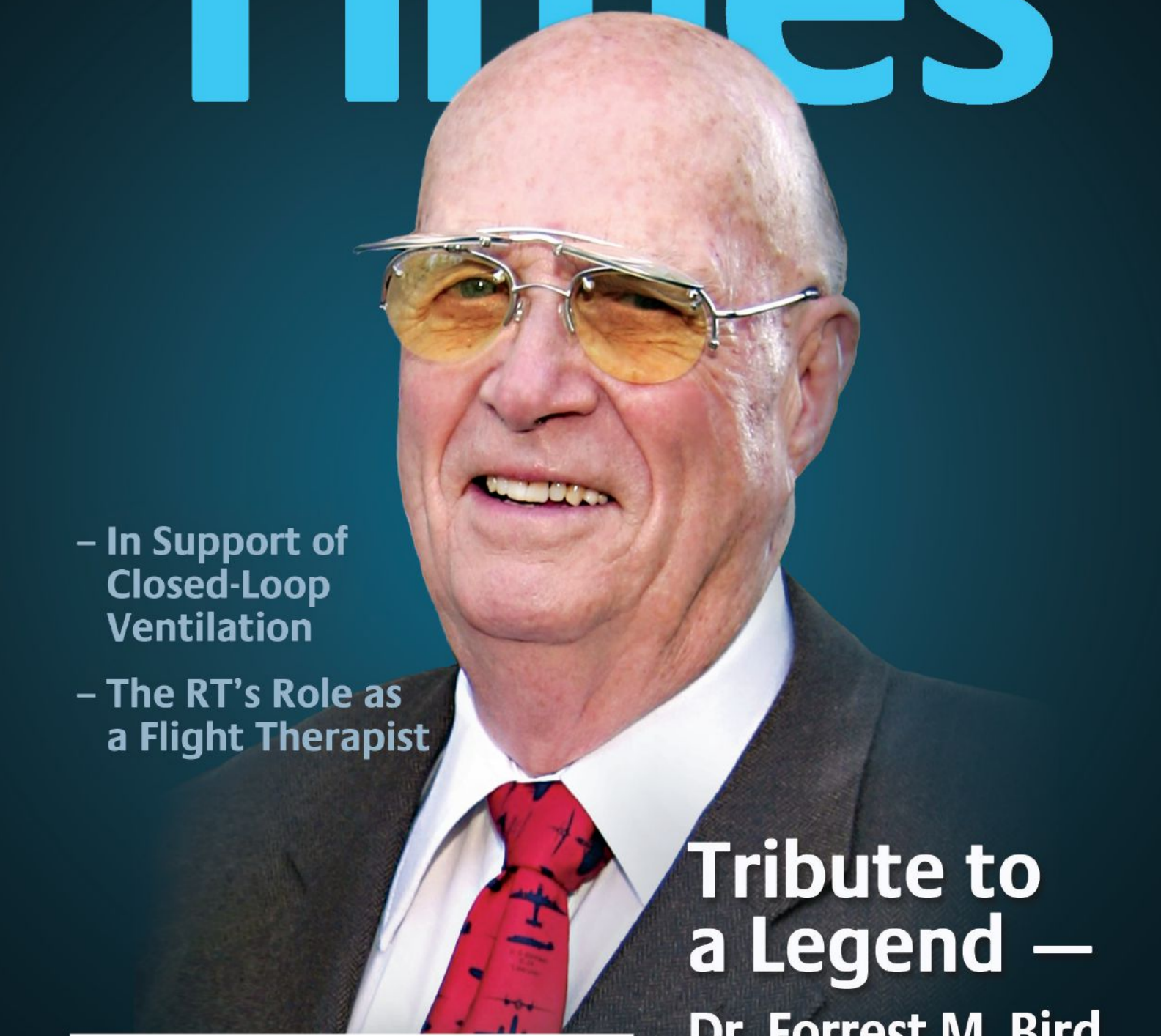
AARC Times
An Official Publication of the American Association for Respiratory Care
October 2015 Vol. 39, Issue 10 www.aarc.org $11.50



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[1] Frat JP, Thille AW, Mercat A, et al. High-Flow Oxygen through Nasal Cannula in Acute Hypoxemic Respiratory Failure. The New England Journal of Medicine 2015; DOI: 10.1056/NEJMoa1503326

[2] Hirst KR, Patel A, Vines DL. Evaluation of Bronchial Pressures and Tidal Volume Using Three Different Adult High Flow Nasal Cannula (HFNC) Devices. AARC 2011 Open Forum # 13 Presentation.
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Table of Contents

October 2015
Volume 39, Issue 10

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Publisher
Thomas J. Kallstrom, MBA, RRT, FAARC

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AARC Times **(USPS 491-930)** (ISSN 0893-8520) is a monthly publication of Daedalus Enterprises, Inc., for the American Association for Respiratory Care.

Periodicals Postage: Paid at Irving, TX, and at additional mailing offices. POSTMASTER: Send form 3579 to *AARC Times*, Daedalus Enterprises, Inc., 9425 N. MacArthur Blvd., Suite 100, Irving, TX 75063-4706.

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Ventilation for Life

Cybernetics in the ICU: Will Computers Take Over Mechanical Ventilation?

by Robert L. Chatburn, MHHS, RRT-NPS, FAARC

EDITOR'S NOTE: This article is the first of two on closed-loop ventilation and takes the "pro" position in an *AARC Times* "debate." Part 2 (written by Tony Ruppert, MS, RRT-ACCS, CPFT) will appear in the Ventilation for Life column of the November issue of *AARC Times* and will present the "con" position.

Before defining "cybernetics" or "closed-loop control" in the context of mechanical ventilation, we need to examine how ventilators are managed from a systems point of view. The "system" is a mechanical ventilator connected to a patient with the interaction between the two managed by a human operator. The operator manages the system with "information" that is comprised of data (i.e., facts about system components) that answer questions related to clinical decisions. The patient-ventilator system can be seen in terms of inputs (e.g., settings) and outputs (e.g., pressure, volume, and flow waveforms). Data are interpreted by the operator (applying decision rules and other heuristics) to create information. This information is applied to the ventilator in the form of a change in mode or mode settings (see Figure 1).

Open-loop control — decision support: The age of computers has given rise to the field of artificial intelligence (AI). Computers can now interpret the data from patient-ventilator interaction as a preliminary step before passing information in the form of clinical recommendations to the operator (see Figure 2). This is called *open-loop control* or a *decision-support system* (DSS). AI uses a variety of tools such as physiology-based mathematical models,[1,2] rule-based expert systems,[3] fuzzy logic,[4-7] and even artificial neural networks[8] that can learn from their experience to improve performance.

about the author...

Robert L. Chatburn, MHHS, RRT-NPS, FAARC, is research manager at the Respiratory Institute and adjunct professor of medicine at Lerner College of Medicine at The Cleveland Clinic in Cleveland, OH.

One major advantage of DSS is the standardization of decision making (i.e., reduction of practice variation), which is the foundation of learning and quality improvement.

Closed-loop control — cybernetics: Closed-loop control means that the computer directly controls the ventilator based on its own assessment of the data (see Figure 3). It works by taking some of the data from the output and feeding it back to a comparator (or "feedback control"). The comparator determines if there is any difference between the actual and the desired output; and if there is, it generates an error signal. The error signal is used to make adjustments so that the *actual* output is closer to the *desired* output. Of course, this general definition does not require a computer; the thermostat on your furnace can do the same thing with a simple mechanical mechanism. Indeed, even the regulator on an oxygen tank is based on a simple feedback control mechanism.

As it relates to mechanical ventilation, closed-loop control mechanisms are referred to as "targeting schemes."[9] Any mode of ventilation can be described in terms of one or more of seven basic targeting schemes (see Table 1).[10–15] At this point we need to define what we mean by "closed-loop control" for the purposes of this discussion. We are not talking about the simplest targeting schemes that maintain a constant inspiratory flow or pressure during a single inspiration (set-point targeting) nor the ability to switch between the two (dual targeting), nor even the ability to randomly vary tidal volume (bio-variable targeting). Instead, we are talking about targeting schemes

that *automatically adjust the level of assistance as the patient's condition changes*. The level of assistance (i.e., the proportion of the work of breathing supported by the ventilator) is adjusted, for example, as a change in inspiratory pressure or minute ventilation. Patient condition is sensed, for example, as changes in inspiratory effort, lung mechanics, SpO_2, or E_TCO_2.[16] Defined in this way, closed-loop control of ventilation includes the following "automatic" targeting schemes (see Table 1): servo, adaptive, optimal, and intelligent.

In addition to the advantage of applying standardized protocols (as seen with DSS), automatic targeting schemes are on the job 24 hours a day, seven days a week and can make countless minor adjustments that humans can never be expected to make due to resource restrictions.

What is the evidence?

I wanted to establish the context of the discussion and the basic theory involved because this can be an emotional topic. Although there are data to support the other targeting schemes, due to space limitations I have restricted the following discussion to modes based on intelligent targeting schemes (i.e., that use AI components).

Table 1. Targeting schemes

Name	Type	Description	Example Mode Name	Ventilator	Manufacturer
Set-point	Manual	The operator sets all parameters of the pressure waveform (pressure control modes) or volume and flow waveforms (volume control modes)	Volume Control Continuous Mandatory Ventilation	Evita Infinity 500	Dräger
Dual	Manual	The ventilator can automatically switch between volume control and pressure control during a single inspiration	Volume Control	Servo-i	Maquet
Servo	Automatic	The output of the ventilator (pressure/volume/flow) automatically follows a varying input	Proportional Assist Ventilation Plus	PB 840	Covidien
Adaptive	Automatic	The ventilator automatically sets target(s) between breaths in response to varying patient conditions	Pressure Regulated Volume Control	Servo-i	Maquet
Bio-variable	Automatic	The ventilator automatically adjusts the inspiratory pressure or tidal volume randomly	Variable Pressure Support	Evita Infinity 500	Dräger
Optimal	Automatic	The ventilator automatically adjusts the targets of the ventilatory pattern to either minimize or maximize some overall performance characteristic (e.g., work rate of breathing)	Adaptive Support Ventilation	G5	Hamilton Medical
Intelligent	Automatic	Targeting scheme that uses artificial intelligence programs such as fuzzy logic, rule-based expert systems, and artificial neural networks	SmartCare/PS	Evita Infinity 500	Dräger

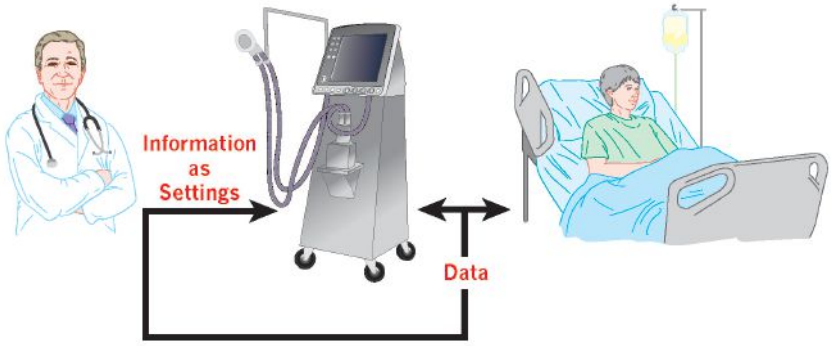

Figure 1. Schematic of open-loop (human) control of mechanical ventilation

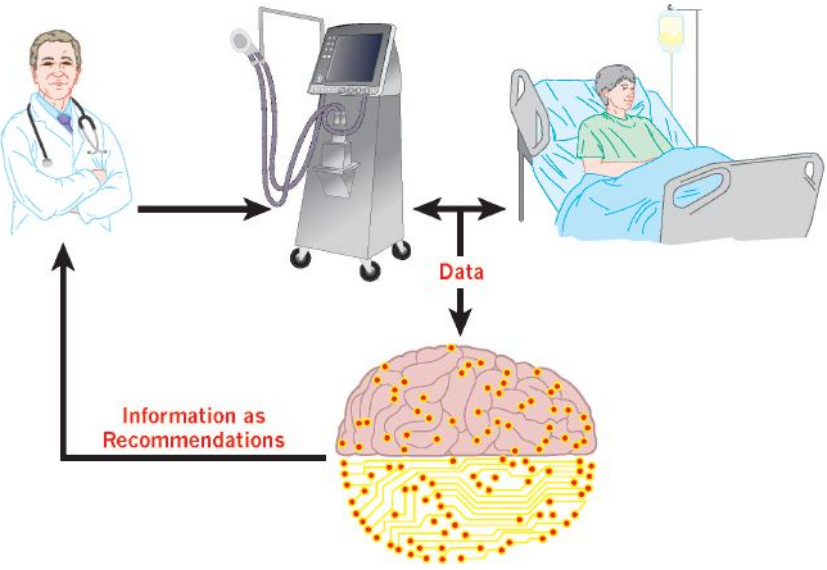

Figure 2. Schematic of open-loop decision support system for mechanical ventilation

If you think that AI cannot be trusted with the safety of human lives, consider the use of auto-pilot systems to fly airplanes or the development of self-driving automobiles as announced by Google and many of the major car manufacturers (www.popsci.com/tags/self-driving-cars). However, what good does it do?

Decision-support Systems: Tehrani et al have reviewed 21 decision-support systems for mechanical ventilation.[17] Clinical trials using DSS with ARDS patients showed improved outcomes[18] and the ability of the system to be transferred to other hospitals.[19] Many other systems have been described within the last two decades showing results at least as good as human decision makers in addition to increasing adherence to protocols.[2,4,7,20-30]

Closed-Loop Systems: There are currently three commercially available "closed-loop" modes of mechanical ventilation employing intelligent targeting schemes. One mode, restricted to weaning patients, is called SmartCare®/PS[31-33] (available in the United States) and was developed by Dräger (Telford, PA). Although SmartCare, in particular, may not be superior to a well-staffed ICU,[34] a recent meta-analysis concluded that automated closed-loop systems generally may result in reduced duration of weaning, ventilation, and ICU stay compared to manual ventilator management.[35]

A more comprehensive ventilator management system called Adaptive Support Ventilation (ASV®) was developed by Hamilton Medical (Allentown, PA). It uses optimal targeting to automatically adjust tidal volume and frequency using a mathematical physiology model and expert rules (AI) to keep the model-based settings within safe limits. Fernandez et al provide a nice state-of-the-art review of ASV.[36] A recent comparison of this mode to pressure control with set-point targeting showed ASV may shorten the duration of weaning and total duration of ventilation with fewer manual ventilator settings.[37]

A more advanced version of ASV is called IntelliVent® (also developed by Hamilton Medical but available only outside the United States) can manage all aspects of ventilation including automatic selection of minute ventilation, tidal volume, frequency, FiO_2, and PEEP targets based only on operator input values for patient weight and sex.[38-40]

In summary, the evidence so far is that automatic closed-loop control using intelligent targeting appears to be safe, effective, and comparable to or better than manual human management of ventilation in a wide range of patients.

Predictions about computer control of mechanical ventilation

I believe that computer management of mechanical ventilation is currently not superior to an individual human expert. Development of intelligent targeting systems is still in its infancy. However, computer control may be superior to a general population of humans (i.e., the night shift in a remote hospital where clinicians have little experience with ventilators). As for whether computer control will be superior to routine care, I would argue that it already is for the simple fact that computers follow their protocols and humans do not,[41–45] leading to unwarranted variations in health care delivery.[46] I predict that manufacturers will continue to develop autonomy simply because (a) the gap between technological complexity and user understanding continues to grow and (b) staffing continues to become less optimal with growing economic pressure to reduce cost. At the moment, however, I would have to admit that the intelligence of ventilators is like that of children: smart enough to follow basic directives but not smart enough to stay out of trouble.

How to avoid obsolescence as a human

I have some recommendations for rules for human survival: First is *Awareness* — follow the research and new product developments, particularly outside the United States. Second is *Attention* — understand the developing technology even if you can't use it yet. Third is *Acceptance* — resistance (to change) is futile. Instead, strive to evaluate and, where appropriate, integrate new technology.

Finally, remember that the issue is not about machine intelligence versus human intelligence; it is about human experts versus human non-experts, and machine intelligence is simply the medium. Plus, the whole point of expertise is improved patient care. ■

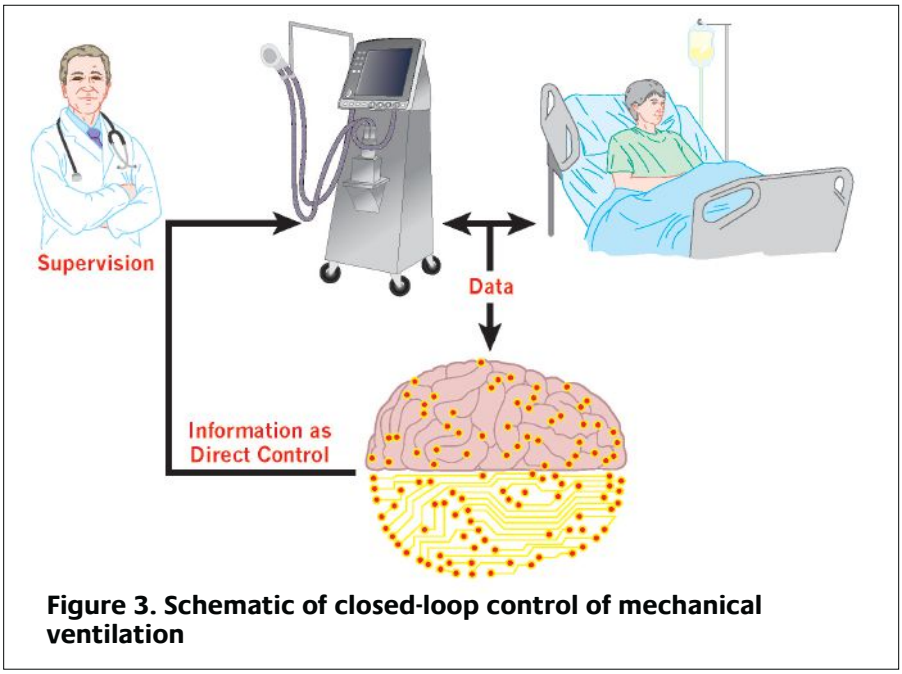

Figure 3. Schematic of closed-loop control of mechanical ventilation

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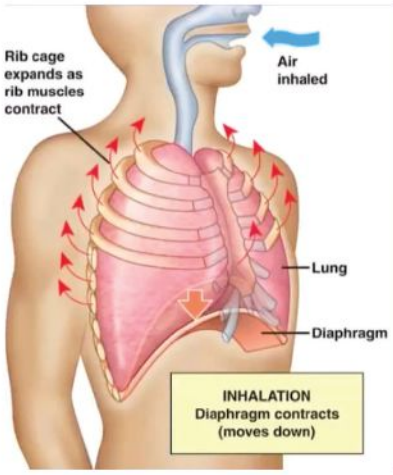

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Airway Remodeling in Asthma

by Karen L. Gregory, DNP, RRT, FAARC

Airway remodeling is characterized as structural changes of the bronchial wall causing irreversible airflow limitation with superimposed effects of inflammation and smooth muscle constriction.[1] First described in 1922, airway remodeling has been documented in large and small airways and in all degrees of asthma severity. Until recently, airway remodeling had been considered to develop late in the disease process as a consequence of persistent inflammation. Research now demonstrates structural changes may occur even before the clinical diagnosis of asthma.[2]

Mechanisms of airway remodeling

Persistent airflow obstruction and airway hyperreactivity are present in airway remodeling, despite aggressive anti-inflammatory therapies including inhaled corticosteroids (ICS) and systemic corticosteroids. Bronchial epithelium is the barrier that protects the lung against external environmental factors. Epithelial damage tends to be a consequence of ongoing inflammation and stress caused by bronchoconstriction.[3] Furthermore, the extent of epithelial injury correlates with airway hyperresponsiveness.

Inflammatory mediators, cytokines, chemokines, and growth factors released by inflammatory and structural cells contribute to airway remodeling. Airway smooth muscle is the critical effector cell modulating airway tone.[4] The increase in smooth muscle mass is a result of hypertrophy and hyperplasia. Increased airway smooth muscle mass can generate increased shortening of the muscle, resulting in increased airway narrowing and airflow obstruction. Another important feature of airway remodeling is subepithelial fibrosis, which occurs in the lamina reticularis layer just below the basement membrane. Subepithelial fibrosis is associated with airway hyperresponsiveness and asthma severity.[1] Airway remodeling tendencies demonstrate exaggerated or uncontrolled injury repair process due to the intensity of the stimulus and modulated by host factors under genetic control.[3]

Tools used to measure airway remodeling

The standard method of measuring airway remodeling is through direct analyses of airway tissues obtained by flexible bronchoscopy, surgically, or post mortem.[2] Alternative assessment methods to evaluate airway remodeling include high-resolution computed tomography, endobronchial ultrasound, and monitoring of lung function measurements. Indirect analysis of blood, urine, or sputum remodeling markers are available; but it is unknown if fluid variations in collagen products or proteases have significant consequences in the airway.[2]

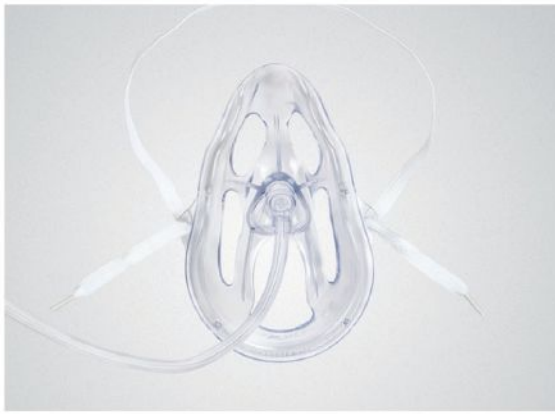
Preventing airway remodeling

Pathophysiological processes causing structural changes have a high potential for reducing asthma control[5,6] and also support an extensive financial burden to the health care system. Understanding components of remodeling that contribute to physiologic effects is an important precept of therapeutic approaches to asthma management. Although research is somewhat limited, maintaining well-controlled asthma may aid in preventing airway remodeling.

Prevalence of comorbidities, such as rhinosinusitis, gastroesophageal reflux disease, and obstructive sleep apnea, tend to be high in severe asthma and may avert

about the author...

Karen L. Gregory, DNP, RRT, FAARC, holds a doctor of nursing practice degree at the Oklahoma Allergy and Asthma Clinic in Oklahoma City, OK. She is also an assistant professor at Georgetown University School of Nursing and Health Studies in Washington, DC.



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asthma control.[5,6] Implementing interventions to control comorbid disease may reduce the frequency of uncontrolled asthma and prevent airway remodeling.

Prevention of infection or modulating the immune responses may help reduce exacerbations. A strong association exists between respiratory viruses, particularly human rhinovirus, and development of asthma and frequency of asthma exacerbations.[7] Obesity tends to affect the pathogenesis of asthma and inflammatory responses, but the mechanism by which it influences asthma or asthma symptoms is not well established. Weight-reduction strategies may prevent the long-term ramifications of uncontrolled asthma.

Pharmacological interventions

Current asthma therapies suppress the symptoms and airway inflammation without targeting the underlying cause of the disease.[3] Although there is controversy on whether inhaled corticosteroids are effective in preventing airway remodeling, the literature has demonstrated that early intervention with ICS or a leukotriene receptor antagonist may prevent characteristics of airway remodeling.[8] Asthma guidelines base treatment regimens on assessment of clinical criteria with individual variations in dose-therapeutic efficacy of ICS[1] and are considered the cornerstone of asthma therapy.[5] Inhaled corticosteroids have limited effectiveness in improving lung function in asthma.[2] Anecdotally, ICS therapy frequently reduces airway obstruction and improves FEV_1. Clinical efficacy may be greater if therapy is initiated early after diagnosis.

Beta-2 agonists reduce airway smooth muscle constriction and improve expiratory flows, but there is little evidence on the effect of airway remodeling.[1] Literature is sparse comparing ICS/long-acting beta agonists versus ICS alone on airway remodeling. Leukotriene modifiers suppress eosinophilic infiltration and eosinophil numbers in peripheral blood, sputum, and bronchoalveolar lavage fluid samples, and improve airway hyperreactivity and lung function.[1,9] Evidence from animal and human studies indicate montelukast may prevent airway remodeling at the level of goblet and smooth muscle cell hyperplasia and subepithelial fibrosis, but long-term studies are needed to confirm.[8,9] Therapeutic effects of anticholinergic drugs may exceed their bronchodilatory effects and may reduce airway remodeling. Most of these observations lack human studies for confirmation of a significant role in airway remodeling.

Immunoglobulin E (IgE) is a key mediator of inflammatory allergic asthma. Omalizumab, a recombinant humanized anti-IgE monoclonal antibody (mAb), binds free circulating IgE, preventing the interaction between

IgE and its receptors on inflammatory cells.[2,8,9] Clinical trials have demonstrated omalizumab has reduced symptoms and exacerbation in moderate and severe persistent asthma.[8] Further research is needed to determine if long-term treatment with omalizumab reduces airway remodeling.

Recognizing early onset of airway remodeling

Respiratory care practitioners should understand the epidemiologic and immunologic factors, clinical presentation, and the importance of the pathogenetic mechanisms involved in acute and chronic injury to the airway structures. Asthma is associated with loss of pulmonary function and airway remodeling, which should prompt RTs to consider early intervention, treatment, and management. Evaluating assessment of asthma control using a validated instrument (i.e., asthma control test) in conjunction with pulmonary function tests are clinical tools that may assist in identifying possible airway remodeling.

Identifying the appropriate treatment regimen and recognizing perceptual barriers to patient adherence is key in recognizing early onset of airway remodeling and treatment. Asthma education that begins at the time of diagnosis may reduce risk for acute and chronic injury of the airway.[5] Comorbidities are associated with suboptimal asthma control and must be a component of asthma education to minimize asthma exacerbations.[5] Asthma management and patient education interventions frequently implemented will aid in respiratory therapists recognizing the risks of airway modeling.

Early diagnosis and prevention of airway remodeling needed

Airway remodeling is a multifaceted and dynamic process with multiple mechanisms developing according to the extent of structural responses to various stimuli and possibly genetic influences. Early diagnosis and prevention of airway remodeling has the potential to decrease disease severity and reduce risk of further injury. More studies linking specific causative mechanisms, prevention, and treatment of airway remodeling are required. Identification of the early structural changes that may precede the development of asthma and of factors leading to permanent loss of lung function are essential to achieving superior clinical outcomes and decreasing the risk of airway remodeling. ■

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The In-Laboratory Evaluation of Patients with Excessive Daytime Hypersomnolence

by Todd J. Swick, MD, FAASM, FAAN

The International Classification of Sleep Disorders-3 (ICSD-3) lists eight separate conditions that have these unifying characteristics: daytime hypersomnias that originate within the central nervous system (as opposed to other primary sleep conditions that have excessive daytime sleepiness as a consequence of the primary disorder). Once a sleep condition is considered a central hypersomnia, usually a polysomnographic evaluation will be performed to obtain objective evidence of the presence and severity of daytime sleepiness as well as to investigate if there is any evidence of abnormal rapid-eye movement (REM) sleep intrusions into daytime sleep.[1]

Narcolepsy is a life-long neurologic/sleep disorder characterized by excessive daytime sleepiness, cataplexy, hypnogogic hallucinations, sleep paralysis, and disrupted nocturnal sleep (the narcolepsy "pentad"). From a mechanistic standpoint, the syndrome represents a dysregulation of the wake and REM/non rapid-eye movement states.[2] It affects approximately 0.05% of the general population, with incidence rates depending on ethnicity and geographical location.[3,4] Narcolepsy is associated with significant and substantial morbidity and reductions in health-related quality of life.[5]

Narcolepsy is considered an "orphan disease" in the United States (i.e., affecting less than 200,000 individuals); however, this may be an underestimate due to a high number of individuals who have been misdiagnosed or continue to go undiagnosed.[3] In Western countries (North America and Europe), narcolepsy has an estimated prevalence of 40 per 100,000 inhabitants. However, narcolepsy is not uniformly distributed. The highest reported prevalence is in Japan, and the lowest is in Israel (native-born Israelis as opposed to those who have immigrated to Israel).[6] Although the incidence of narcolepsy is difficult to pin down, it has been estimated to be approximately 1.4 per 100,000 person-years. There is no sex preference, and the age of onset has a peak in adolescence at 14.7 years with a second smaller peak at age 35.[7] The youngest onset of narcoleptic symptoms has been described in a child at age two and (in the case of a hypocretin gene mutation) at age six months.[8]

Excessive daytime sleepiness (EDS) is defined as an irresistible urge to sleep, sometimes accompanied by sudden irresistible sleep attacks usually occurring as the first independent symptom. Cataplexy can occur simultaneously with the EDS, but typically it starts on a delayed basis by one-to-two years. Less than 20% of patients exhibit all the symptoms of the pentad simultaneously.[1]

The elucidation of the pathophysiology of narcolepsy has been greatly accelerated following the discovery of a canine model[9] with evidence of monogenetic autosomal recessive transmission.[10] In 1998 the discovery of the orexin/hypocretin system revolutionized research in the control of sleep/wake states.[11,12] Within one year, researchers identified the cause of narcolepsy in dogs with the identification of an autosomal recessive mutation of the hypocretin receptor 2 gene. In 2000, a seminal paper was published that established the pathophysiology of human narcolepsy/cataplexy as the critical reduction in cerebral spinal fluid (CSF) hypocretin/orexin[13] and the near total absence of hypocretin/orexin producing cells in the postero-lateral hypothalamus[14] sparing melanin-concentrating hormone neurons, which are co-localized with the hypocretin/orexin cells in the

about the author...

Todd J. Swick, MD, FAASM, FAAN, is the assistant clinical professor of neurology at the University of Texas Health Sciences Center School of Medicine in Houston, TX. He is also a fellow of both the American Academy of Neurology and the American Academy of Sleep Medicine.

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hypothalamus.[15] Thus, the loss of hypocretin/orexin neurons is selective; and given the high association between narcolepsy with cataplexy and the presence of human leucocyte antigen DQB1*06:02 (an antigen responsible for immune regulation), the most likely explanation is that the loss of the hypocretin/orexin cells results from an "autoimmune attack" directly on these neurons.[16]

The most common central disorder of hypersomnia is narcolepsy. In the new ICSD-3 nosology, narcolepsy has been divided into two types.[1]

Type 1 narcolepsy

Type 1 narcolepsy is defined as when the patient has excessive daytime sleepiness defined as daily periods of irrepressible need to sleep or daytime lapses into sleep occurring for at least three months *and the presence of cataplexy*.

Cataplexy is defined as episodes of brief sudden loss of muscle tone with retained consciousness. The episodes are usually precipitated by emotions that are usually "positive" in nature, with almost all patients reporting laughter and excitement as the most common precipitating event. The muscles involved in the cataplectic attack can be very varied and do not have to be the same muscle group with each attack. Seventy percent of the cataplexy attacks involve the muscles of the face, throat, neck, and shoulder girdle muscle group and results in patients developing a drooping face and/or jaw, slurred speech, head bobbing, drooping shoulders, and dropping of objects that are held in their hands. Roughly 30% of cataplectic weakness involves the muscles of the legs and lower back. Cataplexy can be partial, where only a select group of muscles get weak or where there is complete loss of all muscle tone in all muscle groups (with the exception of the diaphragm and the muscles that control eye movements), resulting in the individual falling to the floor. Some patients have intermittent blurred vision, in that there are muscles that allow for accommodation of vision that can be affected. The majority of attacks are partial.[17]

In addition to clinical evidence of cataplexy, a polysomnogram (PSG)/multiple sleep latency test (MSLT) has to be conducted in the absence of low or absent CSF hypocretin levels (defined as a CSF hypocretin-1 concentration that is either <110 pg/mL or less than one-third of mean values obtained in normal subjects with the same standardized assay.[1]) The essential diagnostic tests for all narcolepsy categories include an *overnight polysomnogram*, which is necessary to exclude other sleep disorders that could cause daytime sleepiness (e.g., obstructive sleep apnea syndrome, periodic limb movements of sleep, insufficient sleep, circadian rhythm disorders, etc.) followed by an MSLT.

The MSLT is a series of daytime nap tests (usually five naps, but four naps can be used if there is clear-cut evidence of short sleep-onset times) and the presence of at least two sleep onset REM periods (SOREMPs), starting 1.5–3 hours after an overnight PSG test. Each nap opportunity is in a comfortable darkened bedroom, lasting 20–35 minutes, repeated five times every two hours, and each nap ending after 20 minutes of no sleep or 15 minutes after sleep onset without any evidence of REM sleep. For an MSLT diagnosis of hypersomnolence with narcolepsy, the average latency to sleep onset must be eight minutes or less, and at least two out of the five MSLT naps demonstrating REM sleep or SOREMP starting within 15 minutes of the first epoch of sleep or one SOREMP on the overnight PSG test, with one SOREMP on the daytime MSLT as revised recently in 2014, with demonstration of a mean sleep latency of less than eight minutes, and two or more SOREMPs. The PSG/MSLT test should be done after documentation of two weeks of regular sleep.[1,18]

The MSLT should not be carried out if the PSG demonstrated less than six hours of sleep or if there was significant sleep-disordered breathing or moderate-to-severe periodic limb movements. It is also recommended that a urine drug screen be obtained immediately after the conclusion of the fifth nap to be sure that the subject was not attempting to "game the system" (i.e., trying to appear alert to maintain employment or trying to show sleepiness in order to obtain stimulants, etc.).[19]

The technical aspects of the overnight polysomnogram are critical for the proper evaluation of the sleep studies. Even before the test starts, the technologist needs to be sure that all historical paperwork has been completed and is available to the interpreting physician, including a log or some other assessment of the patient's sleep (sleep-onset times and sleep-offset times for at least the prior 7–10 days/nights). A detailed list of all medications taken by the patient over the past 7–10 days/nights, including over-the-counter (OTC) and prn medications, should be reviewed and noted. Electrode placement, particularly the eye leads, are crucial for determining REM sleep onset, as are the electromyogram electrodes.[20]

The sleep technologist has to be vigilant while observing the patient between naps to ensure that the patient doesn't inadvertently fall asleep or take any countermeasures to "game the test" (external stimulation such as caffeine, nicotine, actual stimulants, or drugs that increase sleepiness, such as sedative hypnotics, barbiturates, opiates).

One of the most critical things the sleep technologist can do is to document everything the patient did during the intervals between the naps, including their affect, speech, activities, visitors, family, and meals. Any

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medications (prescription or OTC) taken from the beginning of the PSG to the end of the last nap must be documented as to the name of the drug, the dose, and what time it was taken. The consumption of caffeine-containing beverages such as coffee, tea, and colas also needs to be recorded.[19]

Type 2 narcolepsy

Formally known as "narcolepsy without cataplexy," Type 2 narcolepsy is excessive daytime sleepiness defined as daily periods of irrepressible need to sleep or daytime lapses into sleep occurring for at least three months. Additionally, *there is no clinical evidence of cataplexy*, or CSF hypocretin-1 levels have not been measured, or the level is >110 pg/mL or is more than one-third of mean values obtained in normal subjects with the same standardized assay. The polysomnographic evaluation is the same as it is for Type 1 narcolepsy. If cataplexy develops later or a subsequent CSF hypocretin level is <110 pg/mL, then the disorder should be reclassified as narcolepsy Type 1.[1]

Idiopathic hypersomnia

The patient with idiopathic hypersomnia has daily periods of irrepressible need to sleep or daytime lapses into sleep occurring for at least three months. Cataplexy is absent. A PSG/MSLT, having excluded other primary sleep disorders, shows *fewer than two SOREMPs* looking at both the overnight PSG and the five-nap MSLT with evidence that the average sleep onset latency over the naps was less than eight minutes or the total 24-hour sleep time is >660 minutes (typically 12–14 hours).[1]

Ensuring proper diagnosis and treatment

Narcolepsy with or without cataplexy is associated with significant impairment of health-related quality-of-life issues including vitality, general health perception, pain/discomfort, and anxiety/depression.[21] As narcolepsy is a life-long condition, these are not trivial complaints. This is precisely why there are so many misdiagnoses because narcolepsy is not on the radar screen of most health care providers. The disease affects both daytime activity as well as nocturnal sleep continuity. Thus, this is a 24-hour disease. The role of sleep technologists is crucial because they have the opportunity to interact with the patient and get an idea of the extent of the complaints of daytime hypersomnolence and to help in differentiating EDS associated with the more common disease entities such as obstructive sleep apnea from the narcolepsy syndrome. Queries about muscle weakness elicited by emotional triggers are very important historical data that is frequently overlooked by busy health care practitioners. The sleep technologist can also impart the necessity of follow-up with the referring physician to ensure the highest quality of care.

The collaboration of the sleep technologist, sleep physician, and the patient are critical for the proper diagnosis and eventual treatment of this debilitating and life-long condition. ■

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Meeting the Challenge

by Shawna Strickland, PhD, RRT-NPS, FAARC

The AARC supports the movement from associate degree prepared respiratory therapists to bachelor's and master's degreed RTs as the profession experiences a growth in scope, complexity of clinical skills, and diversity of care sites. The need for critical thinking and non-technical skills has also grown, resulting in a demand for RTs who are not only technically competent but can also demonstrate skill in communication, deductive reasoning, management, health policy, and education.[1] Advancing the degree of the RT provides a foundation for these skills and also offers career opportunities for the RT that might not otherwise exist. In addition, the AARC Respiratory Therapist Human Resource Study 2014 noted that annual compensation increases with each increase in academic degree level.[2]

about the author...

Shawna Strickland, PhD, RRT-NPS, FAARC, is the AARC's associate executive director of education.

Moving the profession forward

Currently, about 65% of practicing respiratory therapists have earned a bachelor's degree or higher. At its July meeting, the AARC Board of Directors set an aspirational goal of 80% of practicing RTs having earned or be actively pursuing a bachelor's degree by 2020.[3] The vision statement of the AARC is to "encourage and promote professional excellence, advance the science and practice of respiratory care, and serve as an advocate for patients, their families, the public, the profession, and the respiratory therapist." The 2015–2020 AARC Strategic Plan sets forth several key objectives to not only advance the profession but also to ensure safe and effective respiratory care. Within the strategic plan, the AARC promotes advancement and practice expansion for RTs as well as the continuing development of the respiratory care workforce.[4] The AARC understands that advanced education is the key to accomplishing these goals.

Of the 433 respiratory therapy programs accredited by the Commission on Accreditation for Respiratory Care (CoARC), almost 86% confer an associate degree.[5] Degree-advancement programs allow RTs with an associate degree to complete their education and earn a bachelor's degree. The degree titles may vary, but a degree-completion program will include a core curriculum specific to respiratory therapy as well as general education requirements. Each program is structured differently, so it is important to review the program curriculum carefully before committing.

Data suggests that RTs who express interest in earning an advanced degree encounter barriers such as program quality, tuition cost, geographical location of program, and number and type of courses that transfer.[6] While there are currently 49 respiratory therapy degree advancement programs in 30 states,[7] these barriers may impact the number of associate degree respiratory therapists who opt to earn a higher degree. Interestingly, the 2014 AARC Respiratory Therapist Human Resource Study identified that the most commonly offered recruitment and retention benefit used by acute care facilities is tuition reimbursement but that only about 7%–10% of RTs surveyed are taking advantage of that benefit.[2,8]

Finding the perfect fit

Choosing the right degree program can be challenging. Candidates are highly encouraged to consult with the program advisor or program director to determine if the program is a good fit for them. Quality is the first

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question they should ask: Is this a "good" program? At this time, CoARC does not specifically accredit degree advancement programs, though a set of standards has been proposed.[9] If the college that sponsors the degree advancement program also has an entry-to-practice program, the quality of that program may indicate the quality of the degree advancement program. However, some degree advancement programs are not associated with an entry-to-practice program, so quality may not be easily measured. It is acceptable to ask for references. Might a graduate from that program be willing to talk to a potential applicant? Hearing about the program expectations from a graduate will put the experience in perspective for the candidate.

As not every state has a program, format flexibility and cost is important. Does the program offer online courses? Will students be required to visit the campus while pursuing the degree? Will tuition be higher for those who are not state residents? Does the school offer scholarships? It is also advisable that the candidate check with the human resources department to ensure that the college qualifies for tuition reimbursement.

The transfer of previously earned college credits can be a significant challenge. Theoretically, the RT should be able to transfer all previously earned college credit to reduce the number of courses necessary to earn the bachelor's degree. However, in many cases, the courses the RT completed in the initial degree satisfied the program's requirement for graduation but the course content does not transfer to the new college to satisfy future graduation requirements. Each college and university has the freedom to establish unique policies for accepting or not accepting credits earned from a different college or university.[10] This is why the transfer of previously earned college credit can vary from college to college.

During the conversation with the program director or advisor, it is recommended that the RT ask for a degree audit of college transcripts. The program director or advisor will look at the RT's prior college transcripts and determine if and how the courses will transfer to the new college and satisfy graduation requirements as well as identify what core curriculum is required of the student. This report will give the RT a better picture of what commitment — both financial and academic — will be necessary to earn the degree.

Rising to the challenge

There are many personal and professional benefits to RTs who advance their degree. The RT should make an informed decision to enter into a degree advancement program and understand all of the challenges and benefits of this decision. For more information on respiratory therapy degree advancement, visit http://www.aarc.org/careers/respiratory_therapy_degree_advancement/. ■

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Bringing in Equipment from Home

by Anthony L. DeWitt, JD, RRT, FAARC

As the diagnosis of sleep disorders and the rise in the number of home continuous positive airway pressure (CPAP) machines persists, every hospital, nursing home, and overnight health care provider is faced with the question: "Can I bring in my CPAP from home?" Policies vary from institution to institution, but the safest answer, from a legal standpoint, is always "no."

Issues involved

There are several significant issues that arise with equipment brought in from home. The first issue is whether the equipment is properly maintained from an infection-control perspective. Most people who use home CPAP machines do not understand the way the devices work or the theory behind their use. They may not understand microbiology and the breeding ground for bacteria created by a heater/humidifier. They also tend to have a rather limited understanding of pulmonary anatomy and physiology. For this reason, it is not uncommon to find equipment that simply is unsafe to be brought into a facility from an infection-control perspective.

If a patient has a CPAP unit that is growing organisms, or a filter clogged with pollen, or some other potential allergen or pathogen that is released when it is turned on, it might not affect the patient using the device. To them these organisms are essentially normal flora. However, the patient in the next bed may well experience a severe reaction to the very things that don't bother the patient using the device. The affected patient may not know that the device is the cause; and in fact, it is likely to be way down the list of possibilities. However, the potential for significant problems resulting from use of a badly maintained device exists and should not be overlooked.

Even if cleaned regularly and properly, a device may present other hazards to both the patient and others. For example, is it electrically safe? It might be reasonable to assume that anything with an Underwriters Laboratories (UL) tag on it would be free from electrical hazards, but any device that contains water and is powered by electricity creates an electrical safety issue. While the risk in today's world is slight, it only takes one slight risk to manifest itself for patient injury to occur. Machines fall off nightstands, get bumped in transport, and sometimes wires get loosened. Just because the UL tag went on at the factory doesn't mean the device is still electrically safe.

As before, the risk of injury with an electrical device goes beyond the patient to those in close proximity to the patient. If the device were to catch fire or short out other equipment, the result could harm other patients. While a patient might be insured (as might his durable medical equipment provider), the hospital would bear the brunt of the liability, given that it allowed the equipment to be used either (1) without verifying its safety or (2) after certifying its safety in a negligent manner.

The third significant issue is whether the device is actually performing to specifications. A CPAP machine that is set to physician-ordered parameters by a DME supplier is likely properly set up on the day it arrives in the patient's home; but valves and seals, as with all rubber components, wear with time. Compressors and other mechanical devices suffer wear, too. The device that three years ago was putting out 10

about the author...

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

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cm of CPAP may now only be putting out 6 cm. If the hospital allows the device to be used and the patient suffers an adverse event because the equipment is not functioning properly, the result could be liability even though it is the patient's equipment. Equally important, while therapists might be very familiar with the hospital's CPAP equipment, they might not be familiar with the specific brand brought in by the patient. This, too, can create liability issues when a therapist attempts to make an adjustment and winds up varying the settings inappropriately.

Why would the hospital be liable?

A hospital has a "special relationship" with its patients. It is not like a hotel (which simply must take ordinary steps to ensure a guest's safety). It is not like a restaurant (which in some states may have to meet an even lower standard). While it does not guarantee a patient's safety, a hospital does have to exercise a higher level of vigilance in order to protect patients from known harms. This is why hospitals now have systems to safeguard newborn infants from being kidnapped.

If the hospital did not take all appropriate steps to ensure that a device was properly inspected, properly maintained, and delivering exactly the prescribed level of support prior to placing the device into use, then any resulting catastrophe would fall on the hospital. While there may be defenses to such an action, and indeed, liability might not always attach, the mere fact that a lawsuit is brought doesn't run under "good news today" in the newspaper.

Complicating matters even more, if a hospital does have a policy of inspecting and verifying the safety of equipment and the equipment later fails, it has a greater liability exposure than if it did nothing. Additionally, any third-party defendant (like the DME dealer) would claim that modifications made by the hospital caused the short or the fire; and liability would be a snarled mess. Again, the manufacturer, the DME provider, and the hospital would likely all wind up being sued — and defending lawsuits costs money.

This is the reason that the best policy is to employ the facility's own equipment so long as the patient is in residence in the facility. The equipment has presumably been checked out by the hospital biomedical equipment technicians and is set up and maintained on a daily basis by staff therapists with a solid working knowledge of the equipment. The hospital will normally have standardized around one or sometimes two models, and all therapists will normally be familiar with the equipment. This reduces error from using a multitude of brands with different features and different set-up protocols.

There is, of course, a customer satisfaction issue that arises if a hospital maintains such a policy. As a CPAP user myself, I never want to be without my ResMed S9™. When my insurer issued me a different brand, I could not adapt to it and went out and purchased an S9. So I understand that a patient might well want to have their own machine and that other machines would likely feel different. One way to avoid this problem is to learn what machine is being used by local DME companies and, if possible, standardize around that device (or perhaps, two devices). If the hospital has a policy of requiring use of the hospital's own equipment, then that policy should not be varied for anyone (even a vocal and irascible lawyer who wants his own S9). Varying the policy for one eventually means the policy will no longer apply to everyone; and when a policy has its root in patient safety, deviations from the policy tend to be the kind of things that make lawyers smile. ■

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A Flying ICU — Life as an RT Away from the Hospital

by Wade Scoles, RRT-NPS, EMT

As the helicopter circled over the accident scene, I thought to myself, "Wow! A car really *can* get literally wrapped around a tree." I also remember thinking, "What am I, a respiratory therapist, doing here? This is a whole different world from the ICU."

My stomach was churning — a result of my anxiety and the pilot banking the helicopter into a hard right turn as we circled the scene, double-checking that the landing zone set up by the EMS providers was free of hazards. Even the most well-coordinated accident scenes are a bit chaotic and loud. As I exited the helicopter, my ears were assaulted by the sounds of the helicopter rotors, diesel fire trucks idling, and the noise of extrication equipment that had almost finished cutting the roof off the car that was literally wrapped around a large ponderosa pine tree.

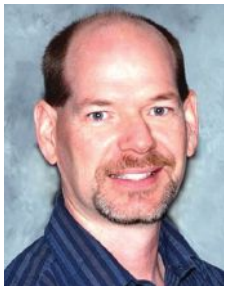
By comparison, the hospital ICU is a quiet, organized tranquil place. The hospital ICU also has a distinctive smell; but the smells here are quite different: a mixture of diesel exhaust, gasoline, hydraulic and radiator fluids, asphalt, and pine trees.

There were two bodies covered up on each side of the car; and our patient was still trapped inside, barely breathing with a weak carotid pulse. I had to crawl over the trunk of the car to intubate the young female patient still sitting upright in the back seat of the car (something we obviously never practiced in the operating room during intubation training). The car was traveling so fast when it hit the tree that the backseat passenger was now crushed between the tree and the back of her seat (the front seat was obliterated). The pressure being exerted on her abdomen was actually the only thing keeping her from bleeding to death; and tragically, once she was extricated from the vehicle, that is exactly what happened. They teach you that in EMT class, but you're never quite prepared until you see it up close. We attempted resuscitation at the scene without success.

On our flight back to base, my hands were shaking from the adrenalin rush. I replayed that scene in my mind over and over again, wondering if we could have done anything differently to help that girl. To this day, I replay that scene in my mind; but it's these situations that prepare you for the next.

So, what is a respiratory therapist doing at the scene of a rural car crash?

about the author...



Wade Scoles, RRT-NPS, EMT, is the staff education coordinator for Northwest MedStar Critical Care Transport based in Spokane, WA.

RTs in a flying ICU

There are many RTs working for air medical transport programs across the country, but very few programs utilize RTs on every flight. RTs are often part of the pediatric/neonatal specialty team and occasionally go on ventilated adult patient transports, but seldom do they respond to accident scenes.

When I started flying in 1991, we had one base, two helicopters, one airplane, and seven RRTs. Today, Northwest MedStar has six bases throughout the Northwest, 21 modes of transport (helicopters, airplanes, and ground ambulances), and 33 RRTs on staff providing more than 5,000 critical care transports yearly.

The roots of Northwest MedStar go back to the 1970s when the RTs and RNs (and sometimes physicians) at Providence Sacred Heart Medical Center flew along in National Guard helicopters to transport premature and critically ill newborns back to Spokane. The RRT/RN crew configuration (coming out of the neonatal ICU) was logical for the neonate population; and as the flight program grew and began transporting pediatric and adult patients, the vast majority of flights remained inter-hospital ICU patients so the RRT/RN crew configuration remained. Today, Northwest MedStar's transports consist primarily of inter-hospital transports. Only a small percentage of requests are scene flights. We have a high patient acuity, and a large percentage of our patients require some sort of ventilatory

assistance. With this mix of critically ill patients, RTs are a valuable member of the critical care transport team.

Education is preparation

Once hired on the transport team, the RRTs go through a lot of additional training and education. Initial orientation starts with two weeks of ground school in the classroom. Early on, we are taught survival skills and altitude physiology. Remember those gas laws from respiratory therapy school? They actually come into play every day in the flight environment. ET tube cuffs inflate when you gain altitude; and your patient with a small pneumothorax can potentially develop a large, life-threatening tension pneumothorax due to the expansion of air as the barometric pressure decreases.

Maybe most importantly, we spend a lot of time on aviation safety. We learn how we can do our part to help maintain a safe flight environment and what to do in case of an emergency. We learn to use night vision goggles and help the pilots operate the helicopter radios during flight. After completing ground school, the new RT is paired with an experienced transport RT for 10–12 weeks of buddy flights until they are released from orientation and given their "wings."

Becoming an Emergency Medical Technician (EMT) is also part of our orientation process. In EMT class, we learn about the pre-hospital world of focused patient assessment and how to quickly identify and treat immediate life-threatening emergencies in a less than ideal environment. This course covers skills that we didn't spend much (if any) time on during respiratory therapy school. Things like immobilizing the cervical spine of a trauma patient, splinting a fractured leg or pelvis, and applying a tourniquet to a bleeding extremity. Advanced skills we practice over and over again include intubation, needle chest decompression, chest catheter insertion, IV and intra-osseous line insertion, as well as surgical and needle cricothyrotomy.

Preparing for critical care in the air

Northwest MedStar requires at least three years critical care experience, but successful candidates usually have quite a lot more than that. Advanced cardiac life support (ACLS), pediatric advanced life support (PALS), and the neonatal resuscitation program (NRP) are all pre-requisites to the job. We look for well-rounded RTs with time spent in all of the ICUs. The job isn't for everyone though. If you just like to stay focused in your area of expertise of mechanical ventilation and let the nurses, doctors, and other staff deal with the other stuff, this job isn't for you. It is just you and the flight nurse in the aircraft, so we look for RTs who understand the pathophysiology and management of critically ill and injured patients. They need to know more than just the respiratory management, but the entire critical care management of that patient, including their hemodynamic and neurologic status. We are already experts in the inhaled respiratory medications; but we also need to know about analgesics, sedatives, and paralytics for rapid sequence intubation, vasopressors and antihypertensive medications, as well as thrombolytics for heart attacks and strokes.

Quick, independent critical thinking and trouble-shooting skills are required in the critical care transport environ-

ment. The job is so much more than just managing a ventilator while in a helicopter or airplane. When you come to work, you never know where you are going to go. You may be sent to a small rural hospital to assist in the delivery of a premature neonate, and then be dispatched to the scene of a car crash or rock-climbing accident.

The flight nurses and RTs receive the same orientation and work together as a team to care for the sickest of patients in flight. You need the knowledge, skills, and confidence to perform at a very high level because there is no back up to call. It's just the two of you, and your partner is relying on you. There is a great deal of autonomy as a flight crew member. Even though we work under physician-approved protocols, we often encounter patients and situations that are not covered in any protocol. That is where critical thinking skills and independent decision making come in and are perhaps the most important criteria for the job. That is difficult to teach, and the successful transport RT thrives in that type of environment. That is what we love about our jobs!

Exciting job

Of course, it's not all excitement and glory. There are those hot, turbulent days when a few of us struggle with motion sickness. When you have a patient vomiting or bleeding in the aircraft, there is no housekeeping department to call. You do what needs to be done to get that aircraft cleaned, decontaminated, and back into service.

The flight crews work long hours (12- and 24-hour shifts) and often on-call shifts when you need to respond to the hangar in less than 25 minutes. Compensation is similar to the hospital environment with opportunity for on-call pay and overtime. The flight environment takes some getting used to as well. It's a small space, and we do have a weight limit for our crew. It's loud inside a helicopter with constant vibration, and we wear helmets — so you learn to assess your patients without relying on your sense of hearing and in less than ideal lighting conditions.

You quickly find out if critical care transport is right for you. It took me about two years to become completely comfortable with my job and stop feeling like a "newbie." Today, I would have a difficult time leaving this position for a hospital position. Our crew, because of low staff turnover and a passion for flying, is a family; and this job really gets in your blood. As far as I'm concerned, it's the best respiratory therapy job on the planet. ■

State Licensure: Don't Fight the Fight Alone

by Kari Woodruff, BS, RRT-NPS, and Kevin Fischer, BS, RRT

More and more state affiliates have to deal with the dreaded renewal of licensure. Whether it is a scheduled "sunset review" mandated in the respiratory therapy (RT) licensure law itself or a surprise move to deregulate, don't let it catch you off guard and do not fight it alone. Each situation may be unique, but we learn a little from each state that has fought this fight and apply these lessons in most cases. The Colorado Society for Respiratory Care (CSRC) would like to share what worked so successfully for us in getting our RT licensure statute renewed for another nine years.

There was a lot of preparation and planning by the CSRC, and we did prepare for a worst-case scenario. Planning began two years before our sunset review was scheduled to occur. We pooled all the best resources in our state to create a committee. We included those RT champions who were involved in the initial effort to gain RT licensure as well as those who were involved in the first sunset review. Then we started doing our homework.

There are several different models throughout the country for RT licensure regulation. Some states have stand-alone RT licensure boards, some states put RT regulation under medical or physician licensure boards, and some states manage RT licensure under the umbrella of a state-licensing agency. Colorado falls under a state-licensing agency — the Department of Regulatory Agencies (DORA).

Initially we had a set of tasks we needed to address including ensuring we were in good communication with DORA, knowing whom our DORA contacts were, and learning the regulatory processes so we knew what actions to anticipate and, as best we could, when those actions would happen. About a year before our sunset review started up, we (basically, the Colorado respiratory therapy profession) were assigned an auditor from another state agency who was tasked with investigating both the current status of Colorado RT licensure as well as reviewing the history of RT licensure. The investigation was to determine if there was still a need for respiratory therapy licensure in Colorado. The auditor was also the individual who would make the recommendation whether to continue or to "sunset" our RT license. We didn't fully understand at the time just how instrumental this individual would be to our success. Ultimately, he was the key to issuing a very favorable recommendation that led the Colorado legislature to pass RT licensure continuation.

about the author...

Kari Woodruff, BS, RRT-NPS, is a delegate from Colorado and a past president. Kevin Fischer, BS, RRT, is a current delegate and the past president of the CSRC.

Preparing for licensure sunset

The CSRC leadership immediately set up a meeting with the auditor and spent time with him to ensure he understood our profession and (in our opinion) the value of keeping our licensure. This is where our homework really started paying off as we had a good handle on what worked the first time Colorado had gone through RT licensure sunset and what the focus points should be. We were also very fortunate that the auditor was very receptive to learn from us and use us as key resources in his investigation. He used Kevin Fischer, BS, RRT (immediate past president of the CSRC), along with Jamie Sahli, BS, RRT, AE-C, (current president), and Kari Woodruff, BS, RRT-NPS, (delegate) as back-up resources. Kevin was in contact weekly to answer any questions throughout the process so that the auditor could make an informed and timely decision when reaching his recommendations. Designating specific CSRC RTs as the society's representatives and contacts for the auditor turned out to be one of the most important decisions we made, as it made it very easy for the auditor to come to us and find answers to questions and access information quickly.

We are convinced that there was one approach that may have actually sealed the deal on a positive recommendation. Our auditor was willing, at our suggestion, to make site visits to actually see what our profession does. Kevin quickly set up the visits with various leaders in our community in a broad range of clinical settings. The auditor was able to observe therapists in settings such as acute care, home care,

outpatient clinics, sleep labs, and diagnostic labs. The task was difficult to accomplish due to HIPAA privacy regulations, but the Colorado leadership really came through to help make this an impactful experience.

While the different professional clinical settings were important for him to experience, even more critical (and another of our suggestions) was the value of picking the right RT professionals for the auditor to shadow. The auditor was extremely appreciative of this effort as we were the first profession he had encountered to offer such an opportunity. The shadow opportunities provided valuable insights into who we are, what we do, and our broad range of duties. We are convinced that this alone was the biggest factor in our success. The end result was an extremely positive audit and a recommendation to continue RT licensure that was sent to the Colorado legislature.

The legislative process was painless, but we monitored it closely for any surprises. Allen Wentworth, MEd, RRT, FAARC, a two-time CSRC past president, was a great resource during the legislative "march." We also developed (with the assistance of Cheryl West, MHA, from the AARC Executive Office) information packets on the profession and distributed them to all our legislators. In the event any issues arose, there were at least two CSRC board members at all legislative committee meetings. In the end, our licensure was renewed without any opposition.

Preparing for your licensure renewal

In summary, we would like to offer these suggestions:

1. Start planning early. Know your resources and take the time to learn from them.
2. Form a small committee that includes RTs who have the time and experience to work with whomever the state assigns to do the state review.
3. Offer one point of contact to your reviewer, with backup individuals who can also respond as needed.
4. At least consider that you might need a lobbyist if you really sense RT licensure will be endangered and budget for the cost of an outside lobbyist. Before you hire one, however, see if one of your hospital groups has a lobbyist who may be willing to support you as needed.
5 Do not do this alone. Use resources at the national level such as the AARC and other state societies that have had success. ■

Staff Communication Techniques for Improving Patient Safety

by Jenni L. Raake, MBA, RRT-NPS, FAARC

EDITOR'S NOTE: This article is an excerpt from a session at AARC Congress 2014. The presentation was designed to provide caregivers with tools designed to improve patient safety through various communication techniques.

Communication is a term describing the sharing of information.[1] In health care, human factors impact communication. Suboptimal communication, the primary cause of medical mistakes and a leading cause of morbidity and mortality, is linked to more than 98,000 deaths per year.[2] To improve outcomes and patient safety, communication must improve.

When the medical team is providing patient care, communication should include the three C's: **C**ite names, give **C**lear instructions, and **C**lose the loop.[3] A typical conversation would go like this:

Physician: "Vanessa, change the tidal volume to 500 mL."
Vanessa: "Tidal volume has been changed to 500 mL."

This simple mnemonic improves communication and leaves little room for errors. For your suggested use, additional mnemonic devices are shown in the sidebars accompanying this article. The choice of which mnemonic to use depends upon the patient situation. SBAR, ARCC, STAR, and the Five-step Approach might be preferred when requesting action from a physician. Graded Assertiveness, the Step Back approach, Flying by Voice, and Below the 10,000-foot Level are appropriate in group situations. I-pass may be used during safe hand-off of care.

Communication and the National Patient Safety Goals

The Joint Commission establishes National Patient Safety Goals — standards for hospitals that focus on quality of care and patient safety. One such goal is to reinforce caregiver communication.[4] Sub-optimal communication may lead to risks taken by caregivers due to fear of criticism or intimidation. To improve patient safety, the health care culture must transition from a hierarchy to a horizontal authority structure that engages all members of the team to speak up.

How effective are communication mnemonics?

Used in hospitals abroad and in the United States, reports of improved outcomes include: reduction in medical errors, reduction in unexpected patient deaths, reduction in adverse safety events, improvement in the quality of patient care, enhanced employee morale, enhanced confidence in raising patient concerns to the health care team, and improved patient satisfaction — all of which were gained through efforts in improving communication.[5–7]

Of special note is the SBAR mnemonic (see sidebar), which is widely used in health care. Borrowed from the military, it is used as a key framework for communication in hospitals across the country. It can effectively provide safe hand-off of care, obtain consultation from other care providers, and articulate concerns to others. When used, the tool is concise and provides a clear and comprehensive picture of the situation.

Additionally, the ARCC mnemonic (see sidebar) is a valuable tool for conversations. ARCC is a tool used to double-check work practices and provide real-time coaching. Newer staff may be hesitant to speak up for fear of criticism and may proceed with care in the face of uncertainty. ARCC is an effective way to reinforce clinical skills and provide active real-time coaching. This helps improve caregiver confidence, morale, teamwork, and quality of patient care.

about the author...

Jenni L. Raake, MBA, RRT-NPS, FAARC, is a manager at Cincinnati Children's Hospital Medical Center in Cincinnati, OH.

SBAR

The SBAR mnemonic communicates concerns and requests action.

SITUATION: "This is Jonah, the respiratory therapist. My patient, Howard Bell, in Room A225…"

BACKGROUND: "He is an asthmatic."

ASSESSMENT: "He is still wheezing after his treatment."

RECOMMENDATION: "I would like to give another treatment."

Eberhardt S. Improve handoff communication with SBAR. Nursing 2014; 44(11):17–20.

STAR

The STAR mnemonic is used when faced with uncertainty.

STOP: "I am concerned about Mary Smith in Room B544."

THINK: "I think her ARDS is worse. Her O_2 saturation is 78%."

ASK QUESTIONS: "Should we increase the FiO_2 to 100%?"

REQUEST ACTION: "Do you agree?"

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ARCC

The ARCC mnemonic is used to escalate concerns without mitigating language.

ASK: Did you know this patient is in isolation?

REQUEST: Would you wear a gown, gloves, and mask?

CONCERN: If you don't wear isolation gear, germs can be spread to other patients.

CHAIN OF COMMAND: I will talk to the supervisor about isolation compliance.

Seton Doctor Link website. Caven T. Speak up for safety using ARCC. Available at: http://doctors.seton.net/stories/story-detail/speak-up-for-safety-using-arcc *Accessed July 27, 2015*

How can respiratory therapists help?

Respiratory therapists have a unique opportunity to lead the way in improving patient safety through communication. From the start of the shift, the RT interacts with multiple patients, nurses, physicians, and other care providers. In each of these interactions, the respiratory therapist can utilize these communication tools with the focus on effectively achieving patient safety.

Communication mnemonics have been successfully employed in many organizations, both in the United States and abroad. RTs can successfully integrate these communication techniques into their practice, with the ultimate goal of improving patient safety through communication. ■

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Graded Assertiveness

Graded assertiveness is a tool that gains emphasis on a situation.

HINT: Is the endotracheal tube (ET) in correct position?

PREFERENCE: I think we need to advance the ET tube.

QUERY: Do you think we should advance the ET tube?

SHARED SUGGESTION: We should advance the ET tube.

STATEMENT: We need to advance the ET tube.

COMMAND: Advance the ET tube.

Leonard M, Graham S, Bonacum D. The human factor: the critical importance of effective teamwork and communication in providing safe care. Qual Saf Health Care 2004; 13(Suppl 1):i85–i90.

I-PASS

This mnemonic technique for hand-off of care closes the communication loop.

ILLNESS: Mary Smith is in Room B544.

PATIENT SUMMARY: Admitted two days ago for trauma and ARDS. The morning x-ray showed a high ET tube, but the doctors did not want to advance it.

ACTION LIST: She is mechanically ventilated with a PEEP of 10 cm H_2O with an FiO_2 of 100%.

SITUATIONAL AWARENESS AND CONTINGENCY PLANNING: I noticed a large air leak, and her tidal volumes are low. I worry about an unplanned extubation. We need the doctor to agree to advance the ET tube.

SYNTHESIS BY RECEIVER: Sounds like a good plan. I will get with the doctor.

Starmer AJ, Spector ND, Srivastava R, et al. I-pass, a mnemonic to standardize verbal handoffs. Pediatrics 2012; 129(2):201–204.

STEP BACK

The STEP mnemonic reflects on the patient and the effectiveness of current treatment.

STOP: Please stop for a minute.

TIME-OUT: Reassess ET tube placement.

EVALUATE: Look at the chest x-ray.

PLAN: The ET tube is high and needs to be advanced.

Brindley PG, Reynolds SF. Improving verbal communication in critical care medicine. J Crit Care 2011; 26(2):155–159.

Below the 10,000-foot Level

In aviation, this phrase describes when the plane is below 10,000 feet in altitude and the pilot must focus on the landing. During a hospital crisis situation, the focus is on the patient and the doctor is "Below the 10,000-foot level." Unnecessary chatter and communication about other patients, especially during a high-risk medical procedure, may distract the physician and compromise patient safety. This is a way to reinforce situational awareness skills with the health care team.

Chute RD, Wiener EL. Cockpit-cabin communication: II. Shall we tell the pilots? Int J Aviat Psychol 1996; 6(3):211–231.

Five-step Approach

The five-step mnemonic is used to gain attention, retain it, and achieve action.

STEP 1: Call the person by name: Dr. Carter.

STEP 2: State concern: This patient has no breath sounds on the left side.

STEP 3: State problem: On x-ray, the ET tube is too deep.

STEP 4: State solution: We should pull back the ET tube.

STEP 5: Obtain agreement: Do you agree?

Dunn EJ, Mills PD, Neily J, et al. Medical team training: applying crew resource management in the Veterans Health Administration. Jt Comm Qual Patient Saf 2007; 33(6):317–325.

Flying by Voice

This mnemonic is an aviation expression that generates a shared mental model for staff.

SENDER: We have a 54-year-old trauma patient with ARDS. Her PO_2 is 70 mm Hg despite 100% FIO_2 and a PEEP of 10 cm H_2O. Does anyone have suggestions?

RECIPIENTS: Give input into the plan of care.

Gaba DM, Fish KJ, Howard SK. Crisis management in anesthesiology. New York NY: Churchill Livingstone; 1994.

Celebrating a

Millions of people have been given a second chance to live, thanks to the inventor of the modern ventilator

The respiratory care profession lost one of its legends with the death of Forrest Bird, PhD, ScD, MD, FAARC, last August.

Remarkable Life

by Debbie Bunch

When Morley Safer of "60 Minutes" profiled Dr. Forrest Bird back in 2007, he began the segment by comparing the iconic inventor of the modern respirator to another iconic character out of the movies, "Forrest Gump." Indeed, a look back at Dr. Bird's long and illustrious life certainly reveals more than a few Forrest Gump-like moments:

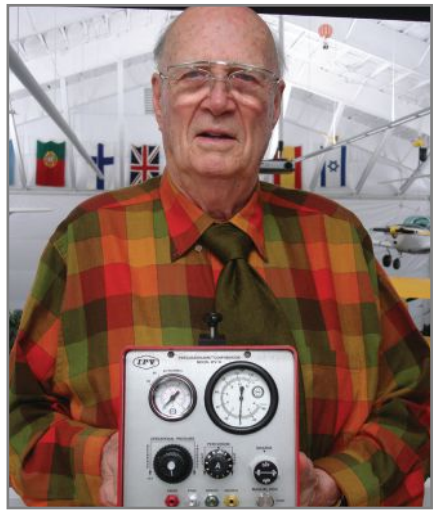
- like the time the aspiring young pilot met one of the inventors of the airplane, Orville Wright;
- or the day in 1937 when he encountered the German zeppelin Hindenburg, swastika and all, while cruising the skies over Massachusetts;
- or the several occasions when he went up in a float plane with one of the 20th century's most mysterious men, millionaire recluse Howard Hughes.

Among respiratory therapists, however, Dr. Bird (who passed away last August at the age of 94) will be most remembered for his pioneering work in mechanical ventilation — work that essentially changed the way critical care medicine is practiced throughout not just the United States, but the world. "Dr. Bird was truly a pioneer in respiratory care and pulmonary medicine," says AARC President Frank Salvatore, MBA, RRT, FAARC. "The respiratory care community has been privileged to have known him as a fellow member and colleague."

The entrepreneurial spirit started young

Dr. Bird's long career as an inventor had its roots back in his hometown of Stoughton, MA, where he grew up the son of a World War I pilot. By the time he was 14, he had already made his first solo flight in his dad's Waco Biplane; and his father had instilled a love of airplanes in the young man that was to last a lifetime.

Being around airplanes also fostered an interest in the way things work. When the Great Depression hit, he began earning extra money for his family by taking old Model A and Model T Fords and transforming them into farm equipment. The devices sold well to local farmers, who appreciated the chance to acquire mechanical devices well under the prices they would have had to pay for brand-name equipment. In high school, he enrolled in the accelerated military-based Mass Educational Program directed toward technical programming. After graduation, he went on to study aeronautics in college, then was commissioned into the Army Air Corps at the beginning of World War II, serving in various capacities, including as a technical air training officer charged with testing out new planes and teaching pilots to fly them. His high regard for and support of the U.S. military continued all throughout his life. He spent a lot of time with the medical branches of all the services.



WWII fostered an interest in respirators

Mechanical ventilation made its way onto Dr. Bird's radar screen during the war, when he began thinking about better ways to deliver oxygen to pilots flying at high altitudes. During a flight in a German bomber (he was charged with piloting this captured aircraft back to the United States from England), he noticed the plane was equipped with some demand regulators designed for oxygen delivery.

He ran some experiments on the equipment during the flight and eventually took one of the regulators with him to California, where he worked on improvements to the device. After presenting his findings to physicians at the School of Aviation Medicine in San Antonio, TX, his life's work began in earnest, first taking a military focus with demand regulators for aircraft and, later, transforming into a keen interest in helping people with life-threatening pulmonary conditions.

By 1953, he was piecing together shortcake tins and a doorknob in an attempt to produce a device that would deliver the breath of life; and failure didn't stop him from reimagining, reinventing, and retesting the concept until he got it right.

The Bird Mark 7

That work led to the world's first modern respirator, the Bird Mark 7, which was introduced to the market in the mid-1950s as Dr. Bird flew around the country to share his invention with physicians caring for patients in dire need of respiratory support. As he got more and more involved in respiratory innovation, he established the Bird® Corporation to market his products.

Perhaps one of his greatest achievements came in the early 1970s with the introduction of the Baby Bird®, a ventilator that has been credited with reducing the mortality rate for infants with respiratory problems from 70% to less than 10%. Intrapulmonary Percussive Ventilation (IPV®) and Volumetric Diffusive Ventilation (VDR®) followed in the 1980s, adding to his acclaim as an inventor in the field. Along the way he also established the Percussionaire® Corporation.

"Dr. Bird's development of the Percussionaire line of products was a labor of love and his desire to impact patient care," says Richard Branson, MS, RRT, FAARC, a long-time friend who often brought his family to Dr. Bird's Sandpoint, ID, compound for a week of vacation in the summers. "He had a huge personality to go with his intellect, and his personality emboldened others to go and further the practice of respiratory care."

"Forrest Bird has left an indelible imprint on both the field of respiratory care and the profession of that name," agrees David Pierson, MD, FAARC, editor emeritus of Respiratory Care, the AARC's science journal. "His creativity, initiative, and technical savvy changed the way patients with respiratory disease were managed and also how departments, hospitals, and other health care institutions operated. Today's respiratory care industry has been profoundly affected by his contributions."

RTs Tell Their Favorite Forrest Bird Stories

Respiratory therapists who were privileged enough to meet Dr. Forrest Bird in person invariably have a story to tell. Here are four that illustrate his magnanimity, intellect, humor, and deep appreciation for the lives of everyone and everything around him.

Richard Branson, MS, RRT, FAARC: On the morning of Jan. 28, 1986, I had spoken with Dr. Bird regarding the impending Challenger launch. He was involved with the U.S. Air Force and NASA and was a tremendous fan of the space program. I called later as everyone was dealing with the shock of the disaster. I naively asked, "What do you think happened?" It was mostly a rhetorical question. "Damn O-rings!" was his response. Of course, all of us watched in shock and awe as the brilliant physicist, Richard Feynman, demonstrated the impact of cold temperatures on O-rings separating the fuel components on Feb. 11, 1986. I thought to myself, one of the greatest minds in history just demonstrated the cause of the accident when Forrest Bird had told me the same thing two weeks earlier.

Trudy Watson, BS, RRT, FAARC: Dr. Bird once told me that as the military began flying at higher and higher altitudes during WWII, whether or not hypoxia was present in the crew was determined by assessing their handwriting at specific altitudes and comparing it to samples at lower altitudes. If their handwriting deteriorated, hypoxia was assumed to be present. Then he jokingly added, "Based upon handwriting, I imagine you now believe that the majority of physicians in this country must be hypoxic!" To this day, whenever I see illegible handwriting, I am reminded of Dr. Bird's story and always have to smile.

Sam Giordano, MBA, RRT, FAARC: I was visiting Dr. Bird at his Sandpoint compound when his wife began telling me a story about one of the little ground squirrels they have around his house. Evidently someone was there spraying the trees for bugs and Dr. Bird noticed one of the squirrels was acting strangely. He thought it was sick and then realized what had happened — the squirrel had inhaled some of the bug spray. He rigged up a little ventilator to try and ventilate the squirrel to get him through that crisis. Even though it didn't work, it showed just how much he cared for life — human and animal.

Steve Sittig, RRT-NPS, C-NPT, FAARC: I met Dr. Bird for the first time at the Percussionaire booth at the AARC Congress in Las Vegas. One of his sales representatives wanted to introduce me to him. As we shook hands, he paused for a moment and repeated my name. Then he said, "You know, I have heard of you." Whether he actually had or not, I felt very honored to meet him as he treated every RT as someone special. ■

AARC Member since 1956

Dr. Bird's support for the respiratory care profession began with his AARC membership in 1956 and grew steadily over time. He was a regular attendee at AARC annual meetings — including last year's Congress in Las Vegas, where he and his wife, Pamela, donated an all-expenses-paid trip to his Sandpoint compound to the winner of the grand prize at the American Respiratory Care Foundation's "Night at the Vineyards" fundraiser. Dr. Bird was the ARCF's first trustee emeritus. He always visited with RTs at the Congress to talk about the latest in technology and hear their ideas about how the devices he and others were developing were impacting patients at the bedside.

"Dr. Bird had the rare combination of a brilliant scientific mind, a charismatic personality, and humility," says AARC Historian Trudy Watson, BS, RRT, FAARC. "He always took time with our members to pose for a photo, answer a question, inscribe a program, or just stop to chat. You could always spot him at our AARC meetings by his flip-up eyeglasses and the crowd gathered around him."

Dr. Bird spent considerable time networking with RTs about his devices outside of the annual meeting as well. Sam Giordano, MBA, RRT, FAARC, remembers first meeting him in 1967 when formal education was lacking for many people in the profession. "My generation were OJTs (on-the-job-trained), so we really appreciated educated people educating us," says the former AARC executive director.

Dr. Bird did just that, using 8 mm instructional films on his ventilators that he shipped to hospitals across the country. "The first time I saw him was in one of those instructional movies," says Giordano. "He was our teacher. He was one of the people who took the time to actually teach the people who were going to be using his ventilators on our patients. That meant a lot to us."

Many RTs who were around in those days remember meeting Dr. Bird in person, too, as he came to their hospitals to show them how to best use his devices on patients and (perhaps just as important) how to fix them when they broke down. That was no small advantage during a time when "tech support" was only in its infancy. "It's not like we had an extensive support system out there for the few ventilators we had at the time," says Giordano. "He built them so they could be serviced by RTs like us; and he followed through with the training so we could use them correctly and maintain them."

In 1983, Dr. Bird established the Forrest M. Bird Lifetime Scientific Achievement Award with a grant to the ARCF. The award is given at the AARC's International Respiratory Convention & Exhibition each year to recognize outstanding individual scientific contributions in the area of respiratory care of cardiopulmonary disorders and is the ARCF's most prestigious honor.

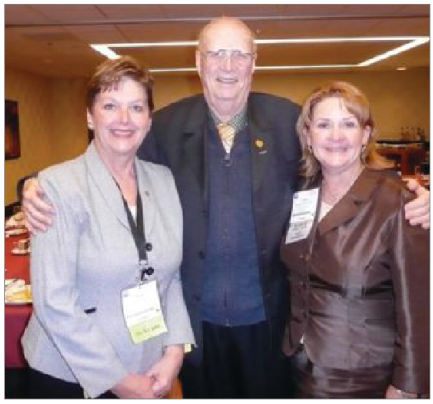
Dr. Bird's willingness to involve RTs in his work and his steadfast support of the profession earned him an Honorary Membership in the AARC as well; and he remained an active proponent of respiratory care well into his latter years, serving on the ARCF Board of Trustees, most recently as an emeritus member of the Board. He was named a Fellow of the AARC in 2007, and he was in the first class to be inducted into the Hall of Legends in the AARC Virtual Museum just last year. Dr. Bird received the AARC's highest honor, the Jimmy A. Young Medal, in 2009.

The breath of life

Dr. Bird also received recognition for his accomplishments on the national stage. He was inducted into the U.S. Inventors Hall of Fame in 1995, and in 2008 he received the Presidential Citizens Medal from President George W. Bush. He received the National Medal of Technology and Innovation from President Barack Obama in 2009 and the Lindbergh Award in 2012.

He opened the Bird Aviation and Invention Center Museum near his Sandpoint home and business in 2007, and along the way even started a charter school for middle and high school students in Sandpoint. Its mission is to teach young people the basics of literacy while fostering in them the ability to participate passionately and responsibly in the life of their community.

That's something he did for nearly all of his 94 years, and it was a gift not only to the respiratory care profession, but the entire world. ■



AARC Historian Trudy Watson and former AARC President Dianne Lewis

Dr. Bird attended many AARC meetings.

Dr. Bird and his wife Pamela attended the 2014 AARC Congress.

5 Sessions You Won't Want To Miss

These presentations are sure to tick all the boxes

The 61st AARC International Respiratory Convention & Exhibition is just a few weeks away, and speakers are gearing up to deliver lectures and symposia certain to tick all the must-have boxes attendees will bring with them. These five previews from Congress presenters stand as shining examples of the kind of cutting-edge content you can expect in Tampa this Nov. 7–10.


AARC
CONGRESS 2015

1 Pulmonary Rehabilitation

by Trina M. Limberg, BS, RRT, FAARC

Pulmonary rehabilitation (PR) has long been established as a standard of care for patients diagnosed with chronic lung disease. In their updated statement on the advances in pulmonary rehabilitation published in 2013, the American Thoracic Society and European Respiratory Society defined pulmonary rehabilitation as "a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies that include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors."

Referral rates to pulmonary rehabilitation are not well understood but generally believed to be lower than expected, despite strong, evidence-based scientific support of these programs. COPD has climbed to the third leading cause of death, and millions remain undiagnosed. Yet only about 1,000 programs exist nationwide, making it clear that these services are underutilized and access is unavailable in many communities.

Pulmonary rehabilitation professionals help patients understand their diagnosis and learn to navigate life with confidence and skill. Therapists working in pulmonary rehab must possess competencies in taking histories, conducting physical capacity tests, and assessing the impact of dyspnea, all while developing an individualized plan of care that is targeted to improve exercise and activity capacity, enhance self-efficacy, reduce dyspnea, and ultimately raise quality of life.

This symposium on pulmonary rehabilitation will review the basics, explore possibilities for expanding services, and delve into end-of-life preparedness. RTs will appreciate shared insights and experiences by presenters on delivering clinical services to patients with diverse needs and physical abilities. Clinicians attending the session can expect to leave with insights to improve the care of the chronically breathless. ■

Trina M. Limberg, BS, RRT, FAARC, is director of preventive pulmonary and rehabilitative services at the UC San Diego Health System in San Diego, CA.

2 Liberation from Mechanical Ventilation: Are SBTs Still the Way To Go, or Is There Something New?

by John Davies, MA, RRT, FAARC

The process of liberation is a vital component of overall ventilator management. Ventilator dependence can be caused by disease-related factors (respiratory, cardiac, neuromuscular, and metabolic) and clinician management factors (failure to recognize discontinuation potential and inappropriate ventilator management). Undue liberation delay can result in an increase in time on the ventilator and ICU length of stay, unnecessary sedation, and iatrogenic lung injury; and it may even increase mortality.

On the other hand, premature liberation can potentially cause muscle fatigue, impairments in gas exchange, aspiration, and again, potentially higher mortality.

The question is, "what techniques should we, as clinicians, be using to help us determine optimal liberation potential?" Spontaneous breathing trials (SBTs) are presently the gold standard for identifying liberation potential. However, the best method to perform SBTs is not clear at this point in time.

A number of different clinical indices have been suggested to help identify readiness for liberation. The rapid-shallow breathing index (RSBI) and compliance, resistance, oxygenation, pressure (CROP) index, among others, have generated some excitement but are probably better suited as "components" of the overall liberation picture. Newer ventilator capabilities and modes have also been developed with the aim of identifying and optimizing liberation potential. SmartCare® (Draeger) is designed to automatically lower pressure support levels to minimal settings based on E_TCO_2 and respiratory rate. NAVA® (Maquet) and PAV (Covidien/Medtronic) are novel modes that amplify the patient effort to a degree set by the clinician.

This lecture will examine the evidence relating to SBTs and the potential of newer ventilator capabilities to assist with patient liberation and newer ventilator modes to allow the patient to have more control over the delivered breath. ■

John Davies, MA, RRT, FAARC, is a clinical research coordinator at Duke University Medical Center in Durham, NC.

3 Student Seminar

by Shawna Strickland, PhD, RRT-NPS, FAARC

Students attend many conferences — local, regional, state, national, international — but the content is always CRCE-approved, which means it increases the breadth and depth of knowledge of the practicing respiratory therapist. The CRCE-approved content is really good but can be too advanced for students.

This non-CRCE-approved student seminar will not only include some great information about professionalism, job seeking, interviewing, test preparation, and joining the RT workforce — which is critical to a new graduate — but also a bit of clinical information for students at a level that makes sense to them.

For example, the "OMG He Wrote My Textbook!" lecture by Respiratory Care Editor Dean Hess, PhD, RRT, FAARC, will provide students with the unique opportunity to learn about an important part of caring for critically ill patients — analyzing mechanical ventilator graphics — from an expert. Another of the skills necessary for new RTs is the ability to take evidence and apply it at the bedside. This is an intimidating task but essential to provide evidence-based care. Richard Branson, MS, RRT, FAARC, deputy editor of Respiratory Care, will explain how to read a journal article and use the evidence at the bedside to improve patient outcomes. In the same vein, understanding how to utilize a clinical practice guideline (CPG) can be a challenge as well. The recommendations are there, but how does that help the respiratory therapist? I will discuss the purpose of CPGs and how the RT can use them for clinical decision-making.

As noted earlier, the second portion of this seminar will be dedicated to professionalism, getting a job, and passing board examinations. The speakers scheduled for these talks are all experts in their own right: Crystal Dunlevy, EdD, RRT, is an educator and has mentored hundreds of RT graduates over her career; Cheryl Hoerr, MBA, RRT, FAARC, and Dana Evans, MHA, RRT-NPS, AE-C, are hiring managers with a wealth of wisdom and tips on getting a job; and Bill Galvin, MSEd, RRT, FAARC, is an educator who has been preparing RTs to take board examinations for decades. ■

Shawna Strickland, PhD, RRT-NPS, FAARC, is associate executive director-education at the AARC in Irving, TX.

4 Noninvasive Support for the Acute Respiratory Failure Patient Symposium

by Carl R. Hinkson, MS, RRT-ACCS, FAARC

Noninvasive ventilation as a therapeutic modality has been around for more than 20 years now. However, despite many years as an accepted therapy, a great deal of confusion remains about how, when, and to whom noninvasive ventilation should be delivered. The addition of humidified high flow nasal cannulas (HHFNC) to the respiratory therapist's armamentarium has added to the problem.

The presentations in this symposium will help attendees understand the evidence behind high flow nasal cannulas and the application of noninvasive ventilation. "HHFNC: Fad or Serious Management" will examine the published research on this modality and arm clinicians with the knowledge to appropriately apply it. "HHFNC: A Case Report and One Large Tertiary Center's Experience" will describe how a major medical center successfully utilized high flow nasal cannulas and how their practice changed with their internal data.

"NIPPV: Can and Should It Be Used Outside of the Critical Care Areas for COPD and CHF?" will discuss the logistics and ramifications for the application of noninvasive ventilation (NIV) outside the ICU, including a discussion on the use of NIV in the pre-hospital setting. "NIPPV in Patients Other Than CHF and COPD" will examine the use of NIV to prevent intubation in acute respiratory disease syndrome patients and other nontraditional uses where the evidence is less robust. "NIV in High Risk Pulmonary Infections" will discuss the use of NIV in patients with severe infections such as H1N1 and SARS.

This symposium will be a great session for those looking to increase their knowledgebase about NIV. The attendee will understand what the evidence says about safely delivering this therapy. ■

Carl Hinkson, MS, RRT-ACCS, FAARC, is assistant manager of respiratory care at Harborview Medical Center in Seattle, WA.

5 Pediatric Safety: Raising the Bar

by Amber Galer, BS, RRT

Medical errors are responsible for a significant number of recurring hospital admissions and consequently result in higher costs for the health care system. In this fast-paced world of medical care, mistakes are easily made; and it is evident that safety is becoming a serious focal point for staff, patients, and families. All levels of health care begin with patient safety, whether the patient is seen in the ER or ICU, on the general floor, or in routine ambulatory settings. Respiratory therapists are expected to be role models of the future and take the lead in "raising the bar" for the treatment of pediatric and neonatal patients by promoting safety polices, practicing specialized skills, and advocating for patients in all areas of care.

Increased risks for pediatric patients are multifactorial and are often overlooked. Particular examples may include improper patient identification; errors in pediatric medication ordering, dosing, and delivery; discrepancies in mechanical and diagnostic values; inadequate documentation; and most importantly, lack of communication.

This symposium will emphasize the significance of promoting patient safety in pediatric areas by reducing medical errors. Among the topics to be covered are areas of weakness, organizational commitment to goals, and providing quality care through best practices. Presenters will highlight the importance of patient safety in each department and how RTs can make an impact on improving overall patient safety.

Attendees will be inspired to share this knowledge with their home departments and brand patient safety as a priority. With RTs leading the team to recognize potential harm, be reliable and accountable in the event a patient is at risk or injured, and prevent repeat incidents, we can dramatically drop the startling number of medical errors we see today. ■

Amber Galer, BS, RRT, is a staff therapist at Primary Children's Hospital in Salt Lake City, UT.

TAMPA INSIDER

Photos clockwise from top left:
1) The Amalie Arena is home for the Tampa Bay Lightning Hockey Team. 2) The Florida Aquarium is located in Channelside district. 3) Channelside is just a block from the Amalie Arena, and about two blocks from the host hotel; site of many after-hours food and family opportunities. 4) The Trolley system runs between Channelside and Ybor for the 10 minute trip.

Tampa Hotspots Await

Florida Society members share their top picks for dining, entertainment, and adventure

by Gina Ricard, MS, RRT-NPS, and Connie Farmer, BS, RRT-NPS

Flambé Restaurant

Channelside District

Hablo Taco

About the Authors
Gina Ricard, MS, RRT-NPS, is the respiratory care program director at Hillsborough Community College in Tampa, FL. Connie Farmer, BS, RRT-NPS, is a respiratory therapist at All Children's Hospital in St. Petersburg.

With AARC Congress 2015 just around the corner, you should be preparing yourself for some great food, entertainment, and adventure. Tampa is definitely this year's hot spot for everything fun.

Dining

Tampa is a food lover's paradise. With the Cuban culture a big part of Tampa, no stay can end without savoring a Cuban sandwich. There are many great restaurants and cafes that make delectable Cubans. You can try Carmine's in Ybor City or La Teresita's on W. Columbus Dr.

If you're a steak lover, you can't leave Tampa without trying Bern's Steakhouse. Known the world over for their delicious food, as well as one of the largest wine collections anywhere, their desserts are out of this world. Located on S. Howard Ave., Bern's Steakhouse is simply the best of the best. Make sure to ask for a tour of the kitchen and wine cellar when you go.

Columbia Restaurant is another Tampa staple. Founded in 1905, it has been honored by the Florida House of Representatives as the oldest restaurant in Florida. Located in the heart of Ybor City, Columbia is known for its Spanish cuisine: tapas and paellas. Be sure to check out the flamenco shows performed nightly except on Sundays.

For those who like handcrafted beer, Cigar City Brewing should be at the top of your list. Tours are available Wednesdays through Sundays.

Entertainment

Nightlife in Tampa is **hot**! The Channelside District offers many places for food and beverages. Hablo Taco landmarks the entryway into the area. Whether it's cocktails at LIT or family fun at Splitsville, there's a place there for all interests. Flambé is a spot for seafood and American mains, with international influences and bayside patio seating. Thai Thani and Oishi offer a variety of Asian and hibachi fare.

Ferg's Live, a sports bar and tailgating spot for pre-game fun, is located right across the street from the Amalie Arena. It is the "sister" to Ferg's Sports Bar in St. Petersburg that is the place for concerts and watching the big game.

Ybor City is Tampa's historic Latin Quarter, home to over 30 restaurants and more than 15 nightclubs. It is also only a 10-minute trolley ride from our host hotel. It's the place for late-night fun and food! Centro Ybor, located right in the middle of Ybor City, houses many diverse restaurants and a Muvico 20 movie theater. It also houses the Tampa Bay Brewing Company, which serves some of the best steaks around town, not to mention craft beers. The Ybor City Jazz House is open on the weekends with some fabulous jazz offerings.

Adventure

The Tampa Museum of Art displays contemporary and classical art, including traveling exhibitions. Right in downtown, it is a gorgeous museum with access to Curtis Hixon Park and Tampa's Riverwalk.

The Tampa Bay History Center is another great venue where you can discover the history and culture of Florida. Located on Old Water St., it offers lots to see as well as hands-on exhibits.

The David A. Straz Center for the Performing Arts is a premier theater showcasing national touring companies. "Newsies" is scheduled to be at the Straz Nov. 10–15.

The Tampa Bay Lightning, just coming off a fantastic 2014–2015 season, is scheduled for a home game against the Sabres at the Amalie Arena on Nov. 10. Hockey fans may want to see the Lightning in action. The Tampa Bay Buccaneers have a home game with the New York Giants on Sunday, Nov. 8.

Children will have a great time at the Lowry Park Zoo. Chosen by *Parents and Child* magazine as the best zoo in the United States, the Lowry Park Zoo displays over 1,500 animals. It definitely offers a wonderful experience for the entire family.

The Glazer Children's Museum is another family-friendly place to visit. More than 170 interactive exhibits give children a place to learn about science, math, and reading while having the best time ever.

Tampa is also home to MOSI — the Museum of Science and Industry. Kids will love to explore the more than 450 hands-on activities, including a driverless vehicle, Mission: Moonbase, Saunders Planetarium, Backwoods and Bio Works Butterfly Garden, and an IMAX Dome.

The Florida Aquarium and Busch Gardens, Tampa are also great places to take the entire family — or just some fellow kids-at-heart. The aquarium features aquatic creatures like penguins, sharks, and alligators, just to name a few. Busch Gardens is not only known for thrilling roller coasters and rides, but also for the animals that inhabit the park. Come and say hello to the giraffes, zebras, cheetahs, gorillas, and chimpanzees that call Busch Gardens, Tampa, their home. See you soon in beautiful Tampa! ■

Ferg's LIVE is the Tampa-sister to the Famous Ferg's in St Petersburg, home of the Tampa Bay Rays. Place for pregame tailgating, at it's finest!

Thunder Alley! The Amalie Arena's home of many Stanley Cup playoffs and finals fan watch parties

Splitsville, in Channelside — Family fun with bowling and food

Students Step Up by Stepping Out

Engaging in activities outside of the classroom builds professionalism

by Debbie Bunch

Going to class and clinicals is expected of every RT student. To succeed in the real world, however, students need to cultivate a significant level of professionalism as well — and getting actively engaged in something above and beyond what is required can help build the confidence they need to shine once graduation is over and life begins in earnest. As the following stories show, opportunities to get engaged come in many shapes and forms.

Students and delegates gather for a "photo op" at the 2014 HOD meeting in Las Vegas.

Mentoring Leaders for the Future

Every professional association needs leaders, but making sure there are enough people with the drive and talent to assume these roles is a challenge. Several years ago the AARC House of Delegates (HOD) decided one way to foster leadership for tomorrow would be to bring in RT students to attend their bi-annual meetings today.

A growing program

The initiative was launched by John Steinmetz, MBA, RRT, as an informal mentoring exercise back in the early 2000s and grew over the years into what is now a formal Committee for Student Mentorship. Since recordkeeping began in 2011, 113 respiratory therapy students have traveled to HOD meetings, where they got the chance to sit in the room as delegates debated the pressing issues of the day.

"The goal is for students to become inspired to go back to their states and become more involved at the state level," says Committee Chair Kerry McNiven, MS, RRT. "We hope that this opportunity will spark a lifelong love of the AARC and their profession and that it will translate into continuing AARC membership as they see firsthand the individuals who volunteer for their benefit and on their behalf."

Over the years, she and her co-chair, Dana Evans, MHA, RRT-NPS, have grown to believe that goal has been met and more, as students who have attended have expressed a desire to remain engaged in the Association. "We have even had students tell us that one day they hope to be the AARC president!"

Students pay it forward

Beth Wilson, BS, RRT, attended the 2013 meeting in Anaheim and says it was "the most positive and influential event I could have experienced as an RT student." As the session progressed, she had the chance to learn much more about key issues facing the

profession and was impressed by the way the delegates approached their task of passing resolutions aimed at improving the professional outlook for RTs.

"By the end of the second day, there was a moment where anyone could get up and say whatever they'd like — including students," she recalls. "I was nervous, but I got up and spoke at the microphone. It all happened so fast that I can barely remember what I said; but by the end of it, I had a standing ovation from the delegates." Receiving that positive feedback from leaders in the profession was just what she needed. "I knew after attending the meeting that I had chosen the right profession," says the RT. "I love my career and am grateful for the delegates at the HOD meeting for showing me how much more fun my job can be when I am enthusiastic and engaged."

As a student attendee at the 2011 meeting in Tampa, Ivan Lee, BHS, RRT-NPS, who came to this country from Singapore to study respiratory care at the University of Missouri, says he gained a greater perspective on the profession as a whole and enjoyed witnessing the intricacies involved in the decision-making process. "It's literally history in the making, and it's exciting to be able to be immersed in this experience," he says.

Even though Lee is no longer in the United States, his AARC membership remains important to him; and he's also putting the mentoring experience he had as a student to good use in his new role as a practicing therapist back in Singapore. "In my department where I work, we are actively engaging students who are considering a career in respiratory therapy," he says. "The student mentorship committee in the HOD meeting has inspired me greatly, and I definitely want to pay it forward." ■

Ivan Lee is paying it forward by helping to recruit new people to the profession back home in Singapore.

Medical Mission Delivers Priceless Experiences

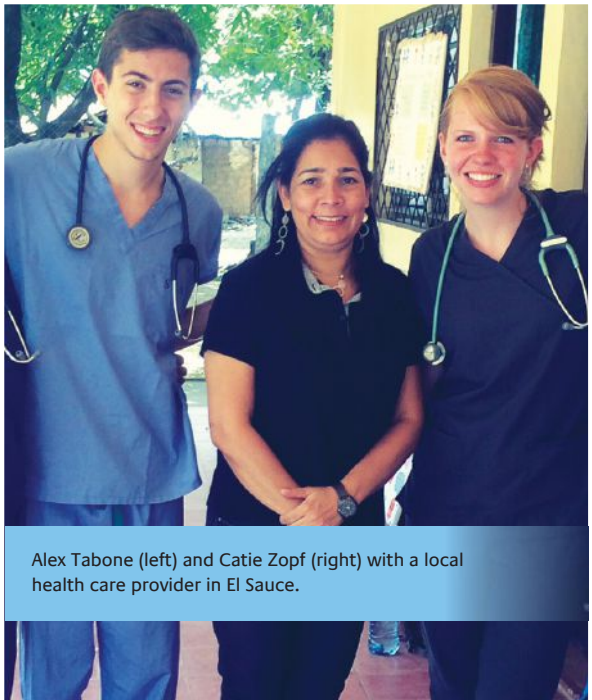
When Catie Zopf, RRT, and Alex Tabone, RRT, heard a respiratory care student at SUNY Upstate Medical University in Syracuse, NY, talk about a trip he had made to Nicaragua to help people in medically underserved areas, they knew it was something they wanted to do, too.

"We were immediately interested in going on the next trip," says Zopf, who graduated from the SUNY program along with Tabone last spring. Turns out the next visit was coming up in mid-July of 2014, and the Enlace Project (a nonprofit organization located in Nicaragua that promotes the trips to facilitate economic development in the city of El Sauce) was still looking for volunteers. Both of these newly minted RTs say it was an experience they'll never forget.

Getting to work

Tabone says the first leg of the journey took them to the capital city of Managua, where they spent the first night. The next morning it was on to El Sauce, a mid-sized town of about 30,000 located in the foothills of the Segovia Mountains. The Upstate group, which consisted of the two RT students plus eight medical students, was housed with host families in the area and quickly threw themselves into the work at hand.

"We worked alongside Nicaraguan physicians to treat natives in medically underserved areas," says Tabone. In addition to performing basic assessments, they were charged with helping to diagnose a range of infections; and they worked with women's and children's health as well, performing wellness exams, measuring fundal height, and finding fetal heartbeats.



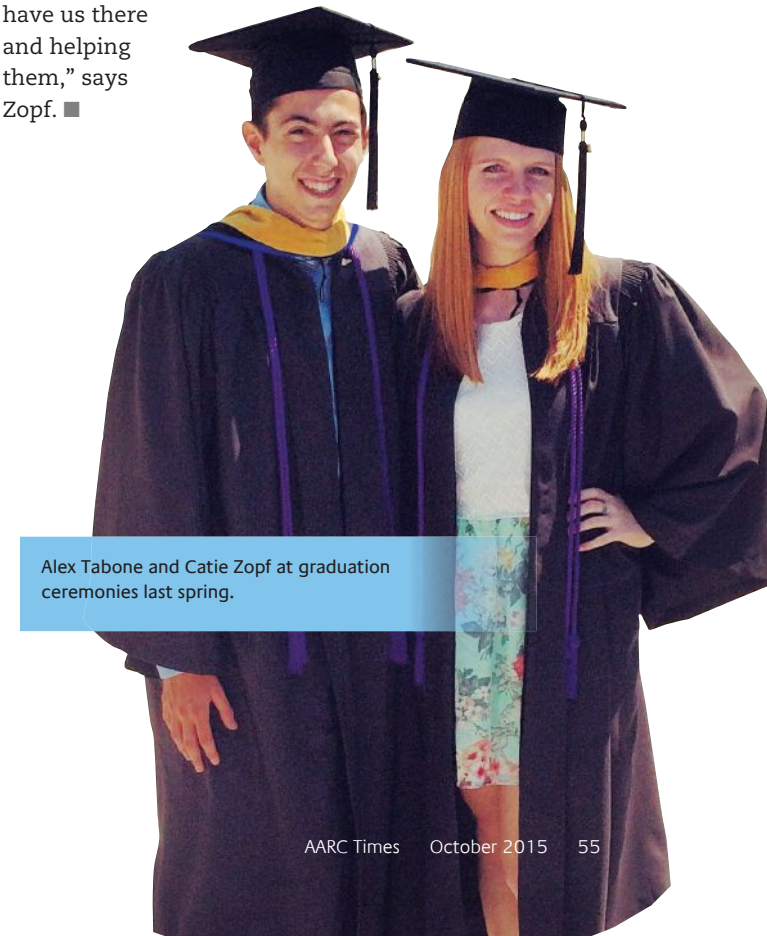
Alex Tabone (left) and Catie Zopf (right) with a local health care provider in El Sauce.

"We also worked on suturing, bandaging, and injection techniques," says the recent graduate. "It was nice to put some of our respiratory skills to good use while also learning more about medicine for the entire body."

Zopf agrees the hands-on experience they got was priceless, but health care wasn't the only thing they became engaged with during the two-and-a-half week trip. "Aside from medically related things, we helped teach an English class to the community and played basketball with the locals," she notes. They also took a weekend trip to Los Altos de Ocotal, where they ended up bonding with the children in the town. "Although there was a language barrier, we played soccer and tag with them and met their families and stayed with them for a night. They seemed overwhelmingly accepting of us and happy to have us visit their homes, which was incredibly endearing for a bunch of foreigners!"

A learning experience

Going on this medical mission while still students in respiratory school taught both of these new therapists what it means to help others — and how important their medical skills are to people everywhere. "People receiving health care seemed extremely thankful to have us there and helping them," says Zopf. ■



Alex Tabone and Catie Zopf at graduation ceremonies last spring.

Huffing and Puffing for a Good Cause

As president of his respiratory care class at Bowling Green State University Firelands in Huron, OH, this past school year, Dylan Kadow was charged with ensuring his classmates completed the hours of community service required in the program. He could have just found a place for everyone to volunteer, but that would have been too easy for this self-proclaimed ambitious young man.

"I thought 'let's do a race' — but me being ambitious, I thought it would be even cooler to put on an obstacle course race." He ran with that idea, and the event took place last spring, with the American Lung Association (ALA) as the benefactor.

A group effort

Kadow, who plans to graduate in December, says it wasn't easy. "It was an unbelievable amount of effort to carry out this event. I worked on it at least 40 hours a week, on top of school, clinicals, and my other job." Since the college wasn't able to sponsor the race, the first thing he did was start his own company, Huff and Puff Respiratory Race LLC, to provide the general oversight. Then he got busy on everything from designing and building the actual course to planning for the insurance that would be needed to host the event and taking care of all the logistics. He also set up a website for the event, www.huffandpuff.org, and attracted several sponsors who helped with some of the expenses incurred along the way.

He credits several people for helping him make it all possible. His sister, Jessica George, is active in organizing events in Cleveland and lent her expertise on the finer details involved. His boss, Lee Klingshirn, pitched in on everything from building the actual course to providing the venue (his Klingshirn Winery in Avon Lake).

His RT classmates rose to the challenge, as well. "They made signs and were always there when I asked them to help out," says the student. The city of Avon Lake provided local police to block off the route and also supplied school busses for transportation, and his friends and family were there for him too, offering both physical and emotional support as the big day neared.

Next year already in the works

By the time the race began on May 16, more than 90 runners were signed up to participate — and about 100 spectators had gathered to cheer them on. "The spectators got to enjoy a wine tasting by the Klingshirn Winery, Barrios Food Truck (Cleveland's No. 1-rated food truck), a petting zoo, face painting, a DJ with a 20-foot bus, and a hay ride that took them on a ride throughout the course," says Kadow. Feedback from participants was positive. "Frequent obstacles and challenging aspects of the course broke up the race and made it enjoyable. At the end of the race I wanted to run it again!" said one runner — and Kadow plans to make the race an annual event, with the ALA remaining as the beneficiary.

"Hopefully, we will grow to become bigger and bigger each year so we can donate more each time!" ■

Dylan Kadow's Huff and Puff obstacle course kept participants on their toes.

RT student Clay Sawyer works with HUG patient Mel Olson while Kathryn Patterson looks on.

Give Me a HUG

Respiratory care students learn a lot during their clinicals, but most often what they're learning is how to care for patients suffering from an acute exacerbation of their disease. Patient education and rehabilitation are just as important, but in many areas of the country these services are hard to come by. Faculty members in the respiratory therapy program at GateWay Community College in Phoenix, AZ, have found a way to ensure their students get to see the other side of respiratory care while simultaneously helping patients in need.

Holistic perspective

"Our students have very little interaction with chronic pulmonary disease patients outside of the acute care facility. As a result, they have a tendency to see the pulmonary patient only from the perspective of acute exacerbation," explains Program Director Toni Rodriguez, EdD, RRT, FAARC. "Because today's graduates must possess an holistic perspective and skill set in the management of patients with pulmonary disease across the care spectrum, we chose to partner with the HUG Clinic."

Operated by the college to serve as an integrated learning experience for physical therapy and sonography students, the clinic was happy to add pulmonary rehabilitation to the mix. "The clinic is an opportunity for both students and the community to benefit from services that are not readily available in our area," says Kathryn Patterson, BS, RRT, an instructor in the program who assists her students in volunteering with the pulmonary rehabilitation patients at the clinic. "The community benefits with free services that they would not otherwise have access to."

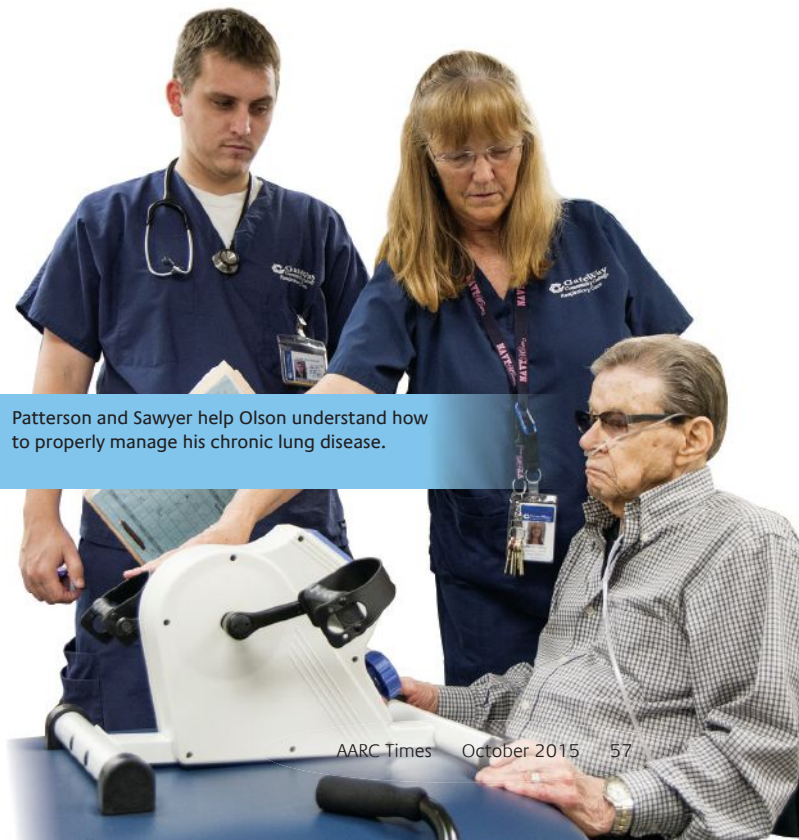
One-on-one

The pulmonary rehab program operates two days a week during the fall and spring semesters, and two students and one faculty member are paired with each group of four patients. Students monitor the patients before and after exercise, and they also prepare presentations on topics of interest to the patients to present in between the exercise sessions.

Patterson says students who participate in the clinic learn to talk with patients individually in ways that usually aren't possible in a hospital setting. "Seeing them in street clothes makes them realize that they have a life and are not just patients," she says. "Comments I hear from students are things like: 'Wow, it took everything they had just to get in here'; 'That breathing technique really works for them, but I need to remind them'; and 'The exercise really makes a difference!'"

Dr. Rodriguez adds that having the students in the clinic gives the patients a real psychological boost as well. "The patients love talking and joking with the students. The one-on-one attention they receive lifts their spirits, and they love contributing to the education process."

One patient was so impressed with the care she received from the GateWay students, in fact, that she actually attended this year's graduation ceremony. "They treated her like a VIP," says Patterson. ■



Patterson and Sawyer help Olson understand how to properly manage his chronic lung disease.

Advocating for Respiratory Therapy: A Student's Experience

by Nicholas Clayton, BS, RRT

This past March I had the opportunity to fly to Washington, DC, to meet respiratory therapists and respiratory care students from all over the country who had gathered for the AARC's annual Capitol Hill Advocacy Day. Over a hundred of us convened at the Crystal City Hilton to strategize advocacy for the Medicare Telehealth Parity Act and related legislation. Our goal was to obtain congressional co-sponsorship for the bill with the desired outcome of improving outpatient access to respiratory therapists and other allied health professionals.

As a penniless college student from New York, I was able to attend the event because of financial support from the New York State Society for Respiratory Care (NYSSRC). That is to say, they paid for my transportation, food, and hotel room — which, by pure luck, happened to be an executive suite and was much appreciated after a long morning of air travel. This generosity stemmed from an essay contest sponsored by the state society, which I had won in February. The contest rules entailed writing about the importance of involvement in my professional organization, why I wanted to participate in the Washington, DC, event, and how I would contribute if I were to attend.

Nicholas Clayton, BS, RRT, graduated from Stony Brook University in Stony Brook, NY, last summer.

FINDING A MENTOR

In my essay, I stated that the AARC plays a major role in promoting the recognition of respiratory therapists as specialized health care professionals who provide unique, valuable services to their patients. I wanted to join the lobbying effort because I sought to become more knowledgeable about politics and the issues that affect my profession. I also indicated that I had a strong interest in building a better future for my patients and my colleagues.

Sheri Tooley, BSRT, RRT-NPS, FAARC, a therapist from Rochester, NY, and the NYSSRC chair for government affairs, was the first to congratulate me on winning the contest. She became my mentor and helped me prepare for the trip. She encouraged me to contact my own congressman, Lee Zeldin, and schedule a meeting in advance. I was nervous at first about corresponding with Zeldin's office, but his staffers were friendly and accommodating. I was even more nervous about the prospect of meeting a member of Congress by myself, but Sheri assured me that she and other therapists with lobbying experience would accompany me.

March 17 was the day I arrived in Washington, DC. Sheri met me in the hotel lobby and vibrantly introduced me to the other RTs. Everyone I met had a warm disposition and seemed genuinely enthusiastic about being there. We took our seats in the hotel's conference hall and listened to several presentations about telehealth, the Medicare Telehealth Parity Act, and strategies for approaching congressional members and their staff.

The concept of telehealth was new to me, but I quickly understood its significance in the future of health care. The general idea is that telecommunications technology can allow for quality medical services outside of a clinic. Such services include educating and evaluating patients and managing their health

to prevent frequent hospital readmissions. Various studies support the efficiency, efficacy, and safety of telehealth services in managing chronic diseases such as COPD. The Medicare Telehealth Parity Act would allow respiratory therapists, physical therapists, occupational therapists, audiologists, speech-language pathologists, and certified diabetes educators to receive compensation for providing telehealth services. Learning about telehealth opened my eyes to growing needs in health care, particularly with the steady paradigm shift to outpatient care and the major role of RTs in satisfying those needs.

THE MEETINGS BEGIN

On March 18, I went to Capitol Hill with Sheri and Ron Jacobs, MBA, RRT-NPS, another respiratory therapist from New York. In our first appointment, we met with staff in the office of Sheri's newly elected congresswoman, Elise Stefanik. Stefanik's legislative aide on health care was new as well, but he listened with an open and inquisitive mind.

Sheri did most of the talking, but I supplemented her with my own experiences from clinical rotations. I mentioned that I had met many patients with COPD who frequently returned to the hospital. Many of these patients didn't understand their illness and demonstrated improper use of their inhalers. It seemed like strong evidence that patients can suffer due to inadequate education because of poor outpatient access to respiratory therapists.

The staffer took an interest in our cause and arranged for us to meet Rep. Stefanik. He escorted us to where she was having a committee meeting, and she came out during recess to talk with us. She was wholly engaging and immediately understood the relevance of telehealth to her very rural district, where many people face long commutes to hospitals. She stated that she wanted to explore new approaches to health care and that she would definitely look into our bill.

Meeting the personable Rep. Stefanik made me feel optimistic about enacting change and dispelled much of my anxiety about lobbying. Other appointments included the offices of a senator and two more congressmen. AARC President Frank Salvatore, MBA, RRT, FAARC, joined Sheri, Ron, and me in Lee Zeldin's office for the finale. We first talked with a staffer, who expressed some familiarity with respiratory therapy and respiratory medications due to his father being a pharmacist and his grandfather taking nebulizer treatments. The congressman himself met us at the end and agreed to a group photograph. We learned that his office had previously collaborated with the staff of California Congressman Mike Thompson, who was a key figure in drafting the Medicare Telehealth and Parity Act. We left with the impression that there would be further communication between the two offices regarding issues we raised.

A VALUABLE EXPERIENCE

By the end of the day I felt more comfortable about the political process and had a greater appreciation for the legislation we advocated for. The elected officials and their assistants seemed to understand the value of telehealth and broadening access to respiratory therapists and other providers. I felt that I could return home and confidently share what I had learned with my classmates and encourage them to participate in advocacy for respiratory therapy.

During my time in Washington, DC, I enjoyed meeting enthusiastic RTs who care so greatly about promoting patient welfare and advancing their profession. Everyone I met was friendly and eager to answer all my questions about politics and beyond. I even received some coaching in professional development, learning tips about writing a curriculum vitae, and polishing my interview skills. I had many opportunities to network and discover multiple career options in respiratory care. Meeting so many dedicated people made me proud to be part of such a worthwhile profession. I can't speak highly enough about how valuable this experience has been for me. ■

Now That's Cool!

Beth Wilson was sitting in a lecture at a Utah Society for Respiratory Care conference during her last year in the bachelor's degree program at Weber State University when the speaker, Dr. Michael Gallindo, said: "You know, it would be cool if someone started a COPD support group."

Turns out, there wasn't one in her part of the state; and Dr. Gallindo's comment struck a chord. "From that moment on, I couldn't stop thinking about the idea," says the recent graduate, who now works as an RT at Intermountain Health in Salt Lake City. "I would find myself waking up in the middle of the night with ideas on how we could structure the group and what we could teach people."

A team effort

Of course, lots of people have great ideas that never get past the wool-gathering phase. Not so for Wilson. She enlisted the support of fellow student Michelle Williams, BS, RRT, and the two decided to team up the support group with an assignment in one of their classes calling for them to spend a minimum of 30 hours promoting health in the community. Before it was all over, a third classmate, Trenton Ridges, BS, RRT, came on board to add a Spanish language component to the effort.

Beth Wilson (center) started the COPD support group with fellow students Michelle Williams (left) and Trenton Ridges (right).

"In order to divide up the work and play to our strengths, Williams took on the public relations responsibilities and Ridges translated all of our materials from English to Spanish and taught all of the Spanish-speaking meetings." Wilson did most of the clerical work involved, such as creating business cards, developing contact information sheets and consent and waiver forms, creating surveys to track outcomes, and taking care of accounting. All three students worked on lesson planning, teaching, logo design, grant and abstract writing, and giving presentations on the results of their research.

The group initially met at an area hospital but — as time went on — transitioned to a local nonprofit clinic where patients would have less distance to walk to get to the classroom. Since the clinic already saw a lot of low-income patients and, particularly, low-income Spanish-speaking patients, it proved to be the perfect venue to increase participation in the group. Weber State faculty members Lisa Trujillo, DHSc, RRT, and Janelle Gardiner, DHSc, RRT, AE-C, pitched in as well, finding new ways for the students to get the word out to the community and acquiring local grants to support the initiative.

Outcomes tell the story

The support group met twice a month, with one session devoted to English-speaking patients and the other to Spanish-speaking patients. The three respiratory therapy students would contact attendees the night before, reminding them about the meeting; and they also received support from Alpine Home Medical, which graciously volunteered to bring in healthy snacks to help promote attendance. Outcomes were tracked via the surveys, which patients filled out during their first meeting and then again every third meeting. Kim Bennion, MHS, RRT, who oversees quality assurance for respiratory therapy at Intermountain Health, guided the students through the design of the surveys to ensure they would capture meaningful information.

"The most success we tracked with one patient was with his home oxygen use," says Wilson. "When he first began attending the meetings, he wore a six-liter nasal cannula continuously and could walk only about one hundred feet at a time before having to take a break." After attending just four of the support group meetings, he was able to reduce his oxygen to two liters on exertion and one liter during rest.

Says Wilson, "We were thrilled with his improvements and felt a tremendous amount of gratification from our work."■

PARTNERS IN COPD
EDUCATE. CONNECT. PREVENT.

This logo was designed by the three students specifically for the COPD support group.

RC Currents

Respiratory Care Week 2015

Respiratory Care Week — Oct. 25–31 — is that special time of year when you and your respiratory care colleagues are honored for your contributions and for improving patients' lives. This year's theme, "Respiratory Care — Changing the World One Breath at a Time," reflects the commitment of RTs to respiratory health and awareness. Use this week to share your enthusiasm in your chosen profession by planning events for recognition, fun, and awareness with your respiratory therapy team, your patients, your community, and local students.

Online resources are available to help you plan your team events, health fairs, and festivities. As the official sponsor for Respiratory Care Week, the AARC provides a useful website at **www.AARC.org/rcweek** where you can get event ideas, planning tips, photo sharing, and more. Themed products for RC Week are also available at the Official 2015 RC Week Store **www.jimcolemanstore.com/rcweek** operated by AARC partner Jim Coleman, Ltd. Here you'll find everything you need for RC Week events: t-shirts, banners and gifts.

Stay tuned in October for the release of AARC's special **RC Week discount code** that you can use for one of our most popular CRCE courses. It's AARC's way of saying "thank you" for all you do as a dedicated RT. ■

AARC Names Kimberly Turner Director of Legislative Affairs

Kimberly Turner, JD, has joined the AARC as director of legislative affairs. She has over 17 years of experience as a government relations attorney and strategist in state and federal legislative affairs and congressional advocacy. Turner previously worked as the legal counsel to the governor of New Jersey and as a partner at a Washington law firm.

Turner will give a voice to Association members and to patients by increasing their presence on Capitol Hill. She will also work on important regulatory matters with key health agencies. Based in Washington, she will interact with members of Congress as the AARC's advocate on Capitol Hill. ■

Check Out the AARC New Members List Online

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

AARC Board of Directors Sets Degree Goal

The AARC Board of Directors (BOD) met in Phoenix, AZ, recently and continued making progress on actions to move the Association and the profession forward, as momentum builds on strategic goals and professional direction projects. Revising its former goal for bachelor's degrees held by respiratory therapists, the BOD made a statement aspiring to 80% of practicing RTs having earned or being actively working on a bachelor's degree by 2020. The most recent survey shows this to be 65% at this time.

To assure the profession is on track to meet that goal, interim surveys and evaluations will be done leading up to 2020 to measure that forward growth is being realized.

Many factors impact how quickly the profession can move to a bachelor's degree minimum, including the number of respiratory care educational programs. Currently there are 22 states with no bachelor's educational programs. While a necessity to move the profession forward, a bachelor's degree minimum could create some initial barriers or obstacles with a more rapid implementation.

"This is a bold goal, but we will not leave our profession hanging without help," said Frank Salvatore, MBA, RRT, FAARC, AARC president. To help RTs attain higher levels of education, a workgroup is developing toolkits. One will assist schools to transition from associate to bachelor's programs. The other will assist RTs in seeking degree advancement programs.

These toolkits are coming from one of five workgroups that are actualizing the strategic goals of the Association. Input is still being sought from the membership on these goals and is being collected for use in planning. We invite you to provide input by clicking on www.aarc.org/aarc-bod-sets-80-bachelor-degree-goal-by-2020/. ■

Draeger Donates Ventilators to Raffle Benefiting RT Schools

During the AARC Summer Forum Education Section meeting in Phoenix last July, Draeger Medical Inc., an AARC Corporate Partner, donated 10 ventilators featuring advanced ventilation modes to a special raffle for respiratory therapy schools.

"Institutions of higher learning that offer respiratory care education are on the frontlines of training the next generation of dedicated respiratory care professionals," said AARC member Edwin Coombs, MA, RRT-ACCS, FAARC, director of marketing for Draeger's intensive care and neonatal care division. "Providing the latest technology in mechanical ventilation fosters a great learning experience in the lab setting for RT students and better prepares graduates for the workforce." ■

Dräger

New AARC Virtual Museum Galleries Make Their Debut

Two new galleries have recently been added to the AARC Virtual Museum. Head over to Early ICU Ventilators (http://museum.aarc.org/gallery/early-icu-ventilators) to scroll through a pictorial timeline showing how these life-saving devices developed from the 1950s through the 1970s. Photos range from the 1954 Mueller Morch Respirator (used with polio patients as an alternative to the iron lung and designed to fit under a hospital bed), the iconic Bird Mark 7 (developed by Dr. Forrest Bird and widely considered to be the first true modern respirator), to the mid-1970s Emerson 3PV + PEEP. Depending on how long you've been in the profession, you might even see an RT or two you recognize from back in the day as well.

From the first inhaler developed by John Mudge in 1778 to the kid-friendly nebulizers on the market today, asthma management has come a long way; and our Asthma Management gallery has the whole story (http://museum.aarc.org/gallery/asthma-management/). Some of the more unique displays:

- an advertisement circa 1890 claiming "asthma cigarettes" could treat the condition,
- the first paper describing the use of heliox in 1936,
- the introduction of adrenalin in 1947 and metered-dose inhalers in 1955,
- and the launch of the National Asthma Education and Prevention Program in 1989.

AARC Virtual Museum

These new galleries join existing galleries on everything from the legends of respiratory care to intermittent positive pressure breathing, medical gas systems, negative pressure ventilation, and more. ■

Bring it to life with AARC + Edison NATION MEDICAL

Submit Your Idea To Improve Mechanical Ventilation

The AARC and Edison Nation Medical, the premier health care innovation marketplace, encourage AARC members to submit ideas on improving mechanical ventilation.

Edison Nation Medical brings 12+ years experience working with individuals and small businesses to commercialize their innovation ideas. Do you have a great product idea for improving mechanical ventilation? Submit your idea today! If your idea is selected for development, you will receive an advance of $2,500, 50% of licensing royalties, and be named as the inventor on any patent application.

To learn more or to submit your mechanical ventilation idea, go to http://c.aarc.org/go/edisonvent ■

AARC Leaders Attend Meetings

Throughout the year, AARC leaders and members of the Executive Office staff attend meetings of the Association's state societies as well as other special meetings. In addition to making AARC representatives available for speaking engagements at meetings, the Association funds a special program to help some state societies partially pay for the travel costs of the speakers. Below are some activities AARC representatives are involved in:

Frank R. Salvatore, Jr., AARC President

- Speaking on Advancing the Profession Beyond 2015 at the Arkansas Society for Respiratory Care Conference in Hot Springs, AR, Sept. 30.
- Speaking twice at the Indiana Society for Respiratory Care Conference in Indianapolis, IN, on Oct. 9.
- Speaking twice at the Virginia Society for Respiratory Care Mountain Air Symposium in Blacksburg, VA, on Oct. 22.

Shawna Strickland, AARC Associate Executive Director of Education

- Speaking at the Western Regional Conference of the Pennsylvania Society for Respiratory Care on Oct. 29 in Mars, PA.

Don't Miss Your Chance for a Free Membership Renewal!

AARC Times is looking for creative AARC members to enter our AARC Photo Contest. Finalists will receive a **free** one-year membership renewal with the chance of their photo being chosen and featured on the cover of a 2016 *AARC Times* issue. For information on how to enter, go to www.AARC.org/resources/publications/aarc-times and click on the "Photo of the Year Contest" link. Deadline to submit photos is **Nov. 10, 2015.** ■

Contribute to Our "Transitions" Column

The AARC "Transitions" column is devoted to sharing news about the passing of AARC members. You can submit news about your colleagues' 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. ■

Get Involved with Peak Performance USA

by Shawna Strickland, PhD, RRT-ACCS, FAARC

The prevalence of asthma continues to rise in the United States. Approximately 25 million Americans have asthma, and almost half of those people suffered a severe episode in the last year. The direct costs from doctor visits, medications, hospitalizations, and ER visits added to the indirect costs of missed work; and missed school days add up to about $56 billion each year.[1] About 8.3% of children have been diagnosed with asthma, and most are school-aged. A 2005 study published in *The Journal of Pediatrics* cited asthma as the leading cause of missed school days.[2]

Empowering children with asthma and their families to manage the child's asthma can lead to improved health and fewer missed school and work days as well as reduced health care costs. It is ideal for these interventions to be provided in the school, as this is where the child spends a large portion of the day. Research has demonstrated that models of asthma education provided in schools are effective to provide education and reduce the burden of asthma.[3] Knowing that taking asthma education to schools is an effective learning model, the AARC developed the Peak Performance USA program.

AARC's Peak Performance USA is a free program that provides structured education to improve asthma self-management. Health care providers offer this national asthma awareness program within the school to reach the child, the family, and the school staff. It focuses on improving everyone's knowledge of issues such as being aware of asthma signs and symptoms as well as how to respond to exacerbations; understanding which triggers are problematic for the child and how to avoid them; and promoting a positive, supportive environment in which the child can learn and grow.

Many RTs from respiratory therapy departments across the United States have implemented Peak Performance USA in the schools in their communities and continue to provide this necessary education. The Peak Performance USA program provides an exceptional amount of asthma information and resources. For each school registered, the respiratory therapy department will receive a demonstration kit that includes valved holding chambers, peak flow meters, and other essential training materials. The program's website contains pre-developed presentation slides, patient forms like asthma action plans and peak flow trending charts, and asthma guides to help the child, family, and school staff in their quest to control asthma. The website also has valuable information for families, including links to groups that can help people who lack prescription coverage get their asthma medications.

RTs can partner with parents of asthmatics in their area to use AARC's Peak Performance USA website to request the assistance of an RT to work with the child's school and establish a positive environment and provide the necessary education for asthma self-management.

Visit http://www.peakperformanceusa.info/ today to learn how to establish this successful and vital program in your community. Providing such programs benefits both the community and respiratory care professionals who want to help through community service. ■

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3. Cicutto L, Gleason M, Szefler SJ. Establishing school-centered asthma programs. J Allergy Clin Immunol 2014; 134(6):1223–1230.

Dr. Shawna Strickland is associate executive director of education at the AARC, headquartered in Irving, TX.

Transitions

Francis Ross Payne, Jr., RRT, passed away last June at the age of 70. A long-time member of the AARC, Payne was one of the first Registered Respiratory Therapists in the state of Arkansas. He started two RT educational programs in the mid-1970s and worked on standards developed for respiratory care education programs. Payne was also an active member of his state society and was appointed to serve as chair of the Respiratory Care Licensure Committee for the state of Arkansas by then-Governor Bill Clinton. ■

Secondhand Smoke Also Implicated in Stroke

Secondhand smoke (SHS) is a known risk factor for cancer and other diseases in nonsmokers. Now researchers from the University of Alabama at Birmingham also find it is directly responsible for some incidences of stroke in people who don't smoke.

Using data from the Reasons for Geographic and Racial Differences in Stroke study, investigators found secondhand smoke exposure over the past year in 23% of nearly 22,000 participants. During the nine-year study period, 428 reported experiencing a stroke. Exposure to secondhand smoke raised the risk of stroke by 30%.

"Future research should focus on whether SHS exposure among former smokers further impacts their risk of stroke, the relationship between SHS exposure and hemorrhagic strokes, and the interaction between SHS exposure and other environmental exposures such as ozone or particulate matter," study author Leslie McClure, PhD, was quoted as saying. The study was published in a recent issue of the *American Journal of Preventive Medicine*. ■

Strange But True...

Gulp! Chinese physicians thought a 32-year-old man who came to them complaining of constant coughing might have a tumor. Imagine their surprise when surgery revealed a pen cap stuck in his bronchial passageway instead. It turns out the man had swallowed the cap in primary school some 20 years before.

The teeth will tell: A new study out of Europe and the Middle East is shedding some light on respiratory irritants faced by people who lived some 300,000–400,000 years ago. By analyzing dental plaque extracted from the teeth of three Lower Palaeolithic hominins who were sealed in a cave in Israel for 200,000 years, they found prehistoric people were exposed to smoke from fires. They also faced respiratory irritants and allergens such as fungal spores and pollen.

High-tech pill dispenser: Getting patients to take their medications on time and in the right doses is a challenge that might be overcome by a new pill dispenser developed by mechanical engineering students at Johns Hopkins. The electronic device requires a fingerprint scan and only opens to dispense the correct dosage during the correct timeframe in which it needs to be taken. It's impervious to attempts at break-ins as well. Even attacking it with a drill won't open it up, ensuring overdoses are a thing of the past.

Twitter roadmap: University of Vermont researchers are using Twitter to identify potentially dangerous drug interactions and side effects years before they show up in standard databases. By using the #hashtag links that tie them together, they can search millions of tweets related to the names of drugs and medicines and then build a map showing how they're connected. ■

RT Student Members: Send Us Your Stories

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

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

MERS Prevention and Treatment Therapeutics Look Promising

Middle East Respiratory Syndrome (MERS) has killed more than 400 people since it began three years ago. Now scientists at the University of Maryland School of Medicine and Regeneron Pharmaceuticals Inc. have found two therapeutics that show early promise in preventing and treating the disease. They described the two antibodies, REGN3051 and REGN3048, in a study published in a recent issue of the *Proceedings of the National Academy of Sciences*.

The therapeutics are the first-ever possible treatments for MERS, which has a death rate as high as 40%. ■

Updated International Guidelines for IPF

Four major medical societies from around the world recently published updated guidelines on treating idiopathic pulmonary fibrosis (IPF). Issued by the American Thoracic Society, the European Respiratory Society, the Japanese Respiratory Society, and the Latin American Thoracic Association, the guidelines reflect new evidence since the initial guidelines were first published in 2011. The updated guidelines appeared in the *American Journal of Respiratory and Critical Care Medicine* last summer.

"Our systematic review of the available evidence on IPF treatments points to the need for additional research and long-term studies of their safety and efficacy. This is especially true for treatments that received conditional recommendations in the guidelines," guidelines committee chair Ganesh Raghu, MD, was quoted as saying. "The guidelines

empower the clinician to make the most appropriate treatment choices for the patient confronted with IPF and encourage shared decision-making with the well informed patient to choose the most appropriate treatment options tailored to the individual patient's needs." ■

Gene Therapy Helps CF Patients

A phase 2 randomized trial published in *The Lancet Respiratory Medicine* last summer found a significant improvement in lung function among cystic fibrosis (CF) patients who received a form of gene therapy to treat the condition. The technique uses inhaled molecules of DNA to deliver a normal working copy of the defective gene responsible for CF in the lung cells.

Coordinated by the United Kingdom Cystic Fibrosis Gene Therapy Consortium, the two-year study involved 136 CF patients aged 12 years or older from across the UK. Participants were randomly assigned to either 5 mL of nebulized pGM169/GL67A or saline at monthly intervals over one year. After a year of treatment, FEV_1 was 3.7% greater in the 62 patients who received the gene therapy. However, in the half of patients with the worst lung function at the start of the study, there was a doubling of the treatment effect, with changes in FEV_1 of 6.4%.

The gene therapy was well tolerated, with patients in the treatment and placebo groups experiencing similar rates of adverse events. ■

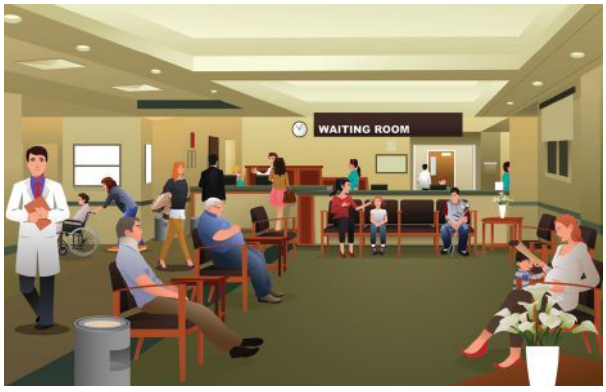
E-cigarette Ads May Be Luring Kids into Smoking

One of the main reasons why cigarette advertising on TV was eventually banned years ago was because health experts believed such ads were luring children into smoking. It appears the same thing is happening today with e-cigarette ads on the small screen.

Researchers from RTI International conducted a randomized, controlled trial involving 3,655 U.S. adolescents who had never used e-cigarettes. Those who were exposed to four e-cigarette TV ads reported a 50% higher likelihood of future e-cigarette use than those not exposed to the ads. Positive attitudes about e-cigarettes were also more common in the advertising group, with these kids deeming the devices cool, safe, fun, healthy, and enjoyable.

Study author Matthew Farrelly, PhD, was quoted as saying, "The lack of restrictions on e-cigarette advertisements, which can be seen anywhere from Comedy Central to the Super Bowl, could have significant implications for the rates of e-cigarette use among adolescents and their health." The study appeared in a recent edition of the *American Journal of Preventative Medicine*. ■

Minimizing the Impact of Preventable COPD and Asthma Exacerbations



Minimizing health care costs for potentially preventable conditions like COPD and asthma exacerbations may not be as easy as it sounds for people on both Medicare and Medicaid. They found that while efforts to increase access to primary care among these dual-eligible individuals did result in fewer hospital admissions, it actually increased the number of ER visits.

Why? The investigators believe better primary care in general simply made the people more likely to seek out care earlier in an episode; and for them, the ER was often the most convenient place to go because it is always open. The finding held true across racial groups in the study performed by University of Iowa researchers published in a recent online issue of *Health Affairs*. ■

Therapeutic Plasma Changes Help IPF Patients

U.S. investigators who treated patients suffering from acute exacerbations of idiopathic pulmonary fibrosis (IPF) with autoantibody-targeted therapies similar to those used to treat autoimmune diseases like rheumatoid arthritis and lupus reported promising results in a recent issue of *PLOS ONE*.

Eleven patients were treated with therapeutic plasma exchanges and a biologic drug called rituximab, supplemented in later cases with intravenous immunoglobulin. Outcomes among the trial subjects were compared to those of 20 historical controls treated with conventional steroid therapy prior to the trial. Nine of the trial subjects showed improvement in pulmonary function, compared to only one of the historical controls. Two of the three patients who relapsed after five plasma exchanges responded positively with additional exchange procedures. No serious adverse events were attributed to the experimental medications.

"One-year survival of trial subjects was nearly 50%, which is remarkable," study author Steve Duncan, MD, now a professor at the University of Alabama at Birmingham, was quoted as saying. "Acute exacerbations of IPF are almost always fatal in a very short period of time. None of the 20 historical controls survived for even a year." ■

Don't Speak Too Soon: Polio Not Yet Eradicated

Polio killed thousands of people in the United States during its heyday in the 1930s through early 1950s and left many more with life-long physical difficulties. Some ended up in iron lungs or on ventilators for the rest of their lives.

Thanks to polio vaccines, today the disease is largely nonexistent in developed countries and has been greatly reduced in others as well, leaving only Pakistan, Afghanistan, and Nigeria as strongholds of infection.

Researchers from the University of Michigan, however, warn against celebrating too soon. Even when the last cases of polio are finished in the three nations where the disease is still found, it could take another three years or more before victory is declared.

"Using transmission models, we show that you can have sustained chains of silent transmission in populations for more than three years without a single

person ever showing up as a reported polio case," study author Micaela Martinez-Bakker was quoted as saying. "Once we've eradicated polio — or think we've eradicated polio — we probably should intensify the environmental surveillance to make sure the virus is not just lurking at very low levels."

She and her colleagues published their findings in a recent edition of *PLOS Biology*. ■

Why They Do, Why They Don't Get Vaccinated

Now that flu season is upon us, RTs need to convince their patients to get the annual influenza vaccine. A new study out of the University of Georgia identifies several barriers and facilitators that motivate people as they make their flu vaccine decisions.

The study, published recently in *Vaccine*, was spurred by historically low flu vaccination rates. The most recent statistics show, for example, that only 29.6% of adults ages 18–49 and 46.5% of adults ages 50–64 received the flu vaccine in a given flu season. An analysis of 29 flu vaccine-related communication research reports identified seven reasons that led people to get the annual flu vaccination and six reasons that led others to forego it.

Reasons for getting the vaccination:

- They believed they are susceptible to getting the flu.
- They believed the vaccine matters and works.
- They were older or had a chronic health condition.
- They had received a recommendation from a doctor.
- They had experienced a bad flu or flu-like illness.
- They had been on the receiving end of active vaccination promotion.
- They had convenient and easy access to the flu vaccine.

Reasons for ditching the vaccine:

- They believed that flu is a "manageable illness."
- They didn't believe the flu vaccination recommendation applied to them.
- They did not believe flu vaccines are effective.
- They had a concern about getting the flu from the vaccine.
- They believed other measures are more effective.
- They had a negative personal experience with the vaccine. ■

Santa Fe Institute Researchers Explain the Pertussis Comeback

Nearly 50,000 pertussis infections were reported in 2012, the most in any year since 1955. Researchers from the Santa Fe Institute believe they may know why: vaccinated individuals who show no signs of the disease themselves may nevertheless be infectious.

The study grew out of previous work showing today's acellular pertussis vaccines prevented baboons from developing symptoms of the disease but didn't prevent them from spreading it. Using whooping cough case counts from the Centers for Disease Control and Prevention, genomic data on the pertussis bacteria, and a detailed epidemiological model of whooping cough transmission, the investigators concluded acellular vaccines may well have contributed to or even exacerbated the recent pertussis outbreak by allowing infected individuals without symptoms to unknowingly spread pertussis multiple times in their lifetimes.

"There could be millions of people out there with just a minor cough or no cough spreading this potentially fatal disease without knowing it," study author Ben Althouse was quoted as saying.

"The public health community should act now to better assess the true burden of pertussis infection," he emphasized. The study appeared in a recent edition of *BMC Medicine*. ■

CAP Spells Long-term Trouble

People who have had a bout of community-acquired pneumonia (CAP) have significantly worse long-term health outcomes, report Canadian investigators publishing online in the *American Journal of Respiratory and Critical Care Medicine* earlier this year.

The University of Alberta researchers followed more than 6,000 adults with CAP and 30,000 matched controls for a median of eight to nine years. During that period, 2,858 CAP patients died, reflecting an absolute risk difference of 30 excess deaths per 1,000 patient years of follow-up and a >50% relative increased rate of mortality among CAP patients. Although CAP patients <25 years of age had the lowest absolute risk difference for mortality, and those >80 years had the highest absolute risk difference, young adults with CAP had the worst relative outcomes, with over a two-fold increased rate of mortality relative to controls. Also, absolute rates of all-cause hospitalization, ER visits, and CAP-related hospital visits were significantly higher in CAP patients compared to controls. ■

Industry Update

Featuring information on products and equipment from manufacturers

Mobile Spirometer

Cohero Health's new mobile spirometer measures critical lung function metrics with the same precision as clinical-grade spirometers. The handheld spirometer pairs with a smartphone or tablet, enabling real-time measurement and reporting. It also integrates with Cohero Health's mobile asthma and COPD disease management platform, which includes bluetooth sensors that attach to maintenance and rescue medication. Additionally, its mobile apps track medication usage and motivate, remind, and reward patients for improved adherence to prescribed medication. www.coherohealth.com

▶ Press releases and photos on new products are welcome. Send to Marsha Cathcart, *AARC Times* editor, at cathcart@aarc.org.

Classifieds

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We reserve the right to make editorial changes for reasons of clarity and consistency. Every effort is taken to avoid mistakes, but ***AARC Times*** cannot be responsible for clerical or printing errors. **Deadline for Ad Placement/Cancellation** Deadline for ad placement and written cancellations for the next available issue is September 18. Blind ads available. **For Recruitment Advertising Information, Contact Classified Advertisement** Andrea Conté • Alhambra Plaza • 725 N. Highway A1A, Suite C-106 • Jupiter, FL 33477 • (561) 745-6793 • Fax (561) 745-6795 • AARCAD@aol.com

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— 2015 —

Since 1947, the AARC has been leading the effort to advance the respiratory care profession and promote quality respiratory care. Collaborating with our 50 state organizations and other organizations, we have successfully advocated at the federal, state and local level for patients, their families, the community, the profession and the respiratory therapist.

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Calendar of Events

AARC & State Society Programs

September 30–October 2

Hot Springs, Arkansas

44th Annual Arkansas Society for Respiratory Care State Meeting

Contact: John.Lindsey@Mercy.net

October 1–2

Bridgeport, West Virginia

West Virginia Society for Respiratory Care's Fall Health Care Conference

Contact: www.wvsrc.org, Cynthia.Keely@gmail.com

October 8–9

Indianapolis, Indiana

Indiana Society for Respiratory Care's 41st Annual Conference

Contact: Charity Bowling, (317) 921-4211, cbowling17@ivytech.edu

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October 8–9

Lexington, Kentucky

Kentucky Society for Respiratory Care's Annual Seminar

Contact: ajones@soahec.org

October 20–21

Honolulu, Hawaii

42nd Annual Hawaii Society for Respiratory Care Conference

Contact: Jung Eun Kim, jungeun@Hawaii.edu, (808) 734-9243

Submissions for the next available issue are due September 28.

For information on submitting calendar events, contact: Beth Binkley, AARC Times 9425 N. MacArthur Blvd, Suite 100, Irving, TX 75063-4706 (972) 243-2272 Fax (972) 484-2720 E-mail binkley@aarc.org

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