, such as the ability to communicate with a measure of strategy and sensitivity, when approaching EOL and ACP discussions.

about the author...

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Pulmonary rehab: A venue for communication

Patient interactions with the respiratory care professional are very common in the Pulmonary Rehab setting. Therefore, respiratory care professionals also have opportunities to educate patients about PC, EOL, and ACP. These may be uncomfortable discussion topics, but they are important and can change a patient's experience as the disease progresses. However, research demonstrates that these conversations are among the most difficult tasks for clinicians and are often avoided.[2] This reality is particularly prevalent among those with chronic obstructive pulmonary disease (COPD).[3]

COPD is a leading cause of increased morbidity and death worldwide and has an increasing morbidity within the United States.[3,4] COPD exacerbations are a common cause for emergency room visits and also have risk for respiratory failure and death.[3] ACP for this population is especially indicated.[5] Unfortunately, many people diagnosed with COPD do not understand the implications of the disease nor the benefit of ACP.[6] In our program, we help patients gain understanding of the chronic and progressive nature of the disease through our education process to help clarify why planning for future medical decisions is beneficial.

The differences between PC, EOL, and ACP

Understanding PC, EOL, and ACP enables us as clinicians to serve as better resources for patients. The World Health Organization defines PC as "an approach that improves the quality of life of patients and their families facing the problem associated with life threatening illness through the prevention and relief of suffering...."[7] PR is a type of PC providing improved quality of life, self-efficacy, and exercise tolerance, as well as reduced depression symptoms, anxiety, and dyspnea. Discussing concerns that patients have about suffocation, their shortness of breath, pain control, or use of sedatives informs the patient and reduces anxieties. Providing PR patients with education targeted at these issues gives them freedom to explore such matters.

The National Institutes of Health defines EOL as "the support and medical care given during the time surrounding death."[8] For some individuals with CLDs this

often involves aggressive interventions such as intensive care unit stays, cardio-pulmonary resuscitation, and mechanical ventilation. One study revealed only 23% of the subjects had discussed cardiopulmonary preferences before being hospitalized.[9] This is alarming and indicates the need for clearer and earlier communication between patients and their clinicians concerning matters of EOL; all relevant topics for clinicians and patients to explore while in PR. Many of my patients have acknowledged their lack of understanding about these interventions and Advanced Directives. After obtaining their permission to hold an EOL and ACP conversation, we review things about Advanced Directives such as what they are and are not, how to approach the discussion with their physician and family, and the importance of having the document notarized.

Given the unpredictable path of COPD and other CLDs, it is in the interest of diagnosed individuals to reflect upon the implications and plan for future health care decisions. By gently informing patients why ACP should be done, they are able to they are able to make EOL care decisions for themselves, the PR goals of improving self-efficacy, autonomy, and quality of life are encouraged and fostered. Initiating these conversations can be facilitated by a specially trained health professional or health care professionals who are a part of patient's routine care,[10] such as clinicians who routinely treat and educate patients in pulmonary rehab.

Barriers to effective ACP

Very little early communication regarding ACP or EOL occurs through a physician-directed approach.[10] Reasons vary from physicians' limited skills in ACP to misperceived concerns that ACP will provoke patient anxiety and depression. Some patients assume their doctor will initiate the conversation. However, in order to provide the most effective palliative care, ACP needs to be initiated at some point.[11] Many clinicians feel ill-prepared for these discussions, including RCPs. This is an area of opportunity for health care organizations and respiratory care educational programs to create training to improve respiratory care professionals' communication and processing capacity surrounding EOL matters similar to a study done at UCLA's Medical Center.[11] As a profession this is the direction we must move toward.

Strategies to initiate discussion in pulmonary rehab

I discovered that my patients welcomed these discussions as we began seeking opportunities to educate them. I also learned some communication skills that help exploration, insight, and action[12].

- Build rapport with your patients before diving into the topic. Wait until midway through the program rather than first few visits.
- Approach patients with open-ended questions such as: "What's important to you? What are you hoping for? [13]
- Ask for their permission to discuss and then be sure to attend to the patient's emotions.[14]
- Use a script to relieve any awkwardness. My department uses verbiage we borrowed from the COPD Foundation's EOL educational materials.
- Most importantly, approach the subject with sensitivity. ■

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RT Students: Get the Job!

by Anthony L. DeWitt, JD, RRT, FAARC

One of the frequent complaints I hear from therapists, often asking about discrimination issues, is "why can't I get a job?" The answer is often because the person looking for the job doesn't know enough about what the employer wants. Because of that, he doesn't position himself for that job. Or sometimes it's because the therapist is selling an out-of-date product with bad packaging.

"Wait a minute," I can hear you saying. "I'm not a box of soap! I can't be bought and sold like a commodity!"

You have that half right. You may not be a box of soap, but the same rules of marketing that apply to selling soap apply to selling yourself, and that's what applying for a new job is: selling your prospective employer on the idea that you and you alone can do the best job for her. To do that, you need to think about experiences in your own life and start applying them to your job search.

Intelligence

Intelligence is important. No, not how smart you are, more like what spies do. You need to do some basic online research into the organization. Find out what the organization is all about. What struggles have they had? What is the job climate like at that hospital? If you know a therapist or nurse working there, call them and find out as much as you can about the organization. What you learn will be of great value to you. You want to find what they need, and be the solution.

An example from my own past may be helpful. Out of law school I sought a job with a big firm. The named partner was coming to interview at the law school, and so I went and found cases he had tried. Deep in the heart of the Midwest and nowhere near an ocean I found an "admiralty" case involving a shipping accident. So early in the interview I asked him about the case and he spent our 20-minute interview telling me all about it. He then invited me for second round interviews. I passed on the job, but I would never have gotten the offer if I had not done my homework. Knowing who is hiring and what they like is an important first step.

about the author...

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Marketing

Imagine you're looking for a mobile phone charger. There's one that has been rewound, its plastic packaging stapled to the cardboard backing. There is another that is brand new that hasn't been opened or suffered any damage. Which one do you choose? You choose the most attractive, unopened one. The same principle applies to employee hiring. All things being equal (and they often are with new graduates) the graduate that dresses the nicest, observes courtesies, and says "yes, sir" and "no, sir" is the one most likely to rise to the top of the pile.

In this day of "electronic submission" it may be even more important to find out who the hiring manager is. When resumes are sent electronically, they are often not even printed — just viewed on a computer screen. A clerk scans them and checks to make sure that the applicant is qualified, and then they're electronically sent to the hiring manager.

If you want to really make an impression, after sending your electronic copy, send a paper copy on 24-pound bond (or heavier) paper to the hiring manager along with a succinct cover letter. Everyone else's resume and cover letter will be similar because they all took the

same classes you did. So add some zip to your resume by including photos, providing links to any published research you've done, and use cream or ivory-colored stationery. If every other bottle of laundry detergent is orange, you want to be a bright yellow! Be meticulous. Look for spelling and grammar errors. Make your resume 100% perfect. Several great resume books exist to help you decide on a way to stand out from the crowd, including *Knock 'Em Dead*[1] and *What Color is Your Parachute?*[2]

Candor

You can blow nearly every chance you'll ever have to get a great job by being less than honest. If you're a staff therapist, but want to become more, don't state you're a supervisor if you aren't one. Your references will be checked, and the truth will come back to bite you. Similarly, don't supersize your education or experience. Tell the truth, and the truth will get you hired.

The Interview

If you get selected for an interview, prepare for it. Dress nicely. Wear suitable business attire. Don't take anything for granted. Never sit before the hiring manger sits. If you're a man and are invited to dinner, stand when a lady exits or arrives at your table. Read a book on table manners, and, whatever you do, never order spaghetti or other dishes that can soil your clothing. Many times these common courtesies (which are often not that common) will impress people who might otherwise have decided things based on objective factors. Good managers know that you can train a respiratory therapist to perform almost any task, but you cannot train them to be a good person. Good manners indicate a good person.

Follow Up

Whatever else you do, follow up with a thank you note after an interview (not an email, but a real, hand-written thank you note). Mention a specific thing that happened in the interview. If you get the job, terrific. If you do not get the job, call the manager and ask why. What you learn may help you improve your performance on the next interview.

Humor

Everyone loves a good joke, but unless you're interviewing for Billy Crystal's job, humor is not something to display in a job search. Many years ago my brother and I had a contest to determine which of us could have the most original answering machine message. Mine was "Thank you for calling the CIA Central Computer. We know why you're calling, and you don't need to leave a message." Everyone who called thought the message was funny — except the HR director from a hospital where I interviewed. He called twice according to caller ID, and never called again. Remember, from the minute you apply until the 90th day after you get the job, you're on probation, and the best thing you can do is to remember that not everyone thinks you're as funny as you do. ■

End Notes and References

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Summary from the 2016 Jimmy A. Young Memorial Lecture

by Robert C. Shaw, Jr., PhD, RRT, FAARC

An NBRC lecture has honored Jimmy Albert Young, MS, RRT, during the AARC Summer Forum since 1978. NBRC President Robert L. Joyner, Jr., PhD, RRT, RRT-ACCS, FAARC, introduced the 2016 lecture by saying that Jimmy had accomplished remarkable things in his 15-year career. He grew from being trained on the job to achievement of the RRT. Jimmy directed an education program and was the technical director of the respiratory therapy department at Massachusetts General Hospital. After serving as AARC president in 1973, Jimmy was an NBRC trustee when he passed away in 1975.

This year's theme

I presented the lecture entitled "How Does the NCCA Affect My Ability to Educate, Hire, and Retain Therapists" by discussing the entity that accredits the NBRC's credentialing programs. The National Commission for Certifying Agencies (NCCA) began in 1977 from money granted by the Federal Department of Health, Education, and Welfare. The NBRC was among the first organizations to have programs accredited.

The NCCA is organized inside a membership organization called the Institute for Credentialing Excellence (ICE). Members of ICE are credentialing organizations; some members are accredited and some are not. The annual ICE meeting is attended by leaders of credentialing programs.

Like typical accreditation systems, there are published standards so that an accreditation applicant knows what to expect and can self-reflect about the ways to satisfy the standards. If the comparison indicates that a reviewer would be unconvinced that a credentialing organization's system meets a standard, the organization can change its system.

about the speaker...

Robert C. Shaw, Jr., PhD, RRT, FAARC, serves as examinations director and psychometrician at the NBRC.

New standards in 2016

The lecture described the process through which standards were recently revised. The process started in 2013 while involving three working groups. I served on one of the groups. Lori M. Tinkler, MBA, the NBRC's associate executive director, served on another group. After drafting revisions of existing standards and writing some new standards, there was a period of public comment in 2014. After final revisions, the programs that were accredited at the time were given the opportunity to vote on the new standards, which went into effect in January of this year. What follows are themes from some of the standards.

Autonomy

NCCA anticipates risk when a credentialing program is under the control of a membership organization. Artificial impediments could be thrust up that slow the flow of qualified individuals into the workforce. Negative outcomes could include an artificial scarcity of personnel, leaving some members of the public starved for the services they need.

The fact that the NBRC is incorporated as its own entity helps demonstrate its autonomy. A new trustee of the board learns that he or she has a fiduciary relationship with the NBRC. The trustees are expected to serve the best interests of the NBRC, not their personal interests or the organization that appointed them. Each of these points reinforces that the NBRC operates with autonomy.

Public representation

The NCCA expects to see a board member who has full voting rights while representing the public who are

served by credentialed people. Importantly, the public member cannot be a therapist or even a person who works closely with therapists like physicians or nurses.

Financial resources

If an accredited program stops functioning because it lacks financial resources, then NCCA's credibility would be diminished. A reviewer will evaluate the NBRC's financial records for evidence that it can sustain its operations. Although there are multiple users (state licensing agencies, CoARC, and candidates) of NBRC credentialing results, only the candidates pay.

NCCA looks for evidence of financial sustainability within the credentialing *organization* (NBRC), not within *each* program (for example, RRT-ACCS, CRT-SDS, or CPFT). If each program had to be financially sustainable, then some of the NBRC's programs for specialty credentials likely could not be accredited.

Credential eligibility policies

The standards require that each accredited credentialing program be vigilant while eligibility policies evolve over time. NCCA's concern is that an eligibility change could unreasonably limit access to certification. While proposals like this have rarely been considered inside the NBRC, autonomy while considering eligibility changes is critical under such circumstances.

Grandfathering

A program can become accredited by NCCA even though some people can be awarded the credential without first passing an examination. A common example is to award the credential to members of the committee that developed content of the very first examination. After a program is accredited, it accepts that there will be no grandfathering in the future.

Cut score

A reviewer expects to see that the process through which a cut score was selected for the examination had been managed or influenced by a psychometrician. The role of the psychometrician is to ensure the process follows generally accepted measurement principles. Here again, the standards demand that those in charge of the program remain mindful that the cut score should not create an artificial barrier to entering the profession.

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Examination sub scores

The standards require a program to evaluate whether sub scores will be reliable enough to report them to candidates who intend to remediate after failing. The concern is that a sub score based on only a few multiple-choice item responses could mislead a candidate into concentrating remediation on the wrong topics.

The NBRC is transitioning away from reporting sub scores for minor content domains to candidates, although schools will continue to see these more detailed scores. The first programs to report sub scores only for major domains have been for examinations related to CRT, RRT, CPFT, RPFT, CRT-SDS, and RRT-SDS credentials. Specialty programs for adult critical care and neonatal/pediatrics will transition in two years.

Maintaining a credential

As a result of a 2002 standards change, the NBRC started its Continuing Competency Program (CCP) in July of the same year. Each credential awarded since then has expired on the five-year anniversary. The CCP has enabled credential holders to extend the expiration date or renew a credential in multiple ways.

The NBRC convened a 2015 task force to evaluate the CCP and recommend ideas for the future. The task force will convene again in 2016, after which we expect a new CCP to be developed.

Summary

Lecture participants at the Summer Forum learned about the NCCA system and the extent to which NBRC programs have been influenced by accreditation standards since the standards underwent a recent revision.

Some key points about the new standards and their relationships with the NBRC's programs included the following:

- Autonomy is critical to the operations of the NBRC's programs.
- NBRC trustees include a public member who votes.
- Financial resources needed to sustain operations of the NBRC come largely from fees paid by candidates who seek CRT and RRT credentials.
- While grandfathering could have been a part of a program's history, a program that wants to maintain its accreditation must not grandfather again.
- The CCP program began in 2002; the NBRC plans to revise it in the next few years.

Your questions are welcome

The NBRC Board of Trustees and its committees are interested in your questions, comments, and concerns. You may contact the NBRC by email at nbrc-info@nbrc.org or by phone at (888) 341-4811, or you can visit the NBRC website at www.nbrc.org. ■

2016 COPD Research Review

National COPD Month is a great time to revisit the latest studies on the disease.

Are there new and better ways to provide care to your patients with COPD? The only way to know is to keep up with the medical literature.

By Debbie Bunch

When COPD was declared the third largest killer of Americans in 2010, many believed the pronouncement would bring new attention and new research dollars to the disease. While much more work is needed to unravel the biological and genetic components of COPD, research has moved forward over the last six years, and the past year has seen a number of new studies that are adding to the scientific evidence that respiratory therapists and other clinicians use to care for their patients. This article offers a sample of the kinds of papers published since we last celebrated National COPD Month.

Clinical care

- Treatment with the combination bronchodilator and inhaled medicine therapy indacaterol/glycopyrronium resulted in an 11% lower exacerbation rate when compared to treatment with salmeterol/fluticasone in a study conducted over one year. Patients in the indacaterol/glycopyrronium group also had a longer time to first exacerbation, 71 days versus 51 days. SOURCE: N Engl J Med. 2016;374:2222-2234.
- According to European researchers, a two-minute walk test might be as good as the standard six-minute walk test in predicting exercise-induced oxygen desaturation in patients with severe COPD. In a trial that compared the two tests in 26 patients, researchers found no significant differences in the minimum oxygen saturation, and other standard measures were comparable as well. SOURCE: Chron Resp Dis. 2016 Mar 8 [Epub ahead of print]. DOI: 10.1177/1479972316636991.
- Dutch researchers who surveyed 2,269 patients about the timing of their COPD symptoms found those who reported more symptoms in the morning had poorer health status at follow up. Overall, 51.9% of patients said they had morning symptoms while 39.4% cited mainly nighttime symptoms. SOURCE: NPJ Prim Care Respir Med. 2016;26:16040.
- COPD patients with alpha-1 antitrypsin deficiency (AATD) carry an extra burden from the disease. That was the take-home message from U.S. researchers participating in the Long-term Oxygen Treatment Trial. They

found AATD patients had lower FEV1/FVC and more severe exercise-related desaturation despite being younger and smoking less. SOURCE: Ann Am Thorac Soc. 2015;12(12):1796-1804.

- Positive expiratory pressure (PEP) applied at 1 cmH2O improved exercise tolerance as well as PEP applied at 10 cmH2O in a randomized crossover study conducted by Italian researchers. Similar improvements were seen in the six-minute walk test for each strategy. SOURCE: Arch Bronconeumol. 2016;52(7):354-360.

- COPD patients trying to kick the habit with varenicline might fare better with a longer course of treatment. Researchers from Mexico City found increasing the treatment beyond the standard 12 weeks resulted in higher abstinence rates going forward. Twenty out of the 30 heavy smokers in the study were still abstaining at 12 and 18 months. The median length of varenicline treatment was six months. SOURCE: American Thoracic Society Conference. Ther Adv Respir Dis. 2016 Jun 27 [Epub ahead of print]. pii: 1753465816654823.
- While U.S. and Canadian investigators found a 4.5-fold relative increase in palliative care (PC) referrals among COPD patients on home oxygen who were admitted to the hospital for an acute exacerbation from 2006 to 2012, the overall use of PC was dismal. Only 2.56% were receiving a PC referral by the end of the time period. SOURCE: CHEST. 2016 Jul 4 [Epub ahead of print]. DOI: 10.1016/j.chest.2016.06.023.
- According to the U.S. Preventive Services Task Force, asymptomatic adults should not be screened for COPD. The government agency updated its recommendations on screening after reviewing the medical evidence on the diagnostic accuracy of screening tools like questionnaires and spirometry, whether or not screening improves the delivery of preventive services, and the possible harms associated with treatment for mild to moderate COPD in those who are screened. SOURCE: JAMA. 2016;315(13):1372-1377.

Pulmonary rehabilitation

- Greek researchers found about two-thirds of COPD patients who underwent pulmonary rehabilitation (PR) had an improvement in the BODE index. Duration of the disease, current smoking status, hospitalization rate in the previous year, the presence of poorer quality of life, and baseline anxiety and depression predicted BODE index quartile change. SOURCE: J Cardiopulm Rehabil Prev. 2016;36(1):62-67.
- Smoking was the only factor predicting PR program completion in a study from University of Alabama researchers who looked at data on 440 COPD patients who attended their program from 1996 to 2013. They believe the finding suggests more attention should be paid to smoking cessation prior to PR program enrollment. SOURCE: Int J Chron Obstruct Pulmon Dis. 2016; 11(1):391-397.
- The Anxiety Inventory Respiratory (AIR) scale may be an effective measure of anxiety in COPD patients undergoing pulmonary rehabilitation, find British researchers who evaluated the tool in 192 patients. AIR correlated well with the St. George's Respiratory Questionnaire and Medical Research Council scale, and it predicted PR program completion as well. SOURCE: CHEST. 2016;150(1):188-195.
- A recent meta-analysis of studies regarding the effect of PR on readmissions came up with mixed results. British investigators found readmission rates were lower among PR patients in 10 of the 18 studies in the trial, but in pooled results from three cohort studies, readmission rates were higher. SOURCE: CHEST. 2016 Aug 3 [Epub ahead of print]. DOI: 10.1016/j.chest.2016.05.038.
- A report prepared by 28 leading U.S. experts in the area of respiratory health concluded that COPD patients are not getting all the treatment they need to control the condition. The dearth of PR programs across the country was cited as a major shortcoming. SOURCE: American Thoracic Society Conference in May 13–18, San Francisco. Available at: http://www.thelancet.com/commissions/copd-care-delivery-usa.

Home care

- Could home-based neuromuscular electrical stimulation help patients with severe COPD who can't participate in PR? Yes, found British researchers who compared outcomes among patients who did and didn't receive the therapy. Those who did were walking a mean of 29.9 meters farther on the six-minute walk test by the end of the study. SOURCE: Lancet Respir Med. 2016;4(1):27-36.
- A study by researchers in Turkey found depressed patients with COPD were less likely to comply with their prescription for long-term oxygen therapy. Sixty-three percent of the 54 patients in the study met the definition for major depression, and these patients most often failed to adhere to their prescription. SOURCE: Perspect Psychiatr Care. 2016 May 25 [Epub ahead of print]. DOI: 10.1111/ppc.12169.
- The spouses and other relatives caring for COPD patients at home had a high rate of airflow obstruction themselves in a Dutch study conducted among 194 patients and their caregivers. Airflow limitation based on the Tiffeneua index was noted in 29%, and 19% had airflow obstruction based on the lower limit of normal. About one-third of the group were current smokers and 92% had at least one chronic condition. Hypertension was common. SOURCE: J Am Med Dir Assoc. 2016;17(3):276.e1-e8.
- The hospital mortality rate for patients suffering smoking-related oxygen burns was 14.5% in a study out of Indiana, and the mean hospital length of stay was 8.6 days. A little over half of the patients were discharged to a nursing home or other advanced care facility. SOURCE: Respiration. 2016;91(2):151-155.
- Smoking was found to be the cause of flash burns among COPD patients on home oxygen in a study conducted by Veterans Affairs researchers, despite the fact that 89% of the patients claimed they no longer smoked. Among the 123 burns in the study, 81% resulted in injury and 19% of the patients died as a result of their burns. SOURCE: Am J Med Qual. 2016 July 11 [Epub ahead of print]. DOI: 10.1177/1062860616658343.

Readmissions

- A care package delivered by a nurse practitioner, respiratory therapist, and physiotherapist led to a reduction in 90-day readmissions in a Canadian study, but only for the females among the participants. Ninety-day mortality was reduced across the board. The package consisted of initial contact, a post-discharge phone call, home visit, and continued care. SOURCE: Int J Chron Obstruct Pulm Dis. 2016;11(1):61-71.
- Screening obese COPD patients for obstructive sleep apnea (OSA) during a hospital stay could pay off in fewer hospital admissions in the future. U.S. investigators found those who tested positive for OSA and were compliant with their CPAP therapy made fewer trips to the emergency department. They were also less likely to experience a hospital admission over the next six months. SOURCE: Hosp Pract. 2016;44(1):41-47.
- A motivational interviewing-based health coaching intervention helped reduce COPD-related readmissions among COPD patients by 7.5% at one month, and the statistics just got better from there. At three months, readmissions were reduced by 11%; at six months by 11.6%; and at nine months by 11.4%. By 12 months, readmissions were still lower by 5.4%. The program consisted of one session in the hospital followed by one session after discharge, weekly phone calls for the first three months, and monthly phone calls thereafter. SOURCE: Am J Respir Critic Care Med. 2016 Mar 8 [Epub ahead of print]. DOI: 10.1164/rccm.201512-2503OC.
- In a study that spanned 44 years, Swedish researchers found airflow obstruction at age 55 predicted hospitalization for COPD. Particularly at risk were those with an FEV1/VC <70% but ≥LLN (lower limit of normal). The authors believe these patients could benefit from careful evaluation and early intervention. SOURCE: Euro Respir J. 2016;47(3):742-50.

Telemedicine

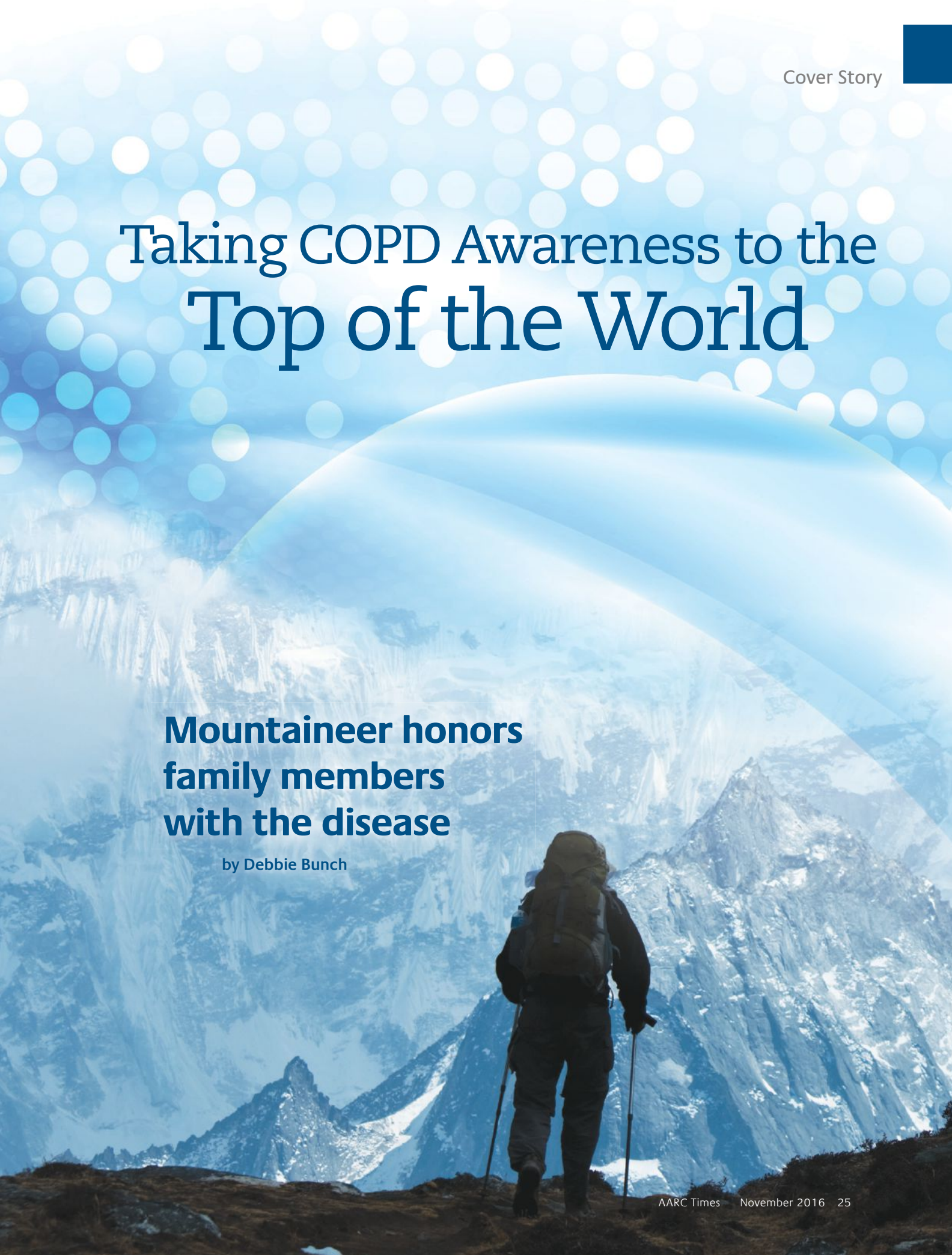
- A nine-week program involving exercise training and self-management education in an online group setting along with individual online consultations got good reviews from patients in a Norwegian study. Only a probable clinically significant effect was seen on the St. George's Respiratory Questionnaire. SOURCE: BMC Res Notes. 2015;10(8):766.
- A mobile app could help patients in pulmonary rehab keep up with their exercise regimen after the program is over, reported Dutch researchers who developed such an app for their COPD patients. The app got good marks from the users, and the mean correlation between the mobile phone app and a validated accelerometer was 0.88. SOURCE: JMIR Mhealth and Uhealth. 2016;4(1):e11.
- A telerehabilation program consisting of home exercise, self-management via a webpage, and weekly videoconferencing sessions proved to be a good alternative to a standard maintenance program for COPD patients in Norway who completed a PR program. Two years later, all the patients had maintained the gains they had made in the PR program. SOURCE: J Telemed Telecare. 2016 Feb 16 [Epub ahead of print]. DOI: 10.1177/1357633X15625545.
- Will some patients reap more benefits from a home-based telemanagement program than others? Italian researchers found the answer is yes in a study conducted among 1,074 patients over a four-year period. Those who suffered relapses, had several ABGs, and asked for more urgent consultations with their general practitioners were more likely to use the services offered by the program. SOURCE: COPD. 2016;13(4):491-498.
- Italian investigators found significant benefits for a tele-assistance program in COPD patients on long-term oxygen therapy (LTOT). They all had fewer hospital admissions, and those on LTOT and noninvasive ventilation had fewer exacerbations as well. SOURCE: COPD. 2016;13(5):576-582.
- A review of 18 previous studies conducted on telemedicine initiatives in patients having COPD found little benefit for the programs when compared to usual care. However, in the three studies that included a health coaching or skills training component, quality of life did improve. This led the authors to conclude these strategies may be more effective than others implemented by telehealth programs. SOURCE: Int J Chron Obstruct Pulm Dis. 2016;11(1):809-822. ■

COPD, By the Numbers

8.7 million — Adults with diagnosed chronic bronchitis in the past year.
3.6% — Percent of adults with diagnosed chronic bronchitis in the past year.
3.4 million — Number of adults who have ever been diagnosed with emphysema.
1.4% — Percent of adults who have ever been diagnosed with emphysema.
285,000 — Number of emergency department visits with chronic and unspecified bronchitis as the primary hospital discharge diagnosis.
10.8% — Percent of assisted living and other residential care residents with COPD.
614,000 — Number of discharges with chronic bronchitis as the first-listed diagnosis.
4.5 days — Average length of stay with chronic bronchitis as the first-listed diagnosis.
46.2% — Percent of adults aged 40-79 with lung obstruction who currently smoke cigarettes.
36.4% — Percent of COPD sufferers who are former smokers.
43.7% — Percent of people with COPD who also report a history of asthma.
71.4% — Percent of COPD patients who are diagnosed using spirometry.
62.5% — Percent of people with COPD who feel symptoms adversely affect their quality of life.
50.9% — Percent of COPD patients taking at least one daily medication to manage their COPD.
149,205 — Number of deaths from chronic lower respiratory diseases.

SOURCE: U.S. Centers for Disease Control and Prevention.

Taking COPD Awareness to the Top of the World



Mountaineer honors family members with the disease

by Debbie Bunch

Respiratory therapists who care for patients with COPD understand what it means to struggle to breathe. They see their patients working overtime to get air out so they can get air in, and they know how difficult it is for them to accomplish the everyday living activities most of us take for granted. Combing their hair, brushing their teeth, doing the dishes, walking to the mailbox… it all takes a concerted effort that can leave them breathless.

Chase Hinckley doesn't have COPD, but he knows what the disease can do to people and families. His grandmother, aunt, cousin, and a family friend all have the condition and they amaze him with their ability to keep going even when it seems their lungs are working against them. Despite being an extremely fit 34-year-old, Hinckley also knows what it's like to breathe against an extreme resistance. As an avid mountain climber, he's had more than his fair share of breathless moments when scaling some of the world's highest mountains.

This past summer he decided to combine his support for his family members with COPD by climbing the world's second highest mountain to raise funds for the COPD Foundation (COPDF). "Anyone who's ever been so out of breath that they felt like they were suffocating knows that trapped feeling and how desperate it can be," says Hinckley. "Relief for the breathless is as important as life itself."

Who's who of extreme challenges

Hinckley's climb for the COPDF was the culmination of a year of adventure. An engineer by profession, Hinckley went on hiatus from his job to pursue his passion for mountain climbing and the list of mountains he's conquered reads like a who's who of extreme challenges: Denali in Alaska, Mt. Rainier in Washington State, and Kilimanjaro in Africa, to name a few. But when he got ready to do his biggest climb to date — K2 in the Himalayas — he knew he wanted the accomplishment to stand for something bigger than just reaching another summit.

"The women in my family have been plagued with this burden that is COPD," he explains. His 88-year-old grandmother has suffered from the disease for years, and he's continually impressed by her ability to live her life to its fullest despite the limitations COPD places on her activities.

His aunt has been an inspiration as well. "My aunt in particular has only 40% lung function remaining, though her composure has always remained. It leaves me awestruck how she quietly battles this illness," says Hinckley. Watching his relatives fight the disease has left him with a sense of appreciation for breathing that most people never feel because they take that ability for granted. "I am fortunate to have the opportunity to travel without a nebulizer and the freedom to push my own limits in altitude," he says. "Those with and without COPD can be the ideal help for each other to realize our full potential."

He also knows the struggle against COPD can be isolating and he wants everyone with the condition to know that they don't have to hide their symptoms or add insult to injury by compounding their experience with the guilt that smoking may have contributed to their development of the disease. Hinckley teamed up with the COPDF when he learned it has the same mindset about people with the condition that he does. "The COPD Foundation is a great way to drive forward in the long road ahead."

K2 stands some 28,250 feet above sea level, just 800 feet lower than Mount Everest. But with hardly any flat terrain, it's one of the toughest mountains in the world to climb. Chase Hinckley did it last summer — and he did it to raise awareness of COPD.

A savage beast

For Hinckley, that long road got even longer when he decided to take on K2. A mountain that got its name from a notation used by the Great Trigonometric Survey of British India, wherein the two highest peaks of the Karakoram range were labeled K1 and K2, it's also known as Mount Godwin-Austen and Chhogori Balti and is second only to Mount Everest in height, rising to an altitude of 28,251 feet above sea level. Located on the China-Pakistan border, it's been called the Savage Mountain for the extreme difficulties posed by ascending it. Over the years, about 300 people have successfully reached the summit, but 80 have died trying. Overall, one in five people who embark on the climb won't come back alive.

He set off on his journey in June, arriving in Pakistan mid-month. From there he made his way to Skandu/Shangri-La, the most common starting point for climbers. A 52-mile journey through the mountains and up K2 followed. Although an avalanche at one of the camps closed off the summit for the year before he could reach it, and he suffered a minor injury in a fall, he says he'll always cherish his time on the mountain.

He explains, "I managed to make it to 24,000 feet without supplemental oxygen — and I know I could have gone farther."

A courageous climb

While he was battling the elements and his own inner reserve to persevere, the COPDF was busy hosting a webpage for donations and letting everyone in the COPD community know of Hinckley's efforts to go the extra mile for their disease. As of this writing in late summer — before he returned to the United States — his extreme adventure had already raised $680 for research and other important work funded by the organization and more donations were expected to come after his return home this fall.

"We at the COPD Foundation are proud of Chase Hinckley for his courageous climb of K2 for COPD awareness," says Craig Kephart, COPDF CEO. "Chase has witnessed the consequences of the disease first-hand and therefore knows living with COPD is like climbing K2 every day. We thank Chase for his incredible advocacy effort and wish him the best of luck in his future treks."

COPD patients and their family and friends who follow the COPDF have been impressed with Hinckley's devotion to helping people with the illness as well. Although the remote nature of the terrain he covered during the climb made it difficult for them to cheer him on while he was gone, they want him to know how much his willingness to go to the top of the earth means to them and everyone else who struggles to breathe every day.

Pushing the limit

As for Hinckley, he believes his year of mountain climbing has helped him realize what his family members go through every day as they work to accomplish goals that some would suggest are beyond their limitations. "These days when I'm feeling exhausted and breathless, I know that I'm nowhere near my limit," he says. "There is value in knowing your limits, and I encourage everyone to find them, because most are capable of so much more than they think. And once you realize this, you are truly free to explore, experiment, and take risks — emotional, mental, and physical — that you'd never dreamed of before." ■

RC Currents

Innate Immunity's Role in Asthma

Working with colleagues in Germany, United States investigators have found that substances in house dust from Amish homes are able to engage and shape the innate immune system in young Amish children in ways that may suppress pathologic responses leading to allergic asthma.

The study was conducted among Amish farming communities in Indiana and Hutterite farming communities in South Dakota. The researchers decided to study these two communities because of the vast differences in their farming practices. While the Amish live on small family farms where animals live in close proximity to the home, Hutterites live on communal farms and use modern farming techniques, thus creating a larger distance between children and farm animals. About 5% of Amish children have asthma versus 21.3% of Hutterite children.

After analyzing the genetic profiles of 30 Amish children 7-14 years old and 30 age-matched Hutterite children, the investigators compared the types of immune cells in the children's blood, collected airborne dust from their homes, and measured the microbial load in homes in both communities. Results of the blood tests showed Amish kids had more and younger neutrophils, blood cells crucial in the fight against infections, and fewer eosinophils, blood cells that promote allergic inflammation. Gene expression profiles also revealed enhanced activation of key innate immunity genes.

The investigators then exposed mice to dust collected from the Amish and Hutterite homes, finding that mice that received Amish dust were protected from asthma-like responses to allergens while mice that received Hutterite dust were not. Further studies in mice lacking two genes crucial for innate immune response, MyD88 and Trif, showed that the protective effect of the Amish dust was completely lost, which investigators believe demonstrates the role innate immunity plays in the process. ■

AARC New Members List Is Online

Our monthly "New Members" list can be accessed at http://c.AARC.org/new_members. Current AARC members are encouraged to check this site on the first of each month to view the names of individuals who have been approved as "Active Members" of the Association. ■

Contribute to Our "Transitions" Column

The AARC "Transitions" column is devoted to sharing news about the passing of AARC members.

You can submit news about your colleague's recent passing by going to http:c.AARC.org/transitions. Please provide any information about the member's recent obituary so that we can share it with the membership and pay tribute. ■

NHLBI Reshapes Its Vision

The National Heart, Lung, and Blood Institute (NHLBI) has released a new Strategic Vision aimed at shaping the government agency's research agenda into the next decade. Four overriding goals will drive the effort —

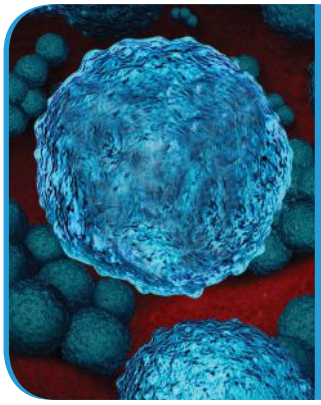
- Understand human biology
- Reduce human disease
- Advance translational research
- Develop workforce and resources

The Strategic Vision was created after the NHLBI reached out to its community of interest to identify the most pressing areas for research. More than 4,000 individuals submitted over a thousand compelling questions and critical challenges that were then refined to create the set of 132 research priorities contained in the document. The NHLBI believes the report will guide and inspire heart, lung, blood, and sleep researchers as they seek to better understand these medical conditions and find new ways to treat them.

You can learn more about the NHLBI Strategic Vision and its research priorities at https://www.nhlbi.nih.gov/about/documents/strategic-vision. ■

Canadian Study Compares Flu Vaccines

Conflicting results have been seen in studies aimed at determining whether the nasal flu vaccine is as effective as the standard flu shot. In a three-year trial conducted in 52 Hutterite colonies where people live relatively isolated from cities and towns, Canadian investigators randomly assigned 1,186 children to receive either the nasal spray vaccine or the flu shot. They also followed 3,425 community members who did not receive a flu vaccine. Average vaccine coverage among children in the nasal spray group was 76.9% versus 72.3% in the flu shot group and no differences were noted between the two vaccines in protecting the entire community. According to the authors, the study is the first blinded randomized controlled trial to compare the direct and indirect effect of the live vaccine versus the inactivated vaccine. The study appeared in a recent edition of the *Annals of Internal Medicine*. ■



Putting the Brakes on MRSA

Why do some influenza patients who are infected with the methicillin-resistant *Staphylococcus aureus* (MRSA) bacterium die despite treatment with normally effective antibiotics? University of Nebraska Medical Center researchers working in a mouse model have found that the virus alters the antibacterial response of white blood cells, causing them to damage the patients' lungs instead of destroying the bacterium.

They also found that inhibiting the enzyme that produces reactive oxygen species in macrophages and neutrophils reduced the extent of this damage, and when combined with antibiotic treatment, boosted the survival of co-infected mice. The study appeared in the *Journal of Experimental Medicine* earlier this year. ■

▶ STUDENT CORNER

Multidisciplinary Teamwork and Collaboration

Araceli Solis, BS, RRT, RCP

Collaboration among health care professionals is essential in delivering quality care to our patients. As respiratory therapists, we work closely with many disciplines, so it is vital that we work together and communicate effectively with the entire team. A lack of communication among disciplines can lead to delays in helping our patients recover.

I found myself in a difficult situation recently when my family member was hospitalized for respiratory distress. I witnessed a cascade of events wherein communication was poor, causing additional pain and discomfort to my loved one. It was rare that I saw someone advocate for my family member. This was very sad to see because every health care professional needs to advocate for his or her patients — especially when the patients are unable to speak for themselves. We have to learn to work as a team.

When I worked in a hospital setting, I made it a point to volunteer for committees that were made up of various disciplines for the purpose of improving patient care. Now that I am in an educational setting, I feel we can make a difference in graduating students who have had that interdisciplinary exposure throughout our curriculum.

Here at Collin College, we use simulation training to sharpen students' critical thinking skills as they learn to work as part of a team. Our simulation department schedules "Code Fridays" where students from all disciplines participate in different patient scenarios. Students from respiratory therapy, nursing, and emergency medical services have participated in these interdisciplinary collaborations.

In addition, some of our clinical instructors have used interdisciplinary teaching in the clinical setting, where nursing and respiratory therapy students teach each other. Polysomnography and respiratory therapy students also routinely collaborate throughout the program. It is important to see the collaboration among all health science disciplines while you are in school so that you are better prepared for that team mentality once you secure employment. A valued employee is one who is not only competent in his or her skills but can function within the team. ■

Araceli Solis is the respiratory care program director at Collin College in McKinney, TX.

RT Student Members: Send Us Your Stories

AARC Times is always looking for good stories from AARC student members that relate special experiences and give your perspective on the respiratory care profession you have chosen as a career.

If you have a story to tell, please contact *AARC Times* Editor Marsha Cathcart at cathcart@aarc.org and include in the subject line, "Student Member Story." Be sure to give us your full name, AARC student member number, and a brief description of the story subject. Then attach a Word document of the story. We hope to hear from you soon! ■

As Seen on *AARConnect*

Have you looked at what your colleagues are talking about on the AARConnect discussion lists? You might find an interesting tidbit you can use in your area of respiratory care or maybe answer a question someone has asked. Here is an example of a dialogue we found on AARConnect while preparing this edition of the magazine.

AARConnect...

Greetings from South Carolina. I am wondering how many managers, program coordinators, and clinical coordinators for PR are RTs in a full-time position and the program is your sole responsibility and you don't work the floors and any areas in a hospital setting? Thanks so much for your assistance with my inquiry.

Robin Sullivan, RRT-NPS
Hilton Head Hospital
Hilton Head Island, SC

At St. Charles Hospital in Port Jefferson, NY, we have two full-time RTs and a .5 RT and a .5 PT in our outpatient cardiopulmonary rehab program. One is the coordinator, the other 1.5 are staff RTs. We are open five days a week, 12 hours MWF and four hours Tu/Th. We work exclusively in the outpatient clinic. We do not do floor work; there is simply too much for us to do in the outpatient setting. Once in a while, we may cover floors in an emergency situation only.

Christian Becker, MS, RRT
CEB Inc.
Shoreham, NY

I work as an RT in cardiopulmonary rehab in Austin, TX. Our PR program days are Tues./Thurs. with our admissions being scheduled on Mon./Wed. I also help with the cardiac rehab program as needed. Needless to say I don't cover any other RT areas in the hospital.

Mary Collins, RRT
St. David's Medical Center
Austin, TX

At Beaumont Health in Royal Oak, MI, we are located off campus and work exclusively in pulmonary rehab. We have our own department/separate budget from the inpatient respiratory care department. We are staffed with RTs only, three full time, including myself as the coordinator, six part time at 20-24 hours/week, and four contingents. We provide individualized treatment for each session throughout the 12-week program. We are open M-F from 0630-1630 and schedule approximately 35-40 patients per day and have another 30-35 maintenance patients who attend throughout the day. They do not have appointment times but rather come in whenever they can within our hours, and on average, attend 2-3 days/week.

Teena Culhane, BS, RRT
Beaumont Hospital
Royal Oak, MI

Here at our pulmonary rehab we run classes Tuesday and Thursday. We have two one-hour maintenance classes that average 7-8 participants and are staffed with one person. We run two program classes, which are staffed with two people, an RT and RN. We had our staff cut, so presently we have a 28 hour RT, 10 hour RN, and 6 hour RT. Our physical therapist position was dissolved three months before January 2010. We don't work on the floors. Our evaluations are done on Mondays. We do two of them. We are booked out a month to six weeks.

Vicki Frausini Moran, BS, RRT-NPS, AE-C
Lawrence & Memorial Hospital
New London, CT

I am the sole provider in our small PR program on Tuesday and Thursday. The morning of those days, I work in the pulmonary lab. I also work one day a week in RT.

Mary K. Barrows, RRT-NPS
Midstate Medical Center
Menden, CT

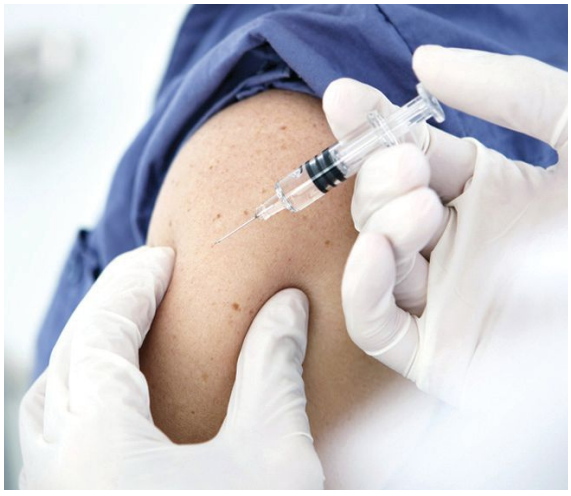
I work in a pulmonary rehab program that operates Monday-Thursday in Kyle, TX. Our class days are Tuesdays and Thursdays. We do initial evaluations on Mondays and Wednesdays, as well as education classes and discharges. There are two RTs who run the program, myself at 36 hours, and one part-timer at 24 hours. We are considered an outpatient department and do not work on the floor or cover other areas.

Lori Larson, BA, RRT
Seton Medical Center Kyle
Kyle, TX

We run a combined cardiopulmonary program off site with an RN as site leader. We're open M-F 8:30-5. The RT works MWF 8:30-3:30 and another RN T-TH 10:45-3:30. The RT also covers at the hospital in the pulmonary lab and on the floor when she chooses, which is quite often 12 hour shifts on the floors. We see approximately 20-25 patients daily and approximately half are pulmonary.

Susan Gribben
Saratoga Hospital Pulmonary Rehabilitation
Saratoga Springs, NY

Vaccine-Boosting Strategy May Not Work in Obese People



Adding substances, known as adjuvants, to vaccines to boost the immune response may not be as effective for obese people as for lean people. Researchers who studied vaccine effectiveness in mice found that while influenza vaccines with adjuvants did improve immune response in both obese and lean mice, following vaccination, the obese mice had lower antibody levels, including lower levels of neutralizing antibodies, and higher levels of the virus. They were also more prone to develop severe flu infections.

"This is the first study to show that current strategies to bolster the effectiveness of flu vaccines protected lean mice from serious illness but fell short of protecting obese mice from infections," said study author Stacey Schultz-Cherry, PhD, from St. Jude Children's Research Hospital, was quoted as saying. The study appeared online in *MBio* earlier this year.

Zeroing in on E-cig Emissions

Studies have shown e-cigarettes emit toxic compounds, but a new study in *Environmental Science & Technology* zeroes in on the source of the emissions and how certain factors affect their release.

Investigators found that the thermal decomposition of propylene glycol and glycerin, two solvents found in most "e-liquids," results in the emission of chemicals such as acrolein and formaldehyde. They also found a variation in emissions depending on the temperatures reached by the device and the type and age of the device in question.

Is LISA the Answer to Preterm Ventilation?

A ventilation strategy known as "less invasive surfactant administration" or "LISA" may be the ticket to preventing chronic lung disease in preterm infants, report McMaster University investigators publishing in *JAMA*. They reached that conclusion after reviewing data from 30 clinical trials involving seven different ventilation strategies in 5,500 infants younger than 33 weeks gestational age.

On average, 164 fewer preterm babies per 1,000 died or ended up with long-term breathing problems when treated with LISA, compared to babies who were intubated and placed on invasive mechanical ventilation. Now the investigators believe more studies should be conducted to determine which preterm infants require surfactant and which don't and to identify which infants receiving LISA will eventually need mechanical ventilation.

Rare Forms of Pulmonary Hypertension Also Get Diagnostic Blood Test

Researchers from Intermountain Medical Center and ARUP Laboratories have come up with a simple blood test to check for a mutation that causes two rare forms of pulmonary hypertension known as pulmonary capillary hemangiomatosis and pulmonary venoocclusive disease in some patients.

Previously the mutation, which was also identified by the investigators, could only be identified through a lung biopsy. "The discovery will eventually lead to improved care, and believe it or not, lower costs for patients," study author Gregory Elliott, MD, was quoted as saying. "The biggest savings will come from accurate diagnosis, which will reduce the use of ineffective and potentially harmful interventions." ■

Lowering Pneumonia Risk

Pneumonia is the most common infection after open heart surgery, but according to University of Michigan researchers, there may be some things patients can do to lower their risk. Based on the experiences of 16,084 patients, they've come up with a list of 17 patient characteristics associated with pneumonia risk, and some of them, like smoking, can be modified by patients prior to the surgery.

The authors believe clinicians can use the predictive risk model identify patients at risk and encourage them to adopt healthier habits prior to their surgery. The study was published in the *Annals of Thoracic Surgery.* ■

E-cig Labels Misleading

E-cigarette labels may be misleading people about the nicotine content of the devices, report North Dakota State University researchers who examined 93 e-liquid containers. While 70 claimed to contain nicotine ranging from 3-24 mg/mL, 34% had less nicotine than advertised and 17% had more.

Among 23 e-liquid containers that claimed to contain zero nicotine, 43% did contain it. What's more, 65% of the e-liquid containers were not child-resistant.

"Mislabeling of nicotine in e-liquids exposes the user to the harmful effects of nicotine," notes study author Kelly Buettner-Schmidt. "In areas without child-resistant packaging requirements, children may be exposed to harmful nicotine." The study appeared in the *Journal of Pediatric Nursing*. ■

ATS Issues New Guidelines on Diagnosing Persistent Wheeze in Infants

New guidelines from the American Thoracic Society are aimed at helping clinicians diagnose persistent wheeze in infants. Published in the *American Journal of Respiratory and Critical Care Medicine*, the guidelines, which the authors stress are conditional due to the lack of well-designed studies in the area, address specialized or controversial tests rather than standard tests such as chest radiography.

For infants younger than 24 months with persistent wheezing despite treatment with bronchodilators, inhaled corticosteroids, or systemic corticosteroids, the authors suggested:

- An airway survey via flexible fiberoptic bronchoscopy
- Bronchoalveolar lavage
- Twenty-four-hour esophageal pH monitoring rather than upper gastrointestinal radiography

- Twenty-four-hour esophageal pH monitoring rather than gastrointestinal scintigraphy
- Video-fluoroscopic swallowing studies

In infants who do not have eczema but have persistent wheezing despite treatments with bronchodilators, inhaled corticosteroids, or systemic corticosteroids, the authors recommended against empiric food avoidance or dietary changes. The report also calls for more research to further define appropriate diagnostic tests for infants with persistent wheeze.

TRANSITIONS

Craig Scanlan, EdD, RRT, FAARC, has passed away. A long-time professor at Rutgers University in New Jersey who was named professor emeritus when he retired in 2011, Dr. Scanlan had more than 45 years of experience in the profession and developed three successful RT educational programs during his career. He was a former chair of the RT education accrediting agency and either served as editor of, or contributed to, several major respiratory care texts, including Egan's Fundamentals of Respiratory Care (1990-2003). He was named a Fellow of the American Association for Respiratory Care in 1999.

DNA Sequencing Could Raise CF Diagnoses

U.S. researchers who looked at cystic fibrosis (CF) screening have concluded that all babies with a known mutation for CF and second mutation called the 5T allele should receive additional screening to better predict the risk of developing CF later in life.

Adding specific DNA sequencing to current newborn screenings would allow for an early diagnosis in ethnically diverse populations and could result in earlier treatment, thus improving the outcome and prolonging the lives of children with the disease. The study appeared in a recent edition of *Genetic Testing and Molecular Biomarkers*.

Could This Be a Cure for Asthma?

New research out of the University of Southampton in the United Kingdom suggests a gene known as ADAM33, which makes an enzyme that attaches to the cells in the airway muscles, may be the key to curing asthma. The investigators took a closer look at ADAM33 in three studies:

- The first showed that a rogue version of the gene causes airway remodeling, resulting in more muscle and blood vessels around the airways of developing lungs, but not inflammation. However, when a house dust mite allergen was introduced, both airway remodeling and allergic airway inflammation were more significantly enhanced.
- The second showed remodeling of the airway in mice that had ADAM33 switched on from in utero. When the gene was switched off the airway remodeling was completely reversed.
- The third looked at the impact of house dust mite allergen on asthma features in mice that had the ADAM33 gene removed. Airway remodeling and twitchiness, as well as airway inflammation rates, were significantly reduced.

"Our studies have challenged the common paradigm that airway remodeling in asthma is a consequence of inflammation," study author Hans Michel Haitchi explains. "Instead, we have shown that rogue human ADAM33 initiates airway remodeling that promotes allergic inflammation and twitchiness of the airways in the presence of allergen." He and his colleagues believe that blocking ADAM33 from going rogue or stopping its activity once it does go rogue could prevent asthma from occurring. The study was published in the *Journal of Clinical Investigation* earlier this year. ■

Blame the Gut Bacteria!

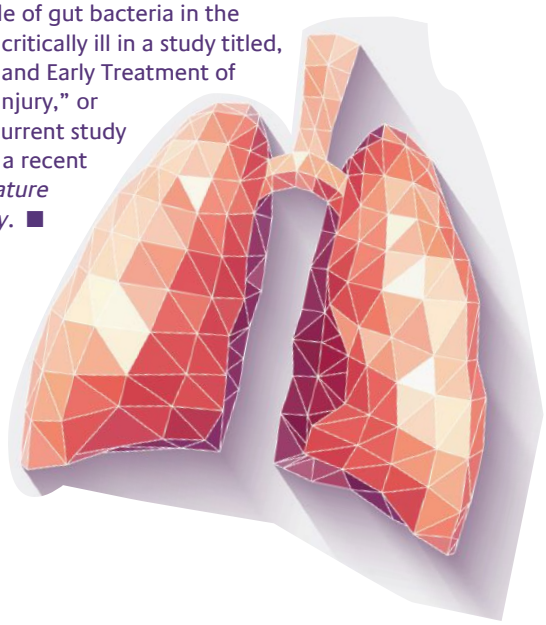
University of Michigan researchers have found gut bacteria in the lungs of people and animals who are critically ill, calling into question the long-standing belief that these bacteria do not enter the lung and could not survive there even if they did.

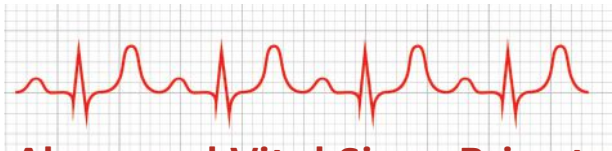
The study was conducted in rodents with sepsis and 68 human patients with the acute respiratory distress syndrome (ARDS). Special genetic tools and bacterial culture techniques were used to study the lung microbiome in the human portion of the trial. Samples from the ARDS patients were compared to those taken from healthy volunteers. The more severe the patients' critical illness, the more their usual lung bacteria were outnumbered by the misplaced gut bugs.

How are gut bacteria getting into the lung? The researchers have ruled out the possibility that they arrive through the upper respiratory tract in the animal studies but suggest the walls of the intestines may become "leaky" in those with critical illness, allowing bacteria to escape and travel upward to the lung. Another theory is that gut bacteria were always in the lung, but only gained the ability to proliferate when the person became critically ill.

Despite the route, however, bringing the lung microbiome back into balance could be a new way to treat ARDS and sepsis. "Virtually all of our attempts to treat these critical illnesses have been aimed at fixing the disordered inflammation and tissue injury we can see in our patients," study author Robert P. Dickson, MD, was quoted as saying. "But our study raises the possibility that this inflammation and injury may actually be downstream consequences of an upstream source: disordered bacterial communities in the gut and lung."

The University of Michigan team is continuing to study the role of gut bacteria in the lungs of the critically ill in a study titled, "Prevention and Early Treatment of Acute Lung Injury," or PETAL. The current study appeared in a recent edition of *Nature Microbiology*. ■





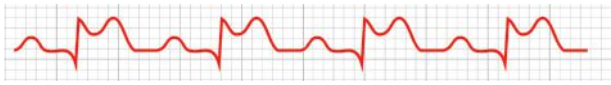
Look for Abnormal Vital Signs Prior to Discharge To Prevent Deaths, Readmissions

UT Southwestern Medical Center researchers have found that 20% of hospitalized patients are discharged before all their vital signs become stable, and these patients are more likely to be readmitted or die within 30 days.

The investigators reviewed the electronic medical records of 32,835 patients at six hospitals, looking specifically for abnormalities in temperature, heart rate, blood pressure, respiratory rate, and oxygen saturation within 24 hours of discharge. Elevated heart rate was the most common abnormality noted. About 13% of patients with at least one abnormality were readmitted or died, and individuals with three or more instabilities had a nearly four-fold increase in the odds of death. The higher rate of readmissions and death persisted even for patients discharged to a post-acute care facility. The researchers offer these recommendations:

- Discharge guidelines should include objective vital sign criteria for judging stability on discharge to improve disposition planning and post-discharge patient safety.
- At a minimum, patients with one instability on discharge should be discharged with caution.
- Close outpatient follow-up and appropriate patient education about warning signs and symptoms that merit urgent medical attention may be warranted.
- Individuals with two or more instabilities should likely remain in the hospital for continued treatment and observation in the absence of extenuating circumstances.

"At a time when people are developing complicated, black box computerized algorithms to identify patients at high risk of readmission, our study highlights that the stability of vital signs, something doctors review with their own eyes every day, is a simple, clinically objective means of assessing readiness and safety for discharge," study author Dr. Ethan A. Halm was quoted as saying. He and his colleagues published their findings in a recent edition of the *Journal of General Internal Medicine*. ■



Strange But True...

Remember this: European scientists have found that the hippocampus in the brains of mice exposed to grass pollen allergen produce more neurons than controls. Because neurons play a crucial role in memory, the investigators now wonder how allergies may impact a person's ability to recall information.

Night-night: A Florida man seeking a better way to put his newborn down to sleep has invented a hammock-like device called the "Crescent Womb" that can be suspended over a standard crib and helps mimic the sleep environment in the womb. He believes it may also help prevent sudden infant death syndrome by putting the baby in a healthier breathing position. ■

Heavy Drinking May Lower Nitric Oxide Levels

A new study based on data from 12,059 adults participating in a study by the Centers for Disease Control and Prevention from 2007 to 2012 found heavy drinkers had lower exhaled nitric oxide levels than adults who never drank, and the more a person drank, the lower the level became.

Heavy drinking was defined as more than one drink per day on average for women and more than two drinks per day for men, along with binge drinking, defined as four or more drinks per occasion for women and five or more drinks for men, at least once a month. Overall, 26.9 percent of the participants were excessive drinkers.

The study is the first to link heavy drinking to nitric oxide levels, and the investigators believe respiratory professionals should take the findings into account when using exhaled nitric oxide measurements to monitor their patients. The findings were published in a recent edition of *CHEST*. ■

Industry Watch

Holaira begins TLD study

According to Holaira, the company has initiated treatments in the AIRFLOW-2 Clinical Trial for patients with moderate to severe COPD using a procedure called targeted lung denervation (TLD). TLD is the first medical procedure that targets the whole lung by disrupting overactive nerves into the lungs, thus opening up the airways and making it easier to breathe. The randomized interventional study will use the Holaira Lung Denervation System. The AIRFLOW-2 trial is currently underway at 16 institutions throughout Western Europe and is the first randomized clinical trial with a sham control for TLD.

Pacific University receives grant to study new tobacco treatment

Investigators from the Pacific University School of Pharmacy have been awarded a $375,000, three-year grant from the National Institute on Drug Abuse to investigate new treatments for tobacco addiction. The grant will fund research to evaluate a dietary agent, cinnamaldehyde, as a prototype for new orally administered tobacco cessation agents with a mechanism of action that is unique from currently approved drugs. A natural product that provides the characteristic aroma to cinnamon oil and cinnamon powder, cinnamaldehyde has shown in preliminary studies supported by a New Investigator Grant from Oregon Health and Science University's Medical Research Foundation to be an inhibitor of a key enzyme that metabolizes nicotine.

Nu-Med to incorporate NO system into existing model

Nu-Med Plus, Inc. is planning to incorporate its newly developed proprietary nitric oxide generation and delivery system into its existing hospital delivery model prior to U.S. Food and Drug Administration (FDA) 510k approval. "It was a straight forward task to change the delivery system in our hospital model over to our new proprietary nitric oxide generator," Nu-Med President and CEO Jeff Robins said. "We believe that this will simplify the 510k submission and speed up the approval of this product." The new generation system takes advantage of room temperature operation and easier handling.

Michael James Enterprises acquires rights to dronabinol

Michael James Enterprises, Inc. has entered into an asset purchase agreement with RP Capital Group to acquire all rights and intellectual property to develop and bring to market therapeutic treatments for sleep disorders using dronabinol as the base ingredient. The generic form of Marinol, dronabinol was approved by the FDA in 1985 and is currently used to treat nausea and maintain weight in cancer patients. A recent study conducted by the University of Chicago was aimed at testing the use of the drug in sleep apnea.

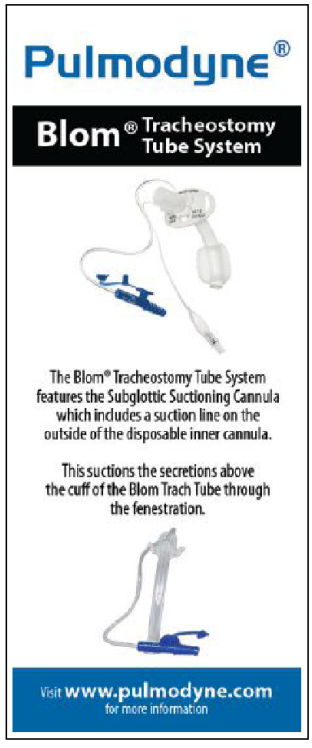
Telehealth study to include Spanish-speaking RT

The Feinstein Institute for Medical Research has received a $1.5 million grant through the government's Patient-Centered Outcomes Research Institute to conduct a study to find out whether a home-based pulmonary rehabilitation program can improve quality of life and decrease hospitalizations among COPD patients. The initiative will be conducted among 276 Hispanic patients with COPD and will involve telehealth sessions with a Spanish-speaking respiratory therapist. ■

Brief submissions and photos for this column may be sent to *AARC Times* Editor Marsha Cathcart at cathcart@aarc.org.

Industry Update

Featuring information on products and equipment from manufacturers



Promote. Educate. Generate Awareness.

For Students Considering A Career in Health Care

Describes the exciting career opportunities as a respiratory therapist, salary range, specialty areas and the requirements to become an "RRT".

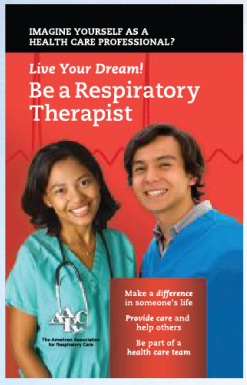
For Individuals Considering a Career Change

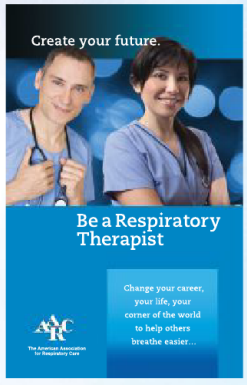
Presents the rewarding career opportunities as a respiratory therapist, the requirements to become an "RRT", salary range and specialty areas.

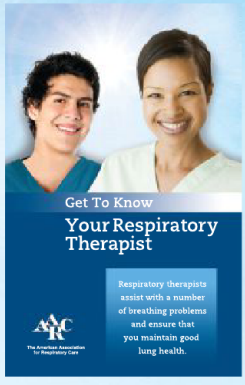
For Current or Future Patients

Familiarizes the patient with respiratory care and the treatments performed.

Brochures to Help You Get the Word Out.







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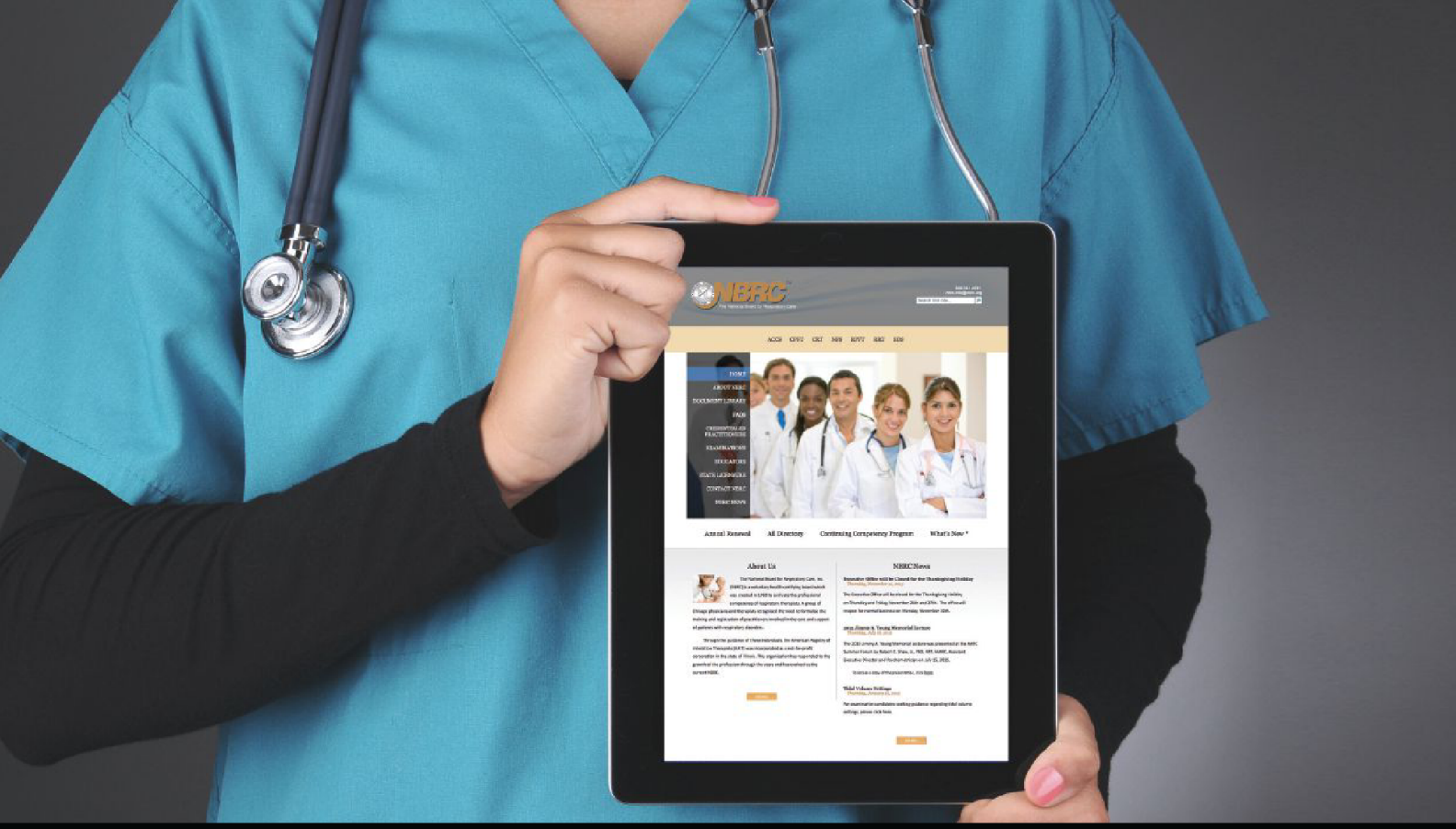

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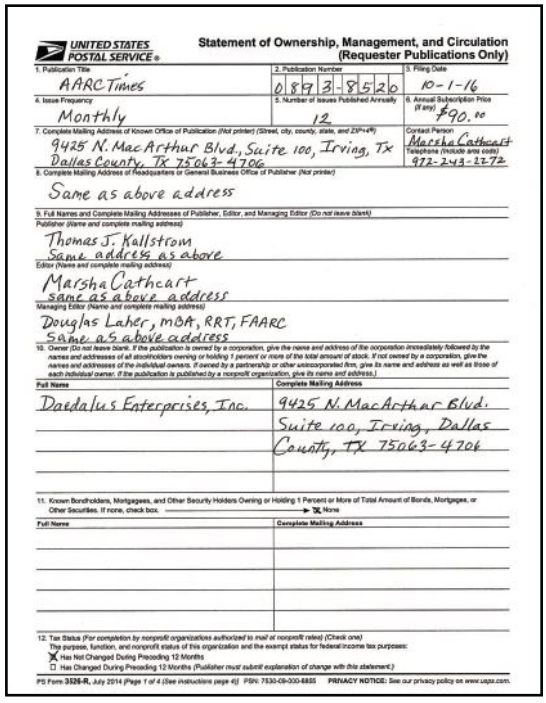

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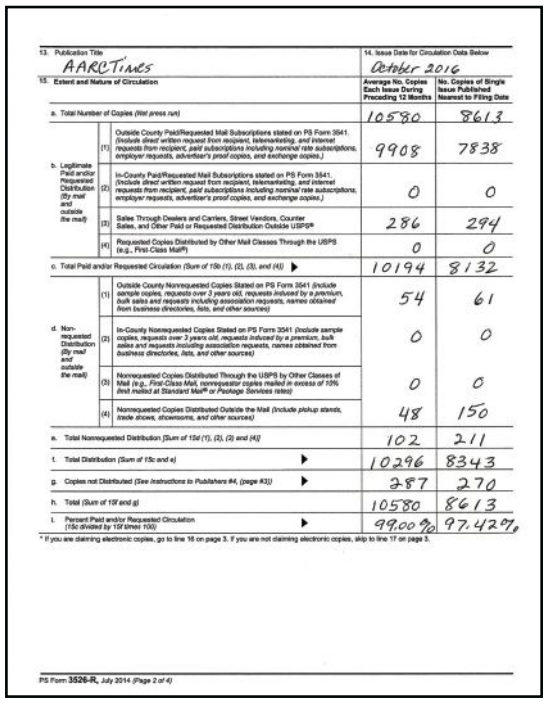

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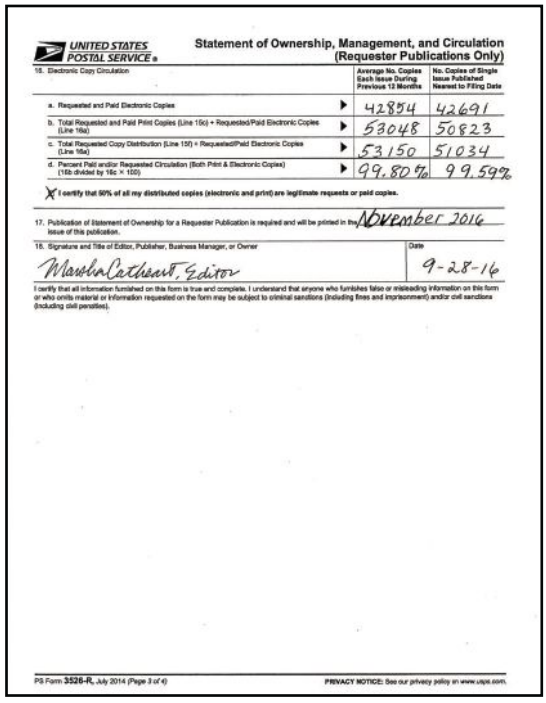

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