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References:

1. Frat JP, Thille AW, Mercat A, et al. High-Flow Oxygen through nasal cannula in Acute Hypoxemic Respiratory Failure. *N Engl J Med* 2015; 372:2185-2196. doi: 10.1056/NEJMoa1503326
2. Dysart K, Miller TL, Wolfson MR, Shaffer TH. Research in high flow therapy: mechanisms of action. *Respir Med*. 2009;10:1400-5. Cited in support of HFNCT benefits not including CPAP as CPAP is off-label for Comfort Flo Humidification System.

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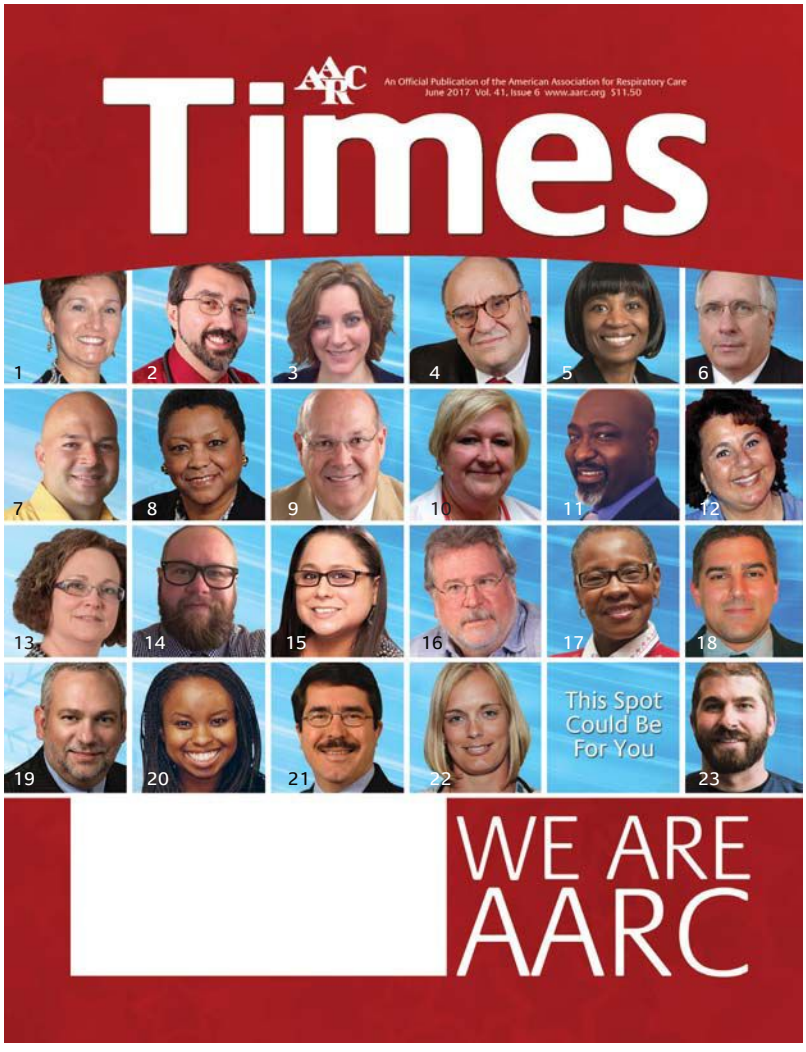
You're the Star of This Show!

On this month's cover of *AARC Times*, we feature you, our members. Ever since the AARC was established 70 years ago, we have served the respiratory care profession and respiratory patients, but we never could have done it without the support of members like you.

You may notice that we left one spot open on our yearbook-style cover this time because we hope you will send us your picture for the June 2018 cover. Next year, this open spot could feature you.

As you read through this edition, we hope you will see what's being done for you and by you to strengthen the respiratory care profession. The AARC Annual Report in this issue highlights some of the many special programs, projects, activities, and people of the Association throughout the past year.

Thank you for being AARC members! We look forward to growing the profession with you and to having a big sendoff for our next 70 years of worldwide service. ■



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Clinical Perspectives

RTs Can Use Musical Therapy To Help Patients with COPD

by Krystal Craddock, BSRC, RRT-NPS, AE-C, CCM

For a chronic obstructive pulmonary disease (COPD) patient, even the simplest physical activity can cause increased dyspnea, fear, and anxiety. They often go out less frequently because of their dyspnea, creating isolation and reducing socialization, which can lead to depression. Anxiety and depression are not uncommon in people living with COPD, but they have been underdiagnosed and undertreated.[1,2] Patients should be aware that, although there is no cure for COPD yet, the disease is very treatable, and the same goes for anxiety and depression.

About 42% of patients diagnosed with moderate to severe COPD also have symptoms of depression.[3] Depression in COPD decreases a patient's quality of life and functional degree while increasing mortality, risk of hospitalizations, and disease burden. COPD patients with associated anxiety and depression tend to have poorer outcomes, are younger in age, smoke, have low forced expiratory volume (FEV_1), are female, and have cardiovascular comorbidities.

Meta-analyses have found that patients with anxiety and depression are less adherent to their overall medication regimens, including COPD medications.[4] Similar to COPD, treatments of anxiety and depression include pharmacological and non-pharmacological methods, and they should be used in conjunction with one another. Non-pharmacological treatments to manage depression and anxiety take a great deal of motivation and effort on the patient's behalf. With anxiety and depression being more prevalent in patients with COPD than in the general population, lifestyle changes that include an exercise component can significantly improve the symptoms of depression and anxiety.[5] Exercise training, as seen in pulmonary rehabilitation (PR), effectively reduces anxiety and depression symptoms in all people with COPD, regardless of the severity of the depression or anxiety.[6]

about the author...

Krystal Craddock, BSRC, RRT-NPS, AE-C, CCM, is a COPD case manager in the department of respiratory care at UC Davis Medical Center in Davis, CA. She is a recipient of the Charles W. Serby COPD Research Fellowship Award.

Musical therapy as a treatment for COPD

Music programs have recently been brought to light as a productive part of a COPD patient's treatment. So recently, in fact, The Global Initiative for Chronic Obstructive Lung Disease (GOLD) has yet to recognize the therapy as a non-pharmacological recommendation in the treatment of COPD other than listening to music as a palliative measure.[1] Singing is thought to be the easiest addition to a COPD patient's therapy, as it does not require instruction on the use of an instrument. A study published in the *Journal of Music Therapy* showed that vocal instruction benefited patients with emphysema by improving breathing techniques and the proper use of diaphragm during singing.[7] Playing instruments such as the harmonica, woodwind instruments, and the kazoo are also utilized as musical therapies and can offer benefits similar to those of singing.

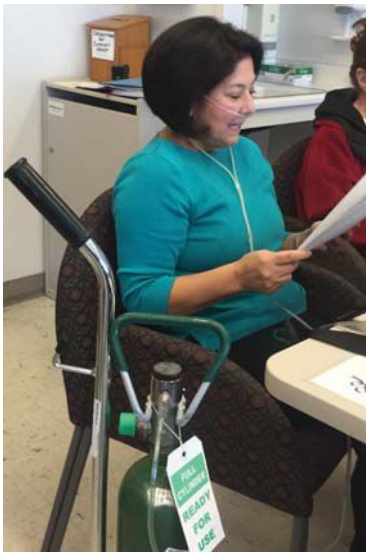
Studies on the physiological effects of singing and playing instruments by patients with COPD are limited in comparison to studies of the effects of medication and exercise. However, these limited studies have shown physiological benefits on improvement of lung function. One study published in the *International Journal of Chronic Obstructive Pulmonary Disease* looked at the effect of singing classes with COPD.[8] The investigators concluded that singing improved lung function; patients exhibited a higher inspiratory capacity, as well as lower expiratory residual

volume and expiratory pressure. Psychological benefits of singing and instrument playing in the management of COPD are supported by more conclusive studies which demonstrate that improved quality of life and depression scores are not just the exception.[9] These benefits are in large part due to patient's participation in the socialization and activities in classes. One randomized controlled trial on the benefits of singing showed that COPD patients felt it improved physical effects in daily dyspnea symptoms and fitness.[10] Patients felt learning about breathing and pacing also helped improve their physical symptoms.

Studies in relation to this topic have also concluded that there are little to no adverse effects of applying daily singing to patients with COPD.[11] Positive effects of exercise interventions for COPD patients have long been reported as a necessary addition to a patient's treatment.[12] However, music therapy has not yet been considered an adjunct therapy.

Musical programs available to people living with COPD

The growing popularity of musical programs for COPD patients has created opportunities and fun new ways to engage with patients enrolled in PR. With education on breathing retraining and a community of patients with COPD, PR seems to be a natural fit for a choir and/or musical instrument program. Choirs for people living with lung disease, such as the "Rockin Rehabers" at the University of California Davis Medical Center, are improving socialization and reducing isolation, and they are growing in popularity among patients and PR coor-



For more information on pulmonary choirs, contact Alexandra Elliott, BSRC, RRT, UC Davis "Rockin Rehabers" coordinator, at alelliott@ucdavis.edu. Information on Harmonicas for Health can be found at http://www.copdfoundation.org/Learn-More/Pulmonary-Rehabilitation/Harmonicas-for-Health.aspx

dinators. In addition, the patients enjoy the therapeutic activities. Bi-weekly PR choir practices or integration in COPD support groups are an easy way of incorporating and introducing patients to this therapy. Having patients make song and performance suggestions allows them to have ownership in such programs.

Harmonicas for Health is the first nationwide music program created by the COPD Foundation to help patients learn to better control their breathing, strengthen breathing muscles, improve anxiety and depression symptoms, and promote socialization.[13] Harmonicas for Health offers leader kits and player kits for individuals or groups. Player kits include a harmonica and an instruction booklet, while the leader kit includes the same as well as an instructional DVD, a music CD, and curriculum guides, making it ideal for PR programs that are starting their own music group.

Publications on the positive effects of music therapy, particularly therapy focused on instrument playing, are limited, which suggests that further randomized controlled studies are needed, especially with the abundant relevance of anxiety and depression in COPD.

Respiratory therapists (RTs) can utilize musical therapy in their bedside practice. Educating patients with chronic pulmonary disease, such as COPD patients, to apply singing and musical instrument playing into their everyday routine can improve their daily dyspnea and depression symptoms. Promoting singing to compromised patients in the hospital, including your pediatric populations, is a fun way of encouraging deep breathing and improving one's spirits, especially in postoperative patients and patients with limited mobility. RTs promoting group singing and instrument playing in a pulmonary rehabilitation setting can help to further improve the patient's socialization within the program and increase public awareness within their community by organizing performances and promotions. Finding innovative and fun ways to improve patient outcomes is something RTs have always done well, and using music to augment our patients' current therapies is just another way we can benefit the patients we care for.

References

1. Global Strategy for the Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017 Report. Available from: http://goldcopd.org *Accessed November 8, 2016.*
2. Fritzsche A, Clamor A, Von Leupoldt A. Effects of medical and psychological treatment of depression in patients with COPD: A review. Resp Med. 2011;105:1422–33.
3. Light RW, Merrill EJ, Despars JA, Gordon GH. Prevalence of depression and anxiety in patients with COPD: Relationship to functional capacity. Chest. 1985;87(1):35–8.
4. DiMatteo MR, Lepper HS, Coghan TW. Depression is a risk factor for noncompliance with medical treatment: Meta-analysis of the effects of anxiety and depression on patient adherence. Arch Intern Med. 2000;160(14):2101–7.
5. Putman-Casdorph H, McCrone S. Chronic obstructive pulmonary disease, anxiety, and depression: State of the science. Heart Lung. 2009;38(1):34–47.
6. Coventry PA, Bower P, Keyworth C, et al. The effect of complex interventions on depression and anxiety in chronic obstructive pulmonary disease: Systematic review and meta-analysis. PloS One. 2013;8(4)e60532.
7. Engen R. The singer's breath: Implications for treatment of persons with emphysema. J Music Ther. 2005;42(1):20–48.
8. Bonilha AG, Onofre F, Vieira ML, Prado MY, Martinez JA. Effects of singing classes on pulmonary function and quality of life of COPD patients. Intl J Chron Obstruct Pulmon Dis. 2009;4:1–8.
9. Panigrahia A, Sohanib S, Amadib C, Joshib A. Role of music in the management of chronic obstructive pulmonary disease (COPD): A literature review. Technol Health Care. 2014;22:53–61.
10. Lord VM, Hume VJ, Kelly JL, et al. Singing classes for chronic obstructive pulmonary disease: A randomized controlled trial. BMC Pulm Med. 2012;12:69.
11. Grasch A, Boley TM, Colle J, Henkle JQ, Todd SO, Hazelrigg SO. Daily singing practice as a means of improving pulmonary function and quality of life in emphysema patients. Cureus. 2013;5(3):e103.
12. Camillo CA, Osadnik CR, Van Remoortell H, Burtin C, Janssens W, Troosters T. Effect of "add-on" interventions on exercise training in individuals with COPD: A systematic review. ERJ Open Res. 2016;2(1):78–96.
13. COPD Foundation. Welcome to COPD360music – Harmonicas for health. 2016. Available at: http://www.copdfoundation.org/Learn-More/Pulmonary-Rehabilitation/Harmonicas-for-Health.aspx *Accessed November 14, 2016.*

Ventilation for Life

The Challenge of Patient–ventilator Interactions and Technological Solutions

by Eduardo Mireles-Cabodevila, MD, and Robert L. Chatburn, MHHS, RRT-NPS, FAARC

Patient–ventilator interactions have been discussed forever, yet, over the last few years they have moved front and center in our daily routine. We have recognized that keeping patients deeply sedated is bad and that having them walk, sit, and interact while intubated is good. Moreover, we have to deal with patient–ventilator synchrony issues while trying to limit the pressures and tidal volumes — often conflicting goals. These principles have made the recognition and optimization of the patient ventilator interaction more relevant than ever.

Research in patient–ventilator interactions and patient outcomes has not been easy. We do not have a standard vocabulary nor a clear understanding of what each interaction means (either in terms of definitions or clinical implications). We do not have much specific evidence that would allow us to rank ventilator interactions in terms of clinical importance. For example, is a delay in triggering worse than delayed cycling? We do not have a practical way to detect and quantify patient–ventilator interactions other than expert opinion, which is often not available at the bedside. In 2006, Thille et al. defined an "asynchrony index," which entailed 30 minutes of recording per patient.[1] No ventilator manufacturer has integrated alarm or detection algorithms, which leaves the clinician at the bedside as the only person to recognize them.

Observational studies have associated asynchrony and dyssynchrony with longer length of mechanical ventilation, morbidity, and mortality.[2,3] Yet this is relatively superficial evidence. Consider what we see at the bedside. Abnormal patient–ventilator interactions are common, frequently overlooked, not part of regular charting, often treated with sedatives, and in general there is no systematic approach to dealing with it. However, there are encouraging signs in that there is increasing focus on how to recognize and improve patient ventilator interactions, from automatic detection systems to clinical algorithms.[4,5]

about the author...

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Robert L. Chatburn, MHHS, RRT-NPS, FAARC, is clinical research manager in the section of respiratory therapy at The Cleveland Clinic.

Defining patient–ventilator interactions

The definition of and criteria for patient–ventilator interactions is not established. We use terms such as "asynchrony," "dyssynchrony," "flow starvation," and "flow asynchrony" by tradition rather than a clear rationale. As we work toward a taxonomy, it is worth discussing some of the ambiguities in our definitions (Table 1). When we talk of synchrony we are talking about time. That is, timing of the trigger and cycling. However, we also see patient–ventilator interactions in terms of flow delivery. The interplay between the patient demand (in terms of the work to inspire) and ventilator supply (in terms of work delivered to assist inspiration) leads to recognizable patterns that identify an imbalance in work. We know that the interactions throughout the breath (start, middle, and end) impact patient work. With this, we see that "flow asynchrony" actually refers to a mismatch of inspiratory work supply and demand. Table 2 outlines the patient–ventilator interactions.

Clinical Assessment

At the bedside, the clinician is the ONLY one who can recognize asynchrony by examining the patient and observing the pressure and flow waveforms. Besides the

Table 1. Definitions

	Etymology	What this means	Examples
Synchrony	*synchrony:* occurrence or existence at the same time	Patient's demand start, peak, or end happen at the same time as the ventilator's supply. Synchrony is the perfect coordination of the ventilator's supply with patient demand (inspiratory/expiratory effort) in terms of time. This means that the patient signal (pressure, flow, or diaphragmatic activity) is the reference and the ventilator needs to match it.	Ideally, a mode would match each timing of the breath.
Asynchrony	*a–*: without	No synchrony between patient and ventilator; by definition it only can occur when there is patient activity but no ventilator output (e.g., missed trigger) or ventilator activity without patient activity (e.g., auto-trigger).	In a paralyzed patient, there is no synchrony as there is nothing to synchronyze with.
			Auto-triggering. This artifact is due to an overly sensitive trigger threshold; there is no synchrony as there is no patient activity.
Dyssynchrony	*dys–*: bad, ill, abnormal,	Poor match between patient demand and ventilator supply; there is a difference between the ventilator's delivery (pressure or flow) and the patient's demand (e.g., Edi, flow, or pressure) in terms of trigger and cycle events.	A difference in the timing of trigger or cycling between patient and ventilator.

evident patient in distress, this usually requires careful observation, listening to the ventilator, and placing a hand on the patient to ensure the patient effort is matching the ventilator breaths.

Another key to identify patient–ventilator interactions is to ensure the ventilator screen has the pressure-time and volume-time waveforms in display. A simple rule is that patient–ventilator interactions are usually (but not always) evident in the waveform the mode is not controlling. That is, during inspiration, for a volume-control mode, the patient–ventilator interaction is seen in the pressure waveform, and vice versa. During the expiratory phase, missed triggers are better seen in the flow waveform (e.g., deformations of expiratory flow waveform) because flow is the best surrogate for patient effort (in the absence of, for example, esophageal pressure or electrical activity of the diaphragm).

Correcting patient–ventilator interactions with current technology

Once we recognize that patient–ventilator interactions can be divided into synchrony and work of breathing balance, it becomes easier to understand the technology available. Table 2 outlines some of the solutions to these patient ventilator interactions. However, as technology has advanced, ventilators have different options to improve the patient–ventilator interactions (Figure 1). Indeed, current technology allows the clinician to adjust settings to a very detailed level or to allow the machine to do it automatically.

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Table 2. Types of patient–ventilator interactions

Type	Description	Outcome	Patient Risk[a]	Solutions[b]
Asynchronies				
Auto-trigger	No patient activity. Trigger due to artifact/inappropriate trigger threshold.	Multiple breaths delivered, respiratory alkalosis	Inappropiate sedation and paralysis	Adjust trigger threshold
Ineffective trigger	Patient effort does not trigger inspiratory flow from ventilator.	Unsupported patient work	Anxiety, discomfort, respiratory muscle fatigue, hypoventilation	Decrease aPEEP, Adjust trigger threshold Consider NAVA
Missed cycling	Inspiration continues due to missed cycle variable. Runaway phenomena.	Excessive volume or pressure delivery	Risk of volutrauma	Set breath termination criteria to safe level
Dyssynchronies				
Trigger				
Delayed trigger	Delay between patient trigger signal and start of flow from ventilator	Increased work of breathing	Anxiety, discomfort, respiratory muscle fatigue	Adjust trigger threshold, use other triggering signal
Early trigger (or reverse trigger)	Inspiratory effort after machine trigger (as a reflex or out-of-phase breath).	May cause breath stacking (double triggering), delivery of large tidal volume	Risk of volutrauma	Decrease set respiratory rate, prolong inspiratory time
Cycling				
Delayed cycle	Delay between machine cycle event and cessation of patient inspiratory effort.	Could cause patient exhalation to happen during mandatory breath	Increased respiratory work	Shorten inspiratory time
Early cycle	Machine cycles inspiration before cessation of patient inspiratory effort.	Ineffective ventilation, may cause breath stacking (double triggering)	Exposure to large tidal volume or pressure	Prolong inspiratory time
Work of breathing balance				
Work shifting	Increasing patient inspiratory work (effort) causes decreased ventilator work output (also known as flow asynchrony, flow starvation).	Less support of patient work, extremes can impose undue work on the patient.	Depends on the severity and clinical goals: extremes can lead to increased patient work, hypoventilation, pulmonary edema	If goal is to maintain a set tidal volume, then consider sedation/r paralysis. Increase VT, switch to pressure control mode
Trigger work	Trigger sensitivity set inappropriately or performs poorly, leading to increased patient work to initiate inspiration.	Increased patient work	Increased respiratory work, dyspnea	Decrease pressure rise time
Cycle work	The cycling threshold is delayed, leading to an active expiration against a mechanical breath.	Increased patient work	Increased respiratory work	Shorten inspiratory time
Expiratory work	A patient with active exhalation finds expiratory pressure, leading to increased work of breathing.	Increased patient work	Increased respiratory work	Sedation/paralysis, automatic decrease of PEEP

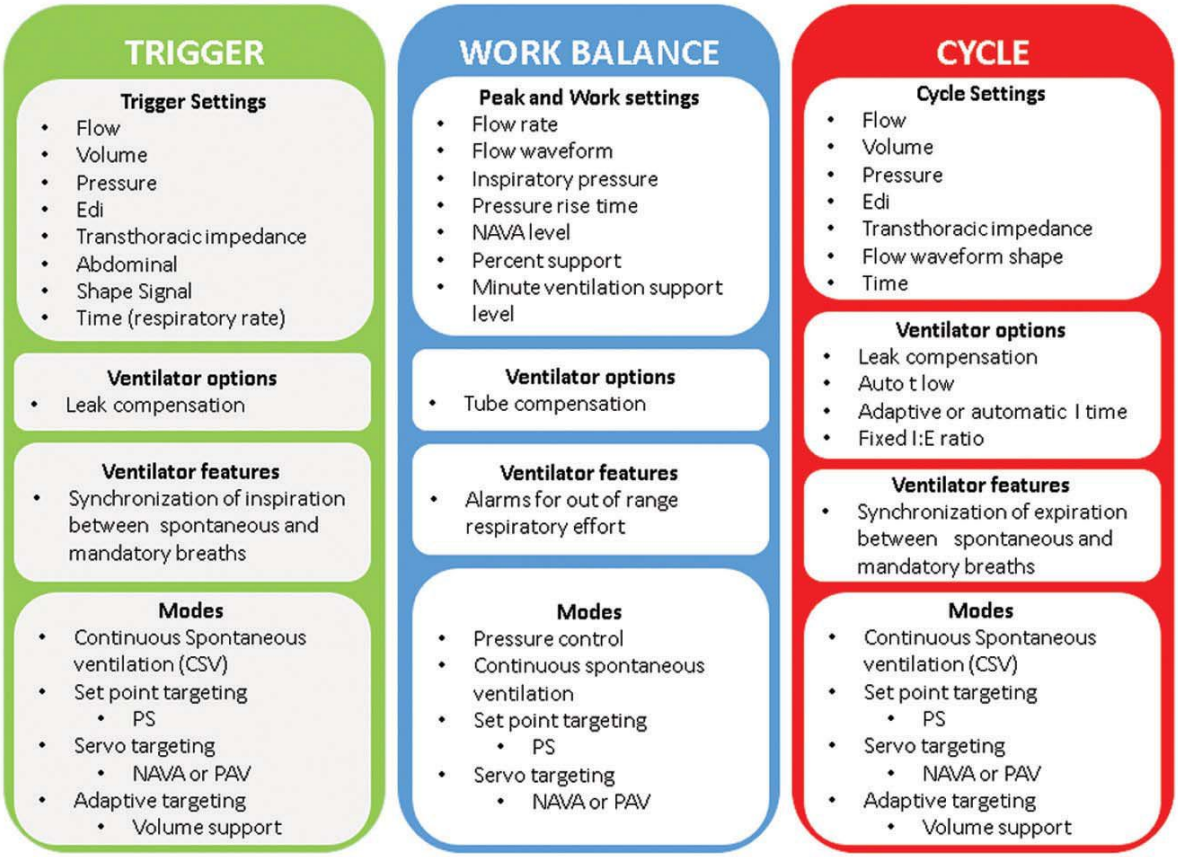
[a]Potential or known risk; [b]Some of the potential strategies to deal with the patient–ventilator interaction.

There are several basic technological features that serve to improve trigger or cycle synchrony. Simply choosing the right signal to trigger can make a big difference. In the setting of leaks (e.g., bronchopleural fistulas), some ventilators have incorporated leak-compensation algorithms to aid triggering and cycling, although their performance is not uniform.[6] Some ventilators have incorporated algorithms that adjust the inspiratory time to the patient's time constant, or to maintain a constant I:E ratio. Another attempt is to implement synchronization windows when using intermittent mandatory ventilation, to allow the synchronization of both inspiration and expiration of spontaneous breaths to the mandatory ones. A major change in mechanical ventilation came with neurally adjusted ventilatory assist (NAVA): this technology allows us to use the diaphragm signal as the reference to trigger and cycle the ventilator, adding another reference to define synchrony.[7]

In terms of work of breathing balance, there are technological features that help avoid undue work in triggering (rise time adjustment, shape-signal triggering) or cycling (flow cycling). However, the clinician must recognize the clinical goal and the technological capabilities of the mode. Some modes do less work as the patient does more work (VC-CMVs, PC-CMVa, PC-CSVa); some modes do the same work regardless of the patient effort (PC-CMVs, PC-CSVs), while some modes do more work as the patient effort increases (PC-CSVr , i.e., NAVA, or PAV).[8]

The clinician should be aware that for most mechanical breaths, there will always be some degree of dyssynchrony. One could spend hours fine-tuning the ventilator to match every breath and trying to eliminate every artifact in the waveform. Yet some of these patient–ventilator interactions may be irrelevant. Two words of caution. First, consider the clinical scenario

Figure 1. Technological features designed to improve patient ventilator interactions



and the severity/consequence of the a/dyssynchrony. Second, we have a lot of technology, but very little patient-level evidence. Before starting everybody on a given technological solution, learn what your ventilator really does and use the best available evidence and physiology understanding.

In summary, there is still a vast amount of research to be done to understand patient–ventilator interactions, how to define them, and which technology and method to use to improve them. ■

References

1. Blanch L, Sales B, Montanya J, et al. Validation of the Better Care(R) system to detect ineffective efforts during expiration in mechanically ventilated patients: A pilot study. Intensive Care Med 2012;38(5):772–780.
2. Blanch L, Villagra A, Sales B. Asynchronies during mechanical ventilation are associated with mortality. Intensive Care Med. 2015;41(4):633–641.
3. Chanques G, Kress JP, Pohlman A, Patel S, Poston J, Jaber S, Hall JB. Impact of ventilator adjustment and sedation-analgesia practices on severe asynchrony in patients ventilated in assist-control mode. Crit Care Med. 2013;41(9):2177–2187.
4. de Wit M, Miller KB, Green DA, Ostman HE, Gennings C, Epstein SK. Ineffective triggering predicts increased duration of mechanical ventilation. Crit Care Med. 2009;37(10):2740–2745.
5. Oto J, Chenelle CT, Marchese AD, Kacmarek RM. A comparison of leak compensation in acute care ventilators during noninvasive and invasive ventilation: A lung model study. Respir Care. 2013;58(12):2027–2037.
6. Sinderby C, Liu S, Colombo D, Camarotta G, Slutsky AS, Navalesi P, Beck J. An automated and standardized neural index to quantify patient–ventilator interaction. Crit Care. 2013;17(5):R239.
7. Thille AW, Rodriguez P, Cabello B, Lellouche F, Brochard L. Patient-ventilator asynchrony during assisted mechanical ventilation. Intensive Care Med. 2006;32(10):1515–1522.
8. Chatburn RL, El-Khatib M, Mireles-Cabodevila E. A taxonomy for mechanical ventilation: 10 fundamental maxims. Respir Care. 2014;59(11):1747–1763.

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BREAS

Mark Your Place in the AARC's 70-Year History

by Thomas J. Kallstrom, MBA, RRT, FAARC

My father was discharged from the United States Navy and later from the Marines in 1946 after serving in the last years of World War Two. He was a pharmacist's mate, which in today's nomenclature would be a hospital corpsman. I was going through his discharge papers recently and found a booklet that directed discharged enlistees to jobs that they may be suited for in civilian life. Interestingly, in 1946 an earlier form of today's respiratory therapist (oxygen therapy equipment technician) was listed as a logical profession to enter. Even in the post-WWII days, there were opportunities that would evolve into what we now know as a respected and needed profession today. My father did not go that route, but he did encourage me, 30 years later, to consider respiratory therapy — since then, I have never looked back.

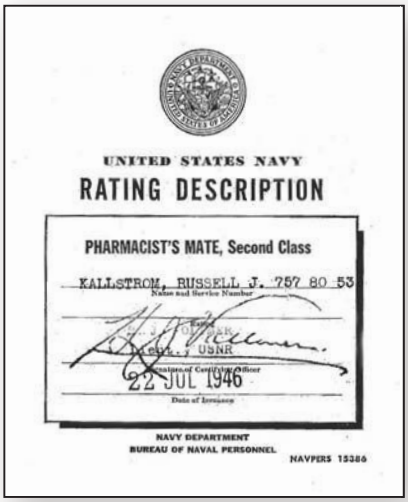
Through the rest of 2017, *AARC Times* will be celebrating the 70th anniversary of the incorporation of the AARC by revisiting some of the memorable events during the Association's history. We ran a story last month about Master Sergeant Thomas A. Wallsmith, who, as far as we know, is the only respiratory therapist killed in the line of duty. He was killed in action in Iraq during Operation Iraqi Freedom in 2005, and he was posthumously awarded the Purple Heart. The story memorializes him by getting a perspective from his family, friends, and colleagues. It was a very heartfelt piece. If you missed it, I encourage you to look at the May issue of *AARC Times*.

Later this year, we will be revisiting a memorable event that took place in 1982, when the AARC's then-president Glen Gee and other respiratory care leaders met with President Ronald Reagan at the White House. Gee's son, who had dealt with asthma, was with them. He and others will talk about that day and the resultant national proclamation that President Reagan signed announcing our first Respiratory Therapy Week, which is now celebrated annually in the last full week of October. President Reagan also had first-hand experience with respiratory therapists after the failed assassination attempt in 1982. He was on a ventilator upon admission to the hospital and received many chest physiotherapy treatments. Perhaps we made an impression.

I encourage you to make 2017 a year to celebrate the 70th anniversary by doing something local. This can be in your hospital or at a state meeting. We are starting to hear about such events already. One event took place in April in Cleveland, on the campus of Case Western Reserve University: The Dittrick Medical Museum hosted a photo gallery of the history of the profession, thanks to the collection put together by AARC member Steve DeGeneres. Also on site were several artifacts from the early days of the profession. One item that caught my eye and brought back memories was the display of a hand-made "jet ventilator" used on premature babies, made by AARC member Rob Chatburn, MHS, RRT-NPS, FAARC, in the early 1980s. According to Chatburn, "One day around 1980 or 1981, Marvin Lough, RRT (respiratory therapy director at Rainbow Babies and Children's Hospital), handed me an abstract from some medical journal by a physician named Miroslav Klain, an anesthesiologist in Pittsburgh. He had made a "jet ventilator" and was experimenting with a whole new way to think about ventilator support. I went to Pittsburgh and had dinner with Dr. Klain. Then I came home and, with Marvin's help, built the first 'Rainbow Jet Ventilator' entirely of Plexiglas and fluidic components. It was entirely pneumatically powered and controlled, like a Bird ventilator. At that time, some of the most prestigious

about the author…

Thomas J. Kallstrom, MBA, RRT, FAARC, is executive director of the AARC.



UNITED STATES NAVY

RATING DESCRIPTION

PHARMACIST'S MATE, Second Class

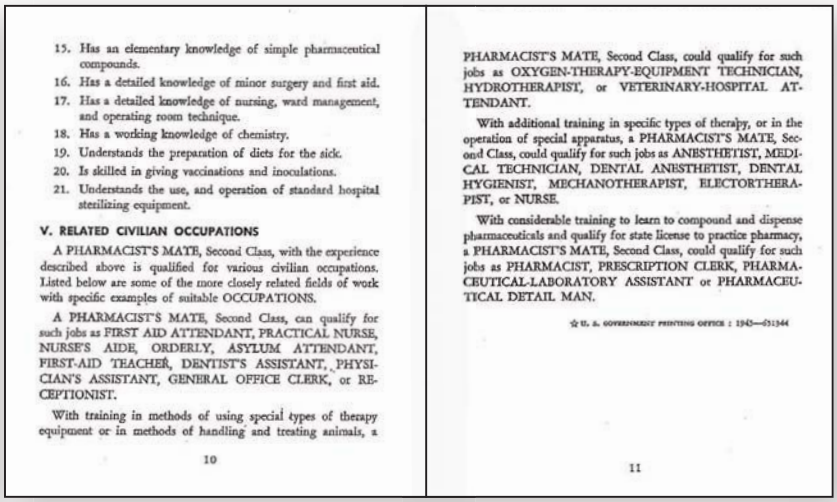
KALLSTROM, RUSSELL J. 757 80 53
Name and Service Number

USNR

22 JUL 1946
Date of Issuance

NAVY DEPARTMENT
BUREAU OF NAVAL PERSONNEL

NAVPERS 15388



15. Has an elementary knowledge of simple pharmaceutical compounds.
16. Has a detailed knowledge of minor surgery and first aid.
17. Has a detailed knowledge of nursing, ward management, and operating room technique.
18. Has a working knowledge of chemistry.
19. Understands the preparation of diets for the sick.
20. Is skilled in giving vaccinations and inoculations.
21. Understands the use, and operation of standard hospital sterilizing equipment.

V. RELATED CIVILIAN OCCUPATIONS

A PHARMACIST'S MATE, Second Class, with the experience described above is qualified for various civilian occupations. Listed below are some of the more closely related fields of work with specific examples of suitable OCCUPATIONS.

A PHARMACIST'S MATE, Second Class, can qualify for such jobs as FIRST AID ATTENDANT, PRACTICAL NURSE, NURSE'S AIDE, ORDERLY, ASYLUM ATTENDANT, FIRST-AID TEACHER, DENTIST'S ASSISTANT, PHYSICIAN'S ASSISTANT, GENERAL OFFICE CLERK, or RECEPTIONIST.

With training in methods of using special types of therapy equipment or in methods of handling and treating animals, a

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PHARMACIST'S MATE, Second Class, could qualify for such jobs as OXYGEN-THERAPY-EQUIPMENT TECHNICIAN, HYDROTHERAPIST, or VETERINARY-HOSPITAL ATTENDANT.

With additional training in specific types of therapy, or in the operation of special apparatus, a PHARMACIST'S MATE, Second Class, could qualify for such jobs as ANESTHETIST, MEDICAL TECHNICIAN, DENTAL ANESTHETIST, DENTAL HYGIENIST, MECHANOTHERAPIST, ELECTORTHERAPIST, or NURSE.

With considerable training to learn to compound and dispense pharmaceuticals and qualify for state license to practice pharmacy, a PHARMACIST'S MATE, Second Class, could qualify for such jobs as PHARMACIST, PRESCRIPTION CLERK, PHARMACEUTICAL-LABORATORY ASSISTANT or PHARMACEUTICAL DETAIL MAN.

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neonatologists were working at Rainbow (Marshall Klaus, Avroy Fanaroff, and Richard Martin), and they had the vision to start research on high-frequency ventilation of neonates with respiratory distress syndrome."

I can vouch for this, as I worked with Rob during those early years in respiratory care at Rainbow Babies and Children's Hospital. In fact, we shared a duplex in Cleveland, and many a night and weekend Rob could be found working on his "jet ventilator" or other respiratory care contraptions at the house. Fast-forward to 2017: while we know that something like this would never be allowed to happen now, with all of the federal and state regulations designed to protect patients, in retrospect, that jet ventilator saved many premature babies' lives.

I am sure you have a story to tell. I encourage you to take part in the AARC's 70th Anniversary year by celebrating your local history. Let the AARC know what you did so we can share it with our members. ■

Two Friends

by Anthony L. DeWitt, JD, RRT, FAARC

Imagine you have two friends. One friend you've known all your life. He was in your wedding, you were there when his kids were born, and on top of that, he's your brother. Your other friend, if you can call him a friend, is someone who pretty much only comes around looking for money. He often provides some help with different projects, but for the most part, he stays in the background of your life. In fact, the only reason you know much about him is because when he gets money, he spends it unwisely. He often loses it or invests unwisely, pays $500 for things you would pick up for $15 at the hardware store, and often doesn't seem to have his own best interests at heart when choosing his other friends.

Now, imagine one day your less responsible friend comes to you and says, "I want to be responsible for all your worldly possessions, money, investment accounts, and property." What would you say?

Quick question: Do you have a will or a family trust?

If you did not answer "yes," then the irresponsible spendthrift friend whom you wouldn't want anywhere near your checking account is going to get his hands on it if, heaven forbid something bad happens on your way home from work today. Without a will or a trust to manage the disposition of your assets, your state laws determine who gets to benefit from your life's work.

The laws of "intestate succession" determine where your assets go. In every state, if you die without a will but leave assets behind, the state makes a will for you by directing courts to divide up your worldly goods according to a set formula. But sometimes that formula rewards people you might not necessarily want to reward.

Suppose a mother has three sons and a daughter. She has already given her daughter the majority of her jewelry, gifts valued at more than $20,000. But, when she dies with $100,000 in assets, all four of the siblings will take $25,000 equally. If the mother had intended a different division of assets based on what she has already given away, that is not provided for under most state laws.

These laws governing disposition of assets without a will, however, are not all bad. They have some vestigial protections built in. At common law, a man could disinherit his widow by writing a will that left her out of it. Laws of intestate succession, however, do not allow this and are now gender neutral. Now, a spouse cannot totally disinherit another spouse because the spouse always has the option to "take against the will." In essence, even if not provided for in the will, a court can apportion 50 percent of a decedent's assets to the surviving spouse, no matter what the will says. Sometimes this results in the major asset of the inheritance (a house or family farm) being sold or subdivided to make sure that the surviving spouse is protected. That's why, even though there are software programs that allow you to write your own will, which you can modify to write your living spouse out of your will, such programs often produce documents that do not stand up in court.

While a will is necessary to ensure that all of a person's assets go where they're intended, it isn't the only

about the author...

Anthony L. DeWitt, JD, RRT, FAARC, is an attorney and a partner in the firm Bartimus, Frickleton, and Robertson, PC, and resides in Opelika, AL. He has also published two books and numerous legal journal articles. This article is not a substitute for legal advice.

way to accomplish this disposition. For example, a family trust can be established that would place all the family's assets into one virtual "basket" and appoint individuals to manage those assets. Once thought of as simply a tool for the wealthy, many people now use trusts to avoid paying high probate fees or state-imposed taxes on an inheritance.

A trust is "declared" by a "trustor." The trustor declares that he is going to put a certain number of assets into a trust for the use and benefit of a particular beneficiary or a group of beneficiaries. The trustor then names a trustee, who is responsible for carrying out the dictates of the trustor. The trustee must manage the assets of the trust for the use and benefit of the beneficiaries and may not reward himself at the expense of the trust.

Perhaps the most useful feature of a trust is that it enables assets to be placed beyond the range of a beneficiary's creditors. This is often done so that a beneficiary who draws funds from the trust cannot be stripped of that interest if he breaches a contract or otherwise injures another party. No creditor may ask a court to have the trust pay off the debts of a beneficiary. They can seize the assets as soon as they are paid to the beneficiary (assuming they are present when that payment occurs), but they cannot garnish a trust in the same way that a creditor can garnish a paycheck.

Several years ago, a client I represented breached a contract and was socked with punitive damages. The client's legal fees were paid by a trust. His car was provided by a trust. He lived in a home owned by a trust. When the winning plaintiff went to collect on the judgment, there were no assets in the client's name that could be attached to satisfy the judgment: they were all in the name of a trust.

Of course, if a trust as an entity contracts with another person for a service, the trust can still be sued under that contract. The trust cannot, however, be sued for the acts of its beneficiaries.

Another feature of trusts is that they go on until the last beneficiary under the trust has been served, and they can be amended as needed to include additional assets or additional heirs. They are a very flexible way for a person whose family situation is dynamic to ensure that all her loved ones are properly provided for.

Sometimes the trustor, trustee, and beneficiary are all the same person, essentially letting a person take all their assets and place them outside the reach of creditors. Courts often look askance at this behavior, but very few trusts are disturbed once they are formed, and they are disturbed only when and how a court permits it.

Irrespective of whether a person uses a will or a trust, it is vital to make appropriate plans for the disposition of your assets upon your death. Like many other legal services, there are websites and software that will let you create your own will. Some of these services are very good, but none of them can give you advice on the best way to go about disposing of assets and ensuring the protection of your loved ones. Only a lawyer licensed in the state where you live can do that. ■

AARC Government Affairs Is Getting a Facelift

by Anne Marie Hummel

The dust is settling as we adjust to Cheryl West's retirement after almost 30 years of tireless compassion for respiratory therapists, the many patients you serve, and the profession as a whole.

Cheryl's legacy is the wealth of information she accumulated over her many years as the AARC's director of government affairs. She worked on numerous critical issues, such as state sunset laws, de-licensure, polysomnography, consolidation or reconfiguration of licensure boards, and the movement to the entry-level RRT credential, to name a few. On the regulatory side, 2016 was a particularly busy year with the Association submitting more than 25 sets of comments on federal issues or signing on to joint letters on topics affecting the profession, including telehealth, tobacco regulation, home mechanical ventilation, pulmonary rehabilitation, and a national COPD Action Plan.

The AARC has a major investment in advocating for respiratory therapists, the profession, and patients with chronic respiratory disease. Let's review a few of the issues we've dealt with recently so you have a sense of how our Government Affairs office works with our members.

- If you've read *News Now* recently, you know that when respiratory therapists in Iowa were faced with de-licensure, AARC Government Affairs was quick to jump in with talking points and legislative letter templates that the Iowa Society for Respiratory Care used to mount an offensive that resulted in the proposed bill being torn up within a week of its introduction.
- Last fall, when Ohio found out its legislature was fast-tracking a bill that would have restructured its Respiratory Care Board by transferring its powers to the Ohio Board of Medicine, Government Affairs advised adding a fallback position to the bill to create a respiratory care advisory committee or council, and we also provided letters of support for the amendment. The Ohio Society for Respiratory Care was successful in their lobbying efforts, and the original bill was defeated. This is expected to come up in this year's legislative cycle, and we're prepared to assist again.
- Several states are considering or starting to pursue raising the licensure entry level to the RRT credential. By now you are aware that Government Affairs and the AARC leadership have developed a guidance document for states to use in this endeavor. Three states — Ohio, California, and Arizona — have already achieved this goal.
- Current Medicare coverage policies for home mechanical ventilation, including bi-level devices or respiratory-assist devices, as the Centers for Medicare and Medicaid Services (CMS) likes to refer to them, are woefully out of date and do not reflect the changes in technology that make it easy to use the devices for both invasive and noninvasive ventilation. Government Affairs has been working with other pulmonary organizations on several tactics to change the rules over the past 18 months. Having been unsuccessful in getting CMS to make a National Coverage Determination, a legislative initiative is next on the agenda.
- Government Affairs and members of the AARC's

about the author...

Anne Marie Hummel is the AARC's new associate executive director for advocacy and government affairs and works in the Washington, DC, area.

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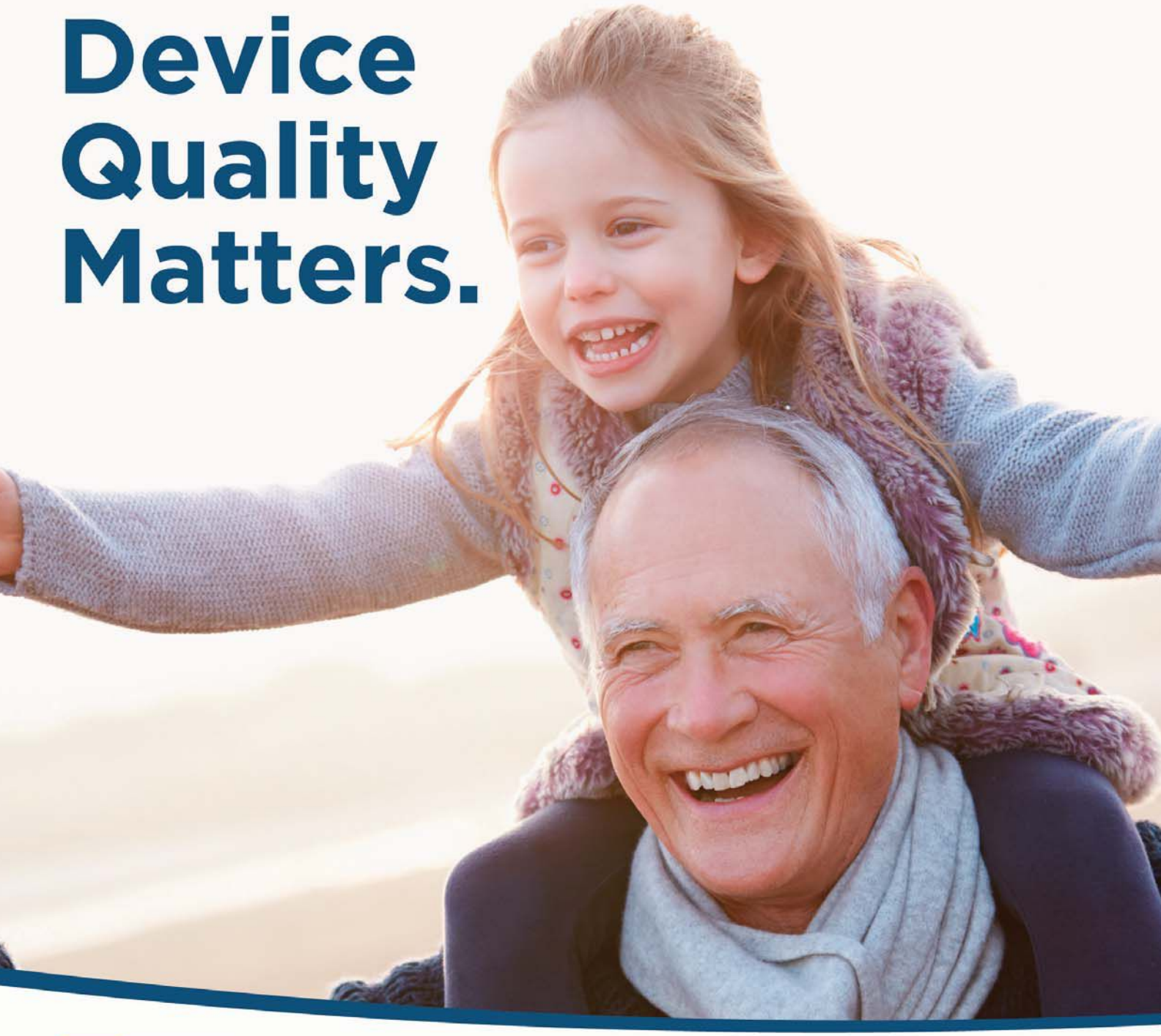

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References: 1. Burudpakdee C *et al.* Pulm Ther 2017 DOI 10.1007/s41030-017-0027-5. Pub online 6 February 2017. 2. Svenningsen S. *et al.* COPD 2016;13(1):66 – 74

Long-Term Care Section have been working behind the scenes to get a commitment from CMS that only respiratory therapists can provide specialized rehabilitative services as part of the final rules to reform policies affecting long-term care facilities. While CMS has not come out with a definite "yes," new interpretive guidelines state that these specialized services are different from restorative services provided by nursing staff and should be provided by or coordinated by qualified personnel in order to maximize potential outcomes. "Qualified personnel" means "professional staff are licensed, certified, or registered to provide specialized therapy/rehabilitative services in accordance with applicable state law." This statement opens the door for long-term care facilities to ensure that respiratory therapists are the right people with the right qualifications to provide specialized care.

- When AARC was asked to endorse new telehealth pediatric procedures established by the American Telemedicine Association to address the needs of our nation's pediatric population, Government Affairs wrote the endorsement letter, recognizing AARC's position on respiratory therapists as telehealth providers. The procedures cover such topics as patient privacy and safety, informed consent, special circumstances and the environment, emergency contingencies, mobile devices, clinical encounters, and provider considerations.

We are faced with new challenges every day. As an AARC member, do you really know how much and how often we advocate for you, your patients, our state affiliates, and the overall profession in both state and federal government-related issues? Most likely not — but that's about to change.

To make sure members know that the AARC is an advocate for you, the first thing we've done is add Advocacy as a new major menu item on the AARC website. In the past, the advocacy discussion was focused most heavily on our Hill Day, Virtual Lobby Week(s), and CAP Connection. But it's so much more than that, and we want you to know about it. We have also changed the title of Government Affairs and elevated it to an Associate Executive Director position with the title "Advocacy and Government Affairs" because we think our members need to know how important it is to our leadership.

We are making changes to the website to add new sections so you are kept abreast of the many issues that may affect you or your patients. We already have articles about certain federal issues we have advocated for on behalf of respiratory therapists, and this will be expanded to provide members with our comments on a multitude of issues that we have addressed in the past year.

What has been missing in the past — and what we aim to fix — is a section on State Issues under our Advocacy heading. We are developing resource documents that can assist state societies when they are faced with licensing board realignments or elimination, as well as background information and talking points on how to combat de-licensure and sunset provisions.

Achieving our goals, however, will take time, so please be patient. It will require considerable work on the part of our Executive Office staff to get the www.aarc.org website the way we want it. In the interim, know that we have your back and we will continue to work tirelessly on your behalf. We will keep you apprised of our progress, and, in the end, you will have a better feel for the Advocacy and Government Affairs role and how it benefits you as an AARC member. ■

Chronic Disease Manager

Are E-cigarettes a Viable Adjunct for Tobacco Cessation?

by Georgianna Sergakis, PhD, RRT, RCP, TTS, FAARC

As our profession embarks on our 70th anniversary, it is interesting to note that some may say we are "see history repeating itself." If respiratory therapists (RTs) had been more prevalent before the Surgeon General's 1964 report, would we have joined the physicians who were recommending certain brands of cigarettes to consumers (physicians who were well paid for their endorsements)? In 1964, the American Medical Association, supporting the tobacco industry's objection to labeling cigarettes as a health hazard, wrote in a letter to the Federal Trade Commission: "More than 90 million persons in the United States use tobacco in some form, and, of these, 72 million use cigarettes.... The economic lives of tobacco growers, processors, and merchants are entwined in the industry; and local, state, and the federal governments are recipients of and dependent upon many millions of dollars of tax revenue."

Well, here we are at another crossroad with a new nicotine-delivery device, and here I am, faced with the task of answering the question "What do I say when asked about electronic cigarettes?" The short answer is, "the evidence is still emerging." We are not at a point where RTs are able to confidently endorse these new devices as an alternative to traditional combustible tobacco cigarettes. Could we be at that point in 5–10 years? Perhaps — it depends on the evidence that emerges from scientific inquiry on the topic. So many unanswered questions remain. Time travel aside, this article is a succinct review of the scientific literature available to us today about e-cigarettes. I hope that this information will be useful to you when you are asked questions about these popular devices. As trusted healthcare providers, we have an ethical duty to understand the evidence-based literature on the topic and cautiously inform our patients of the facts.

E-cigarettes are nicotine-delivery devices that have been quickly increasing in popularity since their introduction in the United States in 2006. The devices produce a vapor by heating a liquid that contains multiple substances: a liquid carrier like propylene glycol or vegetable glycerol (or a mixture of both), nicotine, and flavoring agents. The evaporation of the liquid by a heating element cools to form an aerosol with particles that are 100–200 nm in size and are inhaled directly (or "vaped") into the lung. Deposition to alveoli is estimated to be similar to that of conventional cigarette smoke (9–18%).[1]

about the author...

Georgianna Sergakis, PhD, RRT, RCP, TTS, FAARC, is program director of respiratory therapy at the School of Health and Rehabilitation Sciences at the College of Medicine of Ohio State University.

Contents

First, we should be cognizant of the health effects of e-cigarettes and be prepared to answer questions regarding these effects. Let us start by comparing and contrasting the hazards of e-cigarettes with tobacco cigarettes. The most notable component that is common between e-cigarettes and tobacco cigarettes is nicotine. Nicotine is the addictive substance in both products with known health effects (Table 1).[2] E-cigarettes contain between 0 and 30 mg/mL nicotine.[3] The nicotine level varies, and just as in a tobacco cigarette; the nicotine level in an e-cigarette depends upon the concentration, user experience, cloud effects, device characteristics, and vaping technique.[1]

Other compounds that are found in a tobacco (or conventional) cigarette have also been detected in electronic cigarettes, but at lower levels. Table 2 compares the levels of the most common compounds found in both devices.[4] Additional compounds detected in e-cigarette

aerosols include tobacco-specific nitrosamines, carbonyl compounds, as well as other substances not detected in conventional cigarette smoke like metals such as tin, lead, nickel, and chromium.[4]

While the chronic effects of tobacco cigarettes are well known, there are still questions about chronic e-cigarette use mainly due to the time available on the market. The chronic effects of e-cig use on the cardiovascular system are still unknown. The short-term effects of deep inhalation of a high concentration of the ultra-fine particles produced by the devices causes high concentrations of nicotine in the blood and is associated with endothelial dysfunction, arterial stiffness, and blood clotting.[5]

To contrast the health effects of e-cigarettes with conventional cigarettes, there are some unique safety and health issues. The most common adverse health effects include throat and mouth irritation, cough, nausea, and vomiting.[3]

Toxicity: Poison control center calls related to e-cigarettes have increased drastically in the past 5 years. This is mainly due to the accidental ingestion of the liquid used to refill the new cartridge style e-cigarettes. More than half (58%) of the calls to poison centers concerning e-cigarettes involved children younger than the age of 5 years.[6]

Exploding lithium batteries: There continue to be anecdotal reports of the lithium batteries that power the heaters on these devices exploding and causing fires and injuries. These accidents have resulted in serious burns and penetration injuries.[3]

Indoor air pollution: E-cigarettes are not emission-free. During vaping sessions, compounds and particles emitted by aerosol into the indoor air include propylene glycol, glycerin, heavy metals, nicotine, flavoring agents, and polycyclic aromatic hydrocarbons. While levels of most substances are lower than conventional cigarettes, long-term safety of second-hand exposure to e-cigarette aerosols is another unknown.[7]

Flavoring agents: There are approximately 7,764 unique e-cigarette flavors available on the market at last estimate.[8] The flavoring agents used in e-cigarettes are only FDA-approved for ingestion, and the effect of inhaling flavorings is uncertain. Some flavorings are known to be associated with adverse health effects. Cherry-flavored e-cigarettes have been found to contain benzaldehyde, which is associated with respiratory irritation. Sweet and cinnamon flavors have been found in some studies to be linked to cytotoxicity. Diacetyl, a common sweet flavoring agent used in e-cigarettes, is known to cause bronchiolitis obliterans (BO), an obstructive lung disease. For the inhalation of diacetyl, the evidence of health risk is solid. The first sign of diacetyl exposure problems emerged in the 1980s when two young, non-smoking workers at a bakery flavor-manufacturing plant developed an obstructive lung disease. In the early 2000s, there was a series of similar case reports. The workers in popcorn plants were developing BO. The press dubbed this condition "popcorn lung" because of this association. BO is an irreversible obstructive lung disease in which the bronchioles are compressed and narrowed by fibrosis and/or inflammation. The clinical signs and symptoms include severe decrease in FEV_1, dry cough, shortness of breath, and wheezing. The symptoms can start gradually, or severe symptoms can occur suddenly. Severe cases may require a lung transplant.[9]

In a *New England Journal of Medicine* review, the authors summarized these health effects: "At present, it is impossible to reach a consensus on the safety of e-cigarettes except perhaps to say that they may be safer than conventional cigarettes but are

Table 1. Health effects of nicotine.

Cardiovascular system
Increase in heart rate
Increase in cardiac output
Increase in blood pressure
Coronary vasoconstriction
Cutaneous vasoconstriction
Central nervous system
Pleasure
Arousal, enhanced vigilance
Improved task performance
Anxiety relief
Other effects
Appetite suppression
Increased metabolic rate
Skeletal muscle relaxation

Table 2. Comparison of toxin levels between conventional and electronic cigarettes.

Toxic compound	Conventional cigarette (µg in mainstream smoke)	Electronic cigarette (µg per 15 puffs)
Formaldehyde	1.6–52	0.20–5.61
Acetaldehyde	52–140	0.11–1.36
Acrolein	2.4–62	0.07–4.19
Toluene	8.3–70	0.02–0.63

also likely to pose risks to health that are not present when neither product is used."[10]

Are e-cigarettes a better, safer option than tobacco cigarettes?

Most adult e-cigarette users are either current or former smokers.[3] Therefore, it is likely that the question of using e-cigarettes as a tobacco-cessation aid might emerge in conversations with tobacco-dependent individuals. Some experts believe that e-cigarettes may pose a harm reduction when compared to the use of tobacco cigarettes. This theory is strongly supported by big tobacco companies. Other experts subscribe to the precautionary principle, a mindset that reserves endorsement of the products until we understand the long-term effects. Regardless of the opinion, when discussing e-cigarettes for use in smoking cessation, it is important to note that the devices are not currently FDA-approved as a tobacco-cessation aid in the United States.

We can note that there are positive and promising realities that may contribute to these devices as someday useful for smoking cessation. The e-cigarette delivery system leads to a peak serum nicotine concentration within 5 minutes of inhalation, which is similar to that of the combustible cigarette.[10] This rapid delivery system is very different from the method by which nicotine replacement therapies (NRTs) FDA-approved for tobacco cessation, like the inhaler or gum, deliver nicotine. In these NRTs, nicotine is delivered via buccal absorption, a much slower mechanism. In other words, the e-cigarette delivers nicotine to the body in a manner much more like a cigarette.

The heterogeneity of the studies available and the limited randomized, controlled trials to investigate the utility of e-cigarettes for tobacco cessation make it difficult to assess their findings. Furthermore, complicating the interpretation of research on safety and efficacy of the devices for cessation, over time there have been significant changes in the design of the devices. The first-generation "cigalike" design has been replaced by second- and third-generation designs that use a tank-style design and have been associated with increased consumer satisfaction.[10] Recent meta-analyses, examining

the combined data from randomized controlled trials and observational studies on e-cigarettes for tobacco cessation, conclude that no firm conclusions can be drawn and further studies are recommended.[11] We should also remember to congratulate individuals that are interested in quitting. For individuals with known lung disease, the e-cigarette may appear to provide safer alternatives to continued tobacco use. As RTs, we must not miss the opportunity to deliver the important message — nothing foreign should ever be inhaled into the lungs, especially for individuals impacted by lung disease. Remember, complete abstinence is the goal. There are seven evidence-based FDA-approved pharmacotherapies for smoking cessation. These evidence-based pharmacotherapies include five NRTs, bupropion, and varenicline.[12]

What are other emerging issues on the topic?

Of particular concern on the topic is the rising use of e-cigarettes by adolescents. It is estimated that exposure to advertisements in middle school and high school has increased by 256% between 2011 and 2013. This dramatic increase in adolescent uptake may be due to increased directed marketing and appeal of the flavors available like gummi bear, cotton candy, and other attractive flavors.[13] This is particularly concerning for some and viewed as a possible gateway to tobacco use and nicotine addiction. There are also concerns that the e-cigarette will re-normalize smoking within our culture at a time when we have reached the lowest prevalence of smoking in years. Finally, there is the concerning practice of using other substances within the liquid tank of the e-cigarette, including homemade solutions and cannabis oil, both of which have safety and legal concerns. Legal issues aside, this practice is perhaps most disturbing due to the higher concentration of the marijuana psychoactive agent tetrahydrocannabinol (THC) produced. The increased potency levels and unknown long-term effects are cause for concern, especially in adolescents using the e-cigarettes for this purpose during a critical time for brain development.

The RT's role in counseling patients

In summary, e-cigarettes are nicotine-delivery devices that are not approved by the FDA for use in tobacco cessation. Many e-cigarette users are also cigarette smokers, and the long-term health consequences, safety, and efficacy for smoking cessation remain unknown. In your discussion of e-cigarettes, just as in a discussion of other respiratory therapies, stick to the facts and the scientific evidence. You should first discuss safe, FDA-approved alternatives such as the NRTs, bupropion, and varenicline. If a tobacco user is still interested in using e-cigarettes to quit, you should discuss the issues brought forth in this article: device variability, safety, potential adverse health effects, and unknown long-term health effects. We must continue to be evidence-based, cardiopulmonary experts. We have made so much progress in that area since our beginning 70 years ago. Now is not the time to travel back in time: let us instead be future-minded and continue our professional, scientific evolution. ■

References

1. Zhang Y, Sumner W, Chen, D. In vitro particle size distributions in electronic and conventional cigarette aerosols suggest comparable deposition patterns. Nicotine Tob Res 2013;15(2):501–8.
2. Benowitz NL. Cigarette smoking and cardiovascular disease: Pathophysiology and implications for treatment. Prog Cardiovasc Dis 2003;46:91–111.
3. Grana R, Benowitz N, Glantz SA. E-cigarettes: A scientific review. Circulation. 2014;129(19):1972–86.
4. Goniewicz ML, Knysak J, Gawron M, Kosmider L, Sobczak A, Kurek J, Prokopowicz A, Jablonska-Czapla M, Rosik-Dulewska C, Havel C, Jacob P 3rd, Benowitz N. Levels of selected carcinogens and toxicants in vapour from electronic cigarettes. Tob Control 2014;23(2):133–9.
5. Farsalinos KE, Polosa R. Safety evaluation and risk assessment of electronic cigarettes as tobacco cigarette substitutes: A systematic review. Ther Adv Drug Saf 2014;5(2):67–86.
6. Chatham-Stephens K, Law R, Taylor E, Melstrom P, Bunnell R, Wang B, Apelberg B, Schier JG. Notes from the field: Calls to poison centers for exposures to electronic cigarettes, United States, September 2010–February 2014. MMWR Morb Mortal Wkly Rep 2014;63(13):292–3.
7. Schober W, Szendrei K, Matzen W, Osiander-Fuchs H, Heitmann D, Schettgen T, Jörres RA, Fromme H. Use of electronic cigarettes (e-cigarettes) impairs indoor air quality and increases FeNO levels of e-cigarette consumers. Int J Hyg Environ Health 2014;217(6):628–37.
8. Zhu SH, Sun JY, Bonnevie E, Cummins SE, Gamst A, Yin L, Lee M. Four hundred and sixty brands of e-cigarettes and counting: Implications for product regulation. Tobacco Control 2014;23(suppl 3):iii3–9.
9. Centers for Disease Control and Prevention (CDC). Fixed obstructive lung disease in workers at a microwave popcorn factory, Missouri, 2000–2002. Morb Mortal Wkly Rep 2002;51(16):345.
10. Dinakar C, O'Connor GT. The health effects of electronic cigarettes. N Engl J Med 2016;375:1372–1381.
11. El Dib R, Suzumura EA, Akl EA, Gomaa H, Agarwal A, Chang Y, Prasad M, Ashoorion V, Heels-Ansdell D, Maziak W, Guyatt G. Electronic nicotine delivery systems and/or electronic non-nicotine delivery systems for tobacco smoking cessation or reduction: A systematic review and meta-analysis. BMJ Open 2017;7(2):e012680.
12. Fiore MC, Jaen CR, Baker TB, Bailey WC, Benowitz NL, Curry SJ, et al. Treating tobacco use and dependence: 2008 update. US Dept Health Human Service 2008.
13. Wills TA, Knight R, Williams RJ, Pagano I, Sargent JD. Risk factors for exclusive e-cigarette use and dual e-cigarette use and tobacco use in adolescents. Pediatrics 2014;135(1):e43–e51.

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— 2017 —

Since 1947, the AARC has been leading the effort to advance the science and practices of the respiratory care profession while promoting the highest quality of care for our patients. Collaborating with the respiratory communities at-large, we have successfully advocated at the federal, state and local level for patients, their families, the community, the profession and the respiratory therapist.

The AARC'S CORPORATE PARTNERS

The collaborative efforts between the respiratory care profession and manufacturers in pursuing unique and innovative ways to improve both the quality and outcomes of our patients makes us natural partners in today's ever changing health care continuum.

As health care finances become more strained and patient care becomes increasingly more complex, the mutual challenges become greater for the profession and its industry partners. The inherent synergies of the corporate partner concept are to provide an effective and efficient way to address those needs utilizing our combined skills and resources.

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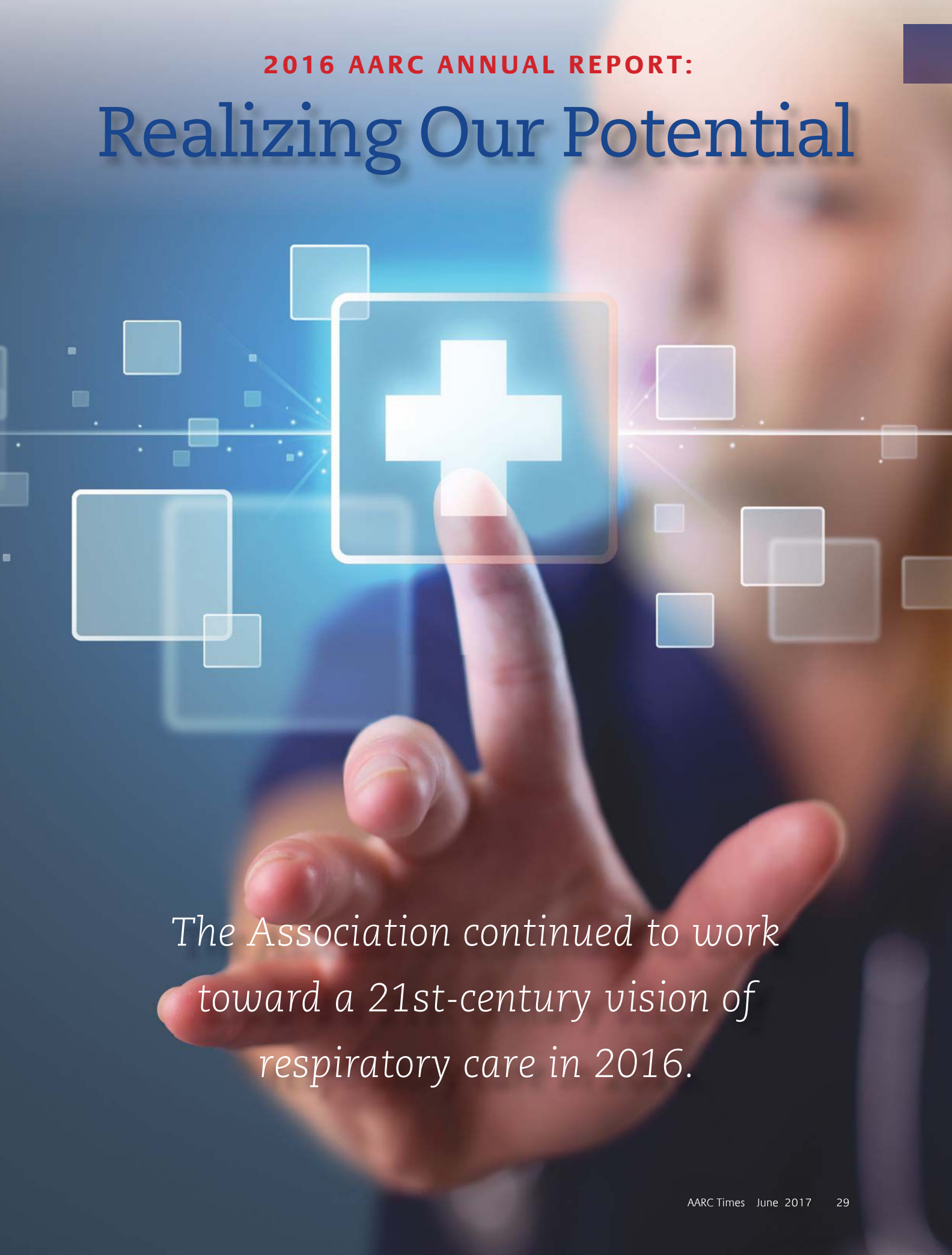
2016 AARC ANNUAL REPORT:

Realizing Our Potential



The Association continued to work toward a 21st-century vision of respiratory care in 2016.

Our health care system is demanding more and more from clinicians. In 2016, the AARC took a series of carefully measured steps to ensure the profession will be ready.

In the volatile world of health care in which we live today, the only sure thing is that there is no sure thing. Researchers are constantly coming up with new theories about the treatment of disease, and manufacturers are introducing more and more technologically driven solutions. Politicians continue to tweak medical benefits, and providers have no choice but to react, and react, and then react again.

In the midst of these developments, though, one premise comes shining through: to compete in the new era of health care, clinicians must work smarter, more cost effectively, and with greater attention to the way their care affects not just the immediate medical needs of their patients but their needs over time as well. Positioning the respiratory therapist to be that kind of clinician has been at the top of the AARC's agenda for a number of years now, and 2016 saw a continuation of those efforts.

"There are no guarantees for anyone in health care, and respiratory therapists are no exception," says 2015–2016 AARC President Frank Salvatore, MBA, RRT, FAARC. "In order to achieve a level playing field with our colleagues in nursing and other disciplines, we must be ready to make the disciplined choices and decisions that must be made to maintain our professional role as the lung health experts."

On the following pages, you will see how the AARC took the lead in this increasingly complex environment in 2016 and what that leadership means for our profession going forward. ■

all about EDUCATION

Like it or not, we live in a world of degree-creep, and nowhere is that more evident than in health care. Disciplines like physical therapy and occupational therapy that previously had entry levels at the four-year degree level have slowly but surely upped the ante, so that some of them now require master's degrees or above to begin practice. Others, like nursing, are reserving their best jobs for graduates with a bachelor's degree or higher.

Respiratory therapists have long been educated at the associate's degree level, and no one disputes the competency of RTs with that level of education to handle the traditional duties of the therapist. To take on a larger role in patient education and disease management, however, the profession must move beyond the associate's degree, and the AARC took the lead in making that happen in 2016.

Early in the year, the Association released a new RT Education Position Statement calling for all new respiratory care educational programs to award, at a minimum, a bachelor's degree in respiratory care. The statement built on the Association's earlier goal calling for 80% of respiratory therapists to either hold or be working toward a bachelor's degree by the year 2020.

(continued on page 32)

More on education

Two new courses were added to AARC University in 2016. Clinician Training on Tobacco Dependence for Respiratory Therapists provides guidance for the delivery of personalized, tailored tobacco-cessation interventions offered in a variety of environments for a range of patient types.

Congenital Heart Defects is designed to assist the clinician in performing patient assessments, gathering appropriate information, and using pertinent clinical information to make clinical decisions in the treatment of infants and children with congenital heart defects.

The Association's popular live course, Pulmonary Disease Educator, was transferred to the online setting to give more therapists the chance to learn the patient education skills they need to serve in expanded disease management roles in their facilities.

The long-awaited Neonatal-Pediatric Specialist Course was finalized. The 20 CRCE course is aimed at helping RTs understand more about the care of our smallest patients while also preparing them to sit for the Neonatal-Pediatric Specialist credentialing exam offered by the NBRC.

(continued from page 31)

The Position Statement was quickly backed up by the Commission on Accreditation for Respiratory Care, which announced a proposed revision to its Accreditation Standards for Entry into Respiratory Care Professional Practice. The revision states that all newly created RT educational programs must award baccalaureate degrees or higher. The standard is scheduled to go into effect in 2018.

Leaders deemed these moves to be a step in the right direction. "The time has come for our profession to advance its educational level," 2015–2016 AARC President Frank Salvatore, MBA, RRT, FAARC, was quoted as saying. "We're faced with situations where state legislatures and/or education departments are demanding fewer credit hours at the associate's level. Respiratory therapists today need more clinical time in order to fully learn not only the advanced technologies we work with today but also to learn how to interact with our patients in ways that will be more meaningful toward educating them about their disease, and even working on keeping them out of the hospital in the future. Less time in RT school does not achieve that." Education Section Chair Ellen Becker, PhD, RRT-NPS, FAARC, agreed. While noting that "students who are enrolled in AS degree programs will have a wonderful start to their careers," she emphasized that "educators can no longer teach the increased number of required RT competencies in a two-year respiratory care program."

Association leaders believe RTs educated at the baccalaureate level will be able to assume an expanded set of responsibilities on the job and envision a new credential to reflect those enhanced responsibilities as well. To that end, initial steps were also taken toward the development of an advanced practice role for RTs, with leaders issuing a request for proposals early this year among academicians interested in researching the need for this role in the care of patients with cardiopulmonary disorders.

These developments, coupled with the Association's ongoing commitment to serving the continuing education needs of its members, were front-burner issues throughout the year. ■

AARC Continuing Education: 2016 Recap

How much do AARC members value the continuing education provided to them by the Association? The answer is in the numbers:

- **More than 40,000 courses** were purchased on the AARC University webpage in 2016, with about 25,000 in the free-for-members category.
- **Attendance at AARC webcasts topped 8,000.**
- **Overall, 16,000 people took part** in one or more AARC continuing education courses last year, up by more than 5,000 from 2015.

PARTNERSHIPS pave the way

Health care doesn't occur in a vacuum, and neither does professional advocacy. For that reason the AARC maintains healthy relationships with scores of other groups and organizations, and in 2016 we saw a strengthening of those bonds.

A partnership with the Centers for Disease Control and Prevention (CDC) Tips From Former Smokers™ campaign that began in 2015 continued in 2016, with the Association pledging to bring the Tips message directly to its members. "We were honored when the CDC approached the AARC in late 2015, inviting us to partner with them in their 2016 Tips campaign," said AARC Executive Director Thomas Kallstrom, MBA, RRT, FAARC. "We are at the front of the line providing patient care and self-management education, and we are in a key position to influence our patients and caregivers about the dangers of tobacco. Certainly the RT can play a powerful role in counseling these patients." The campaign gained momentum among respiratory therapists throughout the year and now is continuing in 2017.

Likewise, the National Heart, Lung, and Blood Institute (NHLBI) COPD Learn More Breathe Better® campaign benefited from AARC involvement. As a Breathe Better Network Leadership Member, the Association has input into the program to help providers educate their patients about COPD and was proud to promote the resources available through the initiative to members.

Efforts like these paid off when the NHLBI decided to host a first-ever town hall meeting aimed at developing a National COPD Action Plan mid-year. Frank Salvatore joined AARC House of Delegates Speaker-elect Keith Siegel, BS, RRT, CPFT, at the session, and together they made sure the RT's voice was heard. "It was an honor to represent the AARC along with President Salvatore at this historic meeting," Siegel was quoted as saying. "This country has long needed a comprehensive national COPD policy, and the work that was done in Bethesda represents a giant step toward achieving that goal."

When a draft of the action plan was released for comments in November, the AARC was again front and center, weighing in on the proposals from the RT's perspective. Thanks to the groundwork laid by the AARC's ongoing relationship with the NHLBI, the Association found itself in the enviable position of supporting much of what the plan delivered. "This document encompasses many facets where respiratory therapists will be crucial to its success," said 2017–2018 AARC President Brian Walsh, PhD, RRT-NPS, RRT-ACCS, AE-C, RPFT, FAARC. "The value that respiratory therapists bring to this far-reaching endeavor is evident in our comments."

(continued on page 34)

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James Kiley, PhD, director of the division of lung diseases at the NHLBI, wrote the AARC in appreciation of its input. "We greatly appreciated the American Association for Respiratory Care's careful review and the helpful feedback you offered during the most recent public comment period for the draft Plan. In particular, your ideas regarding the role of respiratory therapists, medication management, and patient-centric management tools were carefully considered as we continued to finalize the Plan."

Of course, not every policy and program goes the AARC's way, and the power of the AARC to respond swiftly when necessary was tested late in the year when the Centers for Medicare and Medicaid Services (CMS) issued unexpectedly lower rates for pulmonary rehabilitation programs. In concert with sister organizations, the Association reviewed the rates and issued comments aimed at restoring adequate reimbursement for these life-enhancing programs. A meeting was held between CMS, the AARC, and other interested parties, and a data review was initiated to clarify the impact the new rates will have on programs.

That review provided the information needed to continue the dialogue with the government agency, which has indicated a willingness to work with the pulmonary community as rates are developed for 2018. ■

More on professional partnerships

A report outlining the results from the second annual National COPD Readmission Summit convened by the COPD Foundation stressed the important role RTs play in the care of COPD patients. "Respiratory therapists should be included as central members of the health care team for people with COPD while hospitalized and post-discharge. For those organizations that have not yet included respiratory therapists in their COPD care teams, as well as those who have integrated them into their care processes, efforts should be made to clearly elucidate the role of respiratory therapy and therapists at every stage of care," wrote the authors. The AARC was a major

Safe Initiation and Management of Mechanical Ventilation, a white paper published by the AARC and the University HealthSystem Consortium, emphasized the need to ensure competency of clinicians operating mechanical ventilators. The paper grew out of reports that around 9% of all safety intelligence data show that clinicians with

YOUR VOICE
in Washington, DC

The nature of our elected officials and their willingness to course-correct at every turn means the **AARC must remain vigilant** to developments coming out of our nation's capital. The Association maintains a professional legislative staff to keep track of legislation and regulations with the potential to impact respiratory care, and our annual Capitol Hill Advocacy Day ensures legislators hear directly from respiratory therapists in their own states and districts about the key concerns of the profession and the patients it cares for.

This monumental task proceeded as usual during 2016, with another successful Capitol Hill Advocacy Day in April and ongoing communication with legislators and regulatory agencies throughout the year.

(continued on page 36)

no competency training in ventilator use were making changes to ventilator settings. Competency, training, and the interdisciplinary approach required to improve outcomes were defined.

Improved access to respiratory therapists for patients with chronic lung conditions was the main topic of a white paper issued by the Institute for Patient Access. Written by a working group of physicians and RTs, the paper makes the case that respiratory therapists play an important role in the care and education of respiratory patients and that there is a pressing need for their expertise in all care settings. Reimbursement issues that curtail access to RTs outside of the acute care hospital are addressed. The AARC got involved after being contacted by the Institute to provide content experts for the paper.

The AARC continued to partner with the CDC to present CDC Strategic National Stockpile Ventilator Workshops designed to bring RTs up to speed on the ventilators that will be called into action should the nation face a major disaster or terrorist event involving a large number of respiratory patients. ■

Advocating for Patients

Patients are the priority at the AARC every day, whether it involves lobbying Congress or developing a new continuing education course. But the Association works hard to connect with patients on a more personal level, too, through ongoing partnerships with patient organizations, and we also sponsor a patient advocacy event in conjunction with the AARC International **Respiratory Convention & Exhibition.** For the past two years, that event has taken the form of a Respiratory Patient Advocacy Summit. The 2016 session was aimed at bringing patients and caregivers together to talk about key issues of concern so caregivers could learn directly from patients and their families what they need to better manage their chronic lung conditions. Speakers addressed everything from living with cystic fibrosis, to the top five concerns of asthma patients, to a "harmonicas for health" program designed to improve quality of life for people with chronic lung disease. A roundtable session gave everyone a chance to air their concerns and brainstorm new ways to advocate for the better management of respiratory conditions.

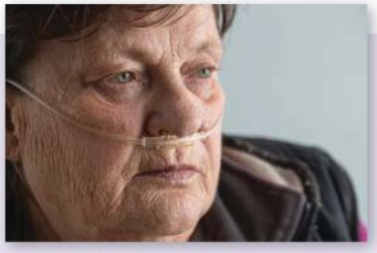
RESPIRATORY PATIENT ADVOCACY SUMMIT

These patient advocacy efforts are increasingly leading to joint initiatives with patient organizations. Last year, the Association finalized grants for joint ventures with the Pulmonary Fibrosis Foundation and the Allergy & Asthma Network that should come to fruition this year. Funding has also been acquired for an update to all three of the AARC's Aerosol Delivery Guides (including one for patients) and a new guide on pulmonary arterial hypertension. ■

(continued from page 35)

Among other things, the AARC:

Stressed the need to add spirometry, pulmonary rehabilitation, and management of patients in need of supplemental oxygen as quality measures in the new physician payment system. The Association also emphasized the value of including the integration of RTs in the care team and evidence-based standards such as the AARC's Clinical Practice Guidelines on home oxygen.



Supported the inclusion of questions relating to mechanical ventilation in a CMS survey regarding patient/family experiences with care in long-term care hospitals.

Supported the inclusion of "clinical staff" that could include RTs as part of CMS chronic care management services, with respect to 24/7 access to care.

when you need us
AARC IS THERE

AARC members have been helping their fellow members in times of need for 25 years now through a special fund set up to issue grants to members who have lost property as a result of federally declared natural disasters.

2016 saw a flurry of activity in this area, as the Disaster Relief Fund was activated to assist members in Florida, Georgia, South Carolina, and North Carolina who were affected by Hurricane Matthew; those in Louisiana, Mississippi, and West Virginia living in areas ravaged by extreme flooding; California members affected by wildfires; and members in Louisiana, Mississippi, Alabama, and Florida who were victims of other severe weather events.

Go to the AARC website to donate online, or call AARC Customer Service at (972) 243-2272 to contribute via phone. ■

Supported increasing rates for pulmonary rehabilitation.

Opposed new payment policies for certain off-campus outpatient departments that could adversely affect pulmonary rehabilitation programs.

Encouraged President Obama to require the U.S. Food and Drug Administration (FDA) to publish final deeming rules regarding their authority to regulate all tobacco products.

Encouraged Congressional leaders to ask the Congressional Budget Office to estimate long-term health savings in future cost estimates that are possible from wellness and disease prevention, especially for patients suffering from chronic conditions.

Supported funding for the CDC's National Asthma Control Program.

As a member of the Tobacco Partners' Coalition, signed on to letters to the U.S. FDA and Congressional committees supporting regulations and other policies calling for greater control of tobacco products.

As a member of the Telehealth Coalition, signed on to various letters to CMS and others supporting the expansion of telehealth services under Medicare. ■

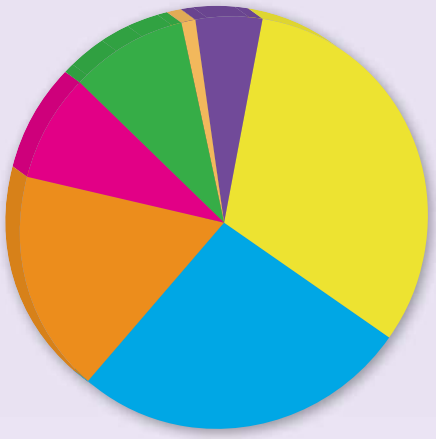
2016 Annual FINANCIAL REPORT

In February 2017, the AARC engaged the public accounting firm Salmon Sims Thomas and Associates to conduct an audit of its financial operations. It issued an unqualified opinion stating that the AARC's financial statements were presented fairly and conform to generally accepted accounting principles.

In 2016, the AARC's total revenues (excluding investments) were $9,932,669, and total expenses were $9,335,816. Figures 1 and 2 highlight the sources of last year's revenues and expenses. Net assets at the end of 2016 were $24,935,823. ■

Figure 1.

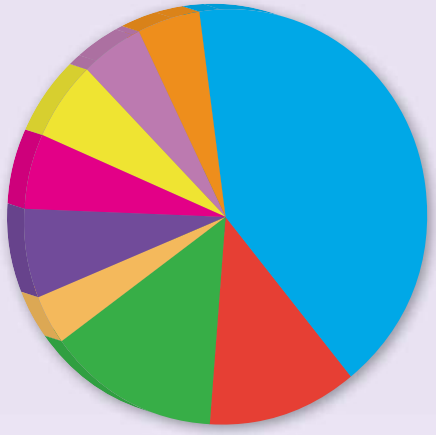
Total Revenues in 2016 (Excluding Investments)



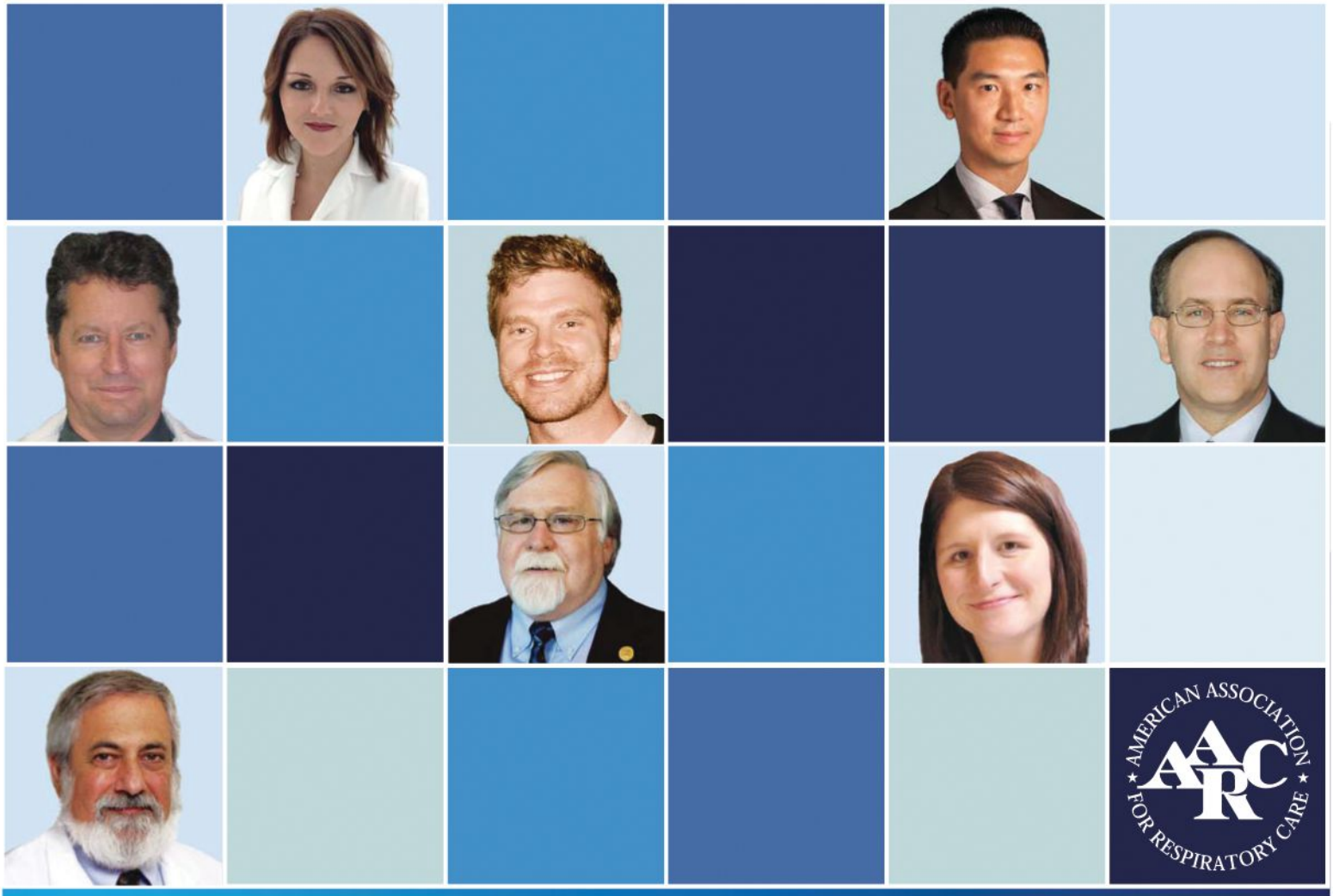
- Convention and Meetings – 31%
- Member Dues – 26%
- Publications and Advertising – 17%
- Grants – 8%
- Education – 9%
- Marketing – 1%
- Other – 5%

Figure 2.

Total Expenses in 2016



- General and Administrative – 42%
- Publications and Advertising – 12%
- Convention and Meetings – 14%
- Grants – 4%
- Member Services – 7%
- Marketing – 6%
- Officers, Board, Committees – 6%
- Contributions to State Societies – 5%
- Education – 5%



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By Craig Smallwood RRT
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The Future of Mechanical Ventilation for ARDS
By Eddy Fan MD, PhD, FAARC, FCCM
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ECMO: Who Would Ever Have Imagined?
By Ira M Cheifetz MD FAARC FCCM

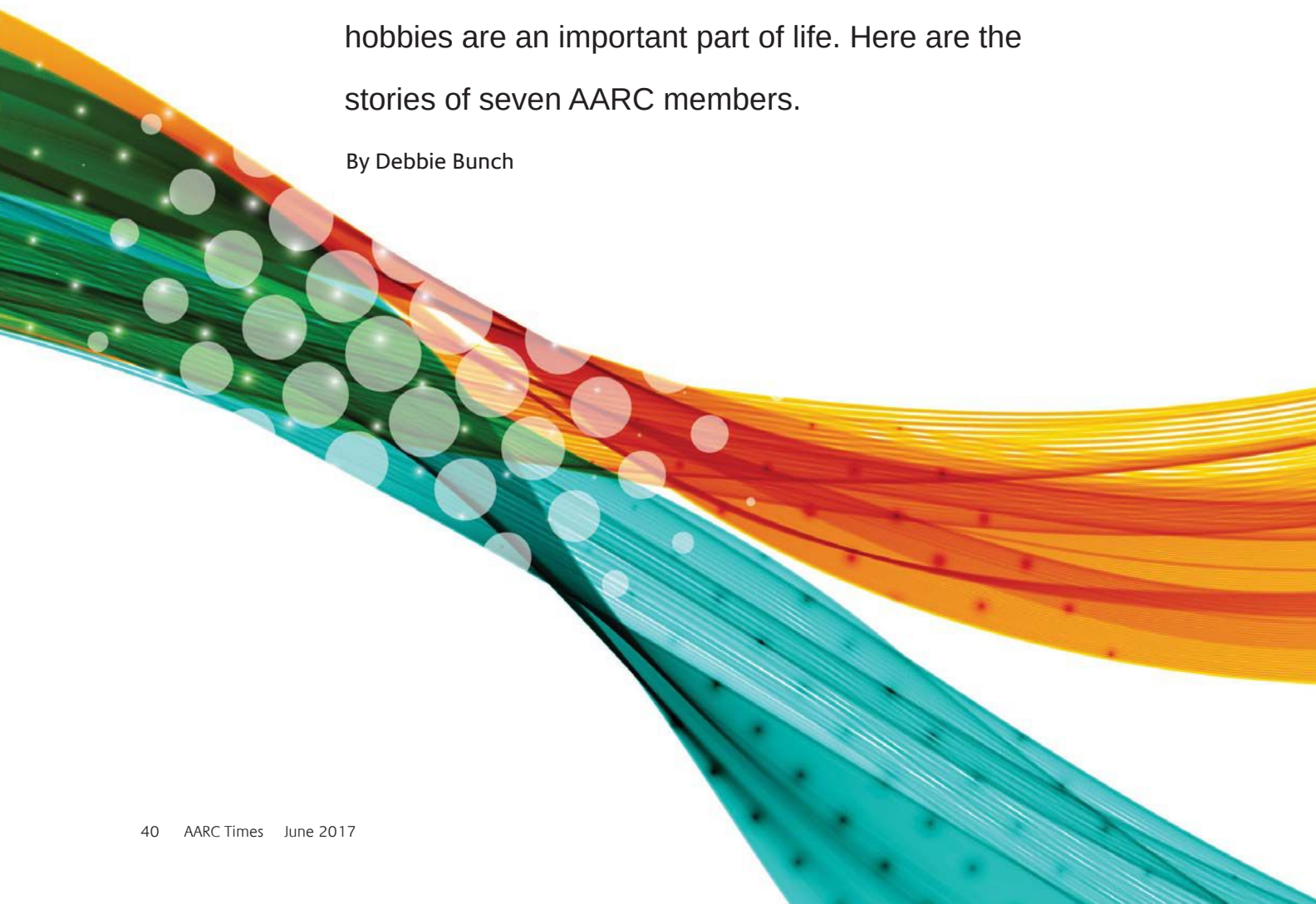
Pulmonary Rehabilitation: Where We've Succeeded and Where We've Failed *By Richard Casaburi MD MEngr PhD*

RT Enrichment

AARC members share their hobbies and why they love them

You know what they say about “all work and no play.” Respiratory therapists who have an outside interest that feeds their soul would certainly agree that hobbies are an important part of life. Here are the stories of seven AARC members.

By Debbie Bunch



COMMUNITY THEATER IS HER PASSION

Who: Erin Henderson, BSRT, RRT

What: Staff Therapist

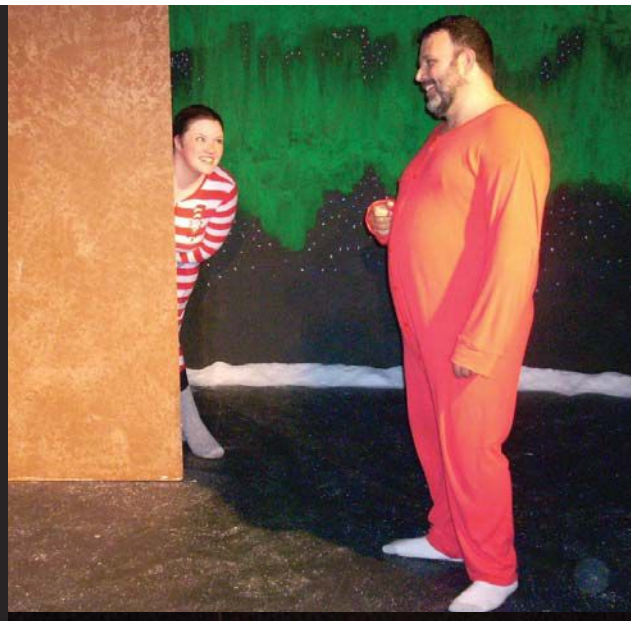
Where: Arkansas Children's Hospital, Little Rock, AR

Erin Henderson can't even remember when she first saw herself up on the stage. "My parents have video of me as a preschooler standing on the coffee table reciting books and singing songs to an audience of dolls," she says. "I started auditioning for community theater productions when I was in elementary school, and it continued through high school and college productions."

She estimates she's been in 25 different shows over the years, from Greek tragedies to modern one-act plays, most recently playing the lead in "Wrong Turn at Lungfish," a bittersweet comedy about the relationship that develops between a retired college professor who has lost his eyesight and the streetwise girl who reads to him. "I love the way acting allows me to explore different characters and different personalities," says Henderson. "I get to walk around in someone else's skin for a while, which I feel really helps me empathize with people who are completely different from me."

Each show she has been in is unique, and even when she does the same show twice, it's always a novel experience. "Each new cast brings something different to a show, and each director leads their show in a different way," says the therapist.

Henderson believes performing in community theater helps her deal with the emotional aspects of respiratory care — but more than that, it hones her ability to work as a member of a team. "Being part of a cast is a lot like being part of a health care team," says the AARC member. "Every person has a role to play, and even the smallest part is crucial to the success of the show."



SHE EATS EUROPEAN CHOCOLATE EVERY DAY

Who: Anne Stark, RRT

What: Staff Therapist

Where: Mary Greeley Medical Center, Ames, IA

Anne Stark and her husband Terry would regularly drive 35 miles from their home in Ames to Des Moines just to get a taste of the chocolate served up in a shop called Chocolaterie Stam. When Terry retired from his job in law enforcement in 2006, they thought, "Why not open a branch in Ames?" The Chocolaterie Stam folks agreed it was a great idea.

The Ames location opened shortly thereafter, with Terry serving as its full-time manager and his wife stepping in part-time during the big chocolate-consuming seasons of the year: Christmas, Valentine's Day, Easter, and Harvest. "Our bonbons, made in the European tradition, start with perfectly tempered Belgian chocolate, are filled with the freshest local ingredients, and molded into beautiful shiny deliciousness," says Stark. The shop, which features a homey atmosphere with chairs "inherited" from Terry's parents and a faux fireplace "inherited" from hers, also boasts a coffee bar and house-made gelato. "I love to hear the 'ahhs' and see the smiles of our visitors as they enter the shop and experience the chocolate, coffee, and gelato through senses of smell, sight, and taste," says the therapist.

She recalls two visitors who made an especially big impression. "The summer after we opened, a young man came in, purchased a gift card, and reserved a seating area at the front of our shop for the following Saturday," says Stark. "That Saturday evening he came down the sidewalk leading a blindfolded young lady into our shop." It was their first date, and they spent it drinking hot chocolate in the "living room" area, with trips to the chocolate counter every now and then to pick out four bonbons to take back to their chairs and savor together. "They ended up getting married, had our chocolate at their wedding, and are still married today," says the therapist.

Stark likens her work in the chocolate shop to her work with positive airway pressure (PAP) patients she sees through her hospital's durable medical equipment division. "We've had folks enter our chocolate shop saying they are stressed or are not having a very good day, and then remark how much better they feel on their way out," says the therapist. "There are also PAP folks who are not very happy about beginning PAP therapy and what it involves, but when I follow up with them I get to hear how much better they feel after finally getting good sleep."

Says the AARC member, "Breathing and chocolate make life sweeter."

TRIATHLONS KEEP HIM IN THE RACE

Who: Andrew Slezak, MEd, RRT-NPS

What: Neonatal-Pediatric Supervisor

Where: St. Joseph's Women's Hospital, Tampa, FL

Always big into sports — he grew up playing everything from basketball to hockey — Andrew Slezak was looking for a new physical challenge when he moved to Florida. He found it by way of fellow RT Jeff Baker. "Jeff has been competing in triathlons for more than 20 years, and it was his experiences and his enthusiastic description of those experiences that really got me started," says the AARC member.

Since finishing his first sprint-distance triathlon in October 2012, Slezak estimates he's competed in 30–40 races. Included in the mix are two full-distance (140.6 miles) and two half-distance (70.3 miles) Ironman races — the longest and toughest races in triathlon.

"What I think I love most about triathlons is the idea that a sport that is completed as an individual can still be a great team sport," he says. "When being passed on the bike, it's easy to yell 'Keep it up!' and when passing someone on the run it's common to hear 'You're doing great, you're almost there!'"

While acknowledging that the most elite competitors in any event are out to win, he says most people are competing against themselves or the distance, and that makes for a level of camaraderie missing in other sports. "Whether it's those veteran triathletes who cheer you on throughout the race, or the amputee competing in their age group rather than the special needs division, or the family and friends who cheer you on, the motivation and feeling of joy is always surrounding you," he says.

Pushing through to the end has helped him develop a degree of fortitude that serves him well on the job, too. "If I can train for a triathlon, compete in a triathlon, and finish a triathlon, there really isn't much out there that scares me in the professional world," says Slezak. "I know what it's like to work really hard, be physically and mentally exhausted, and still reach my goals.

HIS HUMAN STATUE COMES ALIVE

Who: Matt Kilroy, BS, RRT, CHWC, AE-C

What: Respiratory Therapist Case Manager

Where: Priority Health, Grand Rapids, MI

You've seen them in large cities across the country and around the world: people dressed in costumes glazed over to resemble real statues. They stand perfectly still for hours, amazing the crowds that mill past.

It's called "art of the human statue," and Matt Kilroy has invented a new take on the concept: his statue comes to life. "I am a solo entertainer and was in a Celtic band called The Kwils for 20 years," explains the therapist, who also teaches martial arts at a local school. "I happened to go with one of my martial arts students to Busker in Grand Haven, and while I played music, he performed as a human statue. Then I got the idea to create a statue character that comes to life playing traditional Celtic tunes."

His biggest performance venue is the Milwaukee Irish Fest, one of the largest Irish festivals in the nation, but he takes his act to other festivals and venues as well. "It is very relaxing, and I get in a state of meditation," says the AARC member. He believes it is a talent where all three of his skills come together like a perfect storm. RT is the breathing portion. Martial arts improve self-control, which is very important. And finally, there is the musician/entertainer. When Kilroy sees an elderly person with an oxygen tank on, he always comes to life and goes over to play them a tune. He says he loves the reaction he gets from children in the audience.

"Often while working the festivals, kids ages 5–9 come by with their parents. They want to stay and just watch me," he says. "Sometimes I will come out of character to tell the child they need to obey their parents!"

MUSIC IS IN HER BLOOD

Who: Theresa Cannizzaro, CRT

What: Staff Therapist

Where: Kindred Hospital, San Diego, CA

Growing up with a musician for a father led Theresa Cannizzaro into a life of music at an early age, and she's still going strong, despite having severe asthma. "I play the guitar, piano, violin, and mandolin," says the AARC member. "I'm a classically trained violinist, but guitar has definitely been my love and passion since I started playing it in 2000."

Cannizzaro has played in many professional venues over the years, but since graduating from college in 2004 she has mainly showed off her musical talents by playing her guitar and singing in her church on a weekly basis. She and her husband also host jamboree nights at their home. "We invite anyone who wants to come, and we have a giant jam session for hours," she says. "It's super low-key, and people with all levels of musical abilities come and play and sing along. There is no pressure, and the outcome is always amazing."

Her asthma has tried to get in the way, but she won't let it. "Being a very severe asthmatic has definitely posed its challenges when it comes to playing guitar, and especially singing," she says. "I've had to teach myself tricks, such as taking an extra breath, as well as premedicating with my rescue inhaler before a performance." She underwent bronchial thermoplasty in 2015, which dramatically improved her condition, and she sports a lung tattoo on her left forearm to mark the turnaround.

Having asthma helps her relate to her patients, but she also believes her musical interests do, too. "It is so important to have work/life balance, especially in the fast-paced profession of respiratory therapy," she says. "We are always on our toes, with little downtime. Having an outlet, whether it is music or anything else, definitely helps keep us grounded."

HE RIDES IN HONOR OF THOSE WHO SERVE

Who: Curt Merriman, BA, RRT, CPFT

What: Vice President of Sales and Marketing

Where: C.O.R.E. Respiratory Services and rtNOW, Burnsville, MN

Curt Merriman's brother had a motorcycle when he was growing up, and he enjoyed riding a friend's dirt bike when he was in his teens. But it wasn't until his children were grown that he indulged his passion for motorcycles and bought one for himself.

Since then, he's taken the bike on outings throughout Minnesota and surrounding states, but his favorite events are those sponsored by the Patriot Guard. "The Patriot Guard is a national organization with state chapters," explains the AARC member. "We have an unwavering respect for those who risk their lives for America's freedom and security."

Family members of veterans who have passed away request the Patriot Guard to come and provide a "flag line" at the funeral, and the Guard often turns out in support of military personnel being deployed or welcomed back home. "I never served in the armed forces, but I have always respected the service of our men and women who have served or are serving now," says Merriman. "This is my way of providing the honor, dignity, and respect that is well deserved."

The annual Minnesota Patriot Guard Ride fundraising event leaves him especially inspired. "To be a part of 4,000 motorcycles participating in the ride is an extraordinary experience."

Merriman says riding his motorcycle is his therapy from the normal pressures of life and work. "We all need some kind of a release or interest to find fun and friends," says the RT.

SHE KNITS HOLIDAY HATS FOR PREEMIES

Who: Glenna Muse, RRT

What: Staff Therapist

Where: Cox South Hospital, Springfield, MO

Glenna Muse learned to knit from her mother, and she would often knit gifts for friends and family. After taking on a second career in RT and going to work in the neonatal intensive care unit (NICU), however, she decided her hobby could be put to even better use.

"I couldn't resist turning my attention and my needles to those adorable little munchkins I call my 'little littles,'" says Muse. "After all, just because a baby is in the NICU, does that mean that it's not their first Halloween? First Christmas? First Independence Day? Of course not!" Along with her aunt, Susan Meadows, and a group of fellow RTs, she has been knitting holiday apparel for babies in the NICU since the fall of 2007, and despite the pains of arthritis she is committed to staying in the game. "We're looking forward to outfitting the NICU with costumes for Halloween and festive Christmas hats again this year, our tenth anniversary," says the therapist.

The rewards come when parents of her tiny patients express their gratitude for the small gifts. "I can't begin to count the number of times parents have hugged me or sent thank-you notes by way of the nurses or other RTs," she says. "I think the humor and lightness of the hats give us all — doctors, nurses, therapists, parents, siblings — a chance to step back from the seriousness of all the issues that pervade any NICU and remember to celebrate the simple joys of holidays and babyhood."

The best thank-you she ever got was from a mom who came up and gave her a big bear hug, saying, "With all the wires and tubes and machinery, your bunny hat made me feel like my baby is a real baby!" Muse says moments like that make her know all the time and effort she puts into her holiday hats and other items are worth it.

"Knitting for 'our' babies is such a great reminder that it's not just a job, not just clocking in and out and completing tasks — it's about people," says the AARC member. "They are what its all about." •

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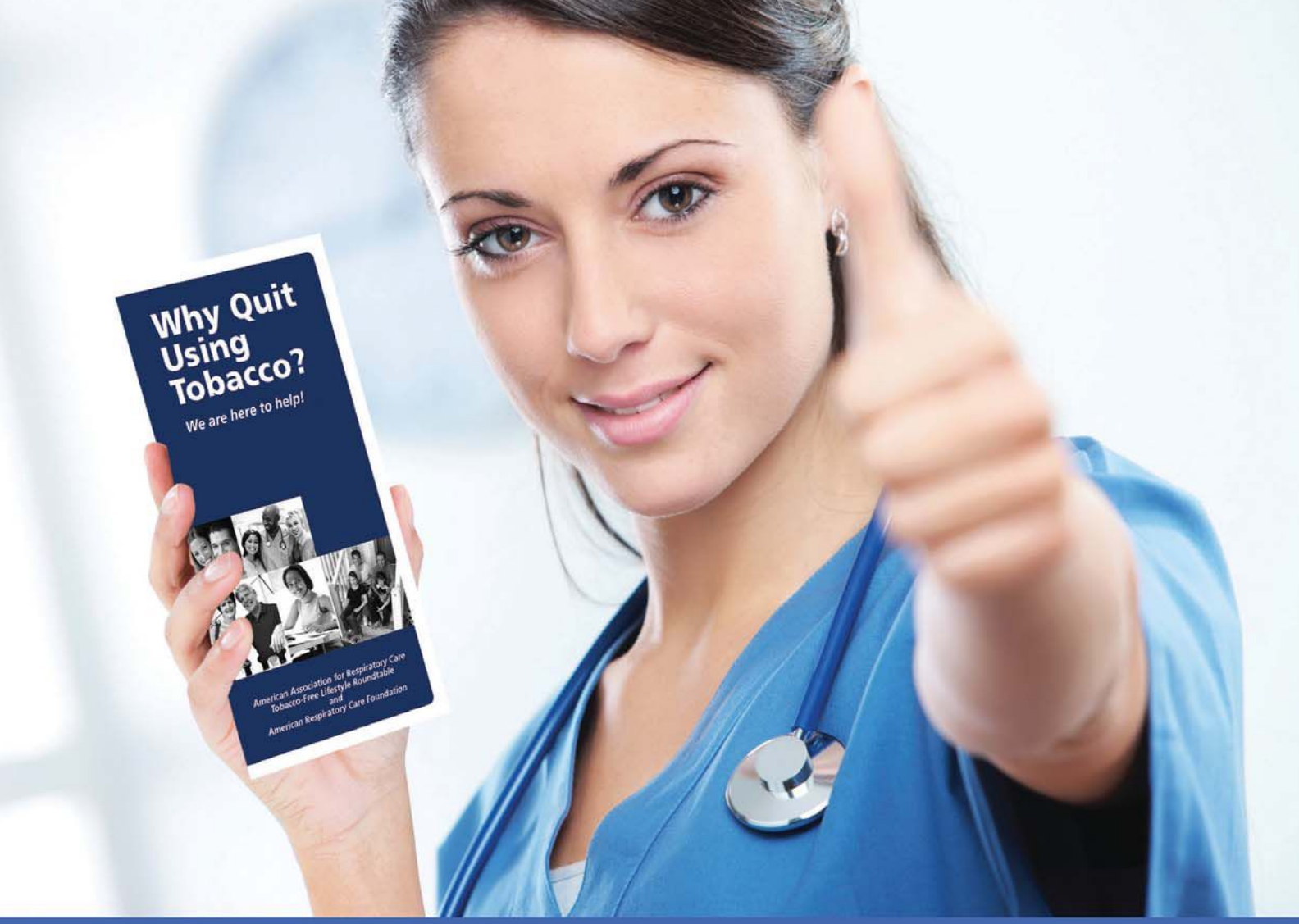
AARC Teams Up with the CDC To Promote the Tips from Former Smokers Campaign

by Shawna Strickland, PhD, RRT-NPS, RRT-ACCS, AE-C, FAARC

Tobacco use continues to be a significant health burden in the United States. The Centers for Disease Control and Prevention (CDC) estimates that, in 2015, approximately 15.1% of the U.S. adult population (18 years of age and older) smoked cigarettes. Though that has decreased from 20.9% of the adult population in 2005, more than 16 million Americans live with a smoking-related disease. Smoking rates are higher in non-Hispanic American Indians/Alaska Natives, persons who have not earned a high school diploma, persons who live below the poverty level, persons with a disability or limitation, and persons in the LGBTQ communities.[1]

The *Tips from Former Smokers* (*Tips*)™ campaign was launched in March 2012. The campaign provides an opportunity for real-life former smokers to tell their stories and to share the negative consequences they suffered as a result of smoking tobacco. The spokespeople for the campaign discuss their experiences with stroke, cancer, chronic obstructive pulmonary disease, gum disease, and preterm birth, to name a few. The adult smoker is the primary audience for the *Tips* campaign, although family members, health care providers, and other support systems are also included.[2]

During the 2014 *Tips* campaign, researchers discovered that the television advertisements generated by the campaign increased the quit attempt rate from 37.5% to 41.9%, which translates to approximately 1.83 million additional quit attempts in the United States. The researchers also discovered that approximately 104,000 smokers quit smoking as a result of the campaign.[3] Another study looked at the effectiveness of each advertisement: Was it worth remembering? Did the advertisement grab attention? Was it powerful? Was it informative? Was it meaningful and convincing? Of the 2014 *Tips* campaign advertisements, the researchers discovered that a video featuring Terrie, a former smoker who was diagnosed with oral and throat cancer at age 40 and who needed a tracheostomy, was the most effective of the videos across all ethnicities. In the video, Terrie discusses how difficult



Build Your Tobacco Intervention Skills

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This course will provide you with the skills you need to talk with people in a variety of settings regarding tobacco use. Learn the methods necessary to approach the often difficult conversation of tobacco cessation.

Learn more: http://c.aarc.org/go/cessationcourse

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it was to see teenagers smoking, because she was a teenager when she started. The researchers were able to confirm a predictive relationship between the perceived effectiveness of an antismoking campaign and tobacco cessation.[4]

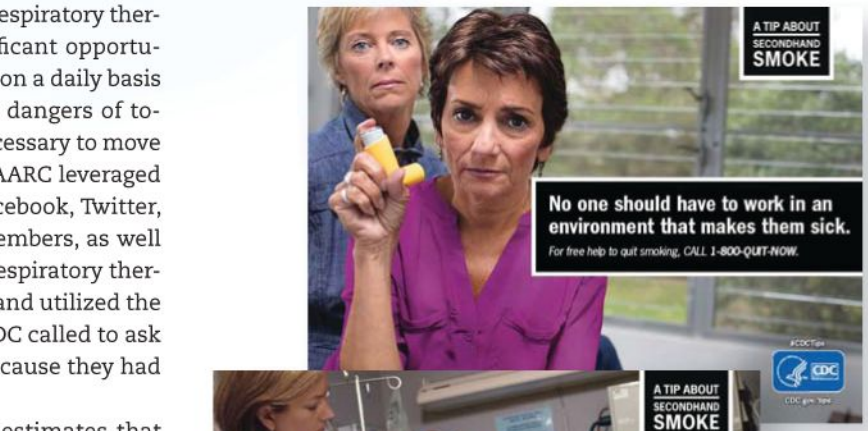
During the first two weeks of the 2016 *Tips* television advertisements, the call volume to the free smoking cessation help line (1-800-QUIT-NOW) was 92% higher than the two weeks before the campaign.[2] This CDC initiative has been shown to provide motivation to start the conversation about smoking cessation and successful quit attempts.

In 2016, the AARC partnered with the CDC and the *Tips* campaign to bring this message to respiratory therapists. The AARC recognized the significant opportunity presented to respiratory therapists on a daily basis to help current smokers recognize the dangers of tobacco use and provide the resources necessary to move toward a successful quit attempt. The AARC leveraged its social media platforms, such as Facebook, Twitter, and LinkedIn, to get the message to members, as well as featuring stories on www.aarc.org. Respiratory therapists responded well to the messages and utilized the free CDC resources so much that the CDC called to ask how we had promoted the materials because they had never experienced such a demand!

Since the launch in 2012, the CDC estimates that about 500,000 smokers have been motivated to quit for good by the *Tips* campaign.[2] In addition, the campaign results include non-smokers who report having more conversations with friends and family about the dangers of smoking-related diseases, and smokers report greater intentions to quit after seeing the *Tips* campaign advertisements. Respiratory therapists can further impact this increase in quit attempts by engaging patients in the cessation conversation and using the free *Tips* campaign materials. The AARC also has tobacco cessation educational courses to help prepare the RT for the conversation.[5,6] Prepared with the right training and resources, the RT can significantly impact the lives of patients and their families by promoting tobacco cessation. ■

References

1. Centers for Disease Control and Prevention. Cigarette smoking among adults—United States, 2005–2015. Morbidity and Mortality Weekly Report 2016;65(44):1205–11.
2. Centers for Disease Control and Prevention. Tips from Former Smokers Campaign. Available at: https://www.cdc.gov/tobacco/campaign/tips/ *Accessed April 10, 2017.*
3. Neff LJ, Patel D, Davis K, Ridgeway W, Shafer P, Cox S. Evaluation of the national Tips from Former Smokers Campaign: The 2014 longitudinal cohort. Prev Chronic Dis 2016;13:150556.
4. Davis KC, Duke J, Shafer P, Patel D, Rodes R, Beistle D. Perceived effectiveness of antismoking ads and association with quit attempts among smokers: Evidence from the Tips from Former Smokers campaign. Health Commun 2016; doi: 10.1080/10410236.2016.1196413.
5. AARC. Tobacco and smoking cessation training. Available at: http://www.aarc.org/education/online-courses/smoking-cessation-training/ *Accessed April 10, 2017.*
6. AARC. Clinician's guide to treating tobacco dependence. Available at: http://www.aarc.org/education/online-courses/clinicians-guide-treating-tobacco-dependence/ *Accessed April 10, 2017.*

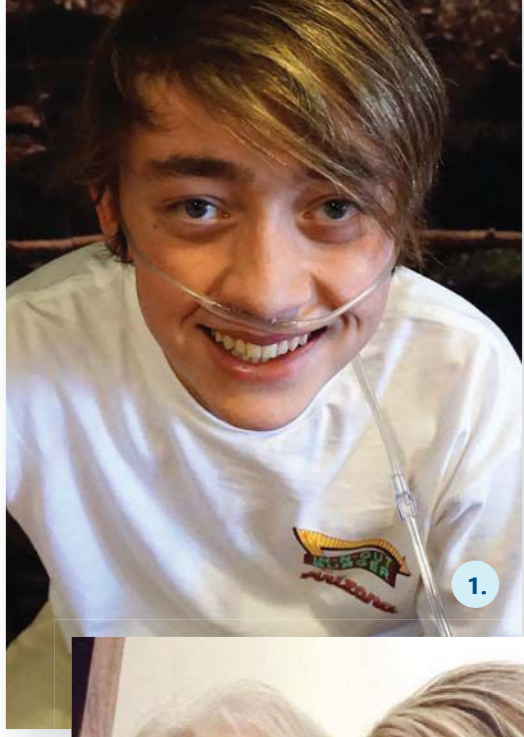


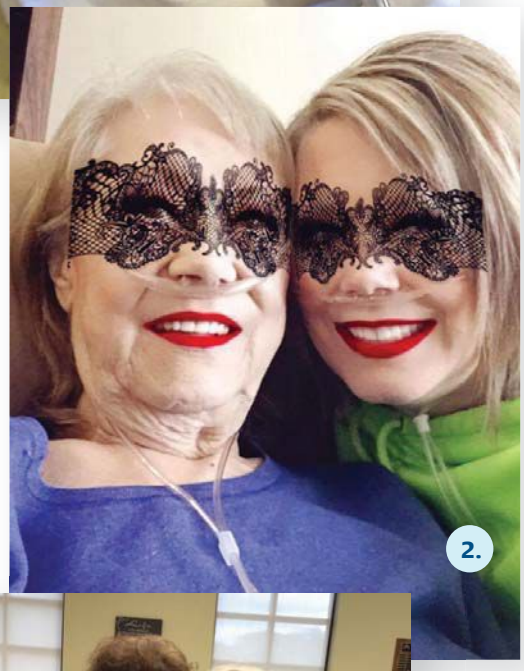
Choose the Cover of *AARC Times* Magazine

The AARC has been collecting photos from Association members for our photo contest. Now it's time to select the winning photo for our August *AARC Times* cover.

Go to www.aarc.org now and click on the "Photo Contest" button to cast your vote for the winning photo. Congratulations to our finalists, who received a free AARC membership renewal!

1. Kristi Guffey, RRT, Papillion, NE
2. Char Raley, Sioux Falls, SD
3. Lynn Leach, RRT, Port Huron, MI





Go to www.aarc.org to vote for your favorite photo! Don't delay — voting will end soon. This is our final Photo-of-the-Year Contest, so we hope you participate. Thank you for the many wonderful cover photos you have submitted for publication over the years. We hope to end this era on a really positive note with one last great photo for our *AARC Times* cover.

Recent Graduates

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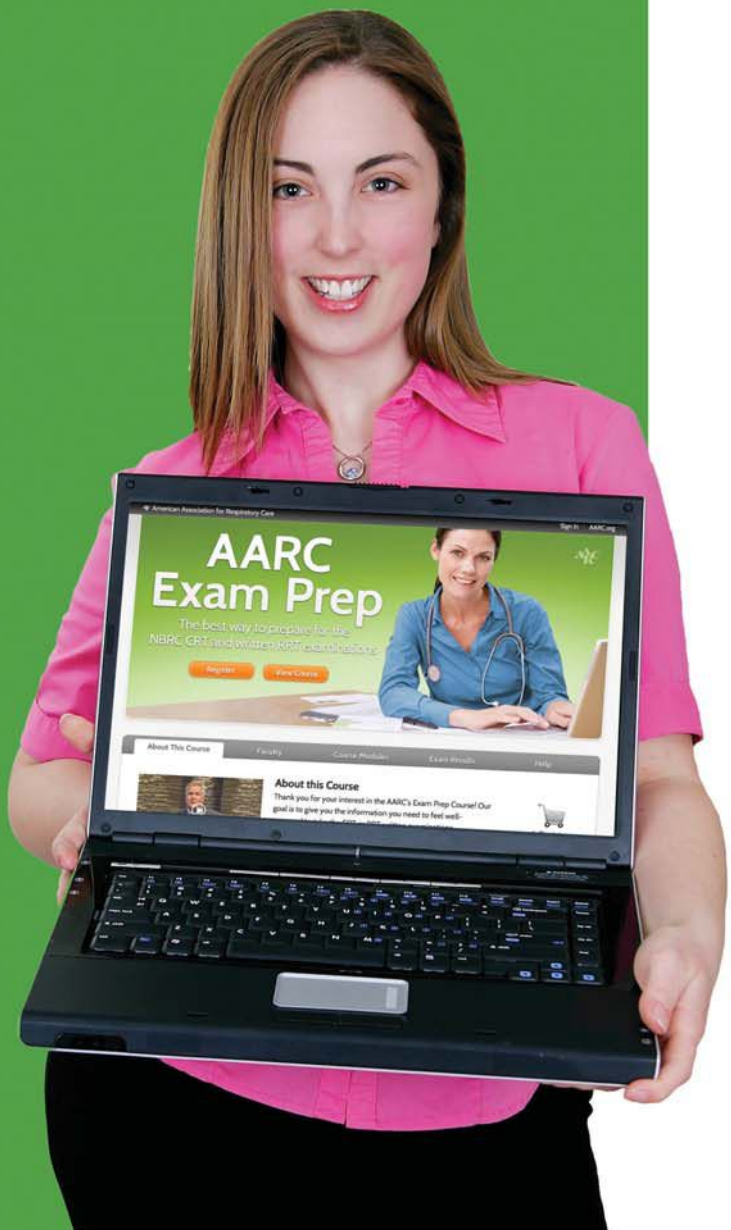

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RC Currents

IN THE NEWS

AARC Times Is Looking for Medical Mission Stories

We know many AARC members have reached beyond the U.S. borders over the past year to help people in need of respiratory care treatments and education. Now we're hoping you will share your stories with the rest of us through an article in our December *AARC Times* international issue. We are beginning to collect medical mission stories, and the submission deadline is August 1.

Preference will be given to submissions describing respiratory care activities of volunteer RTs on medical missions. AARC members who have a medical mission story to share with their colleagues can email *AARC Times* Editor Marsha Cathcart at cathcart@aarc.org and place "Medical Mission" in the subject line. ■

Tell Us Your Patient Stories in "Storytellers"

Most therapists can recall a patient or two who really stood out in their minds. Those patients have made for great stories over the years when visiting with fellow RTs, and we're hoping you'll share them with us, too, in our "Storytellers" column.

Any memorable story qualifies for consideration! Maybe it was an "aha moment" when you knew you had made the right professional decision for that patient. Maybe it was the day you first realized how much difference you were making in his life and the lives of his family members. Or maybe it was just something the patient said or did that made you laugh or cry or just be inspired to be a better RT. Send your stories to *AARC Times* Editor Marsha Cathcart at cathcart@aarc.org. ■

Check Out the AARC New Members List Online

The "New Members" column 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. ■

Honoring Members Who Have Passed Away

AARC wants to honor members who have passed away. You can submit news about a 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 using our Transitions column here in *AARC Times*. ■

Transitions

Barry Anderson, DSc, MBA, RRT, FAARC, has passed away. A long-time educator in respiratory care, he had been a supportive respiratory care professional and active AARC member since 1961. Over the years, he served the Association in many capacities at the state and national level, including as chair of the House of Delegates in 1969. At the time of his death, he was the chief executive officer and senior editor for Anderson & Associates in Virginia Beach, VA. ■

Summer Forum This Month in Tucson!

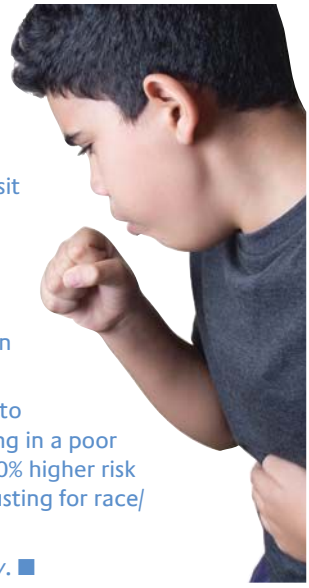
The AARC Summer Forum is just a few short weeks away — June 25–27 — and managers and educators across the country are getting ready to head to Tucson, AZ, for three days of unparalleled cutting-edge continuing education and networking opportunities.

Must-see topics include all the hot-button issues facing leaders in departments and schools alike, and educators who come in a day early will also be able to take part in a pre-session on the CoARC standards, a Meet the Commission session with CoARC referees, and a Laying the Foundation pre-course on preparing students to practice in the era of evidence-based care.

It will all take place at the beautiful JW Marriott Tucson Starr Pass Resort & Spa. Nestled among the saguaro-covered foothills of the Sonoran Desert, this five-star resort offers four different ways to have fun in the water, five premiere restaurants, three nine-hole golf courses, plus a fitness center and hiking and biking trials.

Summer Forum is THE place where managers and educators in respiratory care meet to learn more about new developments in their areas of the profession, share ideas, develop the networking connections they need to get ahead, and strategize for the future. ■

Study Says Urban Living Makes Asthma Worse for Poor Kids



Urban living may not increase the risk of having asthma, but among inner-city children it significantly ups the risk for asthma-related emergency department (ED) visits and hospitalizations. That's the take-home message from Johns Hopkins researchers who analyzed Centers for Medicare and Medicaid Services data on the health care utilization of children from 18 states who had experienced at least one asthma-related outpatient or ED visit over a two-year period.

Results showed children who lived in nonurban areas were 18–21% less likely to be at risk for hospitalizations, even after accounting for race/ethnicity. The researchers also found that, compared to non-Hispanic white children, black children and children of other races had 89% and 61% higher risks of asthma-related hospitalizations, respectively. Hispanic children living in nonurban areas, however, did not experience reduced risks of ED visits or hospitalizations.

Other results revealed that 30% of asthma-related hospitalizations were likely attributable to socioeconomic, geographic, or racial/ethnic disparities: 19% to black race/ethnicity, 4% to living in a poor area, and 7% to living in an urban area. Children who lived in inner-city areas had an overall 40% higher risk of asthma-related ED visits and a 62% higher risk of asthma-related hospitalizations; after adjusting for race/ethnicity, risk was lowered to 14% and 30%, respectively.

The study was published in a recent edition of the *Journal of Allergy & Clinical Immunology*. ■

And Now for Something Completely Different: Investigators Conduct Asthma Study by iPhone

Researchers from the Icahn School of Medicine at Mount Sinai, who used Apple ResearchKit to set up a study of asthma patients using an iPhone, find that the concept is feasible. In the first six months of launching the Asthma Mobile Health Study in March 2015, the study app was downloaded by nearly 50,000 people, and 7,593 completed the electronic informed-consent process and enrolled in the study. At least one survey was completed by 85% of participants, and a core group of 2,317 robust users filled out multiple surveys during the six-month study.

Results were then compared to existing asthma-patient studies and to external factors to see if the data collected by iPhone was as reliable as that collected via traditional methods. For example, scientists were able to correlate increased daily asthma symptoms among participants in Washington State with an outbreak of wildfires at the time, and similar findings were seen for pollen levels and heat. Data for commonly used asthma metrics, such as peak flow, matched data seen in other studies as well.

"The Asthma Mobile Health Study represents the coming together of academia and industry to benefit from the ubiquity of smartphones and harness the power of citizen-science to modernize the clinical research process," noted study author Eric Schadt, PhD. "We now have the ability to capture rich research data from thousands of individuals to better characterize 'real world' patterns of disease, wellness, and behavior."

The study was published in a recent edition of *Nature Biotechnology*. ■

Mucus Busters

What makes the mucus in cystic fibrosis (CF) patients so thick and sticky? A good answer has evaded scientists — until now. According to researchers from the University of North Carolina School of Medicine, the thick and sticky mucus characteristic of CF results from a failure of mucin proteins to unfold normally.

"In healthy people — after airway surface cells secrete mucins — the proteins unfold from a compact form to a more open, linear form," explains senior author Mehmet Kesimer, PhD. "This unfolding process is defective in CF airway epithelia." The finding suggests that therapies to rehydrate the airway lining might restore normal functioning and thin out the mucus sufficiently to provide a benefit for patients. The researchers are also targeting the chemical bonds within mucin proteins, with the hopes that manipulating them can help break up the abnormally large and dense forms of mucus into smaller fragments.

The study was published in *JCI Insight*.

Are E-Cigs Really a Gateway to Smoking?

Studies have suggested e-cigarette use may be a gateway to smoking traditional cigarettes. However, researchers who reviewed previous studies on the topic disagree. Publishing in *Drug and Alcohol Dependence* earlier this year, public health investigators from the University at Buffalo and the University of Michigan point to a number of shortcomings in those studies — such as the use of misleading measures to identify "smokers" — plus the continuing drop in the number of smokers overall as evidence that "vaping" may not be causing more people to pick up the habit.

For example, many studies have identified people as smokers who only admitted to having taken at least one puff in the past six months or smoking only one or two cigarettes in the past year. When it comes to kids, that could just mean experimentation to compare e-cigarettes to the real thing. "None of the studies was designed to be able to follow up smoking intensity at a later date," study author Kenneth Warner was quoted as saying.

The authors believe the public deserves accurate information about the potential harms of e-cigarettes so that informed decisions can be made, particularly among smokers who want to use e-cigarettes to quit. "From the best evidence to date, e-cigarettes are much less dangerous than cigarettes," explained fellow study author Lynn Kozlowski. "The public has become confused about this." ■

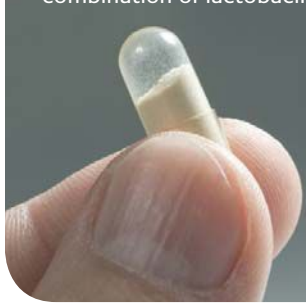
Asthmatic Lungs Have Weaker Immune Response to Flu

British researchers who took lung samples from people with asthma and healthy volunteers and then exposed them to the influenza virus in the lab found the samples from people with asthma were less likely to fight off the virus. "We wanted to look into whether immune system differences explain why asthmatics are more likely to end up in hospital if they get flu than the general population," according to study author Dr. Ben Nicholas. "The samples from healthy people showed a strong immune system-triggering reaction to the flu virus. But in lung samples from asthma patients, this reaction was much weaker."

The study was made possible by a new technique in which the researchers kept a pin-size piece of lung intact, allowing them to see how the lung reacts to the virus in the body. Typically, laboratory studies separate and grow a single layer of cells in a dish. The research was published in the *Journal of Allergy and Clinical Immunology*. ■

Probiotic May Relieve Allergy Symptoms

Could a probiotic help relieve nasal allergy symptoms? Researchers from the University of Florida believe the answer may be yes. They randomized 173 adults who suffered from mild hay fever to either the probiotic combination of lactobacilli and bifidobacteria or placebo during the height of the allergy season. People assigned to the probiotic reported fewer allergy-related nose symptoms, which led to an improvement in quality of life. The study appeared in the *American Journal of Clinical Nutrition*. ■



Dust Mite-Proof Covers Do Get the Job Done

Dust mite-proof mattress covers were found to reduce asthma exacerbations requiring a trip to the ED or hospital admission in a new study out of Great Britain.

Researchers randomized 284 children with proven dust mite allergy to either a dust mite-proof mattress cover or a placebo cover. All the children were then followed for one year. Kids who got the dust mite-proof covers were less likely to require an ED visit or hospitalization for their asthma, 29.3% vs. 41.5%, and they were 45% less likely to have an exacerbation requiring treatment with systemic corticosteroids. They also went longer without an ED visit or hospitalization requiring treatment with systemic corticosteroids. The dust mite-proof covers, however, didn't reduce the likelihood of requiring outpatient treatment with oral corticosteroids. The authors speculate that the covers may not have prevented acute exacerbations, but lessened their severity.

The study was published in a recent edition of the *American Journal of Respiratory and Critical Care Medicine*. ■

Caffeine May Protect Tiny Lungs

Long-term oxygen therapy in preterm infants is known to increase oxidative stress in the endoplasmic reticulum, which in turn leads to inflammation and the formation of fewer blood vessels and air sacs in the lungs. A new study out of the Medical College of Wisconsin suggests that caffeine may protect these tiny lungs from such damage.

The investigators reached that conclusion after studying two groups of rat pups that were exposed to more than 90% oxygen to simulate the type of oxygen therapy commonly used with premature newborns. One group was treated with caffeine injections, while the other was not. The two groups were compared to a control group of rat pups that were exposed to normal room air only. Results showed significantly lower numbers of blood vessels in the lungs of pups in the high-oxygen without caffeine group vs. those in the control and caffeine groups. More new air sacs and less inflammation and markers of oxidative stress were seen in the rat pups treated with caffeine as well.

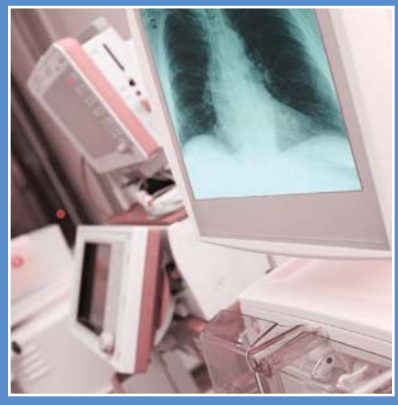
The study was published in the *American Journal of Physiology-Lung Cellular and Molecular Physiology*. ■

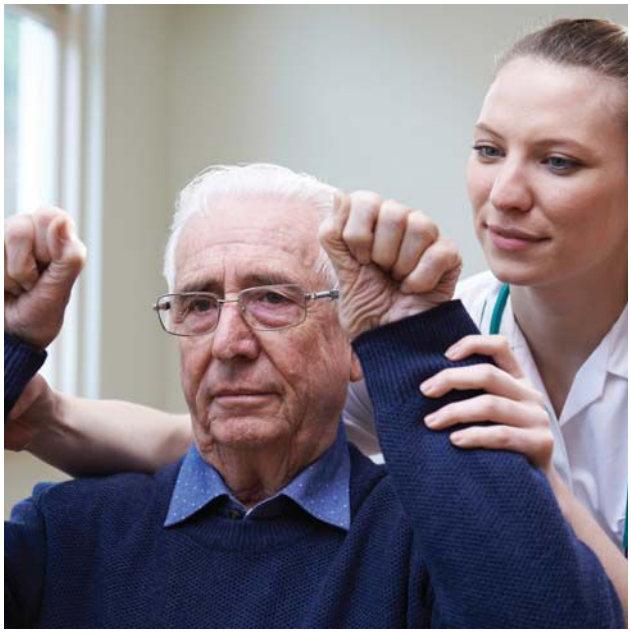
New Treatment for COPD?

German researchers publishing in the *American Journal of Respiratory and Critical Care Medicine* believe they may have found a way to restart the normal lung healing process that is often lost in people with COPD.

The laboratory study was built on the knowledge that the WNT/beta-catenin signaling pathway is responsible for the lung's homeostasis. The current study found that the Frizzled-4 molecule sits on the surface of the cells and regulates cell self-renewal via the WNT/beta catenin. However, when exposed to cigarette smoke, Frizzled-4 begins to disappear. Inhibition of Frizzled-4 in cell cultures led to decreased WNT/beta-catenin, which resulted in reduced wound healing and repair. When Frizzled-4 was reinstated, wound healing and repair was restored.

The authors believe these findings may lead to new therapies for COPD. ■





Idiopathic Pulmonary Fibrosis Linked to Aging Process

A new study led by Mayo Clinic investigators suggests that aging may be behind the development of idiopathic pulmonary fibrosis (IPF). They found that markers of cellular senescence, a process triggered by cell damage and linked to aging, were higher in individuals with IPF. Senescent cell burden increased with the progression of the disease as well.

According to the investigators, senescent cells secrete toxic molecules that affect healthy cells, essentially promoting tissue fibrosis. "Up to this point, research efforts have largely focused on understanding the unique elements that contribute to IPF," notes study author Marissa Schafer, PhD. "Here, we are considering whether the biology of aging is accelerated in this aggressive disease."

Dr. Schafer and her colleagues hope they can use this finding to develop a viable treatment for IPF. "We are exploring whether senolytic drugs, or drugs that can selectively kill senescent cells, can be used for the treatment of aging-associated conditions, including idiopathic pulmonary fibrosis," says senior study author Nathan LeBrasseur, PhD. "Our goal is to move quickly from discovery to translation to application, and, ultimately, meet the unmet needs of our patients." The study was published in *Nature Communications*. ■

Strange but True . . .

Tax this: When lawmakers in Stockholm introduced a "driving tax" aimed at curbing congestion in the center of town and lowering air pollution levels, they didn't really expect to see a major drop in asthma attacks, too. But that's what happened. The 5–10% reduction in pollution levels cut the asthma exacerbation rate in children by nearly 50%.

Fountain of youth? A chemical found in red wine might cut years off the aging of the lungs, report California researchers. In a study conducted in mice, they found inhaled resveratrol treatments slowed the rate of lung function decline, alveolar enlargement, and the alveolar epithelial type 2 cell DNA damage generally associated with the early stages of lung aging.

It *is* easy being green: Surgical scrubs used to be white — the color of cleanliness. But all that changed in the early 20th century, reports the author of an article in *Live Science*. Why? An influential doctor decided green was easier on the eyes. Since green is the opposite of red on the color wheel, there may be something to it.

Who needs the lottery? British researchers who analyzed the sleep patterns of more than 30,500 people across four years found improving sleep quality led to levels of mental and physical health comparable to those of someone who just won a jackpot of around 200,000 British pounds. ■

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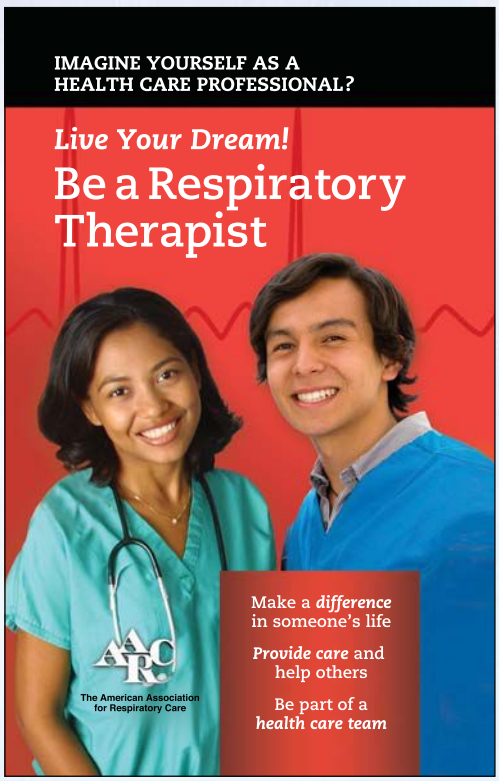

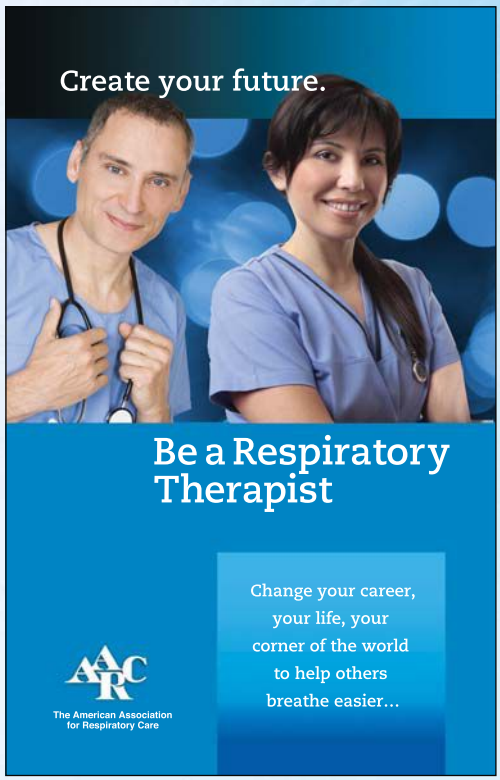

Industry Update

Featuring information on products and equipment from manufacturers

Calendar of Events

AARC & State Society Programs

May 31–June 2, 2017

Oak Brook Terrace, IL

The 49th Illinois Society for Respiratory Care

Contact: http://www.isrc.org or stricdeck@gmail.com

June 8–June 9, 2017

Winter Clove Inn, NY

30th Annual Respiratory Care Managers and Educators Conference

Contact: www.njsrc.org or mdasilvarrt@gmail.com

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We Came a Long Way

by Colleen Schabacker, BA, RRT, FAARC

In 1979 I graduated from Rock Valley College in Rockford, IL, with an AS degree. My major was respiratory therapy. At that time, the respiratory program didn't even have a designated classroom. We had classes in the various hospitals throughout the city. In 1980, I passed the registry exam and took one of the very first clinical simulation exams offered. I thought it was fun!

I started my career as the clinical educator of respiratory therapy at Swedish American Hospital in Rockford right after graduation. I sure was proud of getting this job. It was an awesome time to be starting out in this fabulous profession! In the early-to-mid 1980s, respiratory therapy departments were revenue-generating departments. This was a time before diagnosis-related groups came about and Medicare paid hospitals a fee for service.

Of course, this meant the more we did, the more the hospital got paid. It seemed we were giving every patient in the hospital intermittent positive pressure breathing (IPPB) treatment, ultrasonic treatment, and chest physiotherapy treatment, regardless of their diagnosis. I understand how IPPB can help some patients, but not necessarily how it helped those with a diagnosis of ingrown toenails!

about the author...

Colleen Schabacker, BA, RRT, FAARC, served as director of respiratory care in Cookeville Regional Medical Center in Cookeville, TN.

Ongoing improvement

The main ventilator in use at that time was the good old Puritan Bennett MA1. The first generation of this ventilator only had two modes: control and assist-control. We also had an Engstrom, an Emerson, and a Morch, plus one infant ventilator. We experimented a lot with positive end-expiratory pressure using the old water column on the Emerson. At that time, we were all delivering high tidal volumes and low rates, because that is what the latest literature said to do.

We also had reusable artificial manual breathing unit (AMBU) bags that you had to clean and put back together after each use. These bags had a one-way valve at the patient connection that helped keep the patient's excretions out of the bag. However, if that valve was inadvertently put in backwards, you found yourself with no way to ventilate your patient. I learned this lesson the hard way — from then on I always checked the bag before attempting to ventilate.

The pulmonary function (PFT) machine I learned on was the gigantic Collins, with its rolling water seal and the huge bag under the machine that collected all the exhaled air during a DLCO procedure.

The next generation of ventilators included the Servo 900C, MA-1+1, and the Bear. Since then, we have seen ventilators get better and better, capable of delivering more sophisticated breathing support and PFT machines so small they can fit into the palm of your hand.

I grew up in the profession when things just never stopped improving.

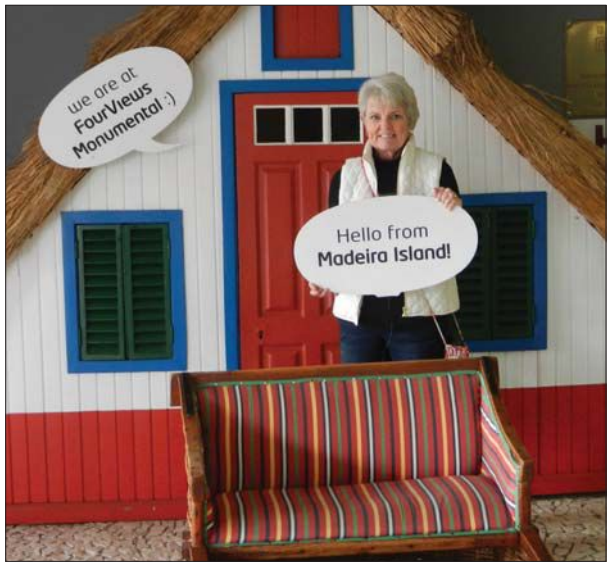
AARC involvement kept me going

I moved on from Swedish American Hospital to 30 years of management positions. I learned so much in these positions that it would take a book to tell you about all of them. But I think the best thing that happened to me in all the years I was in this profession was my involvement in the AARC. I started out at the local chapter level and went on to hold every office there was at the state level. I then served approximately 10 years in the AARC House of Delegates, and finally, another 10 on the AARC Board of Directors.

If you want to feel good about your profession, if you want to stay up to date on what is happening, and if you

want to be rejuvenated on a continuous basis — you simply have to get involved. I was one of the lucky ones and never got "burned out." Burnout is so sad; very good clinicians stop trying their best, don't like their jobs, and act like they just don't care anymore.

Don't let this happen to you. My advice to all those therapists out there today is to get involved in something that shows the world how wonderful you and your profession are. ■



For Colleen Schabacker, retirement has meant more time for travel. Here she is during a recent trip to Madeira Island in Portugal.

Schabacker manipulates a dial on a Jaeger PFT machine during her early years in the field.

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