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Grace Anne Dorney Koppel LEADS EFFORTS TO HELP COPD Patients Through Pulmonary Rehab

This new pulmonary rehab clinic opened recently. Pictured (left to right) are: Kim Barber Tieman, Claude Worthington Benedum Foundation; Cecil E. Roberts, President, United Mine Workers of America; Senator John D. Rockefeller, Jr., of West Virginia; Grace Anne Dorney Koppel and Ted Koppel, Dorney-Koppel Family Charitable Foundation.

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AARC Strategic Plan

AARC Vision/Mission Statement: The American Association for Respiratory Care (AARC) will continue to be the leading national and international professional association for respiratory care. The AARC will 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.

AARC Strategic Objectives

- Refine and expand the scope of practice for respiratory therapists in all care settings.
- Advance the knowledge base and educational preparation of respiratory therapists to ensure competent patient care and to foster patient safety initiatives.
- Support research and scientific inquiry to strengthen the scientific foundation and promote best practice for patient care.
- Establish professional standards and outcomes supported by scientific evidence.
- Advocate for federal and state health care policies that enhance patient care, patients' access to care and professional practice.
- Partner with governmental agencies, community organizations, third-party payers, professional societies and the public to promote healthy behaviors and prevent cardiopulmonary disease.
- Broaden consumer and health care providers' knowledge and understanding of the value of respiratory therapists in providing safe, competent and cost-effective care.

The complete version of the Association's Strategic Plan is available to AARC members online at www.aarc.org/members_area/resources/strategic.asp.

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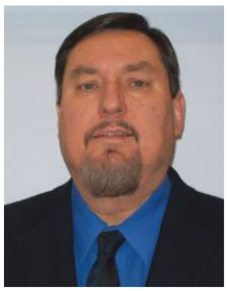
The Hazards of Suctioning

by Bill Lamb, BS, RRT, FAARC

The use of vacuum (suction) throughout the acute care environment is common and often considered routine for removal of body fluids and secretions. Improperly set vacuum regulators and/or lack of knowledge and understanding of correct vacuum pressures can expose patients to vacuum pressures of over 10 times higher than recommended for oral, nasogastric, subglottic, or endotracheal suction procedures.[1]

Vacuum in most acute care hospitals is supplied from wall outlets located throughout the structure, with the major source being a pump in the building's basement (see Figure 1). When the vacuum pressure falls to a predetermined level, a switch engages the pump to restore vacuum pressure; when the vacuum builds back up, the switch disengages and no further vacuum is created. Generally, the pump is set to begin operation when the vacuum level of the system drops to 19 in. Hg (483 mmHg) and to cease operation when the vacuum reaches 25 in. Hg (635 mmHg).

about the author...



Bill Lamb, BS, RRT, FAARC, is the national clinical manager at Ohio Medical Corporation and a member of the AARC Board of Directors.

Measuring vacuum pressure

Negative pressure is a measure of the amount of vacuum force exerted to raise a column of liquid to a certain height. At the bedside, negative pressure is usually measured in millimeters of mercury (mmHg). Inches of mercury (in. Hg) is the term commonly used to measure hospital wall-system negative pressures. Hospital wall systems monitor vacuum pressure in the wall using in. Hg. Typical wall pressures range from -17 to -25 in. Hg (as much as -650 mmHg).

The flow rate

A dynamic in medical suctioning is the flow rate at which air or liquid is removed through the system and from the patient. The flow rate is determined by three factors: (1) the amount of negative pressure produced by the vacuum source, up to a maximum value; (2) the resistance of the suction system, primarily determined by the diameter of the suction catheter but also due to the connecting tubing and collection container; and (3) the viscosity of the matter being suctioned. The clinician must be cautious when determining the amount of negative pressure applied to the patient. The minimum amount of negative pressure necessary to accomplish the suctioning procedure should always be used.

Vacuum regulators

There are multiple types of vacuum regulators available for clinical use, and each type is intended for certain clinical applications. The amount of negative pressure supplied by a central pipeline vacuum system is greater than that required for most clinical applications. A regulator attached to the wall outlet of the vacuum system enables the clinician to control the level of negative pressure. Vacuum lines connected to a regulator should *not* be adapted for more than one application as vacuum pressure cannot be properly regulated and applied.

Continuous vacuum regulators — For continuous suctioning, applications generally are calibrated from 0–200 mmHg; but a flush (full wall) setting provides up to 650 mmHg vacuum pressure. Continuous suction regulators are available in two or three modes — two modes are set to "off" or "on" (suction). Three modes are set to "off," "on," or "full wall suction" (for emergency oral suctioning of vomitus, etc.).

Continuous/intermittent vacuum regulators — Some vacuum regulators are designed to meet specialized

Figure 1. Industrial vacuum pump supplying entire campus (Ohio Medical)

medical suctioning needs, such as gastrointestinal and/or subglottic secretion suctioning. This type of regulator automatically provides interrupted or intermittent vacuum at flow rates that are lower than those generated by constant regulators. Many regulators include a dual-purpose regulator (an intermittent suction unit) designed to function as either a continuous vacuum regulator or as an intermittent vacuum regulator. Intermittent vacuum regulators' timing is usually 15 seconds suction followed by 8 seconds off (see Figure 2).

Clinical applications of suction

Use of vacuum within the acute care environment includes oral suctioning, endotracheal suctioning, subglottic secretion removal, chest drainage, nasogastric suctioning, operating room suctioning, and centesis.

Oral suctioning (oral-pharyngeal suctioning) — Suction is frequently used to remove excessive secretions or vomitus from the pharyngeal cavities when the patient is unable to clear the airway. Equipment used for pharyngeal suction includes: a vacuum source, suction regulator, collection bottle with shut-off float, overflow safety trap, connecting tubing, and a tonsil tip suction unit. Although aspiration of the pharyngeal area should be performed as often as clinically indicated to maintain a patent airway, unnecessary suctioning should be avoided. Careful application must be practiced to avoid excessive contact with mucosa as this can cause trauma to the mucous membranes and lead to edema of the soft tissues. There are no data supporting proper oral-pharyngeal suction pressures, but 500 mmHg or more is typically used. Once again, the clinician should use the least amount of vacuum pressure possible to achieve their goal.

Endotracheal suctioning — Tracheal suctioning is used to clear the lower airway of excess secretions to maintain a patent airway. Tracheal suctioning is done either directly or through an endotracheal tube or tracheostomy cannula (see Figure 3).

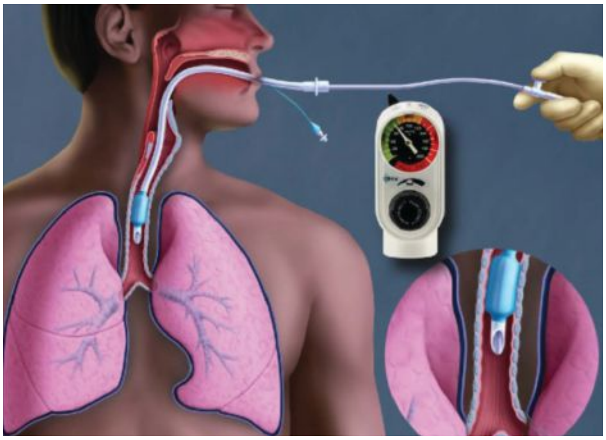
Negative pressure in the tracheobronchial tree can have several adverse effects on the lungs. Suctioning removes oxygen-rich air, leading to reduced functional residual capacity and the possibility of atelectasis and transient hypoxemia. If the artificial airway is completely occluded by the suction catheter, the risks are even greater. This danger can be reduced in two ways: by using the smallest suction catheter to effectively remove secretions and by limiting the duration of suction to no more than 10–15 seconds.

Figure 2. Amvex continuous/intermittent vacuum regulator (Ohio Medical)

The size of the catheter used for tracheal suctioning is very important. As the size of the suction catheter is increased, the negative pressure transmitted to the lungs may also increase. The diameter of the catheter should not be so small as to severely restrict flow, but it must be small enough to fit into the endotracheal tube while leaving the airway open around it. A rule of thumb is that the outside diameter of the catheter should be no greater than 50% of the inside diameter of the endotracheal or tracheostomy tube in adults and no greater than 70% of the inside diameter in infants. Clinicians can estimate the correct catheter size by multiplying the internal diameter of the airway (in millimeters) by three and dividing by two in adults and by multiplying the internal diameter of the airway (in millimeters) by three and dividing by 1.5 in infants.

Before applying suction, the patient should be hyper-oxygenated. Research shows the most effective way to provide the extra oxygen is to use the mechanical ventilator (most new ventilators have an automated control for this purpose). Suction should never be applied during

Figure 3. To shallow suction, insert the suction catheter through the endotracheal tube to the end of the ETT and apply suction.



catheter insertion, between passes of the catheter, and at the end of the procedure unless high-frequency ventilation is being used. Patients' oxygenation and cardiac rhythm should be monitored during the procedure as well and suctioning stopped immediately if there is a precipitous drop in oxygen saturation, as monitored by pulse oximetry or a change in cardiac rhythm. The durations of the entire procedure should not be >15 seconds.[2]

The amount of negative pressure needed for tracheal suctioning is dependent on a number of factors, including the diameter of the catheter and the physical properties of the secretions being removed. The least amount of vacuum necessary to draw secretions into the collection bottle should be used. The literature suggests a range of between 80–120 mmHg negative pressure for adults (with a maximum of 150 mmHg). The suggested range of negative pressure for neonate and pediatric patients is between 80–100 mmHg in a reference-based AARC Clinical Practice Guideline.[2] The tubing must be occluded at the regulator or at the end of the tubing when setting the maximum suction pressure on the regulator.[2]

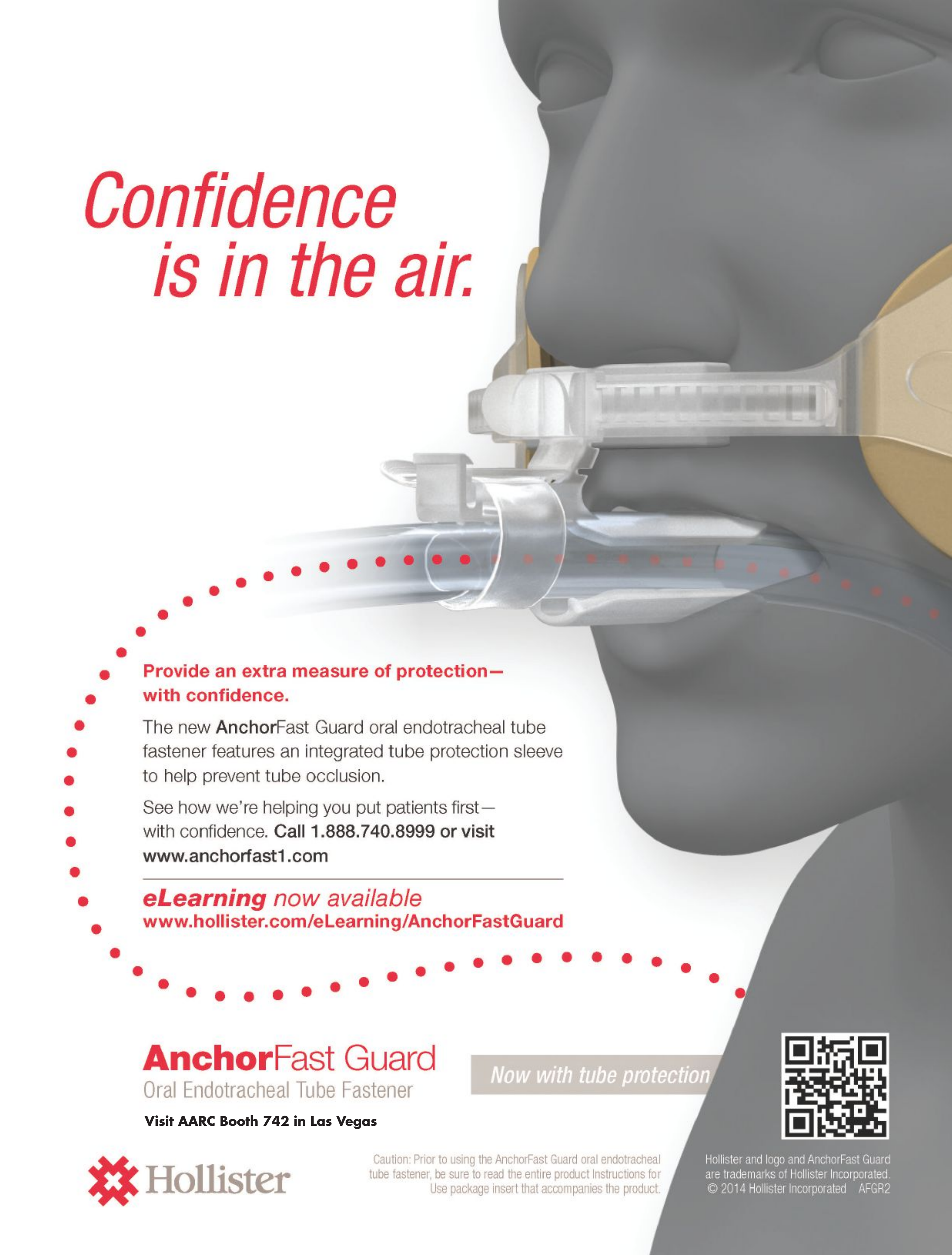
Clinical practice guidelines recommend that only shallow suctioning be performed; the catheter should not be advanced past the end of the artificial airway. Shallow suctioning can be accomplished by aligning the markings on the endotracheal tube with the markings on the suction catheter.[2]

Subglottic secretion removal

Subglottic secretion removal (SSR) is also known as continuous aspiration of subglottic secretions (CASS) and subglottic secretion aspiration (SSA). Endotracheal tube (ETT) intubation impairs cough and mucociliary transport; microaspiration and dormant mucus can lead to atelectasis, airway infection, and respiratory compromise. ETTs prevent the normal physiologic protection against aspiration so that secretions from the oropharynx can collect above the ETT cuff and be aspirated into the lungs, potentially leading to a hospital-acquired infection (HAI) labeled a ventilator-associated event (VAE). Data show VAEs are common in patients on mechanical ventilation (MV). Depending on the surveillance methodology applied for the identification of VAE, the risk of this complication ranges from 1.2–8.5 cases per 1,000 ventilator days (0.6%–4%). VAE is associated with increased hospital length of stay, mortality, infections due to multi drug-resistant pathogens, and an increased hospital cost of approximately $10,000–$25,000 per patient.[3,4]

Multiple interventions are used in efforts to prevent VAE, and there is a rising interest in interventions associated with the ETT being identified as one of the main items associated with VAE.[2,3] An ETT tube is considered one of the major risk factors for VAE, acting both as a reservoir for likely infecting microorganisms and as a channel between the oropharyngeal space and the sterile bronchoalveolar space by bypassing the host defenses.[5] The most important mechanisms associated with the development of VAE are microaspiration and biofilm formation. Microaspiration occurs when microorganisms within secretions collecting above the ETT cuff get around the cuff and migrate into the lower airway. Six common interventions to prevent or reduce VAE include: Semi-Fowler's positioning (30–45 degrees), oral care, SSR/CASS or intermittent suctioning, cuff pressure regulation (20–30 cm H_2O), safe suctioning, and biofilm reduction/removal.

The Centers for Disease Control and Prevention (CDC) recommends: "If feasible, use an endotracheal tube with a dorsal lumen above the endotracheal cuff to allow drainage (by continuous or frequent intermittent suctioning) of tracheal secretions that accumulate in the patient's subglottic area."[6] Specially designed ETTs for SSR can aspirate secretions accumulating above the ETT cuff through a third lumen located dorsally (above the ETT cuff) that permits intermittent or continuous aspiration of subglottic secretions. Accumulations of these secretions above the ETT cuff contribute to costly HAIs.[1,2] SSR or CASS tubes have been available and in use for several years. Although these SSR tubes are recommended and evidence supports that these tubes reduce VAE rates by almost 50%,[7–9] widespread use of SSR tubes has not been adopted due to cost and reported complications



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and undesirable effects associated with SSR use. These complications include tracheal mucosal damage, tracheal-esophageal fistula, and obstructed lumen with tissue mucosa.[10–12] When the dorsal SSR tube lumen becomes occluded, the tube cannot serve its purpose in removing subglottic secretions and is rendered ineffective. The design of these specialty SSR tubes has been questioned as contributory to these complications, and manufacturers have acted to improve their designs. Lack of knowledge about SSR, CASS, and human behavioral elements relative to the proper technique to set appropriate vacuum pressures result in excessively high pressures and inadvertent over-suctioning that may also contribute to complications and tracheal mucosal injury.

It is imperative that the correct vacuum pressures are used for SSR and that the recommended technique is followed to set vacuum regulator pressure — otherwise inadvertent over-suctioning will occur. Generally, 20–30 mmHg of vacuum is recommended for continuous aspiration of subglottic secretions and 80–120 mmHg for intermittent subglottic secretion removal. Intermittent suction mode has recently been advocated as the off time allows the dorsal lumen to un-adhere from mucosa and allow for reperfusion of tissue. All manufacturers of these specialty ETTs recommend intermittent suctioning. The tubing must be occluded at the regulator or at the end of the tubing when setting the maximum suction pressure on the regulator.

Specialty CASS regulators are available that limit pressures and presently provide continuous vacuum only. If intermittent vacuum (as recommended) is desired, an intermittent vacuum regulator should be used.

If it is suspected that the dorsal lumen (SSR) is occluded, the port should be purged with air using a syringe (according to all manufacturers' instructions for use of the specialty tubes). Higher vacuum pressures should *never* be applied to the port as mucosal injury may occur. "Push to Clear" vacuum regulator features are contraindicated and, to avoid tracheal mucosal damage, should not be used.

Chest drainage

Chest/pleural drainage is indicated to remove air and/or fluid from the pleural space so that the lung can re-expand to its original dimension. Pneumothorax is the most common clinical application. A negative pressure must be maintained in the pleural space to keep the lungs expanded against the chest wall. If air or fluid gets into the pleural space, negative pressure is reduced and the lung may collapse. Pleural drainage removes both fluids and air from the pleural space, reestablishing the negative pressure and allowing the lung to re-expand. Equipment used for pleural suction include the following: a vacuum source, suction regulator, connecting tubing, and a chest drainage system connected to the patient's chest tube.

The suction control bottle (or chamber, in the plastic chest-drainage system) provides a water column to regulate vacuum levels. The water seal bottle creates the underwater seal to act as a one-way valve for air to leave the chest but not re-enter the pleural cavity, and the collection bottle is a reservoir for fluids drained from the chest. Most of these units are connected to a hospital wall vacuum.

Newer generation chest drainage systems are available that provide dry suction instead of wet suction and a one-way valve instead of the underwater seal. Dry-suction control systems are controlled by a regulator instead of a water column and provide advantages such as easier setup and quieter operation.

When using the chest drainage system, vacuum pressure is required at the chest drainage system; the vacuum regulator in the wall is used to "power" the system. Chest drainage systems' manufacturers recommend a pressure for the wall regulator (usually 80 mmHg), which must be followed to assure proper function of the system. The tubing must be occluded at the regulator or at the end of the tubing when setting the maximum suction pressure on the regulator.

If a chest drainage set is *not* used and vacuum is supplied directly to the chest tube via a regulator, collection canister(s), and tubing, a thoracic vacuum regulator should be used. The thoracic vacuum regulator is calibrated in cm H_2O and, therefore, can be set directly to the vacuum pressure desired for the chest tube. The tubing must be occluded at the regulator or at the end of the tubing when setting the maximum suction pressure on the regulator.

Nasogastric suctioning

Indications for gastric drainage include: unconscious patient (airway protection, gastrointestinal aspiration), all abdominal surgery patients, major surgery (note that any significant surgical procedure will retard peristaltic action of stomach and bowel), upper gastrointestinal bleeding, overdose, and bowel obstruction. Poor or inadequate gastric drainage may result in distension, discomfort, vomiting, aspirated vomitus or high risk for pneumonia (inhalation pneumonitis or aspiration pneumonia), or may be fatal with highly compromised ICU patients.

Gastric suction may be provided using continuous vacuum at approximately 20 mmHg or intermittent suction (more common in the United States) at 40 mmHg with intermittent regulator cycling 15 seconds "on" and 8 seconds "off." The tubing must be occluded at the regulator or at the end of the tubing when setting the maximum suction pressure on the regulator.

Operating room suctioning

Operating rooms use all applications of suctioning, including tracheal, nasal gastric, subglottic, chest drainage — and additionally use free-flow suction when irrigating surgical fields. Extreme caution must be used in surgical applications. Never apply the suction trocar tip too close to blood vessels and/or vital organs as contact with them may result in serious patient injury.

Centesis

Centesis procedures that use vacuum bottles include paracentesis and thoracentesis. These vacuum chambers generate >500 mmHg vacuum; however, this negative force is not transmitted to the body cavity due to the resistance of the tubing and relatively small diameter of the needle/introducer.

Several centesis tray manufacturers include specifications that their trays be used with vacuum bottles or wall vacuum systems. The circuitry is the same, except for the connection to the vacuum bottles versus a vacuum regulator. The procedure for use is also the same, but the vacuum regulator pressure must be set. Note that the level of vacuum required on a vacuum regulator may approach 500 mmHg or greater to achieve the desired flow (matching the negative pressure of a vacuum bottle). Therefore, on commonly used vacuum regulators that measure vacuum to approximately 200 mmHg (depending upon the model), vacuum pressure required to achieve flow may be off scale. If the clinician desires to monitor the exact vacuum pressure required, a vacuum regulator that is scaled to 600+ mmHg should be used.

Cleaning vacuum regulators

The Spaulding Classification is the sterilization standard used by the CDC and the World Health Organization (WHO) for hospitals (www.cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf). Note that there is no mention of suction (vacuum) regulators in the entire 2008 CDC document.

Since vacuum regulators are downstream from the patient and if the National Fire Protection Association guidelines are followed (a vacuum regulator, device to prevent contamination of the wall system overflow safety trap, 18" of 1/4th ID connecting tubing from the trap to the canister, a wall-mounted canister with integrated hydrophobic filter and 72" of 1/4" connecting tubing from the canister to the patient connection), vacuum regulators do *not* need to be sterilized. The integral filters in the canister filter contaminants, and an overflow safety trap provides further protection.

If a vacuum regulator is contaminated (usually due to misuse), the regulator may be flushed or back flushed with a high-level disinfectant and returned to service. If appropriate configurations are used, it is not necessary. In the rare case of extreme gross contamination, almost all vacuum regulators can be sterilized using a cold sterilant, ethylene oxide, or steam autoclave sterilization. There has never been a report of a patient infection associated with a vacuum regulator.

Role of the respiratory therapist

The respiratory therapist is uniquely positioned to identify misdiagnosis and process flaws and clinician/process systemic opportunities for improvement within the health care environment. Although RTs' primary focus is on tracheal suction and subglottic secretion removal, they should also be aware of vacuum pressures used for nasal gastric and chest drainage relative to potential patient injury, increased length of stay, and mortality and morbidity. By simply pinching the tubing in between the collection canister and suction regulator, the RT can ascertain if excessive pressure is being applied for tracheal, nasal gastric, subglottic secretion and chest tube, and can intervene when necessary.

The RT must practice safe suction techniques by setting the vacuum regulator correctly (occlude to set), using recommended pressures according to clinical practice guidelines, and following recommendations for suctioning technique (length of time for a pass, depth of catheter insertion, period between suction passes, etc.).

Proper technique and practice improves patient safety and may have a positive effect upon outcomes.

The AARC Clinical Practice Guidelines should be followed for tracheal suctioning. Nursing evidence-based guidelines support the guidelines published by the AARC.[13] ■

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Normal Sleep Over the Human Lifespan

by Tony Stigall, MBA, RRT, RPSGT

Sleep can be described as an altered state of consciousness that includes behavioral cues such as closed eyes, relaxed postural muscles, unresponsiveness to external stimuli, and little or no body movement. When awakened from sleep, the level of consciousness is fully restored.[1]

Human sleep patterns

Normal human sleep consists of two distinct states: non rapid-eye movement (NREM) sleep and rapid-eye movement (REM) sleep. NREM sleep is divided into three stages — N1, N2, and N3. N1 is also referred to as transitional sleep, which lasts from one to seven minutes in duration. Slow rolling eye movements can be seen at the beginning of N1 sleep. Most adults spend 5%–10% of the total sleep time (TST) in N1.[2]

Stage N2 can be identified via EEG by sleep spindles and K complexes.[3] Normal duration for N2 may be from 10–25 minutes during a sleep cycle and is between 40%–50% of the TST.[2]

Stage N3 is referred to as delta sleep or slow wave sleep. Normal duration for Stage N3 is 20–40 minutes during a sleep cycle and is approximately 25% of TST. Delta sleep is the deepest stage of sleep and is the most difficult from which to arouse.[2]

Stage REM sleep is identified via EEG by low-amplitude, mixed frequency EEG, low chin electromyogram (EMG) tone, and rapid-eye movements.[3] Most dreaming occurs during REM sleep. Subsequently, patients lose muscle tone (atonia) and their ability to control breathing diminishes during REM sleep. Another phenomenon that occurs during REM sleep is that the ability to regulate core body temperature is decreased.[2] Normal duration of REM sleep is 25% of TST.

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Adults cycle between NREM and REM sleep throughout the night in what is called a sleep cycle. Sleep usually progresses in order from N1 to N2 to N3, and finally to REM sleep. On average, it takes about 90 minutes to reach REM sleep from sleep onset. An adult can have three to five sleep cycles in a given night.

The timing of sleep is governed by circadian rhythm — an intrinsic, self-sustaining rhythm of about 24 hours that is present in all living organisms from plants to mammals and which allows organisms to anticipate the light-dark cycle.[4] This rhythm is adjusted to the local environment by external cues called zeitgebers — an environmental agent or event (such as light or temperature) that helps regulate the cycles of an organism's internal clock.

All human beings, from infants to the elderly, require sleep. However, as the aging process occurs, sleep requirements change.

Newborn sleep

The sleep requirements of a newborn infant greatly differ from adult sleep. The average newborn sleeps 16–18 hours a day — but in short bouts that last 30 minutes to four hours.[5] The average sleep cycle of an infant is 50–60 minutes. A newborn can take up to three-to-five months to develop day-night rhythms.[5] As a result, newborn sleep patterns revolve around the length of time it takes them to feed, digest, and become hungry again, which is why it seems that newborns seem to sleep and wake around the clock.[5]

Infants have two sleep states: active sleep (REM sleep) and quiet sleep (NREM sleep). In contrast with adults, infants immediately enter active sleep and can remain in active sleep 25 minutes or more before entering into quiet sleep. When newborns are in active sleep, their breathing can be irregular and may appear restless. Newborns spend at least 50% of TST in active sleep and are more likely to awaken from sleep during active sleep. Quiet sleep comes at the end of the sleep cycle and is often referred to as deep sleep. When it ends, the baby will either enter the sleep cycle again or wake up.[6]

As patients mature, the average duration of sleep and sleep patterns changes. As babies grow, their sleep evolves into adult-like sleep patterns. Children from 6–12 years of age average 10–11 hours of sleep and have a reduction in REM sleep from birth (50%) to 25%–30% REM sleep.[7] In general, adolescents require 9–9.25 hours of sleep in a night, while adults average seven to eight hours of sleep per day.[7]

As adults age, there is a significant decrease in TST, sleep efficiency, and percentage of delta and REM sleep. Subsequently, N1, N2 sleep, and wake after sleep onset increase with age.[7]

Close to one-third of a person's lifetime is spent sleeping. Dysfunctional sleep over time can lead to deterioration in quality of life, diminished waking performance, increased risk for health issues such as mood disorders, coronary artery disease, heart attacks, stroke, type II diabetes, and increases in both morbidity and mortality.[8]

Sleep problems

The U.S. Food and Drug Administration (FDA) reports that those who have trouble falling asleep or staying asleep most nights may have insomnia.[9] They may have a more serious sleep problem if they fall asleep during the day, snore, or make choking sounds in their sleep or have odd feelings in their legs like they need to move their legs. If they have these symptoms, they should consult with their physician.

Both prescription and over-the-counter sleep medicines to promote sleep may have serious side effects and can affect driving the following morning. Again, they should consult with their physician.

Improving sleep hygiene

Sleep is vital to a person's well-being. When they do not have adequate sleep, it can lead to a diminished quality of life. The following steps are methods from the National Sleep Foundation that can improve the quality of sleep:[10]

- Create an environment conducive to sleep that is dark, quiet, and cool.
- Sleep on a comfortable mattress.
- Avoid caffeine, alcohol, and cigarettes two to three hours prior to bedtime.
- Avoid naps in the afternoon.
- Use the bed for sleeping and sex only; avoid watching TV in bed.
- Keep consistent sleep and wake schedules.
- Exercise regularly — but at least two to three hours before bedtime.
- Finish eating at least two to three hours before bedtime.

The field of sleep medicine is always in need of a good respiratory therapist. The education and training RTs receive in cardiopulmonary science and mechanical ventilation provide invaluable insight into understanding the comorbidities associated with sleep apnea as well as understanding therapeutic intervention with positive airway pressure devices. Respiratory therapists thinking about a career in sleep medicine should consider the Sleep Disorders Specialty Examination by the National Board for Respiratory Care. By earning the CRT-SDS or RRT-SDS credential, future employers will rest assured that applicants are competent in the diagnosis and treatment of patients with sleep disorders. ■

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Pulmonary Function: Quality Standard Considerations When Testing Children

by Katrina M. Hynes, BAS, RRT, CPFT, and Carl D. Mottram, RRT, RPFT, FAARC

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It's often stated that children are just "little adults," but there are recognized specific testing nuances when measuring lung function in these subjects. These differences can be grouped into three unique categories: the initial approach to coaching, including the testing environment; the acknowledgement of specific criteria that qualify a maneuver as acceptable or usable; and the interpretation of the results.

The testing environment and the initial introduction of the testing process certainly needs to be softened — "made fun" — yet still presented in a manner so the child understands the testing process. Some laboratories decorate their plethysmograph with decals and add "pediatric type" pictures to the testing room. The Dartmouth Medical Center pulmonary function laboratory in Hanover, NH, has their diffusing capacity tank decorated and named "Clyde" (see Figure 1a) as a distractor for the children they test. These laboratory adaptations can make the testing environment less threatening to the child. Visual aids prior to testing, such as pinwheels (see Figure 1b) or using a tissue paper as an adjunct, can assist in helping the child understand basic spirometry concepts of blasting or snapping their air out along with sustaining the maneuver. Children also have a short attention span and are easily distracted, so anything that can keep them engaged in the testing process is vital to the quality of the test performance. During forced oscillatory testing, which simply requires tidal breathing, our laboratory has the option of using an iPad to show cartoons as a distractor (see Figure 1c).

Data… what is acceptable vs. usable?

The American Thoracic Society and European Respiratory Society (ATS-ERS) in their 2005 spirometry update for the first time defined both "acceptable" and "usable" criteria for test maneuvers (Table 1).[1] It also defined an end-of-test criteria of >3 seconds specifically for children ≤10 years of age. The end-of-test criteria for adolescents and teenagers >10 years of age is the same as adults (≥6 seconds) as this has been shown to be obtainable in this age group.[2] A "usable" maneuver is defined as no hesitation (e.g., back extrapolated volume <150 mls or 5% of FVC) nor cough or glottis closure in the first second. When the end-of-test criteria are not achieved, a "usable" curve allows for interpretation of the forced expiratory volume in the first second (FEV_1) even though the forced vital capacity (FVC) may be underestimated.

Suggested age ranges for quality test results

The importance of continuous, longitudinal assessment of lung function from birth throughout childhood should not be underestimated in understanding the evolution and natural history of disease process.[3] Pulmonary function testing (PFT) in children is an objective tool in

Figure 1. The testing environment and the initial introduction of the testing process certainly needs to be "made fun" to engage the child.

the clinical assessment and management of the developing respiratory system. Through the course of approximately 15 years, the ATS-ERS has established the usefulness of this testing methodology in infants and children younger than two years.[3] Although a neonate is unable to sit upright with their feet flat on the floor while keeping a tight seal on a mouthpiece as they blow out to functional residual capacity (FRC), highly trained practitioners are able to use such techniques as the rapid thoracic compression ("hug technique") in a cooperative, sedated infant to obtain a partial expiratory flow volume curve. The data allows the measurement of maximal expiratory flow in infants with airway obstruction.[4]

PFTs in children two to six years of age can be performed successfully, although this patient population poses many challenges. These challenges range from the progressive growth and development of lung parenchyma and the associated changes in lung mechanics, to the interpersonal communication challenges presented when interacting with a child and his/her family (see Figure 2). When working with this particular age group, one must first gain trust to obtain the child's cooperation to yield quality outcomes. It is imperative that the clinician be trained and qualified to conduct testing in this population. Testing in these subjects takes time, patience, and the ability to interpret raw data. In a study of 72 children with and without cystic fibrosis (CF), only 58% were able to produce an acceptable forced expiration lasting one second, although 73% could manage an $FEV_{0.5}$.[3] For this reason, the clinician must obtain the knowledge, skill, and ability to make accurate judgments and interpretations of unacceptable and acceptable maneuvers in the patient population. A study conducted by Enright and colleagues showed that children aged ≥ 9 years can

Table 1. ATS/ERS Acceptable and Usable Criteria for Test Maneuvers

Acceptable Maneuver	Usable Maneuver
They are free from artifacts:	**They are free from artifacts:**
1. Cough during the first second of exhalation	1. No cough during the first second of exhalation
2. Glottis closure that influences the measurement	2. Glottis closure that influences the measurement
Early termination or cut-off:	**They have good starts:**
1. Effort that is not maximal throughout	1. Extrapolated volume; 5% of FVC or 0.15 L, whichever is greater
2. Leak	
3. Obstructed mouthpiece	
They have good starts:	
1. Back extrapolated volume should not be >5% of FVC or 0.15 L, whichever is greater	
They show satisfactory exhalation:	
1. Duration of 6 seconds (≥3 seconds for children ≤10 years) or a plateau in the volume–time curve or	
2. If the subject cannot or should not continue to exhale	

SOURCE: Miller MR, Hankinson J, Brusasco V, et al. Standardisation of spirometry. Eur Respir J 2005; 26(2):319-338.

meet each of the adult-based ATS criteria for acceptability and reproducibility about 95% of the time when performing spirometry.[2]

Software applications available to incentivize better testing

Incentives can be a nice testing adjunct but should not be used exclusively to replace verbal training and encouragement. The incentives should be geared toward attaining an ideal volume or flow measurement. For example, during exhaled nitric oxide testing, one incentive program shows a girl riding in a hot air balloon. When the patient inspires, the sun rises. As they expire, the hot air balloon travels across the screen from one landscape bank to another. Flow is incentivized by maintaining the hot air balloon in the middle of the sky. If the patient blows too hard, the hot air balloon goes to the very top of the screen and the little girl has a frightened look on her face. If the patient blows out too softly, the hot air balloon goes to the bottom of the screen and appears as if it's in the river below; the little girl has a frightened facial expression and is looking upwards. Another example of an interactive software incentive used during spirometry testing is a birthday cake with candles. As the patient exhales, the candles are blown out according to flow and volume criteria. These incentives give visual feedback to the subject and may assist them in achieving quality test results. Interactive computerized incentives may be used during testing to encourage the maneuver, but these are only an adjunct available to the technologist and, according to the ATS-ERS guideline, are not mandatory.[3]

Figure 2. Testing pediatric patients takes time, patience, and the ability to interpret raw data.

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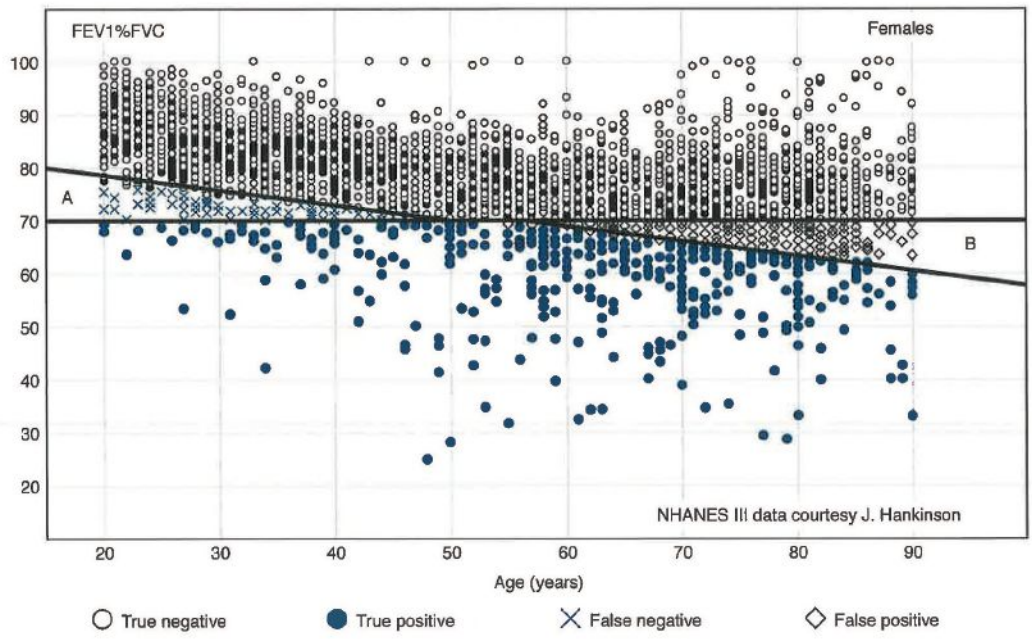
Figure 3. Using the GLI lower limit of normal allows the clinician to identify true abnormalities in lung function.



SOURCE: Mottram CD, Chapter 13, Ruppel's manual of pulmonary function testing, 10th ed. Elsevier 2014.

Choosing the right algorithm

Are the algorithms used to determine impaired lung function in the pediatric population the same as those used with adults?

The key to an accurate interpretation scheme is first and foremost obtaining "quality data" to interpret and secondly, utilizing strong, scientifically valid reference data to make the comparison to a normal population. The ERS Global Lung Function Initiative (GLI) published the multi-ethnic reference values for spirometry with predicted equations for ages 3–95 in 2012.[5] Data was obtained from over 97,000 subjects throughout the age range, elevating the science behind the classification of a normal versus abnormal test. This large data set strengthened the validity and utility of predicted normal values as previously published references were based on small numbers of subjects using data collected decades ago. In addition, it smoothed the transition from childhood, adolescence, and adulthood — filling in the expected lung function gaps, which historically had been an issue.

The GLI multi-ethnic reference set defined the lower limit of normal using a validated scientific approach. Interpretation algorithms that employ standardized cut-points, such as the Global Initiative for Chronic Obstructive Lung Disease (GOLD) interpretation scheme to identify obstruction ($FEV_1/FVC \leq 70\%$), yields false-negative results in young subjects.[6] Using the GLI lower limit of normal allows the clinician to identify true abnormalities in lung function (see Figure 3).

The pediatric normative data for lung volumes and diffusing capacity are less robust. Stock and Quanjer published lung volume references (FRC, RV, TLC) spanning infants through young adults, which are cited in the ATS-ERS Interpretative Strategies for Lung Function guideline.[7,8] No recommendations for diffusing capacity are cited in the ATS-ERS guideline. In our laboratory, we use those described by Nasr for children 6–17 years.[9] Although the dataset from this study is relatively small, the patient characteristics are consistent with the population we serve.

The role of the respiratory therapist and/or pulmonary function technologist in pediatric PFTs

When working with children, the therapist/technologist wears many hats. The age of the child will predetermine and best direct the child-therapist/technologist interaction. It is crucial that the clinician adjust their communication style to the cognitive-level of the patient in order to communicate test instructions clearly.

It is their responsibility to offer clear and concise test instructions and to use alternative instructional tools when needed. In doing so, one will make certain the child has the greatest opportunity to perform a maximal effort ensuring quality data is produced. In the event of suboptimal patient performance, descriptive comments should be documented and communicated to the clinician for accurate interpretation of testing results (e.g., if Johnny had difficulty with glottis closure, erratic breathing, or incomplete effort, this information is important to pass on).

Obtaining quality pulmonary function test results in the pediatric population poses many challenges. Experience and demonstrated competency in testing these patients cannot be overemphasized. These two variables are essential in presenting quality data that may guide therapy and/or clinical decision-making. ■

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Nutrition and Asthma

by Jami E. Baltz, RD, CNSC

Asthma is a chronic inflammatory disorder where bronchial linings react to a trigger by causing smooth muscle spasms and an increase in mucus secretions and mucosal edema. T-helper 2 (Th2) cells secrete interleukin (IL)-4, IL-5 and IL-13, which cause an increase in immunoglobulin (Ig)-E.[1] Ig-E stimulates the mast cells in the lung interstitium, which then produces histamine and slow-reacting substance of anaphylaxis (SRS-A).[1] The result is swelling of the smooth muscle, increased mucus production, and prostaglandin generation, which then further exacerbates the reaction.[1]

According to the National Center for Health Statistics, 25.7 million people in the United States had asthma in 2010 with a 1.1% increase from 2001 to 2010.[2] Due to the increasing prevalence of asthma, alternative interventions are being investigated to target the inflammatory response and to complement conventional therapies.

Nutritional therapy is one modality being investigated as nutrition deficits can lead to suppressed immune systems; however, it may also help to modulate the immune response. With the lifestyle adjustments in Westernized countries, including diet, asthma rates have increased. Epidemiological studies show an association between asthma and an increase in processed foods with a decreased intake of nutrients that support the immune system.[3,4]

Processed foods vs. fruits and vegetables

Ingredients in processed foods including sodium, sulfites, and other food preservatives are being evaluated for their effects on asthma.[1,5] Processed foods are the main source of sodium in the typical American diet. The average American consumes around 3400 mg of sodium per day, much more than recommended.[6]

A 2011 Cochrane analysis included randomized controlled trials from 1989–2008 investigating the effect of sodium on 381 participants.[7] The nine studies involved a manipulation of dietary sodium and included those with asthma and exercise-induced asthma. For the studies that included 318 participants with asthma, the primary outcomes were bronchial hyper-responsiveness and quality of life. The primary outcomes for the 63 participants with exercise-induced asthma were baseline and five-minute post-exercise forced expiratory volume in one second (FEV_1) and quality of life. The reduction in dietary sodium did not have a significant effect on asthma control or improvement in quality of life; however, lung function outcomes improved in those on a low sodium diet with exercise-induced asthma.

With the increased intake of processed foods, food items with potentially immune modulating capabilities are not being consumed. These include food items with high levels of dietary antioxidants, like fruits and vegetables. Antioxidants protect against oxidative stress, which is an important component of the pathophysiology of asthma.[8]

In a randomized controlled trial with 137 stable asthma adults, Wood et al compared a high antioxidant diet (five vegetable servings and two fruit servings) to a low antioxidant diet (</= two vegetable servings and one fruit serving).[8] After a two-week period, participants were given a supplement. Those in the high antioxidant group and half of the low antioxidant group were given a placebo. The supplement for the other half of the low antioxidant

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group contained 45 mg lycopene, a potent carotenoid. Participants were then followed for 14 weeks with measurements of dietary intake, spirometry, exhaled nitric oxide, asthma control questionnaire, and collection of plasma and sputum samples to evaluate for inflammatory markers. Participants consuming the low antioxidant diet were found to have lower percentage predicted forced expiratory volume in one second (%FEV$_1$) and percentage predicted forced vital capacity (%FVC). They also had a shorter time to an asthma exacerbation, and exacerbations occurred more frequently. Plasma levels showed an increase in C-reactive protein, an acute phase reactant present during inflammation. Interestingly, there was no significant difference seen in clinical outcomes for those who took the lycopene supplement.

Polyunsaturated fatty acids

Another key dietary component hypothesized to have inflammatory effects are polyunsaturated fatty acids (PUFA). Similarly to the increase in processed foods and decrease in fruits and vegetables, the Westernized diet has also increased in omega-6 PUFA (margarine) with a decrease in omega-3 PUFA (fresh oily fish). This theory is based on the simple mechanism that omega-3 PUFA metabolites down-regulate the inflammatory response by inhibiting TNF and IL-6 while the omega 6 PUFA metabolites increase the inflammatory response by increasing the synthesis of prostaglandin E2, which promotes Th2 differentiation.

In a multicenter cohort study, data was analyzed by assessing eating patterns and identifying those with an incidence of asthma. Low omega-3 intakes were associated with asthma development, and a high ratio of omega-6 to omega-3 increased this association further. However, specific recommendations cannot be made at this time until intervention studies are conducted.[9]

Vitamin D

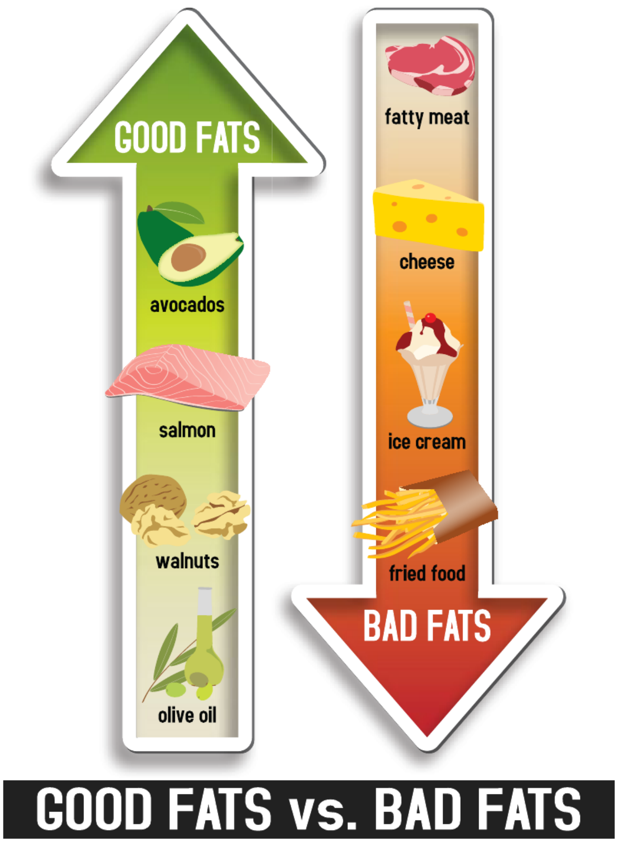
Low levels of serum vitamin D levels (25(OH)D ≤ 30 ng/mL) are another characteristic recently found with the Western lifestyle. Vitamin D has immunological effects including regulatory function of T-cells, and low levels are associated with adverse outcomes in asthma.[3]

In a recently published multi-center randomized controlled trial, 408 adult patients with mild-to-moderate asthma and deficient blood levels of vitamin D (25(OH)D ≤ 30 ng/dl) were randomly assigned to one of two groups.[10] The treatment group received oral vitamin D$_3$ (loading dose of 100,000 IU followed by 4,000 IU daily) while the control group received a placebo with identical looking capsules. Supplementation of vitamin D$_3$ provided little benefit as no difference was found in all primary outcomes — number of treatment failures, number of asthma attacks, and need for emergency care. However, it was noted that the vitamin D group was able to reduce inhaled steroid doses. Also, those in the vitamin D group who were able to achieve vitamin D sufficiency (25(OH)D > 30), did show a trend toward improved asthma control with a decrease in treatment failures and asthma attacks.

Additional mechanisms being studied include gut microbiota and dietary metabolites including short-chain fatty acids (SCFA) and derivatives of tryptophan metabolism.[1,11] Diet in asthma over the life course (specifically perinatal and childhood nutrition) are also being studied, as diet during these life stages may modulate allergic response by affecting early exposure to allergens.[3,4]

Diet patterns and lifestyle

In conclusion, despite epidemiologic studies showing an association between diet and asthma, there is a lack of strong evidence from interventional studies. Nutrition studies are heterogeneous and make it difficult to



pinpoint the exact effect a specific nutrient may have on a disease. There are variations in assessment tools, life stage, genetics, and study design. Diet patterns and lifestyle with the interrelationship of nutrients and other substances may be the key to asthma control.

Keeping this in mind, it is important for the respiratory therapist to encourage whole-food interventions to patients with asthma — limit processed and refined foods, and focus on fresh fruits and vegetables, whole grains, and healthy fat protein sources. If the lifestyle of the client contributes to limited sun exposure, vitamin D levels could be checked for a deficiency, and supplementation may be considered if low. ■

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Fighting Sunset in Texas in Late Spring

by J. Mark Barch, MS, RRT; Russell Graham, BSRC, RRT, CPFT; and Terry Gilmore, MA, RRT-NPS

A riveting national issue for the respiratory therapy profession has been the limited but nerve-wracking efforts on the part of a few state governments to attempt to remove state regulation (de-license the respiratory therapy profession). The most recent attempt was in Texas; and with a great deal of effort, organization, and coordination, it appears that this effort to de-license Texas respiratory therapists has been derailed. Though not entirely ended (read the story below), it has certainly been stymied. The AARC asked the leaders of the Texas Society for Respiratory Care to write the following column and recount their firsthand experience and events as this de-licensure effort unfolded. — Cheryl West, MHA, director of government affairs for the AARC

It was a beautiful late spring day in Texas, the morning of the second day of the Texas Society for Respiratory Care (TSRC) Annual Meeting. The weather outside was perfect for enjoying the San Antonio River Walk, but little did any of us know of the storm brewing just an hour or so north in Austin, the state capital. As the president of the TSRC at that time, I [J. Mark Barch] was scheduled to conduct the annual business meeting later that morning, so naturally I was reviewing the topics I really wanted to address with the membership (the annual business meeting is open to all of the TSRC membership in attendance for the event).

Having been president of the TSRC in a previous term a few years earlier, I knew the routine. I would announce the newly elected Board members, there would then be a financial "state of the Society" report, and so on. This year we decided to honor our military personnel by offering them free admission to the three-day event, and the Program Committee had lined up a color guard for presentation of the "colors" (U.S. and Texas state flags). After the presentation of the colors, we all recited the Pledge of Allegiance. It proved to be a very moving ceremony, and I believe all of the many members of the military who were present were truly honored.

However, prior to all of that, I was thinking about what I would say to the membership — what sage advice could I leave with them as my term as president was coming to an end. I really wanted to impress on them the importance of membership in the TSRC and the AARC and how it was their responsibility as a professional to support their state and national professional organizations. I had heard all the excuses before: "What does the TSRC or the AARC do for me?" "Why should I pay money so the "good old boys" can have a three-day party every year," and so on.

This day would prove to be different — unlike any annual business meeting we had ever had before. Prior to the start of the meeting, I received an email from Cheryl West, MHA, director of government affairs for the AARC, informing me that the Texas Sunset Commission would be making the recommendation to deregulate respiratory therapists (RTs) in Texas. Sometimes you have to dig and dig for something of substance to motivate people, and sometimes it just presents itself. This was one of those times it just presented itself, and I knew what I would be speaking about to the membership.

As I took the podium to address the membership, I did a quick scan of the crowd, which was fairly large (and that doesn't always happen for this particular meeting since it is primarily just a business meeting). I wasn't sure whether to deliver some potentially bad news for our profession or to deliver a call to action. I chose the latter. As I began to divulge the information about the Texas Sunset Commission's plan to deregulate RTs in Texas, I closely watched the faces of the members — some appeared confused, others appeared to be in dis-

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Russell Graham, BSRC, RRT, CPFT, is the president of the Texas Society for Respiratory Care.

Terry Gilmore, MA, RRT-NPS, is the Texas delegate to the AARC House of Delegates.

belief, and others appeared to be angry. However, on a lot of those faces I saw determination and resolve — the look you see on the face of your fellow RT when heading to a code or to a STAT call to the ER or ICU. They were already thinking and planning how they would respond. Needless to say, this news gave me more than ample ammunition to push for new membership recruitment and a reason for them to renew their membership every year.

Welcome to my world! (by Russell Graham, then President-elect)

Mark and I had so many ideas about where to lead the TSRC into the future, but fighting a deregulation effort had not been among those discussions. As with the release of all breaking news (good or bad), rumors began to fly. Folks just flat-out started making up stuff. They called the governor's office, and they wrote their U.S. senators and members of Congress (none of which were the appropriate course of action). I read (and re-read) the commission staff report, and we made inquiries to the Sunset Commission.

What is the Sunset Commission, and why does it exist? First, it should be noted that the initial recommendation was not the actual recommendation of the Sunset Commission — it was the recommendation to the Commission by the actual staff members of the Commission. The Sunset Commission in Texas is tasked by the Texas Legislature to review agencies for both operational efficiency and effectiveness and to recommend changes as necessary to accomplish those tasks. It really wasn't so much that Sunset thought RTs (and others) should be deregulated, it was really a matter of them trying to figure out how to get an agency (the Department of State Health Services) back on track. The Department of State Health Services had become a "dumping ground" agency that could not accomplish its primary mission (and health care licensing wasn't it). We (TSRC) incorrectly viewed Sunset as an adversary. We assumed that they wanted us gone. We also assumed that the Commission would follow the staff recommendations without question.

J. Mark Barch (then TSRC president) picks up the story

You never know when something like this is going to happen; but when it does, above all else, you must have an organized and well-orchestrated plan of action. As soon as the business meeting was over, our Board members started to develop a plan of action with constant input and assistance over the next several weeks from the AARC. A committee was quickly formed to attend the next Sunset Commission meeting to present our case against deregulation of RTs. A letter-writing, phone-calling, and emailing campaign was implemented for all Texas RTs to contact Commission members to oppose the recommendation to deregulate RTs.

The Sunset Commission members admitted that they were taken by surprise and overwhelmed by our massive and relentless response. Within just a few days we had television news coverage, radio talk-show coverage, and coverage in local newspapers. The TSRC's state and regional leadership got things moving and even organized peaceful demonstrations outside the state capital in Austin on the first day of the public hearing. It truly was a sight to see over the weeks following our annual meeting. We were proud to see everyone (from Executive Committee, to Board of Directors, to TSRC members) working feverishly toward one goal: to protect the patients we serve by preserving RT licensure in Texas. We were also relieved that we were not alone in this fight — the AARC was there every step of the way with us — giving guidance and encouragement, garnering letters of support from the National Board for Respiratory Care, the COPD Foundation, and others. The AARC also sent significant representation to attend the Sunset Commission hearings to support us; but most of all, the AARC let the TSRC lead the fight.

President-elect Russell Graham continues

The Sunset Commission meeting in June led to the formation of a subcommittee charged with formulating modifications to the staff recommendations for consideration at the August Sunset Commission meeting. We are elated to say that the subcommittee recommended strengthening of our license by moving us to the Texas Medical Board, setting up an Advisory Board, and enhancing background investigations.

The recommendations were supported unanimously by members of the Sunset Advisory Commission. However, that is not the end of the story. The work is not over. The Texas Legislature will convene in January 2015 and will have to accept the Commission's recommendation. This is not a given — then and only then will that be "the end of the story." We are cautiously optimistic at this point. This optimism is based on the stature of the Commission's members in the State Legislature and the merits of the proposed changes.

Russell Graham and J. Mark Barch

So, stay tuned — and rest assured that neither the TSRC nor the AARC plan to let the "sun set" on RT licensure in Texas! To those of you who ask why you should join your state society and the AARC… this is why. Your state society and the AARC "have your back"; and without them fighting for you, you will most likely not win when these battles come up (and they will) in your state. Without your support and continued membership in your professional societies, those societies cannot exist.

Texas RTs — you owe a big "thank you" to the AARC and to the TSRC Board of Directors. In some ways, history was made — both the outgoing and incoming boards were deeply involved in this, especially the June hearing and testimony. Even though they were only doing their job, make it a point to "show them some love." Go to the TSRC (www.TSRC.org) and AARC (www.AARC.org) websites for contact information. ■

November Is COPD National Awareness Month

by Thomas J. Kallstrom, MBA, RRT, FAARC

Did you know that November has been designated National COPD Awareness Month? This is a time of year where respiratory therapists can make sure that the healthy public is made aware of this chronic disease. It is interesting to note that in large part the general public did not have much of a grasp on what COPD was until it started to be mentioned frequently on television over the past several years in commercials that advertised medication to treat the disease. In fact, every evening while watching the national news I never seem to miss a mention of COPD. This is helpful, of course; but this is not nearly enough if we want to get attention on a broader scale. We need to make sure that this disease is front and center and that it garners the rightful attention that it deserves.

Why, you may ask? First and foremost, it is a disease that is the third leading cause of death in the United States. Plus, as we look at the emerging tsunami of baby boomers, we can expect that its impact will grow exponentially over the next decade or two. It is just as important that we treat our patients with the highest level of care possible as well as educate them and their caregivers about the appropriate self-management skills.

about the author…

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

Easily accessible tools

To make this happen, there are a number of tools that can be easily accessed at no cost. The AARC has been a long-standing partner with the COPD Foundation and through the years has been very active in the DRIVE4COPD. There is a vast amount of information available from the COPD Foundation as well as tools that you can use in your COPD outreach program. I would encourage you to go to www.COPDfoundation.org to learn more about what they have to offer. There you will also find information about public screeners that you can use in an online or public event. It is through these easy-to-answer questions that the person taking it can learn if they are at risk and perhaps start a dialog with a respiratory therapist about the disease. Who better to do this but a respiratory therapist… or even a respiratory care student?

In addition to this, the National Heart, Lung, and Blood Institute (NHLBI) has a campaign called the COPD Learn More Breathe Better® Campaign. This is an effort directed at men and women over the age of 45 who have had a history of smoking or who have a genetic or environmental risk for COPD. The great thing about this campaign is that it also reaches out to health care providers who care for and manage this population of patients. This can be accessed at www.nhlbi.nih.gov/health/educational/copd/lmbb-campaign/.

Some of the materials that the NHLBI has made available include:

- Fact Sheets that pertain to COPD and its diagnosis
- Tips for talking to loved ones about COPD
- Tips on how to get the most out of your office visit
- Public service announcements
- Speaker's Guide that can be used in PowerPoint format for patient/public seminars or conferences or even grand rounds at your health care facility.

Another consideration, of course, is our patient advocacy groups. There are a number of them nationally and locally that serve as an advocate as well as an education platform from which patients and caregivers can learn more about the disease. Below are some easily approachable and most helpful groups:

- COPD-Alert: www.copd-alert.com
- EFFORTS: www.emphysema.net/bindex.asp
- COPD Foundation: www.copdfoundation.org

The C.O.P.D. Information Line direct phone number is (866) 316-COPD (2673) It is a toll-free number for peer-to-peer information and referrals on COPD by patients and caregivers impacted by COPD. Callers receive one-on-one support from an associate who speaks English, Spanish, French, or Italian, as well as provides translation capabilities in over 175 languages.

With the Information Line, all associates are trained over a rigorous 45-hour process on customer service and call etiquette, service to sales, Health Insurance Portability and Accountability Act (HIPAA) compliance, disease management information, COPD Foundation program information, and research initiatives. This can be accessed at www.copdfoundation.org/About-Us/What-We-Do/COPD-Information-Line.aspx/.

Many hospital-based respiratory therapists are active in Better Breathers Clubs (www.lung.org/lung-disease/copd/connect-with-others/better-breathers-clubs/). This is an American Lung Association program that brings together the health care professional and the patient (plus their caregivers) in an effort to teach ways to better cope with COPD and other chronic pulmonary diseases.

Finally, there is YourLungHealth.org, an AARC website where you can refer your patients to go to learn more. In addition to a wide variety of patient-specific information, we also publish a quarterly online magazine called *Asthma and Allergy Health* (www.yourlunghealth.org) that addresses COPD and other chronic pulmonary diseases.

Get involved

Thankfully, ensuring there are many options that caregivers and patients can choose from to tap into cutting-edge assistance and advocacy help. I would urge you to take advantage of this and ensure that you and your colleagues are front and center ensuring that the healthy public becomes aware of COPD and its early diagnosis and treatment options. Once you do, please contact us so that we can share your successes with other members. ■

E-Cigarette Update

by Sarah M. Varekojis, PhD, RRT

You enter a patient's room to administer a medication nebulizer and see a mysterious stream of "smoke" curling above the patient's head. Your carefully honed assessment skills note there is nothing to indicate the patient's room is on fire and that the patient has not started their nebulizer treatment without you... so what's up? The patient finally admits that they are "vaping" — and now that you caught them, they have lots of questions. The purpose of this article is to update respiratory therapists on the current literature regarding e-cigarettes so you are prepared to answer your patient's questions. We will discuss current use of e-cigarettes, safety and hazards of use, and the role of RTs in smoking cessation.

E-cigarettes entered the U.S. market in 2007.[1] E-cigarettes are electronic nicotine delivery systems that heat a liquid to create a "vapor" that the user inhales. The devices are battery-operated and use an atomizer to create aerosol filled with nicotine and other chemicals. The nicotine is derived from tobacco leaves in a glycerin or propylene glycol mixture, and some include various flavorings including menthol, mint, cherry, chocolate, cotton candy, and bubble gum.[1,2] The users of e-cigarettes do not consider themselves smokers, instead referring to themselves as "vapers" who engage in "vaping." Since the practice is not considered smoking, some believe it is exempt from current smoke-free laws and ordinances, which leads our patients to believe that they can "vape" in their hospital rooms.

Current users

Recent estimates indicate that e-cigarette use has increased in the last few years among adults and youth alike. King et al of the Centers for Disease Control and Prevention (CDC) found that both awareness and use of e-cigarettes increased among adults from 2010 to 2011.[3] Increases in use were observed in both genders, in those between the ages of 45–54 years, in non-Hispanic Whites, and in both current and former smokers. In fact, they found that one in five current smokers reported using e-cigarettes. This leads to concerns about the consequences of adult smokers becoming users of both traditional and e-cigarettes.

The CDC also reported that use of e-cigarettes by middle and high school students doubled from 2011–2012, bringing current use of e-cigarettes to 2.8% of high school students and 1.1% of middle school students.[4] This report also found that 61.1% of middle school students and 80.5% of high school students who had ever used an e-cigarette said they also smoked traditional cigarettes. These numbers raise concerns about not only the consequences of using both traditional and e-cigarettes but also about targeted marketing to the adolescent and teen populations, especially given that many of the flavors of e-cigarettes have a direct appeal to this population.

Safety and hazards

Since e-cigarettes are clearly growing in popularity among all populations, it is important to review what is currently known about the safety of e-cigarettes. An analysis of e-cigarette retail websites found a variety of health-related marketing claims, including: they can be smoked anywhere, they do not produce secondhand smoke, they are cleaner, safer (fewer chemicals), they are harmless water vapor, and they help smokers quit smoking.[5] However, several recent publications summarize the current scientific findings on safety and report:[1,2,6]

about the author...

Sarah M. Varekojis, PhD, RRT, is the assistant professor and director of clinical education in the respiratory therapy division at The Ohio State University School of Health and Rehabilitation Sciences, College of Medicine, in Columbus, OH.

An analysis of e-cigarette retail websites found a variety of health-related marketing claims, but what are the current scientific findings?

- E-cigarettes have variable nicotine content, and there are inconsistencies between nicotine content reported on packaging and actual nicotine content.
- E-cigarette vapor aerosols contain known carcinogens and other toxic chemicals, although at lower levels than found in traditional cigarette smoke.
- E-cigarettes produce particle numbers similar to cigarette smoke.
- E-cigarettes are linked to reduced lung function.
- Concerns are evolving regarding the inhalation of solvents, flavorings, and preservatives. These are linked to increased risk of pulmonary infections and immunocompromise and have been found to develop into carcinogens.
- Concerns also exist regarding the inhalation of battery vapor and battery liquid leakage into the device.

In a study comparing toxic substances in traditional cigarettes, e-cigarettes, and nicotine inhalers, the levels in e-cigarettes were less than in traditional cigarettes but much higher than in nicotine inhalers. In fact, five of 11 toxins measured were not detectable in the nicotine inhaler.[6] Emerging concerns regarding the safety of e-cigarettes are derived from several

(continued on page 70)

The 2014 Jimmy A. Young Memorial Lecture: The Clinical Simulation Examination

The NBRC has presented the Jimmy A. Young Memorial Lecture each year since 1978 to honor the memory of a remarkable contributor to the respiratory care profession. Within the span of 15 years, Jimmy went from being an on-the-job trainee to achieving the RRT credential (#263). He directed an education program in Boston, MA, directed a department in one of Boston's leading hospitals, became the 22nd president of the AARC, and was a trustee of the NBRC at the time of his unexpected death. This year, Robert C. Shaw, Jr., PhD, RRT, FAARC, assistant executive director and psychometrician for the NBRC, presented the 2014 lecture in Marco Island, FL, on July 17.

Current and future RRT examination system details

Dr. Shaw began the lecture by describing changes to the RRT credentialing system that relate to Table 1, pointing out that most of the CRT program elements will remain the same.

Dr. Shaw continued his presentation by comparing the value of information that has been provided by results from the Clinical Simulation Examination to other elements of the RRT credentialing system. He did so by discussing two research hypotheses. The first research hypothesis was that scores from the Clinical Simulation Examination added information beyond the information from multiple-choice examination scores when predicting membership in three groups for candidates who sought the RRT credential. Dr. Shaw presented Table 2 to explain how the three groups (certification, certification+1, registration) were formed.

Four sets of test scores from the population of about 9,000 candidates over a recent two and one-half year period were studied. The four test scores were associated with the following examinations: CRT, Written RRT, Clinical Simulation Information Gathering, and Clinical Simulation Decision Making. Dr. Shaw explained that the two clinical simulation examination subscores could be treated separately since each had its own passing score.

Discriminant analysis was applied to the data set, first with all four sets of scores and second with only the scores from the multiple-choice examinations. Dr. Shaw was interested in (1) the order in which variables were automatically entered into the model during the first run and (2) whether the results from the first run were more accurate than from the second run.

The decision-making subscores from the Clinical Simulation Examination were the strongest predictor of RRT outcomes, followed by the scores from the

Table 1. Changes to RRT Credentialing System

RRT Program Elements	Number	
	Current	January 2015
Hours of testing time	9	7
Examinations	3	2
Testing sessions for a candidate who passes on first attempts	3	2
Sets of test scores	4	2
Passing points	4	3
Multiple-choice items to assess competencies broadly	240	140
Patient management problems to assess competencies deeply	10	20
Typical number of sections in a patient management problem	10 (8-12)	5 (4-6)

Table 2. Predicting Membership for RRT Candidates

Credential Status	Label for group	Examination Outcome		
		CRT	Written Registry	Clinical Simulation
CRT	certification	pass	fail	fail
	certification +1		pass	fail
			fail	pass
RRT	registration		pass	pass

Written RRT Examination. Coefficients associated with production of a discriminant score for each person indicated that both the decision-making score and the Written RRT score were vital to the RRT credentialing system. After observing that the accuracy in predicting RRT outcomes was reduced by 7% when scores from the Clinical Simulation Examination were left out of the model, Dr. Shaw stated that this would yield between 500 and 600 inaccurate determinations of the RRT credential each year. Hence, removing the Clinical Simulation Examination from the system would be associated with increased patient risk.

Dr. Shaw transitioned to a second line of research that investigated whether the four sets of examination scores loaded onto only one principal component. Only one component emerged from the analysis, which confirmed the hypothesis that all of the current examinations associated with the RRT credential are assessments of the ability to provide respiratory care. While that may seem like an obvious conclusion, using multiple examinations brings a risk that the simulation examination scores could have coalesced on a different component than the one on which multiple-choice examination scores loaded. Alternatively, RRT examination scores could have hung together while CRT examination scores loaded onto a different component.

Considering results from the two studies together, the NBRC can be confident that the RRT credentialing system was strengthened by collecting information about candidates' abilities from multiple examinations while avoiding the risks that could be linked to using more than one examination.

Candidates should prepare for changes

In the final portion of the presentation, Dr. Shaw described features of the new 20-problem Clinical Simulation Examination for which candidates should be prepared by January 2015. Dr. Shaw explained that keeping the examination content current after a decade had become an increasing challenge. The NBRC chose to solve this challenge by halving the number of sections in problems and doubling the number of problems in the examination while maintaining the four-hour assessment experience.

Additional changes will occur at Dr. Shaw's urging. First, the specifications for assembling each test form will permit less variability. Presently, 70% of the problem types are mandated; going forward, 100% will be mandated. Second, points associated with responses in information-gathering and decision-making sections will be accumulated together into a grand score rather than separately calculated and compared to two passing points. Dr. Shaw explained that a test with more items and more points than its predecessors will yield more accurate scores as indicators of candidates' abilities; thus, pass-and-fail decisions become more accurate.

The total number of information-gathering and decision-making sections that candidates experience across the whole examination will remain as they have been. However, candidates may experience some patient problems on the new examination that include no information-gathering sections. Dr. Shaw urged audience members to help get the word out about this change. Otherwise, some candidates might wrongly assume that a technical flaw had occurred while they were taking the examination, which could disrupt their test-taking experience.

Lastly, Dr. Shaw described the implications that will be associated with a change to the policy that is associated with the determination of a passing level. The range for decision-making passing levels remains unchanged at 60%–70%. However, instead of passing levels falling between 60%–70% for information-gathering sections as in the past, they will fall between 77%–81%. Dr. Shaw illustrated how the scoring system for one information-gathering section will be affected by the policy change. He also illustrated the fact that information-gathering responses will likely influence success on the Clinical

Simulation Examination starting in January 2015. In contrast, information-gathering responses have rarely affected success prior to 2015. Dr. Shaw expressed hope that this will be another change for which candidates will be prepared.

Your questions invited

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

Robert C. Shaw, Jr., PhD, RRT, FAARC, assistant executive director and psychometrician for the NBRC, presented the 2014 Jimmy A. Young Memorial Lecture at this year's Summer Forum in Marco Island, FL.

An RT at the New River Health Center in West Virginia keeps a close eye on patients as they take advantage of some of the equipment donated by the Dorney Koppel Family Charitable Foundation.

Creating Strength in the Broken Places

Grace Anne Dorney Koppel's mission to bring pulmonary rehabilitation to underserved areas is mending lives as well as lungs

When Grace Anne Dorney Koppel was first diagnosed with COPD in 2001, her physicians told her she would not survive more than 3–5 years. Never one to accept such news at face value, she went on the offensive. After learning more about the condition, she enrolled in pulmonary rehabilitation, markedly improved her lung function, began advocating for other patients just like her, and in 2010 got what she calls "the best gift I have ever received" when her husband, former "Nightline" anchor Ted Koppel, presented her with the first Grace Anne Dorney Pulmonary & Cardiac Rehabilitation Center in Leonardtown, MD.

Dorney Koppel outlined those experiences and more during her keynote address at AARC Congress 2011 in Tampa, FL. Now she brings us current on what she's been up to since then in this Q&A.

Q ***AARC Times:*** When you addressed our Congress back in 2011, you were doing quite well with your own COPD. How are you doing today?

A **Grace Anne Dorney Koppel:** Remarkably, from my low point (26% of predicted) when I was diagnosed with COPD in September of 2001, a couple of weeks ago at my regular six-month checkup for 2014, I am holding solid at 50% of predicted. For a few years, after the upper lobe of my right lung was removed in 2005 since I had lung cancer, I had a boost in my lung function, similar to what is seen in lung reduction surgery, and achieved the heights of 65% of predicted. Today, at 1 liter FEV_1 and 50% predicted, I can do all that I want to do. In the last year I've traveled extensively both throughout the United States and to Asia and Africa and always managed to hit the ground running. The only time that I need supplemental oxygen is on flights longer than two hours at altitudes over 35,000 feet.

Q ***AARC Times:*** That is remarkable. To what do you attribute your continued ability to accomplish so much despite having COPD?

A **Grace Anne Dorney Koppel:** Climbing Everest was never on my "bucket list." I am able to do everything that I want to do, perhaps at a slower pace than others, but I know how to pace myself. I take my inhaled medicines exactly as prescribed, get flu vaccines yearly, read all the current research on COPD, and fortunately, have not had an exacerbation since 2006. My hand sanitizer is always in my pocket; and if family members or friends have a respiratory infection, they know to stay clear of me.

I continue to work 10–12 hours a day but always manage to squeeze in 2–3 miles of aerobic activity so that I can maintain my very active schedule. COPD is my major health problem; my lung cancer has not returned, and I am a cancer survivor nine years after surgery. I do not have heart disease or another serious comorbidity.

> "I want everyone who suffers from breathlessness, cough, muscle wasting, anxiety about where the next breath is coming from, to feel that they are able to contribute, to work, to teach life lessons to their family, to be useful and powerful people who are in control of their own lives."
>
> – Grace Anne Dorney Koppel

Pulmonary rehabilitation 13 years ago was what saved me. Continuing exercise and fitness training on a daily basis is what turned my life around. Realizing that millions of others have not had the opportunity to learn about our common disease (COPD) has motivated me to reach out as an advocate so that more and more of us can learn to live well with COPD.

Q ***AARC Times:*** You opened the first Grace Anne Dorney Pulmonary & Cardiac Rehabilitation Center at St. Mary's Hospital in Leonardtown, MD, in 2010. How many programs have you opened since then, and where are they located?

A **Grace Anne Dorney Koppel:** There are four Grace Anne Dorney (GAD) Pulmonary Rehabilitation Centers: St. Mary's Hospital, Leonardtown, MD (2010); New River Health Association, Scarbro, WV (2013); Boone Memorial Hospital, Madison, WV (2013); Cabin Creek Health Center, Dawes, WV (2013). This fall, another two Grace Anne Dorney Pulmonary Rehabilitation Centers are scheduled to open in West Virginia at the Lincoln Primary Care Centers in Hamlin and Man. We are in discussions with several other foundations in other states and are hopeful that in the years to come we will have many more GAD Pulmonary Rehab Centers in areas with the highest incidence of COPD and no rehab facilities.

Q ***AARC Times:*** How do you decide which hospitals and which communities you are going to work with to open new pulmonary rehab centers carrying your name, and how are these centers funded?

A **Grace Anne Dorney Koppel:** We search out locations both on our own and through our partners. The requirements are a high incidence of COPD in the community plus no pulmonary rehab facilities. Outside the urban centers, in rural areas, there is a severe shortage of pulmonary rehab centers. Our partners are those who already support rural health centers and special access hospitals. Federal agencies and state agencies have also generously lent their expertise and support.

We provide funding for the "hard costs" — construction, exercise machines, monitoring equipment, etc. — and the community or a foundation willing to participate must match our funding. My husband wisely believed that without "skin in the game," the community would not be involved. We have been fortunate in that we have been able to find willing, dedicated partners — the St. Mary's Hospital Foundation, the Benedum Foundation

Grace Anne Dorney Koppel, center, visits with graduates of the St. Mary's Hospital program at an annual anniversary party.

of Pittsburgh, PA, private donors, the United Mine Workers of America. Without partners, our work and mission could not be achieved.

Q ***AARC Times:*** What goes into opening a new center, and how are respiratory therapists usually involved in the process?

A **Grace Anne Dorney Koppel:** There is no formula. Each case is unique. Finding a partner, usually a foundation that will work with us, is the first step. In some instances, an existing room is equipped and dedicated to pulmonary rehab, with minor construction. In other instances, a wing is added to a building already in place. In rural communities, construction costs are lower than in urban areas. Needs and circumstances vary greatly. A budget is approved by our partner and by our foundation — the Dorney Koppel Family Charitable Foundation.

Yes, a respiratory therapist is part of the planning, as is a pulmonologist. Johns Hopkins has assisted us in assuring that the program planned is of the highest and best quality. It is part of our contract that each of the GAD facilities assists the next ones selected for funding. Our West Virginia clinic managers and respiratory therapists travelled to Maryland and spent a couple of days at St. Mary's observing and learning what worked best and what didn't. Beyond the first year, each of the clinics is self-supporting through insurance reimbursements. They are not profit centers, but they are not operating in the red either.

Q ***AARC Times:*** Do you have any patient outcomes to report from the GAD centers up and running today?

A **Grace Anne Dorney Koppel:** Feedback is very positive. At graduation in West Virginia for example, each patient gives a testimonial of what they are able to do that they were not able to do before. One man can now walk to and from his mailbox to get his mail and no longer feels housebound. In southern Maryland, at the two-year anniversary celebration, a woman who needed a lung transplant spoke. She graduated from pulmonary rehab and was strong enough to undergo the transplant surgery. She has "new lungs" and no longer has COPD.

Q ***AARC Times:*** Despite the fact that Medicare now covers pulmonary rehab, many places still find it difficult to open these programs. Do you think the Oct. 1 addition of COPD to the Hospital Readmissions Reduction Program is going to change that situation for the better?

A **Grace Anne Dorney Koppel:** We are hopeful that more pulmonary rehab facilities will become available so that all who have COPD will be empowered to take control of their breath and their lives. It is logical that pulmonary rehab programs bridge the gap between hospital and home — I still can't understand why pulmonary rehab is not reimbursed at the same payment level as cardiac rehab. We have the evidence that pulmonary rehab reduces hospital admissions, reduces mortality, and improves quality of life for stable COPD patients. It is a safe and effective intervention in COPD patients. It is a cornerstone in the management of patients with stable COPD. Emerging evidence suggests that pulmonary rehab is an effective intervention for COPD patients both in the stable and acute setting (post exacerbation). Unfortunately, only a very small number of patients who have stable COPD have the opportunity to get the benefits of pulmonary rehabilitation, since there are so few centers.

Q ***AARC Times:*** We know you've also been active in the National Heart, Lung, and Blood Institute's "Learn More, Breathe Better" campaign and other efforts to promote greater awareness of COPD. Tell us a little about what you've been doing with other groups and organizations to improve the care and treatment of people with COPD over the past couple of years.

W. Virginia AARC member Chuck Menders, BA, RRT, AE-C (far left), attended a W. Virginia rehabilitation clinic grand opening with Grace Anne Dorney Koppel and her husband Ted (far right).

A **Grace Anne Dorney Koppel:** I am a member of the board of directors of the COPD Foundation; active on the board of governors of the Patient Powered Research Network (for COPD) funded by PCORI (Patient-Centered Outcomes Research Institute). Lately, almost all of my time has been consumed with either speaking out to raise awareness of COPD, serving on various committees of the COPD Foundation, or working for the Dorney-Koppel Family Charitable Foundation, locating partners and bringing pulmonary rehab facilities to communities in need.

Q *AARC Times:* What does the future hold for the Grace Anne Dorney centers and your own personal advocacy on behalf of COPD patients?

A **Grace Anne Dorney Koppel:** One day, we will be able to identify the various phenotypes of COPD. We now know, for example, some who have COPD have frequent exacerbations and multiple hospitalizations yearly. An antibiotic taken several times a week can make all the difference for these individuals. We are making progress through research, but new medications and research are slow. We will not likely have a cure that is "one size fits all" any time soon. There is no "magic bullet" for COPD on the horizon. Approximately 15 million have been diagnosed with COPD; another 12–15 million remain undiagnosed and untreated. Each of us must become an evangelist and spread the message that COPD is treatable and most of us can lead long, useful, and productive lives if we get treatment. Early diagnosis and treatment is important.

Since that is the case, I feel passionately that learning how to manage, how to live a full and challenging life with COPD, is the answer for the foreseeable future. My husband and I and our daughters will continue establishing pulmonary rehab centers throughout the United States for as long as they are needed. My COPD diagnosis gave my life new meaning and ultimately enriched my life. The 3–5 year life expectancy I was given when diagnosed was wrong. I'm going strong 13 years later. Everyone should be able to have the chance for change that I was given.

Q *AARC Times:* What message would you like to send to COPD patients such as yourself and the respiratory therapists and other clinicians who care for them?

A **Grace Anne Dorney Koppel:** I want everyone who suffers from breathlessness, cough, muscle wasting, anxiety about where the next breath is coming from, to feel that they are able to contribute, to work, to teach life lessons to their family, to be useful and powerful people who are in control of their own lives.

I want all who have COPD to become "strong in the broken places." Pulmonary rehab is the most powerful tool in our arsenal for treating COPD, but only a small percentage of patients are able to access it since it is unavailable outside of large urban areas. This must change. Yes, I and 15 million other Americans have a disease that is not curable. It is, however, highly treatable. Let's emphasize the treatable aspect of the disease and see the results. Pulmonary rehabilitation can transform. ■

— 2014 —

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, we have successfully advocated for the profession at the federal, state and local level.

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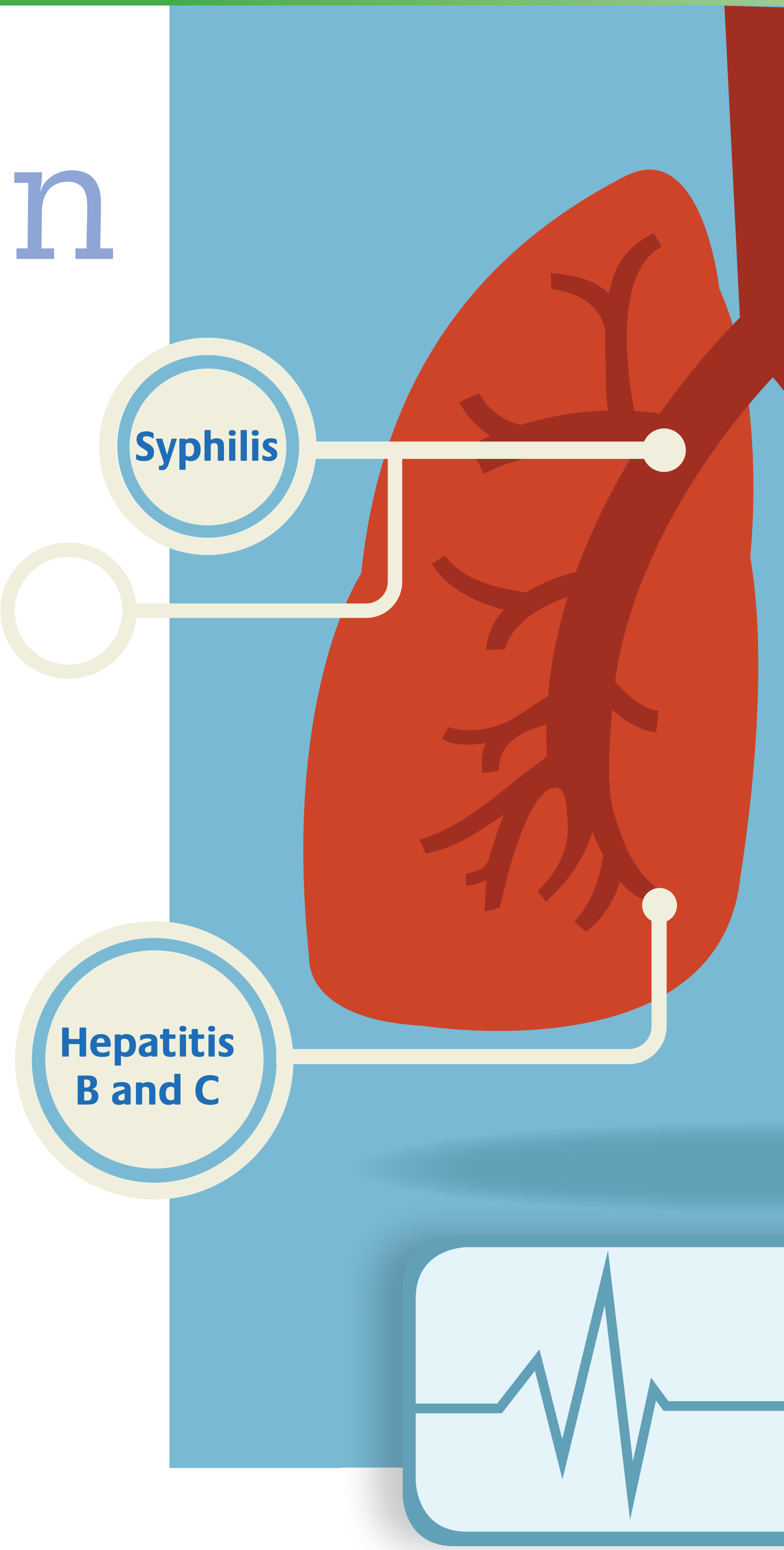
The Role of the Respiratory Therapist in Organ Donation



Respiratory therapists play a vital role in organ donor management. With the increasing number of people on the national waiting list for a life-saving organ, ensuring that every organ donor is managed appropriately is key to decreasing the number of deaths on the waiting list.

An organ procurement organization (OPO) is a federally designated non-profit organization that is responsible for facilitating organ donation in a specific service area. Currently, there are 58 OPOs in the United States; every hospital is affiliated with one. Once authorization for a donation is obtained, an organ procurement coordinator (OPC) is most often responsible for facilitating the organ recovery process.

Traditionally, OPCs consisted mostly of critical care nurses. However, when Midwest Transplant Network (MTN) began partnering with critical care intensivists in 2007, it realized an important role was missing from the process. Respiratory therapists have the education and experience to manage complex respiratory processes and can partner well with RNs to gain maximum outcomes in donor management. In 2006, MTN transplanted 16% of the lungs that were authorized for donation. Since hiring RTs on staff, lung transplant rates have increased to 40%. MTN does not have a lung transplant center in its service area; therefore, lungs have to be in pristine condition for a center to be willing to travel into the area to recover lungs for transplantation.

Small changes, big impacts

Initially, MTN hired two RTs and reevaluated the way it looked at lung management. By making small changes, such as careful ventilator management, prone positioning, and recruitment maneuvers, big impacts were made and the lung recovery rate doubled in the first year. Two more RTs were hired to make a team that consisted of half RNs and half RTs. RTs were trained to perform the same functions as the RN OPCs.

Once authorization is obtained, the donor management process varies based on age and condition of the donor patient. During this time, the OPC is initiating medication protocols, such as thyroid hormone replacement, steroids, and appropriate antibiotic coverage; providing hemodynamic stabilization with appropriate blood and fluid resuscitation; and performing lung management strategies to optimize every organ to its greatest potential.

The organ donor process can vary from a few hours to sometimes 48 hours. Donors are limited and wait lists are long. Therefore, every case is viewed as an opportunity to shorten a wait list and save a life. For example, there are currently 1,620 hopeful recipients waiting on the lung transplant list out of 119,000 patients on the entire organ list. Statistics show that every 13 minutes someone is added to the wait list and that 18 people die every day waiting. In 2013, there were only 8,268 organ donors nationwide. Despite the increasing number of organs, the wait list grows every day.[1]

Customized care

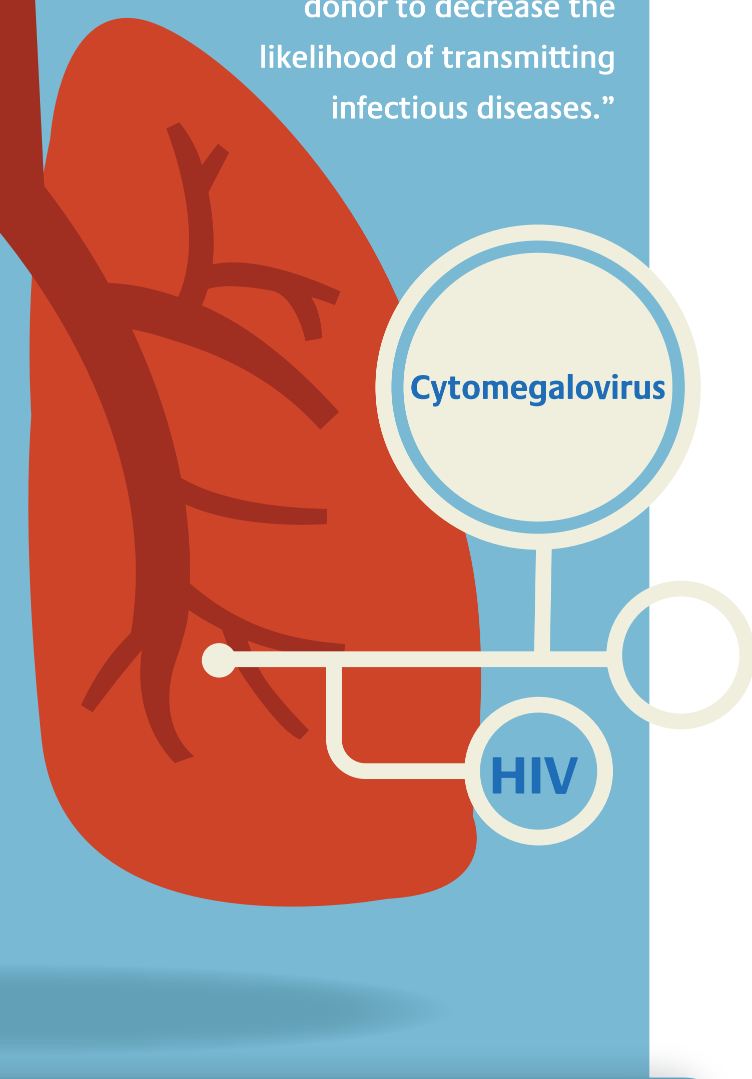
Serology testing is performed on every organ donor to decrease the likelihood of transmitting infectious diseases. At this time, tests for HIV, hepatitis B and C, syphilis, and cytomegalovirus are performed. Procedures such as a bronchoscopy are performed on organ donors who are considered for lung donation. Overall condition of the lungs, secretions, anatomy, and size are all assessed. Past medical history and PaO_2/FiO_2 ratio (PFR) are also important to determine lung suitability. The overall goal is to reach a PFR of 350 to offer lungs. All of the above are utilized by the transplant centers to determine the best donor-to-recipient match.

Occasionally, based on patient history or chest x-ray results, transplant centers will also request a CT to look for further pathology that may not have been revealed based on history, bronchoscopy, and x-ray.

Historically, organ donor management was approached in a "cookie cutter" fashion. RTs have helped MTN learn how to assess every organ donor individually and determine the best strategies to maximize oxygenation. Paying attention to lung history and monitoring peak inspiratory and mean airway pressures have become important routine assessments.

Recruitment strategies are an important part of lung donor resuscitation. Organ donors are patients who have

"Serology testing is performed on every organ donor to decrease the likelihood of transmitting infectious diseases."



About the Author

Kylie Moon, RRT, is an organ procurement transplant coordinator at Midwest Transplant Network in Kansas City, MO.

sustained devastating brain injuries and are unable to cough or clear secretions on their own. Collapsed alveoli often occur. Ensuring re-recruitment of these collapsed alveoli is an essential part of lung management. Recruitment can occur by using sustained inflation with a CPAP of 40 for 40 seconds or by using incremental inflation titrating positive end-expiratory pressure (PEEP) in increments of five until the donor is resuscitated enough to tolerate sustained inflation.

By simply implementing recruitment strategies, MTN was able to increase the initial mean PFR of 100 patients from 282 (ranging from 53 to 611) to a final mean PFR of 334 (ranging from 63 to 567). These lung management protocols were developed in conjunction with the MTN critical care committee and based on strategies found to be successful in live, critically ill patients suffering from severe lung dysfunction.[2]

In May of 2008 MTN started the practice of proning patients in an attempt to improve both ventilation and oxygenation. Patients who are mechanically ventilated routinely develop a ventilation-perfusion (V/Q) mismatch. Distribution of gas and alveolar size decrease significantly in the supine position. With prone positioning and the addition of PEEP, ventilation is maximized and alveolar size improves, resulting in a decrease in the V/Q mismatch. In the first 18 months, 28 patients were proned, with an initial mean PFR of 251 (ranging from 57 to 536). After proning, the final mean PFR was 332 (ranging from 78 to 520). Proning has now become routine for nearly all organ donors in the MTN service area. Any technique that is good for a patient's lung is good for the donor lung and, eventually, the recipient.

Education is key

In 2013 Nicholas Henry conducted a study to assess RTs' awareness of organ donation referral criteria and their attitude toward organ donation before and after an educational intervention.[3] He first identified multiple hospitals that had the most potential for donation to occur and scheduled an educational offering at each hospital's staff meeting. Standardized education was completed with each group, followed by a survey. He concluded that educating RTs about organ donor referral criteria and their role during a case improves therapists' overall perception of donation and should be included as a fundamental part of hospital education.

Since first coming on board as OPCs in 2007, RTs at MTN have made it their mission to ensure respiratory therapy is an integral part of every organ donor case. With their expertise and foreknowledge of the patient, they have been able to work collaboratively with the health care team to decrease wait lists across the United States. Education of respiratory therapy departments in the hospitals MTN serves is vital to their success. Ensuring staff in these departments know what to expect and the basics of donation helps to streamline the process in real time. Midwest Transplant Network has facilitated educational symposia for RTs that feature tracks strictly focused on respiratory education, plus MTN created respiratory care cards that are handed out in hospitals during a donor case to pass from shift to shift. Thanks to the intense involvement of RTs in the MTN service area and employment of RTs on staff, MTN has been recognized nationally as one of the top-performing OPOs with respect to lung recovery and transplantation. ■

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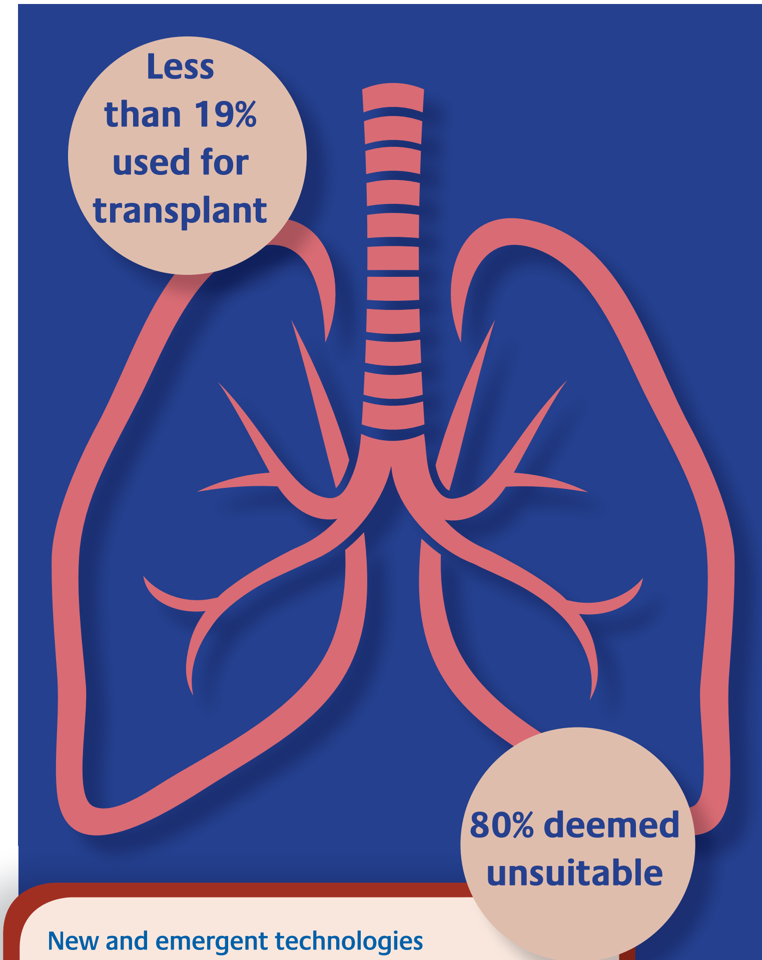
Ex Vivo Lung Perfusion, a Novel Innovation and Opportunity for the RT

by David M. Wheeler, MEd, RRT-NPS

Currently, less than 19% of all procured lungs are utilized for transplantation.[1] Although significant progress in research has produced relatively modest increases in the recover-to-transplant utilization, this number remains problematic and disappointing. When one considers that the procurement of lungs for possible use in transplantation has grown in a significant fashion, it is astonishing that more than 80% of procured lungs are deemed unsuitable for transplant and are wasted. The waste of this gift is both a disquieting fact and a call to action. It is the primary mission and fundamental intention of our Human Lung Lab at the Cleveland Clinic to assess, evaluate, and recondition human lungs and to transform the catastrophic and heartbreaking reality through innovation, the application of evidence-based clinical protocols, and rigorous scientific inquiry.

New and emergent technologies intended to rescue, resuscitate, and recondition lungs for transplant hold great promise for increasing the percentage of procured lungs that are utilized for transplantation. The introduction of the warm organ perfusion device has revolutionized organ recovery to organ transplant. It is shocking to realize that for the past 30 years human organs being transported to their new "homes" have been packed in containers that are not unlike the coolers that can be found at any tailgating party. This has been a major concern for transplant specialists who realize this transport process and the cold ischemic time are problematic. This new technology will facilitate the assessment, reconditioning, and transport of a variety of living organs.

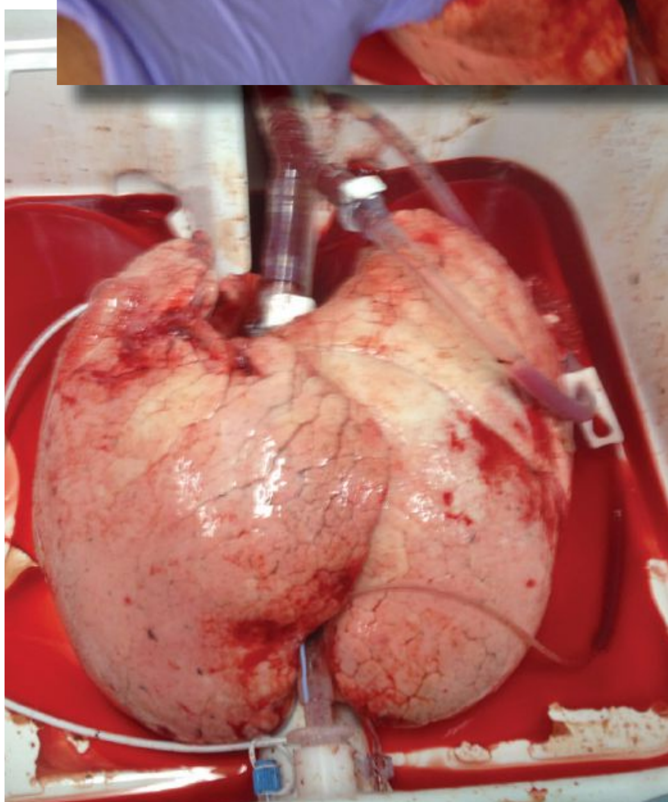
Ex vivo lung perfusion (EVLP) is the protocol-driven perfusion and ventilation of a lung outside of the body. The EVLP process has been described at length in several peer-reviewed journals.[2,3] The purpose of this brief



New and emergent technologies intended to rescue, resuscitate, and recondition lungs for transplant hold great promise for increasing the percentage of procured lungs that are utilized for transplantation.

introductory comment is twofold: to describe the current EVLP technologies and to outline future prospects underscoring the role of the respiratory therapist in this emergent translational technology.

> *Ex vivo* lung perfusion is a breakthrough technology that is unquestionably matched to the skill sets of the respiratory therapist.



EVLP perfect match for RTs

EVLP is a breakthrough technology that is unquestionably matched to the skill sets of the respiratory therapist. The EVLP process involves a rudimentary circulatory device for the perfusion of the pulmonary capillary bed and a mechanical ventilation platform for artificial ventilation of the lung. The perfusion of the pulmonary capillary bed is performed either with acellular (without red blood cells) or cellular (with red blood cells) perfusate that is designed to recondition and enhance the authentic evaluation of the lung. The perfusion circuit consists of a catheter into the pulmonary artery and either an open or closed left atrial cuff. In the closed left atrium system, the perfusate is usually acellular and is circulated through this closed system at 40% of cardiac output. This is commonly called the Toronto system. The system that employs an open left atrial cuff also generally employs a red blood cell-based perfusion solution at 100% of cardiac output. This is generally called the Swedish system.[1] Both of these systems perfuse solution through a leukocyte filter, heater, de-oxygenator, and reservoir system.[2] Some commentaries have likened the systems to extracorporeal membrane oxygenation with ventilation.[3,4]

In our EVLP lab we utilize this technology to stabilize, evaluate, and triage lungs that have been procured and deemed unsuitable for transplant. Upon evaluation and stabilization, the lungs have the potential to be rescued and resuscitated through the use of innovative strategic ventilation and perfusion strategies. The intention of this work is to evaluate in an authentic way the potential for the previously rejected lung to be introduced into the transplant inventory or, if that is not possible, employed in rigorous protocol-driven scientific research. In this context, EVLP ventilation has the potential to increase the available organs for transplant while acting to enhance the science of lung transplant and the knowledge of the lung under duress.[5,6]

This translational innovation will dramatically change the evaluation, assessment, and potential treatment of human lungs that have previously been deemed unsuitable for transplant and have a significant impact on all organ transplants.[7,8] The RT can play a pivotal role in establishing foundational protocols as well as managing and developing the discipline of EVLP and ventilation. In our lab, we have used several configurations — both open and closed left atrium with cellular and acellular perfusate.

Overcoming obstacles to change and innovation

Innovation in health care must be regarded as a moral imperative and an integral component of the core value of constantly evolving our comprehension, expertise, and clinical application of state-of-the-art therapeutic concepts. EVLP ventilation is a prototypical context where both innovative therapeutic alternatives and imaginative scientific protocols might be created and perfected by respiratory therapy professionals.

Compassionate care is associated with clinical inquiry and the insightful pursuit of innovations in thought, technology, and clinical practice. Most obstacles to change and innovation are self-made and self-perpetuated. These are the manifestations of William Blake's "mind-forged manacles" — and they must be shattered by the enlightened clinician in the pursuit of therapeutic excellence and scientific inquiry. ■

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About the Author

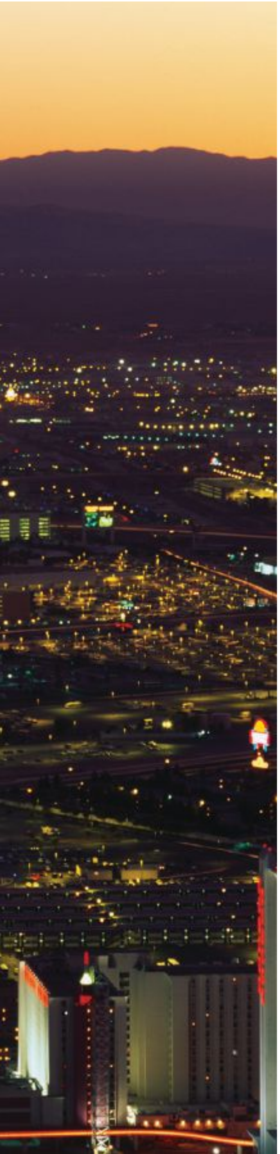
David M. Wheeler, MEd, RRT-NPS, is the education coordinator of cardiothoracic anesthesia respiratory therapy and a research associate in the Human Lung Lab at the Cleveland Clinic in Cleveland, OH.

Another 6 Congress Sessions You Won't Want to Miss

CONGRESS 2014

Presenters offer a glimpse at what they'll be talking about this December at the Mandalay Bay Resort and Convention Center in Las Vegas

The program for this year's Congress reflects all the major changes taking place in health care today, plus all the major advances in the science and technology behind respiratory care. In our final preview of Congress sessions, six more presenters share an inside look at the cutting-edge content they'll be delivering this Dec. 9–12 in Las Vegas.



1 AARC Program Committee Spotlight — Outcomes in Pulmonary Rehabilitation: The Science and Best Practices

by Chris Garvey, MSN, MPA, FNP, FAACVPR

With penalties now in place for excessive readmissions for COPD, hospitals are looking more closely at pulmonary rehabilitation and the role it can play in reducing those readmissions. Professionals in this area will tell you their programs benefit their patients in terms of improved function, quality of life, and activities of daily living. To "sell" your hospital administration on the value of pulmonary rehab, however, you need to be able to provide hard, cold facts on its efficacy. Best practices aimed at getting the most out of every dollar spent are vital to the success of any program, and collecting outcomes that prove the program is benefiting patients while reducing overall costs of care is essential to keeping the program up and running.

This session will highlight strategies for identifying, collecting, and interpreting outcome measures in pulmonary rehabilitation. Outcome measurement is a key element of effective care, as well as a Medicare and program certification requirement. Attendees will learn more about the tools available to enhance accurate and appropriate outcome tracking, interpretation, and data reporting. They'll also develop the skills they need to use those tools and discover various options available for outcome measurement that can fit a variety of program settings. ■

Chris Garvey is manager of Seton Pulmonary and Cardiac Rehabilitation in Daly City, CA, and an NP in sleep disorders and pulmonary medicine at the University of California San Francisco.

2 Doing More with Data — How To Seamlessly Incorporate Bedside Data To Improve Quality

by Brian Walsh, MBA, RRT-NPS, FAARC

With the advancements in technology over the last five years — to the point of being available 24/7 in our pockets — technology pundits, psychologists, and sociologists have been sounding ever louder warnings about information overload. A constant onslaught of communication and information coming at us all the time, and in ever greater volume, will soon be the norm in our everyday life.

However, what if you're a respiratory therapist, nurse, or physician in an ICU? For you, information overload isn't just a daily nuisance — it's a necessary reality. To make the right decisions at the right time for each patient, you must keep tabs on numerous bedside monitors (most of which do not communicate with each other), not to mention protocols and practice guidelines or alerts. Now imagine you're the respiratory therapy department director. For you, information on specific outcomes for patients who receive respiratory therapy services has never been available without manual chart reviews, committees, or manual data entry. To make the right decisions, numerous quality indicators and dashboards will need to be incorporated into your leadership and practice within the department, and soon will be the norm in your everyday life, too.

We provide thousands of patients each year with respiratory care services. While many of the services we provide are therapeutic, some are associated with adverse events. Advancements in the electronic medical record, physiologic monitoring, and ventilation technology provide us with the ability to stream or export information about the services we provide and the patient's response to therapy. Many of the new systems on the market will enable the coupling of intermittent and high-frequency physiologic data sampling for further quality analysis. Yet, as with any new technology, many of the systems have their strengths and weaknesses and can be overwhelming.

During this lecture, we will discuss the past, present, and future of doing more with data and how some of the advancements will allow us to easily discover the successes and failures inherent in the services we provide. The computer and software age is upon us, and we are behind other industries such as aviation. We will need to learn how to embrace the coupling of data with a machine-learning model, resulting in real-time decision support that could lead to improved quality of outcomes-based care. My goal for participants is to: (1) not fear technology — embrace it, (2) control the advancement and make the technology work for you, (3) use the data to make wise and informed decisions, (4) demand technology that will work for your patients and department, and (5) transform data into information and information into knowledge. ■

Brian Walsh is a research coordinator at Boston Children's Hospital in Boston, MA.

3 ALS Management in the Home

by Joseph Lewarski, BS, RRT, FAARC; John Cahill, RRT; and Lee Guion, MA, RRT, FAARC

Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease, is a progressive neuromuscular disease that causes a gradual, continuing degeneration of motor nerve cells in the brain and spinal cord. Although ALS is relatively rare, with an incidence rate of two per 100,000, there are approximately 5,600 people diagnosed annually in the United States. At any given time, as many as 30,000 Americans may have ALS.

The life expectancy of an ALS patient averages about two to five years from the time of diagnosis. However, this disease is quite variable, and many people live with quality for five years or more. More than 50% of all patients live more than three years after diagnosis, and 20% of people with ALS live five years or more.

Survival and quality of life with ALS can be greatly impacted by effective home respiratory management. ALS patients face a myriad of respiratory challenges and complications, many of which can be safely and effectively managed in the home. Effective airway clearance, oxygenation, and ventilatory support, led by the respiratory therapist, are critical factors in the successful home management of patients with ALS. This important symposium will provide an overview of ALS today and review successful home airway clearance and mechanical ventilation strategies and tactics. ■

Joseph Lewarski is vice president of clinical affairs at Invacare Corporation in Wickliffe, OH. John Cahill is executive director of Independence Plus, Inc., in Prospect Heights, IL. Lee Guion is a neurorespiratory clinical specialist at the Forbes Norris MDA/ALS Research and Treatment Center at the California Pacific Medical Center in San Francisco, CA.

4 AARC Program Committee Spotlight — COPD and Post-acute Care… Connecting the Dots

by Zach Gantt, RRT

Respiratory therapists understand the challenges facing those living with COPD. They witnessed the failure of the health care system to deliver effective care for these patients long before the Patient Protection and Affordable Care Act (PPACA) was passed. They have also known precisely what it takes to help those with COPD and make a substantial difference in their lives. However, since the mid-1990s, respiratory therapists as a whole have experienced a steady decline in their ability to provide proactive care for this chronically ill population. As reimbursement adjustments eliminated respiratory therapy from sub- and post-acute care providers, the role for the therapist became focused on acute care. Today, 90% of all RTs work in settings such as hospitals that are well suited to react to acute incidents but fail to proactively address chronic conditions like COPD.

Today's health care imperative is clear — do more with less, and prove your value. The COPD patient population represents one of the best opportunities for this mantra to take hold. Despite continued respiratory therapy reimbursement obstacles, a number of organizations and businesses are rising to the occasion, leveraging RTs as change agents to deliver sub- and post-acute care for this chronic condition. As they prove their value to patients, providers, and health plans, demand for RTs in home, skilled nursing, and rehabilitation settings is increasing, albeit slowly. The question each RT must ask is, "Do I want to be part of this solution?" To answer that question, consider this: If your mother were living with COPD, wouldn't you want her to receive care that was appropriate for her condition? When she experienced exacerbations, wouldn't you want her to know what steps she could take to mitigate the symptoms and to keep her out of the hospital? Doesn't every person living with COPD deserve a chance to live a more independent, full, and rewarding quality of life?

Respiratory therapists may be on the brink of an explosive resurgence in post-acute care. This track will educate you on how RTs are redefining their role as clinicians and how you can engage as a change agent in the health care landscape of tomorrow. ■

Zach Gantt is president of HealthCare Education Systems, LLC, in Livingston, TN.

5 AARC Program Committee Spotlight — Patient Safety

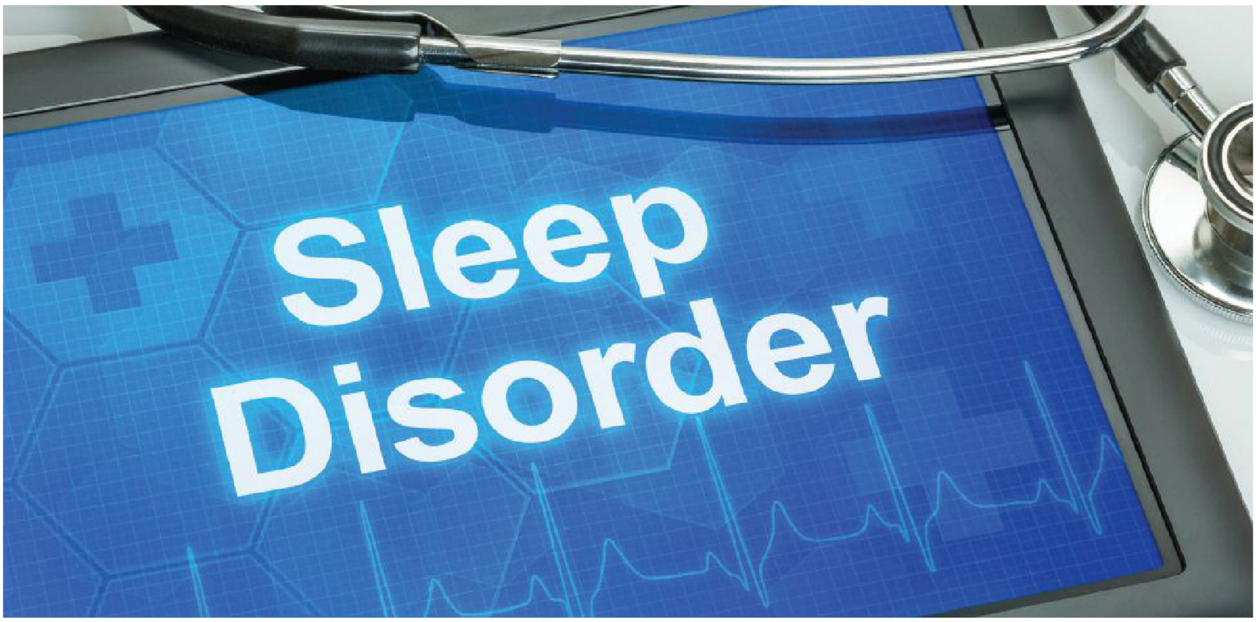
by Cheryl Hoerr, MBA, RRT, FAARC

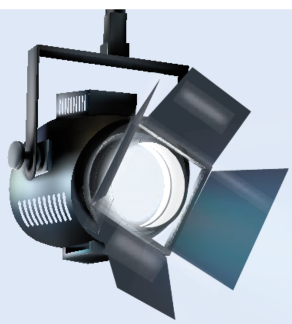
Since the 1990s numerous studies have demonstrated the dangers inherent in our health care system. Preventable medical errors cause serious injury or death and result in billions of dollars in excess health care costs nationwide each year. One way that respiratory therapists can contribute to keeping patients safe is by ensuring that every patient is screened for sleep-disordered breathing. Patients who screen positive and receive the appropriate follow-up treatment have a lower risk of experiencing serious medical complications or death.

Unfortunately, while awareness of this problem is growing, many patients still don't receive the necessary screening and fall through the cracks when it comes to appropriate treatment and monitoring. Even when an organization has a screening program in place, the process isn't consistent throughout all levels of care, and patient follow-up is often lacking.

Our goal is to raise the level of awareness of this issue with attendees and challenge them to go back to their organizations and do some investigation. The ideal outcome would be RTs who go home and champion the creation of a comprehensive screening program for sleep-disordered breathing within their organizations. This would go a long way toward eliminating preventable errors and the unnecessary physical, emotional, and financial costs associated with suboptimal health care. ■

Cheryl Hoerr is director of respiratory services, the sleep center, and neurology services at Phelps County Regional Medical Center in Rolla, MO.





AARC Program Committee Spotlights

Throughout the program for AARC Congress 2014 you'll find lectures and symposia (like three of those previewed here) that carry the "AARC Program Committee Spotlight" label. The Program Committee's goal with these spotlight segments is to highlight information deemed of critical importance to the membership. There's so much to see and do at the AARC Congress that you can easily miss something, and we wanted these presentations to stand out each day. The overall objective is to draw attention to these specific topics and encourage people to attend them, especially those who have only a limited amount of time to devote to the meeting. ■

— Cheryl Hoerr, MBA, RRT, FAARC, AARC Program Committee member

6 Transitioning from Student to Professional: Getting Credentialed and Employed

by Bill Galvin, MEd, RRT, FAARC

Students often ask what their life will entail after they walk out the doors of their college or university. "What are the next steps in my professional life?" "What goals should I establish for myself?" These are insightful and frequently anxiety-inducing thoughts. However, two major goals are clearly in the front of their minds — achievement of professional status through attainment of professional credentials and securing meaningful and purposeful employment. In short, becoming an RRT and getting a job!

This symposium will feature a cadre of seasoned professionals from the academic world as well as the clinical arena. Crystal Dunlevy, EdD, RRT, from The Ohio State University, will get things started with a talk on "What It Means To Be a Professional." Dr. Dunlevy is known for her humor and discerning observations and will address the issue of professionalism with an overview of the evolution, role, and value of the profession of respiratory care. She will highlight the characteristics and traits of a professional and stress the critical importance of professional membership and getting actively involved and engaged in the profession.

I will follow with talks on "Acquiring Your Credential: Success on the Written Exams" and "Success on the Clinical Simulation Exam." I'll draw on my experience providing workshops at state and regional conventions as well as my participation in the AARC Registry Prep Course and as a resource to student services at my university. I've also adapted the test-taking lecture for the AARC Asthma Prep Course, COPD Educator Course, and just recently, the Adult Critical Care Course. I'll provide an overview of preparatory issues, onsite experiences, and specific strategies and techniques for both the National Board for Respiratory Care's written and clinical simulation examinations.

The current employment climate in some regions of the country is particularly challenging, which makes the next presentation in the symposium extremely attractive. Cheryl Hoerr, MBA, RRT, FAARC, a respiratory therapy department manager with many years of experience and considerable expertise in employee relations and hiring practices, will address the very timely topic of "Securing Employment: Marketing and Networking Yourself to the Dream Job." She will provide an overview of the job search process that will include developing the cover letter and resume, interview skills, and measures that prepare one for meaningful and satisfying employment.

The final presentation in the series will be provided by Debbie McAllister, BHS, RRT, from St. Louis, MO, who will take the theoretical elements addressed by Hoerr and bring them to life with actual examples of tactics you should employ during the application and interview process. The title of her presentation, "Nobody Likes a Dead Fish Handshake: Helpful Hints for an Interview," speaks to the nature of the content and the practicalities of how to conduct yourself during the interview process. ■

Bill Galvin is an assistant professor and program director of the respiratory care program at Gwynedd Mercy University in Gwynedd Valley, PA.

Las Vegas Insider:
Parks & Recreation

With the AARC Congress now just a few weeks away, many of you may be thinking about how you'll spend your downtime at the conference. In this final edition of our "Las Vegas Insider," Aimee Barnes, BSRT, RRT, and her colleagues from the Pima Medical Institute, Anthony Everidge, BA, RRT-NPS, and David Kashnow, RRT-NPS, offer an inside look at what the locals do when they want to get some fresh air.

Aimee's Pick

The High Roller at The LINQ

Across from Caesar's Palace

Located in The LINQ outdoor shopping, dining, and entertainment district, the 550-foot-tall High Roller is the world's largest observation wheel. From the ground to the top of the tallest cabin, The High Roller spans 550 feet, making it 107 feet taller than the London Eye. Passengers can enjoy breathtaking Las Vegas views in a 30-minute ride, the time it takes for the entire wheel to rotate. Plan on at least an hour, though, to accommodate entering and exiting the wheel.

The High Roller has 28 spherical, Italian-handcrafted glass-enclosed cabins, each weighing 44,000 pounds. Each air-conditioned cabin is equipped with two benches for seating and holds up to 40 people, totaling 1,120 at full capacity. Each pod is fully enclosed in 300 square feet of floor-to-ceiling glass. Open 11:30 a.m. to 2 a.m. daily. www.caesars.com/thelinq/high-roller.html

Aimee Barnes says The LINQ is an amazing dining, shopping, and entertainment venue.

At 550 feet, The High Roller is taller than the London Eye.

The High Roller offers great views of the city.

Aimee's Pick

Town Square
6605 Las Vegas Blvd. South
Las Vegas, NV 89119
(702) 269-5000

An open-air shopping, dining, and entertainment center lying on 117 acres, Town Square offers 100+ stores in a more private European setting just off the Las Vegas Strip. It's great for tourists who want to avoid the hustle of The Las Vegas Strip and enjoy a more relaxed shopping experience. Many people visit the famous Strip and have no idea that Town Square even exists and that it is so extremely close. As an avid shopper, I find this place amazing! It is two miles south of the Mandalay Bay and literally just minutes from the resort. Open Monday–Thursday 10 a.m.–9 p.m.; Friday–Saturday 10 a.m.–10 p.m.; Sunday 11 a.m.–8 p.m. www.mytownsquarelasvegas.com

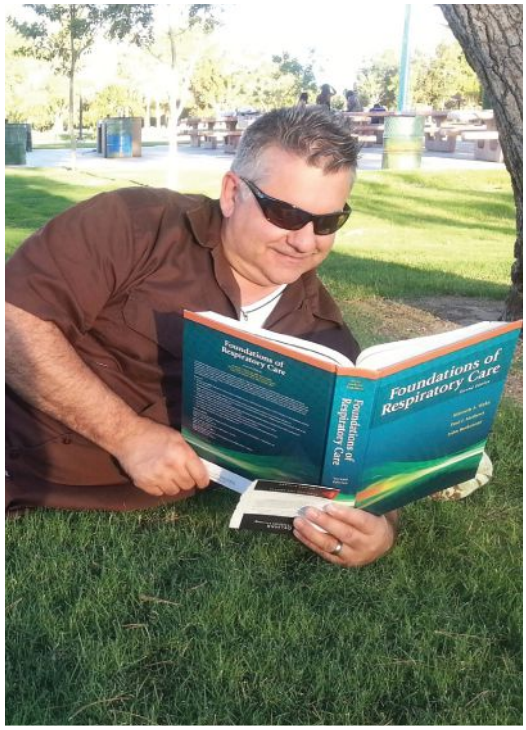
Aimee Barnes and her son Chace take a break while shopping at Town Square.

Anthony's Pick
Sunset Park
2601 E. Sunset Rd.
Las Vegas, NV 89120
(702) 455-8200

This 325-acre regional park is the most popular public park in Southern Nevada. It has been the "Best of Las Vegas" *Review-Journal* pick for the past five years and was selected "Best Park" by *Vegas Seven* magazine and Yelp.com in 2010.

Once home to early ranchers, the land for Sunset Park was acquired in 1967 and contains the last of the dunes that once covered most of Paradise Valley. More than 200 plant species in the Mojave Desert are found nowhere else on the planet, and many of them are preserved at Sunset. The park is also home to abundant wildlife. It is one of the last habitats for Phainopopla, a tiny black-crested bird with red eyes that lives among the mesquite trees.

Paiute Indians inhabited the site a thousand years ago and greeted visitors who sought to trade seeds, nuts, and turquoise. Water continues to flow under the park and surfaces to provide irrigation to the entire west end of Sunset. Sunset Park offers numerous urban park amenities such as shaded picnic areas, enhanced walking trails, a splash pad feature, modern playgrounds, barbeque grills, fields, and open spaces. The park is a great place to enjoy a bike ride or nature walk. Bicycle rentals and sports/fishing equipment are available to the public. Approximately 5.37 miles and 11 minutes from the Mandalay Bay. www.clarkcountynv.gov/



Anthony Everidge brushes up on respiratory care under a tree at Sunset Park.

Sunset Park is a perennial favorite among Las Vegas natives.

David Kashnow enjoys a round of golf at the Las Vegas National Golf Club.

David's Pick

Las Vegas National Golf Club
1911 E. Desert Inn Rd.
Las Vegas, NV 89169
(866) 695-1961

Las Vegas National Golf Club is located just minutes from The Strip. One of Las Vegas' oldest golf courses, built in the 1960s, this is where Tiger Woods won his first PGA tour event in 1996. The course offers a lot of fun for an amateur player as it has wide fairways and most of the par fours are less than 400 yards in length. It is also fun for the better player, with elevated greens and some interesting pin placements.

The first hole has an interesting bit of history: This is where the plane landed in the movie "Casino," and the house where Robert De Niro's character lived is famously located between the 1st and 18th fairways. Inside the club house you'll find the famous Rat Pack Bar and Grill, along with the Las Vegas Golf Hall of Fame featuring pictures of all the former champions of the club, including Tiger Woods and Arnold Palmer. Approximately six miles and 11 minutes from the Mandalay Bay. To book a tee time, go directly to the site and enter as a visitor to Las Vegas. www.lasvegasnational.com ■

Las Vegas National is the oldest golf course in the city.

Take a Spin Down the DRIVE4COPD Highway

National campaign put COPD in the driver's seat

When DRIVE4COPD debuted back in 2010, the AARC was one of the first organizations to jump onboard the campaign; and throughout its nearly five-year history, AARC members have gone above and beyond to screen people for COPD using the campaign's simple five-question population screener.

Along the way, they've also educated thousands of people about COPD and taught those who already have the disease how to properly take their respiratory medications. As the campaign winds up its fifth year of operation, we thought this would be a great time to take a spin down the DRIVE4COPD highway to see how this public health initiative has grown over the years — and highlight the important role respiratory therapists have played in promoting awareness.

by Debbie Bunch

2010: Start Your Engines!

DRIVE4COPD entered the national spotlight early in 2010, spearheaded by celebrities Danica Patrick, Patty Loveless, Bruce Jenner, Michael Strahan, and Jim Belushi, all of whom had a close personal connection with COPD through a loved one who had suffered from the disease. The premise was simple: Use a five-question population screener to help members of the general public better understand their risks for developing COPD while they still had time to make a significant impact on the course of the condition. The original goal: screen one million people for COPD over the course of one year.

The screener was made available on a dedicated website, and groups and organizations who partnered with the campaign pledged to do what they could to screen people at public events and other sites as well. The AARC was among the first to sign up and immediately raised the bar for its members by challenging each of them to use the screener to screen 10 people. By year's end, AARC had featured an interview with Danica Patrick in *AARC Times*, hosted a contest to see which state society could bring in the most screeners, and put our members well on their way to amassing the most completed screeners of any of the organizations partnering with the campaign.

2011: Pedal to the Metal

By the time the one-year anniversary of DRIVE4COPD rolled around in February of 2011, the campaign had reached its goal of screening one million people, and AARC members were applauded for the major role they played in helping the campaign reach that goal.

But with an estimated 24 million people still undiagnosed — many of them of working age — the AARC knew there was much more work to be done. The Association bumped its involvement up a notch by launching the "Adopt-a-Company" campaign in the spring, asking its members to go out into their communities and partner with local businesses to bring COPD awareness and screening into the workplace. Hundreds of members signed on, providing COPD education and screening in sites ranging from local factories, to "mom and pop" stores and restaurants, to their own hospital lobbies.

By the end of the year, the AARC was actively involved in another branch of the campaign as well. Designed by renowned artist Michael Kalish, the pinwheel-inspired 24M: THE DRIVE4COPD MONUMENT debuted in New York City in September, then made its way to Dallas for its second outing at the State Fair of Texas in October. AARC CEO and Executive Director Thomas Kallstrom, MBA, RRT, FAARC, attended the unveiling and spoke with the crowd. "Since February 2010, AARC has been a part of DRIVE4COPD, working to raise awareness of chronic obstructive pulmonary disease," he said at the Texas opening. "Michael is helping expand DRIVE4COPD into a new area by raising awareness through his art."

2012: Cruise Control

By 2012, DRIVE4COPD was in a groove, with AARC members around the country continuing to host booths at health fairs and other events in their communities. Our state societies promoted the campaign as well, and the AARC sponsored booths at several national events.

The campaign itself settled nicely into its new home at the COPD Foundation — a key AARC partner in all things COPD-related — and leaders in the Association took a "time out" to reevaluate the AARC's goals and objectives related to DRIVE4COPD. The result was a period of reflection on the best way to move the campaign forward; and by the end of the year, the AARC was busy reworking an initiative begun the year before, with a rollout date scheduled for the spring of 2013.

2014: Checkered Flag Ahead!

That brings us to 2014. Now in its fifth year, DRIVE-4COPD has once again played a major role in the Association's public awareness activities. Jason Moury has continued to work with members across the country to promote RT involvement in DRIVE events; and since the first of the year, members have screened the public and offered respiratory education and advice in more than 30 major venues. Many others have set up DRIVE booths at local health fairs, shopping malls, hospitals, and other gatherings aimed at improving public awareness of health concerns.

The campaign also added a mobile component this past June to make it easier to screen people using electronic devices like cell phones and tablets, and the AARC launched a "DRIVER" contest to encourage members to take advantage of the new formats. The AARC member with the largest number of screens between July 18 and Nov. 30 will receive complimentary registration to AARC Congress 2015 in Tampa, FL. The recipient will be announced at the AARC booth at AARC Congress 2014 in Las Vegas, Dec. 9–12.

Looking ahead, the DRIVE4COPD campaign will once again evolve. The COPD Foundation is launching a new social collaboration platform, COPD360, in conjunction with COPD Awareness Month in November. Stay tuned for more AARC community outreach initiatives. ■

2013: In the Fast Lane

Part of the AARC's recommitment to the DRIVE campaign took the form of a new hire at the Association. Jason Moury, BS, RRT, came on board as our COPD/DRIVE-4COPD coordinator to help ensure members had the support they needed to continue to host DRIVE events around the country. He also took the lead in the AARC's re-launch of its "Adopt-a-Company" campaign, this time complete with a DRIVE4COPD Toolkit designed to help RTs connect with local businesses easily.

It paid off. Members used the ready-made resources to network with employers in their areas, and soon DRIVE events were being hosted at companies big and small. Several took place at PepsiCo bottling plants, where members were able to visit with workers as they came on and off shift. More than 150 AARC members participated in screening events across the country, accounting for almost 13,000 people screened.

Have RT, Will TRAVEL!

A COPD patient from Tennessee credits his respiratory therapist for making a trip of a lifetime possible

by Debbie Bunch

The Korean War Memorial contains 19 stainless steel figures representing a squad on patrol, drawn from each branch of the armed forces.

With a dad who served in World War II, Rick Carver, CRT, grew up with an appreciation of the sacrifices made by members of the armed forces. So when he began hearing news stories about a local group that sponsors trips to Washington, DC, for aging vets so they can see their war memorials, he knew it was something he wanted to be involved with.

"Over the years, HonorAir Knoxville has received a lot of publicity through many of the local media outlets," says Carver, who works as a respiratory therapist at Blount Memorial Hospital in Maryville, TN. "Also, I began hearing some of my patients who are veterans talk about their experiences with HonorAir, so that really caught my attention." He applied to become an HonorAir "guardian" and also began printing out some applications from the HonorAir website to hand out to other patients who shared their military service with him.

However, Carver never expected to be singled out by one of those patients to serve as a personal guardian. That's what happened last spring, though, when Vince Gimondo asked him to accompany him on the trip on April 16. Despite growing up as an Army kid and traveling extensively during his own service to our country, the 83-year-old COPD patient had never been to Washington, DC.

Getting ready

"There were two other patients I had given applications to who, due to their health, didn't live long enough to make the trip," says the therapist. "They were accepted, but they didn't get to go. Vince got accepted, and it was just an honor that he would want me to go with him." The trips are free for veterans, but volunteers like Carver pay $500 out of their own pockets for the privilege of going along.

With both patient and therapist on board for the trip, planning began to ensure Vince would have a great experience during the day-long excursion. "Since Vince is a medical-needs veteran, I listed my background as a respiratory therapist on the application, along with my background in air and land transport," says Carver. HonorAir regularly takes physicians, nurses, and paramedics along on the trips; but as far as he knows, he's the only respiratory therapist to get involved.

"Before the trip, we did an evaluation listing of all of Vince's diagnoses and generated a medications list as required by HonorAir," says Carver. "In our pre-flight meeting, we discussed his routines, his use of medications, and his needs for both oxygen and wheelchair access on the trip." Right before the flight that would take them from Knoxville to Washington, DC, Carver made sure Vince had taken all his respiratory medications; and they went over the schedule they would follow for taking those medications again throughout the day.

Carver and Vince both credit the pulmonary rehabilitation and fitness programs he's participated in at Blount for making the trip possible. "He's learned how to improve his breathing and push himself to stay as fit as possible," says his RT. "One technique in particular that helped Vince through both the trip and the flight was pursed-lip breathing, which he learned through our pulmonary rehabilitation program."

Vince and his fellow vets were honored everywhere they went.

Seeing the sights

Once on the ground in DC, Carver says Vince and the other veterans were treated like celebrities. The group was met by a hearty round of applause from well-wishers who had assembled to welcome them to the nation's capital, and from there they joined tour guides and police escorts for their whirlwind tour of the capital's top sights. As a veteran of the Korean War, the highlight of the trip for Vince was the Korean War Memorial. "The statues are almost like real humans," he says. "The anguish on their faces… it's just almost hard to explain."

Carver says the trip turned into a living history lesson for himself and the other guardians as all of the vets began talking about their military service as they made their way to each of the memorials. "When we got to the Korean War Memorial, Vince started talking about his time there, the challenges he faced, and how hard it was for the soldiers to do the job that they had to do," he says. It was an emotional experience; and anytime Vince appeared to be having difficulty breathing, Carver would check his oxygen level with the pulse oximeter they brought along and listen to his chest with a stethoscope. The attention to detail paid off — Vince had no significant problems despite the hectic schedule.

After a very busy day, the group headed back to the airport and boarded their flight back to Knoxville. About half way through, they were presented with letters from friends and family thanking them for their service; and when they landed, a crowd of local supporters was on hand to meet the flight. "That was a last bit of surprise," says Carver. "The music was playing and people were shaking their hands, saying hello, and saying thank you. It took us probably 30 or 40 minutes just to get down the ramp into the main lobby."

Vince and Carver take time out for a photo in front of the Washington Monument.

Vince gets ready to head out and see the sights.

The honor's all his

Carver had a chance to sit down with Vince and his wife about a week after the trip to look through some photos he had taken during the excursion and says Vince repeatedly thanked him for going with him. "Vince and I have definitely developed a friendship, and it's even stronger after taking this trip together," says the therapist. "I was initially surprised Vince wanted me to go with him as his guardian, but it was a really good feeling and an honor for me personally."

Vince says the honor's all his. "They think it's their honor to take me, but it's my honor to get to go," he says. "If it hadn't been for Rick, I probably would have never gone." ■

Reducing COPD readmissions is critical.

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AARC COPD FOUNDATION

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COPD Facts:

- COPD is the fourth leading cause of death in the U.S.
- Reducing readmissions will improve quality of care and reduce costs.[1]
- COPD is the third most frequent reason for hospital readmissions.[1]
- There is a quality deficit in routine care of COPD patients.[3]
- Teaching patients self-management can decrease the number of readmissions and emergency department visits.[4]

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Consequences of a Smoker's Life

by John Wiseman

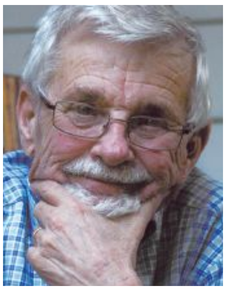
It all began in an alley where I smoked my first cigarette when I was 16. It's been so long ago that I can't remember if I coughed or became woozy. I must have enjoyed this secret adventure because I continued it for more than a half century. Now I have severe emphysema.

That first cigarette was the beginning of my long slide to an addiction that intensified until it became a consuming and destructive habit. Some physicians say it can be as addictive as heroin. It can also become as deadly. However, you don't go to jail for selling or smoking cigarettes; and you can function perfectly well while doing it until it takes its toll on your lungs. Eventually, it can significantly lessen the quality of your life and progressively shorten it. Unless, of course, you're smart and give it up.

A professor of public health at the University of Michigan, Kenneth Warner, hit the nail on the head when he recently told a *New York Times* interviewer that "it would be ridiculous to suggest a 16-year-old kid who has no idea what addiction means and feels immortal is a rational decision maker when it comes to smoking."[1] Years later, when the realization kicks in, it becomes increasingly difficult to quit as smoking becomes an integral part of your daily life and the reasons to continue the moments of pleasure multiply.

For much longer than I am willing to concede, I thought smoking a cigarette with my morning coffee stirred creative ideas. Now I know that emphysema has severely hampered the physical part of my life, and my chronic struggle to breathe during the course of the day wipes me out by nightfall. Moreover, my incapacity for significant physical labor has increased so that my wife now has to do what I once did. Watching her (with an ailing back) perform my chores depresses me (a common result of emphysema).

about the author...



John Wiseman is professor emeritus of history at Frostburg State University and lives in Cumberland, MD.

What is there to lose?

So take a deep breath, then think about what you can lose by smoking every day over a long period of time. I have said goodbye to some of my treasured pleasures.

I have a lifelong passion for baseball but now am reluctant to attend major league baseball games because the stadium may be filled with germs as well as baseballs. Because I run out of strength easily, I no longer play ball with my grandsons. Moreover, my lungs will no longer tolerate fishing in my beloved Rocky Mountains. The last time I was there, I ended up in a hospital in Denver. It's not just the high altitude that can leave you gasping for air. An unpredictable lung infection caused by a ubiquitous viral bug compromised my respiration, trapping carbon dioxide inside my lungs, and landed me in hospitals in Albuquerque (where I brought down a plane for an emergency landing) and in San Diego, which I thought was the safest place in the country for me. High humidity and/or temperature can leave me gasping for air anywhere, so long distance travel is no longer easy. Still, I persist in it, doing what I have learned to prevent flare-ups and going where we have family support for my wife should my preventive measures fail and I need hospitalization.

What I failed to learn years ago was the importance of paying serious attention to the signs of the creeping dangers of smoking. I first detected trouble breathing while climbing a hill in the Lake Country in England more than a decade ago. I also began to forgo fishing some of my favorite holes that I could not climb out of without the help of a good friend. Now I haven't fished a stream in two years. Had I stopped on our return from England or followed my wife's earlier no-smoking vow, I might still be fishing and playing catch with my grandsons. The main lesson is not to start smoking.

Emphysema, a form of chronic obstructive pulmonary disease, is an irreversible, progressive disease that advances with your smoking life. Yet, it can be arrested, giving you more to look forward to. I recently met an example of this in a reformed smoker in his late 30s who was pleased as punch that he had quit nine months ago. He is looking forward to an unhampered life. So, make up your own "bucket list" of personal dreams for your future and put the money you spend on cigarettes in it.

Ray of hope

I often wonder why little national attention is given to this debilitating and deadly phenomenon experienced by millions of Americans, not to mention the huge medical cost to the nation and large job loss/sick leave resulting from smoking. I get multiple daily requests in the mail for money from a growing number of health organizations, but there's nothing to help smokers understand how, why, and when your lungs collapse and the optimum time to prevent what happens to long-time smokers like me. One-half million Americans will die prematurely this year from smoke-related causes, but we hear little about this and other alarming facts about this overlooked disease. For more details see: www.surgeongeneral.gov/library/reports/50-years-of-progress/50-years-of-progress-by-section.html.

There is a ray of hope, however. The COPD Foundation's national Pulmonary Education Program with the catchy title PEP has launched an extensive education program. To subscribe to and support the COPD Foundation, log on to www.COPDFoundation.org or call their toll-free COPD Information Line: 1-866-316-COPD (2673). For starters, I recommend you request the Foundation's dramatic one-page graph, "The Impact of Smoking."

On a personal note, let me express my gratitude to my wife — who has endured my bouts with depression, my irritability, and my limited strength, and who has monitored my medications — to note some of her most noteworthy support efforts. I mention her role because it is critically important and probably lacking in elderly families where the support is needed most. I am also thankful for the enduring help of Stacey Blank, a respiratory therapist at the Western Maryland Health System in Cumberland, MD, (and a member of PEP). Because of the high incidence of chronic obstructive pulmonary disease and tobacco use in nearby West Virginia and the health system's home county, Allegany, this system, with its extensive support staff, provides great value. I wish there were more of both the above-mentioned enablers and well-equipped hospitals in more places.

Finally, think about your future before you light up a cigarette in the morning. That momentary pleasure can cost you dearly in the future. ■

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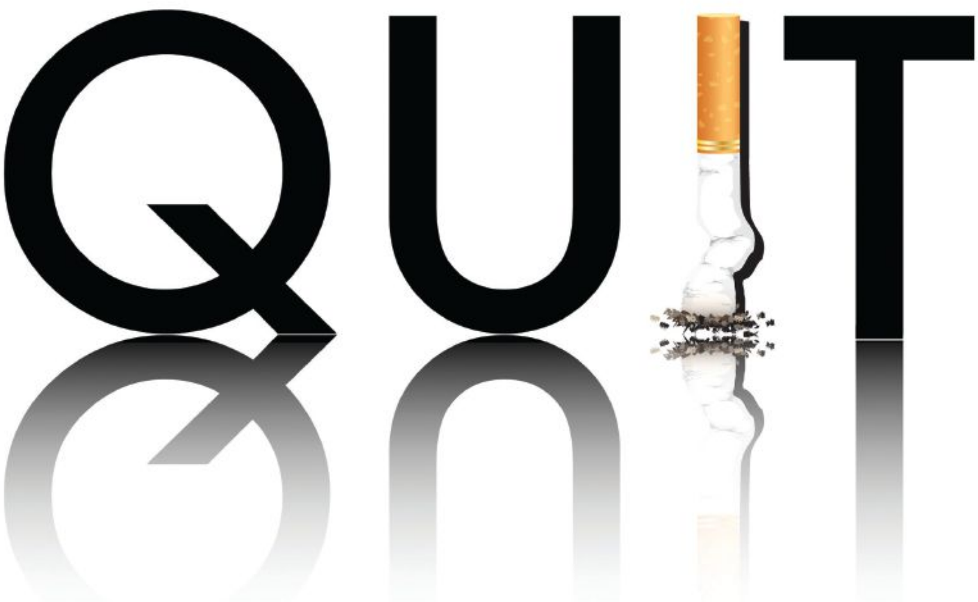

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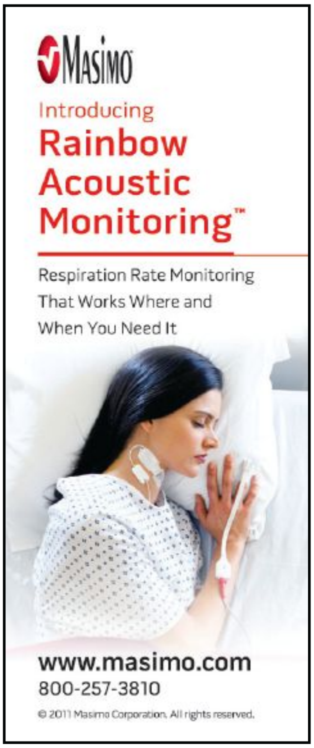

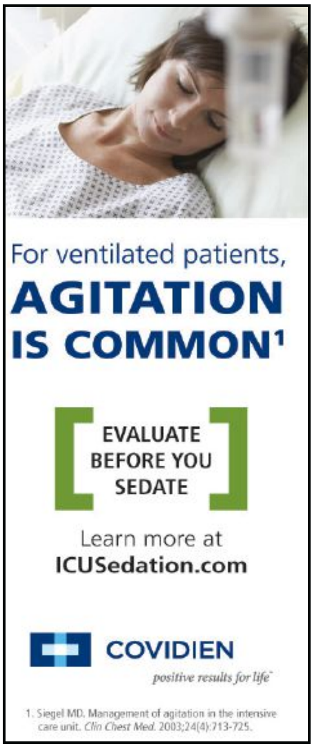

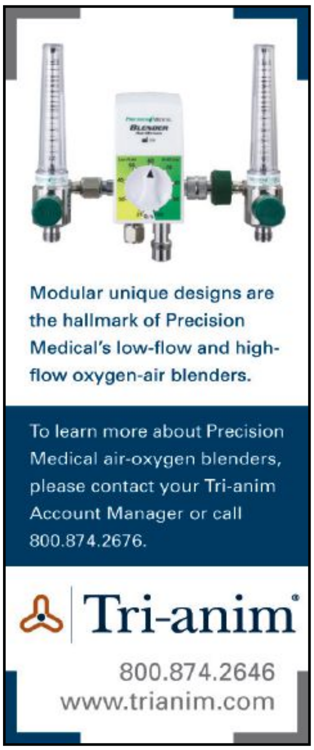

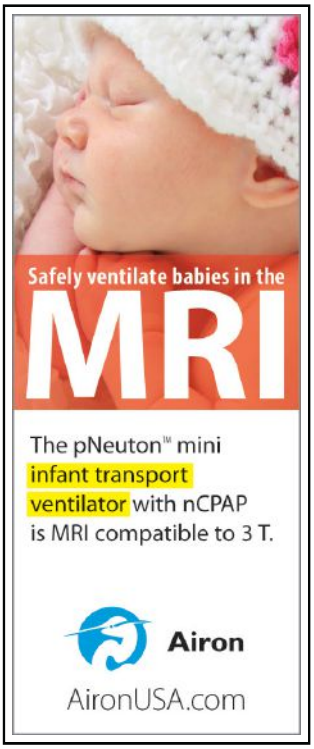

Press releases and photos on new products are welcome. Send to Marsha Cathcart, *AARC Times* editor, at cathcart @aarc.org.

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(continued from page 32)

unknowns, including the effect of long-term inhalation of the particulate matter produced, the risks associated with "passive vaping," and the consequences of the increasing prevalence of dual-use of both traditional cigarettes and e-cigarettes.[2] Obviously, the health-related marketing claims are unsupported by the current scientific evidence.

Use for smoking cessation

While some dual-users engage in "vaping" in situations where smoking is prohibited, others are dual-users in an attempt to quit smoking. Several reports reveal that most current e-cigarette users are current or former traditional cigarette smokers who believe e-cigarettes are less harmful and will help them quit smoking.[3,7] However, additional data indicates that use of e-cigarettes is associated with an unsuccessful quit attempt, that users are less likely to have quit using traditional cigarettes at short-term and long-term follow-up, and that no studies have demonstrated that use of e-cigarettes for cessation is superior to other pharmacotherapies approved by the U.S. Food and Drug Administration (FDA).[1,2]

Role of the RT

So what should you say to the patient "vaping" in the hospital room when you arrive to deliver a medication nebulizer — or to any other smoker or "vaper" with questions? For those with questions about the safety of e-cigarettes, it is clear that they are not "harmless water vapor" as they are so often marketed. For those considering using e-cigarettes as a way to quit smoking, RTs need to be supportive of every smoker's attempt to quit smoking, and we need to be sure that we do not undermine their desire and motivation. However, it is important for RTs to follow evidence-based recommendations for smoking cessation, including use of the 5 A's, setting a quit date, seeking counseling, and using FDA-approved pharmacotherapies as appropriate.[8] However, for those who insist on using e-cigarettes as a mechanism to cut back on smoking traditional cigarettes, we need to ensure they are aware that the products are currently unregulated, still contain toxins and carcinogens, and have not been shown to aid in smoking cessation. Because the 2014 U.S. Surgeon General's report clearly stated that in order to avoid the risk of premature death from smoking-related causes, quitting smoking altogether is much more effective than simply reducing the number of cigarettes smoked per day and patients need to be encouraged to set a quit date for both traditional cigarettes and the e-cigarettes as well.[9]

It is also important for RTs to advocate for explicit inclusion of e-cigarettes in smoke-free laws and ordinances. RTs need to be aware that the FDA is considering regulating e-cigarettes and should support this effort. There is also an opportunity for RTs to encourage hospitals and clinics to ask "do you vape or use e-cigarettes" in addition to "do you smoke" at every patient encounter. Remember, we did not know much about traditional cigarettes when they first came out, and physicians even advocated their use. It seems prudent to follow the recommendations of organizations like the AARC[10] and the American Lung Association[11] that caution against the use of e-cigarettes by anyone in any circumstance. ■

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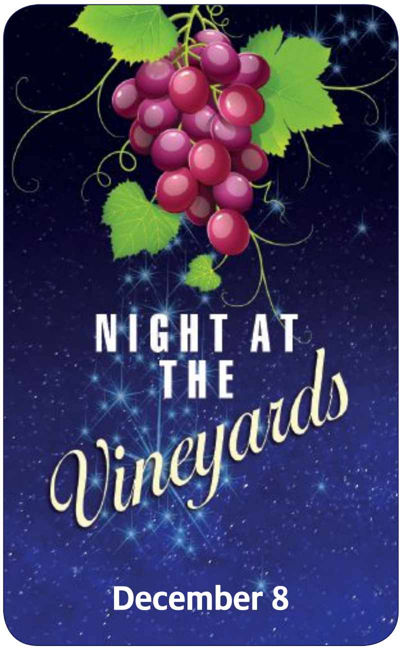
RC Currents

IN THE NEWS



ARCF Hosts Gala

At this year's Congress, the American Respiratory Care Foundation (ARCF) will host their second annual fundraiser gala, "A Night at the Vineyards" on Monday, Dec. 8, at the Mandalay Bay in Las Vegas, NV.

At last year's reception, attendees had the opportunity to view historical respiratory equipment and meet special guests Dr. Forrest Bird and other leaders in the profession. Attendees also had the exclusive chance to purchase the first bricks that supported the construction of the new AARC Virtual Museum.

If you are attending AARC Congress 2014, save the date and plan on joining us. Tickets for the reception are $125 each. Come and celebrate the respiratory care profession and participate in the ARCF raffle, which will offer incredible prizes in conjunction with the reception. All proceeds will go to support education and research in respiratory care. Special thanks to Vapotherm, Inc. for their Sole Platinum Sponsorship of this year's reception. ■

"Respiratory Care Education Annual" Call for Papers

The AARC will publish Volume 24 of the "Respiratory Care Education Annual" in the fall of 2015. This refereed journal is committed to providing a forum for research and theory in respiratory care education and is listed in the "Cumulative Index to Nursing and Allied Health Literature."

The AARC Education Section invites educators to submit papers for consideration. Preference will be given to papers that emphasize original research, applied research, or evaluation of an educational method. Other topics that may be considered include interpretive reviews of literature, educational case studies, and point-of-view essays. Submissions will be reviewed based on originality, significance and contribution, soundness of scholarship (design, instrumentation, data analysis), generalizability to the education community, and overall quality of the paper.

Papers should be approximately 6–10 pages in length and must follow the guidelines in the "Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals" (2013). Abstracts should not exceed 250 words. For more information, contact Dennis Wissing, PhD, RRT, FAARC, editor, at dwissi@lsuhsc.edu or (318) 573-9788. Electronic copies of completed manuscripts should be sent to Shawna Strickland at edu@aarc.org. Deadline is **Feb. 16, 2015.** ■

AARC Sponsors Member Program for Innovation

AARC members now have a new opportunity for sharing their ideas for innovation for better patient care — with the AARC and Edison Innovation Program — in a new partnership with Edison Nation Medical, a health care innovation company that helps bring product ideas to market.

"One of AARC's goals is to give our members ways to continuously improve patient outcomes and shape the future of respiratory care," says Thomas J. Kallstrom, MBA, RRT, FAARC, executive director and chief executive officer of the AARC. "We're certain our members have excellent ideas about how to deliver respiratory care more safely, efficiently and effectively, and by working with Edison Nation Medical, they can submit their concepts for professional evaluation and safely explore commercialization opportunities with a trusted and experienced partner."

Kallstrom explains that individuals must be members of the AARC in order to submit ideas, and membership status will be confirmed during the login process. In this initial launch phase, general ideas related to respiratory care are being sought from any AARC member. Edison Nation Medical has 12+ years experience working with individuals and small business to bring innovation to market.

"The people who deliver direct patient care have the best understanding of what works and what needs to be improved," says Robert Grajewski, president of Edison Nation Medical. "AARC is an advocate for respiratory professionals and pulmonary patients, so the partnership with AARC is a natural fit to help facilitate ideas in respiratory care products to improve patient outcomes while rewarding the creativity of its care providers."

Members who wish to participate by sharing their ideas must first register at no cost. Only when you submit an idea do you pay a $25 submission fee. The Edison team of medical, product development, and legal experts vet the ideas and further investigate the feasibility of those that may be marketable. The end goal is to commercialize each qualified product idea either by licensing the idea to a medical device manufacturer or by starting a company around the idea and, when successful, Edison Nation Medical shares licensing royalties or revenues with the inventor.

The $25 fee is all you will ever pay, which is unlike other invention marketing brokers who ask for substantial financial commitments up front.

"We believe a service like this will be of great benefit to our members," says Kallstrom. "Respiratory therapists are a unique and creative bunch who have shown that innovation is in their blood. We hope we can help some of our members and many more of our patients with some great ideas brought to life." ■

How Did YOU Celebrate Respiratory Care Week?

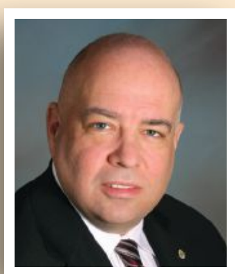
Share what you're doing with the rest of us by sending a short description of your activity along with some photos. Let's share the great news that happens during RC Week, then stay tuned to the AARC website and *AARC Times* for a roundup of all the activities.

Send your photos by **Nov. 9** to milligan@aarc.org along with the following:

- Name of the facility/organization hosting the event
- Your full name and credentials
- Your city and state
- Your email address
- What you did to celebrate, in 100 words or less.

Moving on Up

Lorraine Bertuola, BA, RRT, has joined Christiana Care Health System in Newark, DE, as manager of respiratory care. Bertuola previously served as clinical director at Respiratory Health Services and director of clinical services at Genesis Rehab Services/Respiratory Health Services. She currently serves as chair of the AARC's Long-Term Care Specialty Section.



Edwin Coombs, Jr., MA, RRT-NPS, RRT-ACCS, FAARC, was recently named director of marketing for intensive care and neonatal at Draeger Medical in Telford, PA. In this expanded position he will direct and provide marketing oversight for the respiratory, neonatal care/thermoregulation, and workplace infrastructures.

You can submit news about AARC members by going to www.AARC.org/transitions.

National Health Observances

- **COPD Awareness Month;** November; American Lung Association; www.lung.org
- **Lung Cancer Awareness Month;** November; American Lung Association; www.lung.org
- **World COPD Day**; Nov. 19; Global Initiative for Chronic Obstructive Lung Disease (GOLD); www.goldcopd.org
- **Great American Smokeout;** Nov. 20; American Cancer Society, (800) 227-2345; www.cancer.org
- **National Influenza Vaccination Week;** Dec. 7–13; National Center for Immunization and Respiratory Diseases; www.cdc.gov/flu/nivw/

Contribute to Our "Transitions" Column

The AARC "Transitions" column will now be devoted to sharing news about the passing of AARC members.

You can submit news about your colleagues' recent passing by going to www.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.

Check Out Our New Members List Online

The "New Members" column can be accessed at www.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. Any current member may object to a new membership by filing a written objection with the AARC Executive Office at info@aarc.org within 30 days.

Strange But True…

Buckle up: Spanish investigators are developing seat belts with integrated heart and respiratory rate sensors. The devices are expected to help alert drivers who are becoming sleepy behind the wheel.

Thin air: Most people would struggle to survive at 14,800 feet, but Tibetans do just fine. New research suggests a genetic mutation dating back 8,000 years is the reason. The single DNA base pair change short-circuits a potentially deadly chronic response to low oxygen in which the blood becomes dangerously thick with oxygen-carrying red blood cells. The genetic variation was found in 88% of Tibetans.

Breath analyzer: Researchers from the University of Michigan are testing a new form of technology aimed at curtailing the growth of counterfeit drugs. A single breath on the high-tech label will reveal an image that assures the user that the drug is the real deal.

Mind over matter: A new study out of the Monell Center finds simply believing an odor can cause problems for your asthma or allergies is enough to cause those problems. In the study, 17 people with moderate asthma were exposed to a harmless odor for 15 minutes. Eight were told it might be potentially therapeutic while the other nine were told it could cause mild respiratory symptoms. Subjects informed that the odor could be harmful rated it as more irritating. Even more significantly, they exhibited increased airway inflammation two and 24 hours following exposure.

Enter for a Chance To Win a Free Membership Renewal

AARC Times is looking for creative AARC members to enter our annual AARC Photo Contest. Finalists will receive a **free** one-year membership renewal and have their photo entered into our Photo-of-the-Year Contest with the chance of it being chosen and featured on the cover of *AARC Times*. For information on how to enter, select the *AARC Times* icon on www.AARC.org and click on the "Photo-of-the-Year Contest" link. Deadline for photos is **Nov. 14, 2014.** ■

Staying Out of the Red Zone

Helping patients keep their asthma out of the red (danger) zone is the objective of a new practice parameter published in the August issue of the *Annals of Allergy, Asthma and Immunology*. "Management of acute loss of asthma control in the yellow zone: a practice parameter" is specifically designed for use in the home setting.

According to the new practice parameter, the ideal intervention should "provide quick relief of symptoms, prevent progression to the red zone, be safe enough to initiate at home, be convenient and practical for self-administration, be portable so that it is always available, and be cost effective." ■

FDA Approves Lung Preservation Device

The U.S. Food & Drug Administration (FDA) has approved a device that can preserve donated lungs that do not initially meet the standard criteria for lung transplantation but may be transplantable if there is more time to observe and evaluate the organ's function.

The XVIVO Perfusion System (XPS) with STEEN Solution can be used to warm donor lungs to near normal body temperature and continuously flush the lung tissue with the sterile fluid solution, thus preserving the lungs and removing waste products. The XPS also ventilates the lungs, making it possible for the transplant team to perform a bronchoscopy.

Donor lungs can stay in the machine for up to four hours. If, after further evaluation, the lungs meet certain functionality criteria and pass the transplant surgeon examination, they can be transplanted into a recipient.

The FDA review of the XPS included two clinical trials comparing outcomes of lung transplant patients who received non-ideal donor lungs preserved using ex vivo lung perfusion with STEEN Solution with those of lung transplant patients who received ideal donor lungs that were preserved using conventional cold storage techniques. Similar survival rates up to 12 months after transplant and similar rates of organ rejection were seen between the two groups. ■

Dust Mite Vaccine on the Horizon

Help may be on the way for your asthma patients who are allergic to dust mites. Working in an animal model, investigators from the University of Iowa have developed a nano-sized vaccine package that lowers lung inflammation by 83% in the presence of the allergens.

The vaccine, or antigen, takes advantage of the body's natural inclination to defend itself against foreign bodies. A key to the formula lies in the use of an adjuvant called CpG that sets off a fire alarm within the body, springing immune cells into action. Those immune cells absorb the CpG and dispose of it while at the same time taking in the vaccine. Combining the antigen with CpG causes the body to change its immune response, producing antibodies that dampen the damaging health effects of dust-mite allergens. The study was published in a recent issue of the *AAPS Journal*. ■

COPD Costs Are on the Rise

Costs associated with COPD are climbing, report Centers for Disease Control and Prevention (CDC) researchers publishing in a recent issue of CHEST. According to the investigators, medical costs for the condition stand at more than $32 billion a year today and will go up to an estimated $49 billion by 2020. Medicare currently covers about 51% of the costs, with Medicaid funding 25% and private insurance covering 18%.

"For the first time, our analyses provide state-specific costs for COPD, which provide state public health practitioners with estimates of the economic burden of COPD within their borders and illustrates the potential medical and absenteeism cost savings to states through implementing state-level programs that are designed to prevent the onset of COPD," says Dr. Earl Ford of the CDC's division of population health. ■

Family Connections Made Easier for Care Coordinators

The United Hospital Fund (UHF) has published two new guides aimed at helping care coordinators and family caregivers get on the same page when it comes to caring for the chronically ill. Available for free download at nextstepincare.org, "A Family Caregiver's Guide to Care Coordination" and "A Professional Care Coordinator's Guide to Partnering with Family Caregivers" offer tips on how family and professional caregivers can partner effectively to ensure quality care for the patient.

Another new guide from the UHF, "Understanding and Integrating Family Caregivers into the Re-Engineered Discharge," provides guidance on working effectively with family caregivers to achieve smoother and safer transitions from health care facility to home. Developed in conjunction with the Project RED research group at Boston University Medical Center, the tool is also available for free download.

Industry Watch

Medical gases and equipment market to grow

A new report from *Research and Markets* finds the overall market for medical gases and equipment is being driven by the aging population and growing incidence of chronic diseases. Growth in the adoption of treatment in home care settings in lieu of government initiatives to curtail health care costs in various countries is expected to further propel the growth of the medical gases market. The report notes that markets across the Asia Pacific and Latin American regions are largely driven by growing health care infrastructure, increased affordability of health care services, and an increase in disposables. However, frequently changing regulatory policies and opposing reimbursement policies for respiratory therapies are expected to dampen the market growth to a certain extent. The North American market is expected to grow at a faster pace than the European market mainly due to the rapidly increasing aging population and the high adoption rate of home health care services in North America.

Theravance announces new president and CEO

Theravance Inc. has appointed Michael W. Aguiar to serve as president and CEO of the company and a member of the board of directors. Aguiar follows Rick E. Winningham, who resigned as CEO in August but will retain his position as chairman of the board of directors and is now CEO of Theravance Biopharma Inc. Since joining the company in 2005, Aguiar has led a number of strategic projects, including the recent spin-off of Theravance Biopharma from Theravance, and has successfully driven the finance, IT, and investor relations operations of the company.

Moerae Matrix launches Phase 1 trial of IPF drug

Moerae Matrix Inc. has initiated a Phase 1 clinical trial of MMI-0100, a first-in-class inhibitor of MAPKAP Kinase 2 being developed for the treatment of idiopathic pulmonary fibrosis and other diseases characterized by inflammation and fibrosis. The Phase 1 study is being conducted in the Netherlands and will evaluate the safety, tolerability, and pharmacokinetics of ascending doses of MMI-0100 when inhaled by healthy volunteers. In gold standard preclinical models of pulmonary fibrosis and other fibrotic disorders, MMI-0100 showed significant efficacy in both preventing scars and fibrosis and in treating established fibrosis. Investigators report the drug demonstrated a favorable safety and tolerability profile preclinically.

Genoa receives orphan-drug designation for IPF drug

According to Genoa Pharmaceuticals, the FDA has granted orphan drug designation to Genoa for the use of pirfenidone in their lead program, inhaled GP-101 for the treatment of IPF. The drug was retooled into an aerosolized form after oral doses could not be delivered at high enough doses to have the intended clinical effect and proved to be poorly tolerated. “Acquiring orphan status marks an important regulatory milestone in GP-101’s life cycle to treat people with this devastating disease,” Mark Surber, PhD, president and CEO of Genoa was quoted as saying. “We are pleased to continue the development of inhaled GP-101, with clinical trials beginning in early 2015.”

Almirall and AstraZeneca form alliance for growth

Almirall and AstraZeneca have announced that a strategic transaction will allow Almirall to evolve its respiratory strategy to maximize the return and value of its assets and capabilities, improving its financial position and providing support for growth in specialty areas. “Our agreement with Almirall brings strategic and long-term value to AstraZeneca’s strong respiratory franchise, one of our key growth platforms,” says AstraZeneca CEO Pascal Soriot. “By combining our innovative portfolios and leveraging AstraZeneca's global scientific and commercial capabilities, we will strengthen our ability to address the entire spectrum of care in asthma and COPD." The companies anticipate the transaction to be complete by the end of the year.

IARS and SASM sign agreement

The International Anesthesia Research Society and the Society of Anesthesia and Sleep Medicine have signed an affiliation agreement to work together to increase the amount of published literature about respiration and sleep medicine. As part of the agreement, *Anesthesia & Analgesia* will be designated as the official journal of SASM. David Hillman, MBBS, has been appointed as the respiration and sleep editor for the journal.

Johns Hopkins, Kaiser Permanente Team Up

Johns Hopkins is teaming up with Kaiser Permanente of the Mid-Atlantic States to collaborate on patient care. The two organizations will share data from electronic medical records and work toward better health care models based on the medical evidence. Hopkins brings a research cachet to the table, while Kaiser Permanente offers expertise in population health. Kaiser will specifically work with Suburban Hospital in Bethesda, MD, which is part of the Hopkins network of hospitals.

Masimo launches wearable monitor outside of U.S.

Masimo has received the CE Mark for its Radius-7™ for the Root® patient monitoring and connectivity platform — the first wearable, wireless monitor with Masimo's rainbow® SET® technology. It will enable early identification of clinical deterioration while offering patients continuous monitoring with freedom of movement. "In the past, wearable patient monitoring offered only limited measurements that were often plagued by false alarms. Radius-7 allows untethered clinically relevant patient monitoring," says Masimo founder and CEO Joe Kiani. "We expect Radius-7 and Root to change how hospitals think about monitoring, ushering in a new level of patient safety." Radius-7 is now available in Europe in a limited market release. It is not for sale in the United States.

Rosetta Genomics, Yeda Research sign agreement

Rosetta Genomics Ltd. has entered into a collaborative research and license agreement with Yeda Research and Development Co. Ltd. to develop novel methods for the preparation of next-generation sequencing libraries for small RNAs. The initial goals are to make this type of sequencing more cost effective as well as to minimize sequence-specific biases. The collaboration is also aimed at developing computational methods required for data analysis that could allow more accurate quantification of microRNAs in various biological samples and pathological conditions. The Rosetta Mesothelioma Test™ diagnoses mesothelioma. The Rosetta Lung Cancer Test™ accurately identifies the four main subtypes of lung cancer using small amounts of tumor cells.

Medscape makes app available free of charge

The Medscape app, designed to help health care professionals make quick and accurate patient care decisions, is now available for download. The app is free of charge and is continually updated to ensure it has the latest clinical information. More than 4 million registered users are currently using the app, which is available for the iPhone, iPad, Android devices, and the Kindle Fire and includes an array of functions, such as drug reference, disease and condition reference, medical calculators, and medical news by specialty.

PFF launches ambassador program

Twenty Pulmonary Fibrosis Foundation advocates have come together to inaugurate the PFF Ambassador program, a group of IPF patients and caregivers committed to sharing personal stories of living with IPF, along with health care providers who deliver current disease education information to audiences across the country. "The purpose of the PFF Ambassador program is to engage with the larger community and cover all aspects of disease education," PFF President and COO Patti Tuomey, EdD, was quoted as saying. "Ten of our PFF Ambassadors are patients and caregivers who share their stories about living with the disease, and 10 are health care professionals who provide disease information."

Submissions may be sent to cathcart@aarc.org. •

Classifieds

ADVERTISING SECTION

For Sale/For Rent

ET-CARE Endotracheal Tube Fixation Device

The new ET-CARE™ Endotracheal Tube Fixation Device — no tape, built-in bite block, sliding track for oral hygiene, includes NG-tube holder. The firm fixation with ET-CARE lessens excessive x-rays, decreases the potential for VAP, reduces accidental extubation. Manufactured in USA (patent pending) by IPI Medical Products Inc., (561) 330-7820, www.ipimedicalproducts.com.

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Biomedical Electronics Services & Technologies (B.E.S.T), servicing the greater Chicagoland area and surrounding states for over 40 years, is expanding its service areas to new markets. B.E.S.T represents numerous medical and biomedical manufacturers and repairs/rents/sells durable medical equipment. For more information on B.E.S.T — www.ebestonline.com.

B.E.S.T is looking for an experienced, self-motivated independent sales rep for Michigan and Ohio. Previous respiratory sales experience required. If interested, please send a resume to gkacmarek2@aol.com.

AARC Times Classified Advertising Information & Requirements:

Classified Word Advertisements

AARC Members: $50 for 50 words or less; each additional word, $1. Free Internet placement. Nonmembers: $60 for 50 words or less; each additional word, $1.20. Listings are categorized by state. Following the state listings are United States/International, For Sale/For Rent, Miscellaneous, and Situations Wanted. All copy should be typed double-spaced. All ads will be set in 8-point type. To calculate the cost per advertisement, a "word" is considered to be one or more letters, numbers, or special characters with a space before and after.

Ads are featured on the AARC website for one month after publication. Ad may only be placed on the website with an insertion order for placement in an AARC publication. Ad is noncancelable after placement on the website. NOTE: *AARC Times* reserves the right to refuse any advertisement not directly relevant to respiratory care. *AARC Times* does not endorse any advertiser, its positions, practices, services, or products.

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 Nov. 17. Blind ads available. **For Recruitment Advertising Information, Contact AARC Respiratory Jobs** • Respiratory.Jobs@aarc.org • (972) 243-2272 • Fax (972) 484-2720 • 4925 N. MacArthur Blvd., Ste. 100, Irving, TX 75063

Recruitment Display Advertisements

For Recruitment Display Ad Rates, go to www.aarc.org/marketplace/media_kit/recruitment_2014.pdf, or contact AARC Respiratory Jobs • Respiratory.Jobs@aarc.org • (972) 243-2272 • Fax (972) 484-2720 • 4925 N. MacArthur Blvd., Ste. 100, Irving, TX 75063

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For more information please contact: Regina Bradley (757)534-5891 or Regina.Bradley@rivhs.com

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Powell Valley Healthcare

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d. Percent Paid (Both Print & Electronic Copies) (16b divided by 16c × 100)	99.37%	99.36%

☒ I certify that 50% of all my distributed copies (electronic and print) are paid above a nominal price.

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Calendar of Events

AARC & State Society Programs

October 21–22 Fairlee, Vermont

Vermont/New Hampshire Society for Respiratory Care Education Conference

Contact: Judith Wahler@vtmednet.org

October 23 Newark, Delaware

21st Annual Trends in Respiratory Care

Contact: Laurene Eckbold, (302) 530-0373, www.delawarelung.org

December 8 Las Vegas, Nevada

AARC Pre-Congress Courses: Preparing for a Pandemic (The Strategic National Stockpile), Current Practice of Mechanical Ventilation, Pulmonary Function Testing, ECMO for Pediatric and Adult RTs, and Sleep & Wellness 2014

Contact AARC, (972) 243-2272, www.aarc.org/education/meetings

December 9–12 (Tuesday–Friday) Las Vegas, Nevada

AARC Congress 2014

Contact AARC, (972) 243-2272, www.aarc.org/education/meetings

February 5–6, 2015 Davis, West Virginia

West Virginia Society for Respiratory Care's annual Winter Conference

Contact: www.wvsrc.org

Submissions for the next available issue are due Nov. 19.

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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AARC CONGRESS 2014

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Monday, December 8, 2014

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Attend Pre-Courses and Maximize Your Experience.

Pre-Course Attendees Receive a Discounted Congress Rate

1 *Preparing for a Pandemic: The Strategic National Stockpile – Mechanical Ventilation Workshop*

Designed to provide the respiratory therapist with the information necessary to utilize the SNS ventilators during a pandemic in addition to an opportunity for hands-on experience with all three stockpiled ventilator types. 3.25 hours of CRCE (continuing education credits). ***Richard D Branson MSc RRT FAARC/Presiding.***

2 *Current Practice of Mechanical Ventilation: A Case-Based Audience Interactive Session*

This course will review aspects of current best practices of mechanical ventilation. A case-based audience interactive approach will be used to emphasize important points. 3.50 hours of CRCE (continuing education credits). ***Ira M Cheifetz MD FCCM FAARC and Dean R Hess PhD RRT FAARC/Co-Presiding.***

3 *Pulmonary Function Testing*

This course will provide a better understanding of four major areas of pulmonary function testing. Pertinent to those in a pulmonary function laboratory or who work there frequently. Understand the many different parts that go into obtaining accurate test results from a patient. 2.58 hours of CRCE (continuing education credits). ***Thomas Lamphere BS RRT-ACCS RPFT FAARC/Presiding.***

4 *ECMO: A Comprehensive Approach for Pediatric Adult Practitioners*

This state-of-the-art course will provide a better understanding of this emerging technology. Pertinent for those who care for ECMO patients or who transfer patients to an ECMO center. 3.25 hours of CRCE (continuing education credits). ***Ira M Cheifetz MD FCCM FAARC and Dean R Hess PhD RRT FAARC/Co-Presiding.***

5 *Sleep & Wellness 2014*

This course is designed to increase the effectiveness of the Respiratory Therapist and Sleep Technologist in the Sleep Clinic. 6 hours of CRCE (continuing education credits).

Course capacities are limited. Pre-registration is required. Deadline for all pre-courses: **Monday, November 17, 2014,** or when courses are full.

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