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Strong Family Ties Bind Cousins During Lung Transplant

Member Chaffee Tommarello: A Coal Miner's RT

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References: 1 Frat JP, Thille AW, Mercat A, et al. High-Flow Oxygen through Nasal Cannula in Acute Hypoxemic Respiratory Failure. The New England Journal of Medicine 2015: DOI: 10.1056/NEJ-Moa1503326

2 Hirst KR, Patel A, Vines DL. Evaluation of Bronchial Pressures and Tidal Volume Using Three Different Adult High Flow Nasal Cannula (HFNC) Devices. AARC 2011 Open Forum # 13 Presentation.
i. Cited in support of PEP effect only

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American Association for Respiratory Care

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Ventilation for Life

How Do I Decide To Move Beyond Traditional (Conventional) Ventilation?

by Keith R. Hirst, MS, RRT-ACCS, RRT-NPS, AE-C

In the neonatal and pediatric population, there are a variety of advanced ventilators and modalities that can be used to maximize our respiratory support for patients who are among the sickest and most fragile. These range from high frequency jet ventilation (HFJV), high frequency oscillatory ventilation (HFOV), and even extra corporeal membrane oxygenation (ECMO). Advanced modalities and ventilators are commonly used in NICU and PICU's to take care of the most critically ill patients who fail conventional mechanical ventilation (CMV). The problem that most clinicians wrestle with is when is it time to move on from CMV to either high frequency or ECMO? Is it better to start early and be preventive or use it as a rescue mode when the patient is at their most critical point in their disease process?

High frequency ventilation

High frequency ventilation (HFV) includes both HFJV and HFOV. The theoretical advantages of HFV are to provide a safer approach to providing mean airway pressure, smaller tidal volumes, ability to decouple oxygenation and ventilation.[1] There are currently no clinical practice guidelines, and little evidence available to determine which mode (Jet vs. Oscillator) is best used and when it should be used (rescue vs. primary).[1] A majority of the studies look at a primary end points of either chronic lung disease and/or death with secondary end points such as development of Intraventricular hemorrhages, periventricular echodensities, long-term pulmonary, and neurodevelopmental outcomes.[2] In 2006, Courtney et al did attempt to summarize what was felt to be the best indicators for HFV. This included: need for peak inspiratory pressures > 25 cm H_2O, tidal volumes > 6 ml/kg, conventional rates > 60 to 80 bpm, air leak syndromes, ECMO candidates, infants <1000 grams, and resucue.[3] These appear to be standard guidelines that most clinicians use and are based mostly on physiological principles rather than clinical data.

about the author...

Keith R. Hirst, MS, RRT-ACCS, RRT-NPS, AE-C is the neonatal respiratory manager at Brigham and Women's Hospital in Boston, MA.

Air leak syndrome

HFV is sometimes considered for patients with air leaks syndromes such as pulmonary interstitial emphysema (PIE) or pneumothorax.[4] The thought is that you can safely use smaller tidal volumes and a consistent mean airway pressure to allow the air leak to heal without the open and closing shearing forces that may allow the air leak to remain open.[3] Initial reports showed that infants that had PIE had a better survival rate if placed on HFOV then on conventional.[5] A meta-analysis published in 2012 showed that HFV may not prevent or reduce the incidence of air leak syndromes.[6] Unfortunately, the way HFV was managed in the different trials studied was dependent on how each study was run, which may have led to the conclusion that HFV was not any more beneficial than conventional ventilation.[6] A recent publication by Squires et al show that using low frequency in PIE may be of benefit.[7]

Respiratory distress

Both neonates and pediatric patients can develop pulmonary dysfunction for various reasons and in some cases need higher support then what CMV can provide without damaging the lungs further. The following questions still need to be answered in order to provide an

evidence-based approach. When should the clinical team place the patient on HFV? Should they be placed on HFV electively or when conventional fails? Current literature provides conflicting information. Several meta-analyses have shown that elective or early intervention of HFV does not offer any significant benefit when compared to CMV in either neonates or pediatrics.[1,4,8] Other meta-analyses have pointed to the fact that there may be a benefit with elective HFV in some neonates but that the data was not strong enough to recommend this due to inconsistencies among the trials.[2] The same was shown to be true for rescue in that HFV did not provide any long-term benefit when compared to CMV.[1,8,9]

ECMO

Neonatal ECMO selection is based more on the limitations of the device or complication than on actual ventilator failure criteria.[10] Most centers use the criteria listed in Table 1 as general guidelines, which are based on recommendations from extracorporeal life support organization (ELSO).[11] More recent research is challenging whether or not current guidelines should be changed based on the more prevalent use of high frequency ventilation and inhaled nitric oxide.[10,12,13] At least one study has shown that the current use of an OI >40 is inadequate and that a OI of >25 may be more indicative of success on ECMO.[14]

Pediatric ECMO has guidelines based from ELSO which are listed in Table 2. This area of ECMO is actually increasing when compared to neonatal ECMO. At least

one study suggests an OI >30 in pediatric patients should be used as an indicator.[15] New recommendations by the Society of Critical Care Medicine now advocate the use of ECMO for refractory shock patients and a broadening use of pediatric ECMO is being seen from asthma to tracheal injuries.[12]

Conclusion

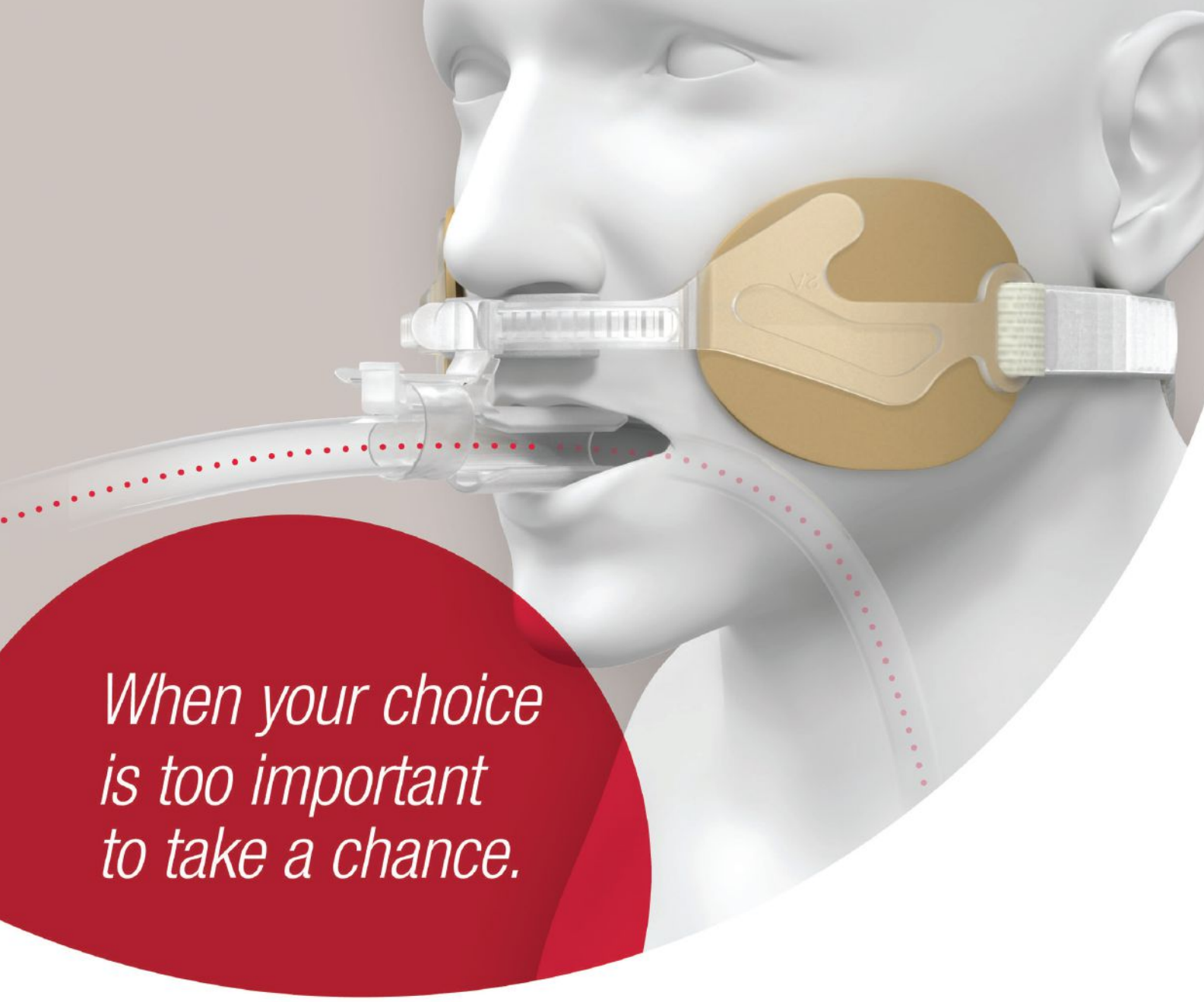
There appears to be no hard and set guidelines or indications for when clinicians should consider that CMV has failed with a patient. Many studies are inconclusive at best or limited to a single site. Much of this comes from the variability of the practice and management of HFV. What is clear is that HFV does provide potential benefits

Table 1

General neonatal ECMO criteria[11,16]
Oxygenation index >40 for >4 hours
Oxygenation index >20 with lack of improvement despite prolonged (>24 h) maximal medical therapy or persistent episodes of decompensation
Severe hypoxic respiratory failure with acute decompensation (PaO2 <40) unresponsive to intervention
Progressive respiratory failure and/or pulmonary hypertension with evidence of right ventricular dysfunction or continued high inotropic requirement
Gestational age >34 weeks birth weight >2,000 grams
No significant coagulopathy or uncontrollable bleeding
No major intracranial hemorrhage
Mechanical ventilation <10-14 days
Reversible lung injury
No lethal malformations
No major cardiac malformation

Table 2

General pediatric ECMO criteria[17]
Severe respiratory failure as evidenced by sustained PaO2/FiO2 ratios <60-80 or OI>40
Lack of response to conventional mechanical ventilation ± other forms of rescue therapy (e.g., HFOV, inhaled nitric oxide, prone positioning)
Elevated ventilator pressures (e.g., mean airway pressure >20-25 on conventional ventilation or >30 on HFOV or evidence of iatrogenic barotrauma)
Hypercapnic respiratory failure: Severe, sustained respiratory acidosis (e.g., pH<7.1) despite appropriate ventilator- and patient-management may be the primary indication for ECLS (e.g., refractory asthma), or may prompt earlier ECLS in patients with co-existent hypoxia and ventilation difficulties.
Rate of deterioration and how quickly ECLS can be initiated: Clinicians working in centers without the capacity to facilitate rapid ECLS (<30-45 minutes) should refer earlier, particularly if there is rapid deterioration.



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and that it is up to the bedside clinicians to determine the pros and cons of these alternative modes. With ECMO, there are guidelines but those rules may need to be re-examined due to current management of patients. ■

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Sleep and the Obese Pediatric Patient

by Lutana Haan, MHS, RRT, RPSGT

Sleep plays a role in obesity in the pediatric population. When working with this population, there are several factors to take into consideration that may affect their health and overall wellbeing.

Obesity in children

Obesity in adults is defined primarily by a body mass index (BMI) >30 kg/m2; however, in children it is often defined by a BMI >95% of the growth chart averages.[1] The incidence of childhood obesity in the United States has increased with prevalence ranging from 7% to 22%.[1-2] Children and adolescents under 18 years of age who are at an increased risk for sleep disordered breathing (SDB) and obstructive sleep apnea (OSA) include those who are obese, African Americans, and have both upper and lower respiratory conditions.[3] The risk of OSA in obese children is estimated at 36%.[4] Additionally, short sleep duration has been found to be a risk factor for obesity in both adults and children.[4] There are several factors that play into this relationship of sleep duration and obesity, including hormone regulation of energy and unhealthy eating habits.[5]

Contributors to obesity in children

Short sleep times have been found to alter the release of several important mediators related to appetite, satiation (feeling full from eating), and energy expenditure.[5] Studies have demonstrated an association between high BMI and leptin levels as total sleep time decreases.[5] Leptin is a hormone that helps regulate food intake by sending the message that one is full. Short sleep duration interferes with leptin, leading one to consume a higher quantity of food, increasing risk for obesity.[5]

Higher screen time was another contributor to shorter sleep durations. Screen time includes watching TV, playing computer games, and using hand-held devices. The more screen time a child has also correlates with less activity (most screen time is sedentary), which may reduce nighttime sleep.[6] In turn, this daytime sleepiness from a reduced nighttime sleep may increase sedentary behavior during the day, additionally reducing energy expenditures leading to weight gain.[6] This can turn into a vicious cycle. When screen time goes up and sleep duration goes down, it has been found that food consumption increases.[7] Increased screen time also seems to be correlated with the consumption of energy-dense, micronutrient-poor foods.[7] Children are also exposed to advertising that features undesirable nutrient/energy ratio foods.[6] These factors related to screen time in children compound the risk of developing obesity.

about the author...

Lutana Haan, MHS, RRT, RPSGT, is chair and associate professor in the Department of Respiratory Care, Boise State University in Boise, ID. Her interests include sleep medicine, simulation in health care education, and interprofessional education.

Obesity, OSA, and inflammation

Obesity is a primary risk factor for OSA. OSA causes a chronic, low-grade inflammatory condition leading to systemic elevation in levels of inflammatory mediators and reduction of anti-inflammatory substances.[8] The imbalance toward an amplified pro-inflammatory state in obesity has long been recognized as one that promotes the occurrence of insulin resistance and vascular dysfunction.[5] Insulin resistance is indicated by an impaired response to in-

sulin and reduced insulin-mediated glucose disposal.[4] There is a strong relationship with visceral apiposity (abdominal obesity) and OSA.[4,9] Insulin resistance has been found to predispose one to cardiovascular risk.[5] Similar to adults, children with OSA have been found to have elevated systemic blood pressure as well as left ventricular hypertrophy and vascular geometry.[5] There has also been an association between prolonged hypercapnia and increased inflammation to the occurrence of hypoventilation during sleep.[10] These changes are more common and severe in obese children with OSA.[10]

Metabolic syndrome refers to insulin resistance, dyslipidemia (elevated triglycerides and a trend toward lower HDL), hypertension, and obesity.[9-10] High BMI with elevated fasting insulin levels during childhood are the strongest predictors of metabolic syndrome in adults.[9] Metabolic syndrome affects 30% to 50% of obese children.[9] OSA exerts changes on lipid homeostasis, systemic inflammation, and negatively affects circulating lipid concentrations that promote inflammatory responses.[10] In the presence of obesity there appears to be an interaction of the increased adipose tissue and sleep apnea to amplify insulin resistance in the pediatric population.[4] OSA causes an increase in LDL cholesterol and reduction in HDL cholesterol.[10] These factors contribute to the increased risk for childhood obesity with OSA leading to metabolic syndrome.[9-10]

Sleep and school performance

A difference between children and adults is their reaction to sleep deprivation. When children are sleep deprived, they tend to be irritable, have difficulty staying on task, and can be overactive or hyperactive.

Adults are also irritable but tend to be groggy and less alert. This overactivity in children can manifest itself in school similarly to attention deficit/hyperactivity disorder (ADHD).[11] Children with ADHD typically have difficulty focusing, staying on task, and controlling their behavior.[11] ADHD is linked with several sleep disorders, including SDB.[11] One study showed that 50% of children with ADHD had signs of SDB, compared to 22% of children without ADHD.[11] When sleep disorders are treated, the daytime symptoms such hyperactivity are alleviated in children.[11] In the pediatric population, the common treatment for SDB is a tonsillectomy. For children with these daytime symptoms, investigation into sleep problems can be beneficial, especially as medications used to treat ADHD can disrupt sleep.

Importance to the RT

There is a need for improved screening tools to help identify children who may be suffering from sleep disorders that could lead to long-term consequences. Identification by the RT can begin with the observation of factors such as obesity, and then lead to questions of sleep and breathing. When appropriate, conversations on school performance may to help determine if further evaluation by sleep experts is necessary. Knowing more about a child's sleep and talking to the children and families about factors that may be related to sleep disturbance may be beneficial. Additionally, children with activation of inflammation pathways caused by short sleep and obesity, may be at increased risk of asthma.[12] These interactions, caused by the lack of quality sleep, are worth investigating in order to improve overall health. ■

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Content Changes within the NBRC Sleep Disorders Specialist Examination

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

Results of a job analysis study performed in 2014 prompted some changes in content for the NBRC Sleep Disorders Specialist Examination. The study was the second done as a part of the content development for this examination. While the focus of this article is to document content changes, it is worth stating that much more will remain the same than will change within the examination content. The changes became effective March 1, 2016.

New content

General discussion among members of the examination committee, while they were guiding the job analysis study, described a transition in sleep medicine away from full polysomnographic diagnostic assessments toward assessments that yield somewhat less information. This is not to say that full polysomnography is no longer done, but rather it is meant to emphasize that less involved procedures are done more frequently.

Particularly because of efforts by third-party payers to control costs, a person who is suspected to have an uncomplicated obstructive sleep disorder is likely to be tested in his or her home. Fewer streams of information are produced by equipment that is deployed for home testing of potential sleep disorders. More complicated cases, including those suspected of having a neurologic component, will still be assessed with full polysomnography.

The following are considered new tasks within the detailed content outline:

- Before testing begins, identify the appropriate diagnostic modality based on patient factors and co-morbid conditions:
  - polysomnography with or without PAP titration
  - maintenance of wakefulness test
  - multiple sleep latency test
  - home sleep apnea testing
  - actigraphy
- While preparing for testing, select the appropriate study montage.
- While performing testing, optimize therapy involving an oral appliance.
- While analyzing study results, verify the accuracy of descriptive statistics (where previous expectations were limited to documenting the statistics produced by the testing system).

about the speaker...

Robert C. Shaw, Jr., PhD, RRT, FAARC, is the assistant executive director and psychometrician of the National Board for Respiratory Care.

Comparison of content specifications

Although the length of the examination will remain at 160 items, the examination committee made choices to shift the emphasis of some topics as described in Table 1. Among the major topics, administrative functions will be emphasized less. There will be an increased emphasis on signal maintenance during testing, and sleep event reporting, sleep staging, and sleep event identification will be emphasized less. Analysis items will be emphasized less within the new examination while items that require the application and recall levels of cognition to select the correct response will receive increased emphasis.

It would be false to assume that passing the new examination will be easier because there are fewer analysis-level items. The examination committee

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Table 1.

Content Area	2008 – 2015 Items				2016 – future Items			
	Cognitive Level				Cognitive Level			
	Recall	Application	Analysis	Totals	Recall	Application	Analysis	Totals
I. PRETESTING	**6**	**10**	**3**	**19**	**6**	**11**	**4**	**21**
A. Identification and Care of At-Risk Individuals	2	2	1	5	3	4	1	8
B. Study Preparations	4	8	2	14	3	7	3	13
II. SLEEP DISORDERS TESTING	**10**	**19**	**19**	**48**	**16**	**16**	**18**	**50**
A. Signal Maintenance during Testing	2	5	2	9	4	4	5	13
B. Sleep-Related Disorders and Therapeutic Interventions	4	10	15	29	5	10	13	28
C. Documentation during Testing	3	0	0	3	4	0	0	4
D. Study Conclusion	1	5	2	7	3	2	0	5
III. STUDY ANALYSIS	**8**	**27**	**15**	**50**	**12**	**38**	**0**	**50**
A. Record Review	1	1	0	2	1	1	0	2
B. Sleep Staging	2	12	0	14	2	6	0	8
C. Sleep Event Identification	2	5	14	21	2	8	0	10
D. Sleep Event Reporting	3	9	1	13	7	23	0	30
IV. ADMINISTRATIVE FUNCTIONS	**3**	**5**	**6**	**14**	**7**	**3**	**0**	**10**
A. Data and Equipment Maintenance	2	3	2	7	3	1	0	4
B. Management	1	2	4	7	4	2	0	6
V. TREATMENT PLAN	**5**	**9**	**15**	**29**	**7**	**13**	**9**	**29**
A. Development	1	3	5	9	1	4	4	9
B. Implementation	2	3	5	10	3	5	1	9
C. Evaluation	2	3	5	10	3	4	4	11
Totals	**32**	**70**	**58**	**160**	**48**	**81**	**31**	**160**

established a new standard for passing that was informed by their judgments about the probability of success for each item. If a typical recall item is more likely to be correctly answered by minimally competent candidates, and there are more recall items than before, then the standard for passing is likely to increase. As of this writing, the examination committee had not selected a cut score for the new examination, but it could end up higher than it was.

A new layer of specifications

After collecting information from job analysis respondents about the extent to which they interacted with patients of different ages, the examination committee decided to exert some control over examination content by adding a set of specifications linked to patient age. Items involving patients who are 6 years old or younger will occupy either two, three, or four spots on an examination out of 160, while the same specification was also applied to patients who are between the ages of 7 and 17.

The balance of the examination, between 152 and 156 items, will involve a general patient population because the concepts are universally applied regardless of age.

Summary

A job analysis in 2014 prompted some content changes within the NBRC examination for sleep disorders specialists. A handful of specific tasks were added that will stimulate items about new content. Toward the conclusion of the job analysis, the examination committee shifted the degree to which some content topics will be emphasized on the examination. A shift away from analysis level items also occurred within the test specifications. An additional layer of specifications was added to ensure that there will be items involving pediatric patients on every examination, but also to ensure that content related to pediatrics is not overemphasized.

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You're "*That Guy*?"

by Anthony L. DeWitt, JD, RRT, FAARC

It was the summer of 1981, long before the passage of HIPAA, and long before respiratory care had the active role it has in most hospitals. I was working at a hospital in Missouri (one that shall remain nameless because the personnel there now are not the same ones who matter in this story). I had been working on the ambulance crew (a county job) and was hired in the RT department as an OJT.

My first task was to get my physical, and I completed it on Monday and went to work on Tuesday. As I was getting my scientific instruction ("This is a Bird; you're the Bird-brain") the director came in and said, "They need to see you in employee health."

I asked why.

"Just go see employee health," he said.

When I arrived, I learned that my VDRL test — the screening test for venereal disease — had come back positive. I laughed.

"This is no laughing matter," the doctor, fresh out of school, told me.

"I'm laughing," I said, "because it's my understanding you have to have been exposed." I patiently recounted that, unlike the other students at the local college, I had no reason to suspect I had a problem.

"That's what they all say." He already had the Penicillin drawn up. But I pressured him into doing a more conclusive lab test after my physical exam showed no symptoms whatsoever. That test later came back clean. I thought that was the end of it.

That is where the story should end. But it doesn't.

In my new role as the Bird-brain, I was introduced to dozens of people, many of whom would not shake my hand. Instead I got, "Oh, you're *that guy*."

At least with respect to medical privacy, there is sometimes an appalling lack of it in a large institution. Everyone knew that there had been a new hire caught in the VD screen, but no one knew the *rest* of the story.

I mention this because of Maureen McPadden, a Walmart pharmacist who chose to fill her prescriptions at the Walmart pharmacy where she worked. In the course of doing her job, she was steadfastly pro-patient and adhered to high standards with regard to patient privacy. But when she learned that her co-workers had not respected *her* privacy, revealing her private medical data to other co-workers, she was angry. She reported this behavior by formal complaint. When she felt the number of errors (which she believed were due to short staffing) was outside of statistical norms, she made a report to the New Hampshire Pharmacy Board and to her management team.

These are all things we would expect an ethical medical professional to do. But apparently it was not what Walmart expected her to do. Apparently, Walmart was annoyed.

When she lost her pharmacy key in 2012, she was terminated. Other male employees had lost keys and had not been terminated. But without a warning, or any other incremental discipline, she was terminated. Subsequently, other male employees lost pharmacy keys and were not terminated.

Walmart is now $31 million lighter on the credit side of the balance sheet because a jury awarded McPadden $15 million in punitive damages for gender discrimination and $15 million in punitive damages on her whistleblower claim, as well as more than $1 million in actual

about the author...

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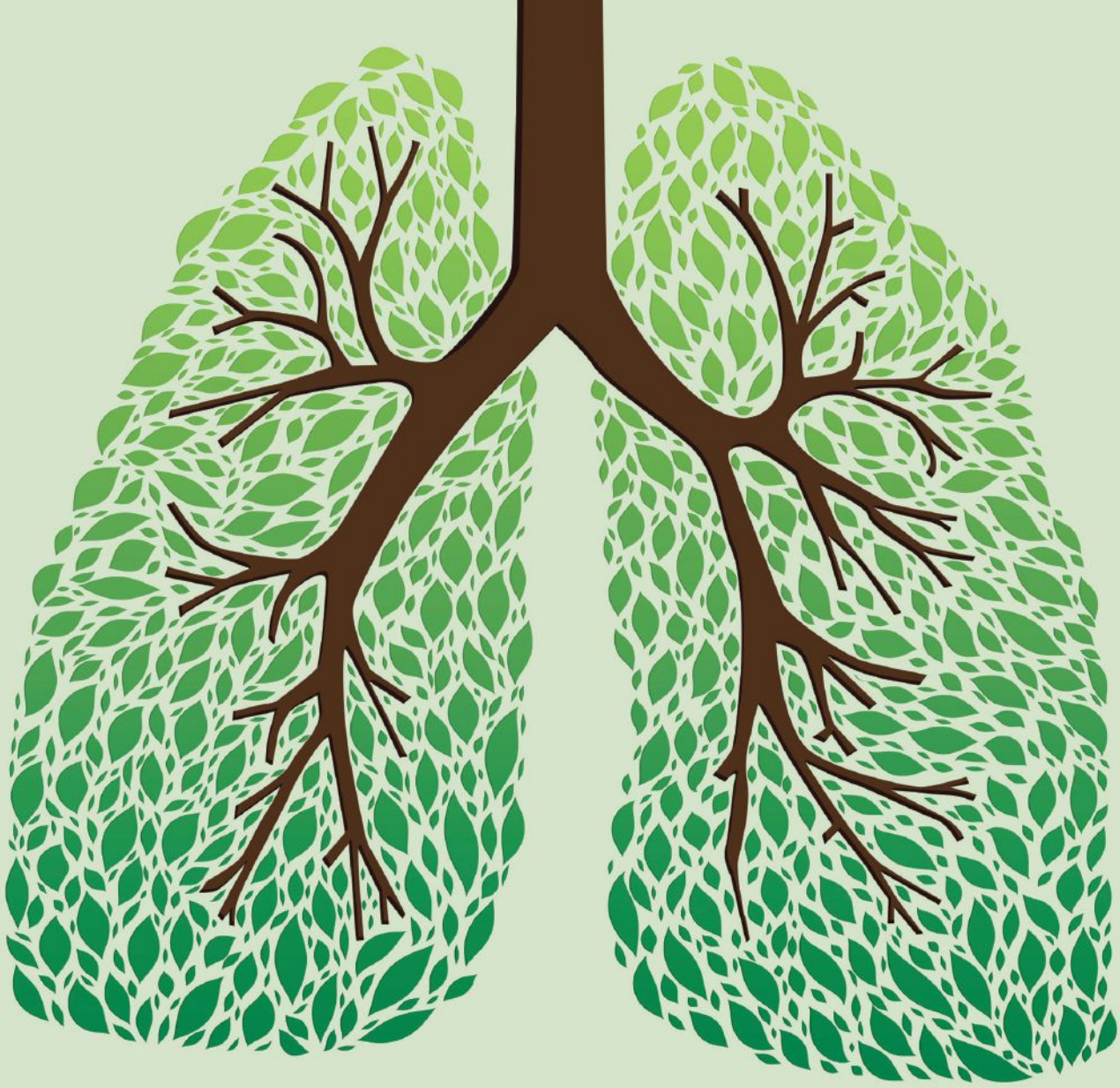

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damages. In short, Walmart did exactly what lawyers tell companies never to do: effect discipline as a means of retaliating against an employee for lawful and ethical behavior. If the company had not been so quick to retaliate, perhaps it could have saved money and fared better.

Several issues arise from this case. The most important is that there needs to be a separate method for handing the medical records and medical charts of any employee in a health care organization who becomes that organization's patient. Only persons with a bona fide need to know should see the chart. Extra efforts should be taken to ensure an employee's privacy (secure storage, specially colored charts, etc.) because HIPAA rules apply to all patients, even the ones you see every day. In McPadden's case, while a pharmacy tech may have needed to verify the prescription and dosage, she had no need to review the diagnosis and medical history, and even less need to circulate it to her co-workers. HIPAA violations can result in federal fines.

The second issue that arises is from the way you handle *that employee*. This is the employee who is never satisfied, who complains when he gets the biggest pay raise, but still thinks it is too little. This is the employee who thinks she works much harder than everyone else and isn't afraid to share that belief with anyone who will listen. Then one day *that employee* sees a patient fall (or were they pushed?) and makes a report of "patient abuse" to the authorities because state law requires it. Or she contacts the nursing board or medical board to report another professional whom they believe to be impaired (they were just "acting squirrelly"). Even though this kind of person is often promised anonymity, because she has a big mouth and wants everyone to know that she stands up for patients, everyone in the facility knows who made the report.

This is where a manager must be very careful: discharging this employee presents risks. There are multiple causes of action that these employees can bring to bear when they are retaliated against for doing lawful acts motivated by improper motives.

When an employee brings a grievance on behalf of other employees, the National Labor Relations Act protects him. This is true even where there is no union. The act says that employees have a right to work together (collective action) to improve working conditions — something it calls "protected concerted activity." If an employee makes a report that is arguably required under state law, the employee may have a right to bring an action for discharge "in violation of public policy." And, in those situations where there is fraud, the False Claims Act makes discharge unlawful.

No employee who fits into this mold should be terminated without the health care organization obtaining legal advice. Doing so only invites litigation. Instead, the organization should take actions to encourage the employee to leave employment. These actions include counseling the employee, providing additional training opportunities, and similar actions.

But while you can suggest they look for a job they'll like better than the one they have, you cannot make their life miserable enough so that they leave. This is called "constructive termination." Do not move the employee who has been working the day shift for 12 years to the night shift. Do not cut their pay or discriminate in work assignments. It is important to document bad behavior and impose appropriate corrective discipline that errs on the side of being less strict. Build a case for discharge that is predicated solely on behaviors that violate published regulations, harm patients, or affect the hospital's reputation.

But do not jump right to termination the first time the employee is tardy, unless, of course, you'd like to pay that employee $31 million. ■

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Managing ARDS and When To Consider ECLS

by Keith Lamb, BS, RRT-ACCS, FCCM

Acute respiratory distress syndrome (ARDS) is reported to have a relative mortality rate of about 40% but can be as high as 90% in some cases.[1] First described by Ashbaugh et al,[2] the definition of ARDS has gone through a couple of revisions. The first of which was in 1994 when the American European Consensus Conference (AECC) attendees defined ARDS by describing four key parameters.[3] In order to fit the ARDS criteria there must be 1) acute onset; 2) a PaO2/FiO_2, P/F ratio of <300; 3) no demonstrable left heart failure; and 4) bilateral infiltrates. Then in 2012, the Berlin definition was established,[4] which went on to describe the syndrome using the previous AECC definition but also added sub-stratification of severity of ARDS (i.e., mild, moderate, and severe ARDS), added more detail to use when evaluating for left heart failure, and suggested ways of improving inter-rater reliability when interpreting chest images.

In 2000, the standard of care was changed when the ARMA trial demonstrated that when tidal volumes were limited to 6ml/kg/pbw that there was an improvement in outcomes with a survival rate that was approximately 9% higher.[5]

Current therapies

Current supportive therapies should be aimed at reducing the potential for secondary lung injury, and the resultant release of circulating inflammatory mediators that involve other organ systems and precipitously decrease survival. There is no consensus for a "one size fits all" strategy; however, it is generally agreed upon that improving gas exchange in and of itself should not be the primary end point. In essence, a lung-protective ventilation strategy should be used with less concern about improvements in gas exchange solely.

As previously mentioned, the ARMA trial showed that the use of lower tidal volumes and moderate levels of PEEP produced better mortality outcomes than the traditional use of high tidal volumes and low PEEP. Although there is no consensus on the method of finding the optimal level of PEEP, it has been suggested that the use of PEEP/FiO_2 tables like the one integrated into the ARDSnet recommendations may be as good a method as any, and is easy to employ without requiring additional equipment or expertise.

It is thought that this low tidal volume, moderate PEEP approach should be taken whenever possible and should be a front line approach when a patient has either a P/F < 300 or is at a risk of developing ARDS.[6] It is not clear whether or not all intubated patients from all causes should be managed in this way, but the evidence is mounting and there are those that suggest this approach should be taken.[7]

Other approaches or "adjunct strategies" have been investigated and may be reasonable when conventional lung-protective ventilation fails. These other approaches include inhaled nitric oxide (iNO), high frequency oscillatory ventilation (HFOV), prone ventilation, minimizing driving pressure, and extracorporeal life support (ECLS).

Although not FDA-approved, iNO in adults has been used "off label" in efforts to reduce pulmonary vascular resistance, improve ventilation/perfusion matching and improve systemic oxygenation. Unfortunately, there are no meaningful outcome studies that show any advantage in the use of iNO for ARDS. iNO is often used in adults when there is evidence of right heart failure and perhaps as a bridge to other strategies when hypoxemic respiratory failure is profound.[8]

HFOV is thought to be protective in that alveolar delivered tidal volumes are small (usually less than anatomic dead space), and the resultant pressure changes the distal airways are minimal. Ultimately, this strategy eliminates

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the cyclical opening and closing of the alveoli that is associated with conventional ventilation. Unfortunately, two large RCTs published not long ago suggest that HFOV should not be empirically used in adults with ARDS. In fact, one of the trials was stopped before complete enrollment due to outcomes that were worse in the study (HFOV) group. HFOV cannot be recommended at this time for use in Adult ARDS. Some suggest that using as a rescue modality, much like iNO as a bridge to another intervention, may be a reasonable approach when there is profound hypoxemia.[9-10]

Another approach to the management of ARDS is prone ventilation. Prone ventilation facilitates improvement in gas distribution, reduces compressive atelectasis caused by the heart resting on the lung, and it may reduce trans-pulmonary pressure. These effects result in improvements in oxygenation. A recent RCT (Proceva) showed mortality benefits with the use of prone ventilation.

In a recent paper by Amato et al[12] it is suggested that the parameter that may be most closely related to outcomes and survival may be the driving pressure (difference between the lowest pressure and the highest distending pressure during a breath). As an example, a patient on pressure-controlled ventilation with a plateau pressure of 25 cm H_2O and a PEEP of 10 cm H_2O would have a driving pressure of 15 cm H_2O.

Extracorporeal (outside the body) life support has been used for many years in the neonatal world and was first employed for meconium aspiration babies successfully by Bartlett et al[16] in the mid 1970s. Fast forward to the H1N1 pandemic of 2009 where the use of ECLS for respiratory failure gained much popularity in adults. The Cesar trial[17] suggested that when ECLS was used in adults with influenza-related ARDS (FLARDS) there was a reduction in mortality when patients with MLIS >3 and pH <7.20 were transferred to ECMO centers, even though there were patients with ARDS transferred who did NOT receive ECMO, but probably received better standard care from an experienced center.

ECLS

Venovenous (VV) ECLS or extracorporeal membrane oxygenation (ECMO) is the most common type of extracorporeal support for respiratory failure. VV ECMO can be accomplished in a couple different ways. The most common methods are to gain access to a large vein for outflow, usually the femoral vein, and a large vein for inflow, usually the internal jugular (IJ) vein. The inflow cannula will be directed toward the tricuspid valve, and introduces freshly oxygenated blood into the right side of the heart where it takes part in normal circulation through the pulmonary system. This can also be accomplished with a double lumen cannula that uses one cannula placed in the IJ with the distal end in the inferior vena cava and a proximal port positioned above the tricuspid valve. Outflow is done through the distal port, and inflow is through the proximal port above the tricuspid valve. The latter method using the double lumen catheter allows for less recirculation due to proximity of both ports and is the preferred method. The double lumen catheter is somewhat limited in terms of achievable flow due to smaller lumens and increased flow resistance however, and may not be efficacious in patients with high BMIs.[18]

Once venous access is obtained, the blood is removed from the body via the outflow cannula, sent through the oxygenator where gas is exchanged, and then returned to the body via the inflow cannula. The work of the lungs is essentially taken over by the machine. This results in the clinician's ability to focus on using the least injurious ventilator settings as possible, reducing the chance of further lung injury and secondary inflammation, and improving survival. Although there is no consensus in terms of ventilator strategies once on ECLS, it is reasonable to use an approach that minimizes atelectasis, trans-pulmonary pressures and driving pressure.[19]

The most appropriate time to employ ECLS for respiratory failure (ARDS) is not clear. P/F ratio which has been shown to be insensitive due to its lack of acknowledgement of the level of ventilator support and the imaging component of the MLIS is subject to variations inter-rater standardization. As a result the oxygen index has been suggested to provide a higher sensitivity in predicting two things in adult respiratory failure, 1) confidence that at some point traditional approaches to mechanical ventilator have been attempted; and 2) a more sensitive prediction of risk of death.[15]

ECLS sounds appealing but is not without its inherent risk. Each patient has to be managed with a precision that prevents both significant bleeding and thrombus formation. This is accomplished with careful anticoagulation management and attention to detail. Other risks include infection, equipment malfunction, catastrophic bleeding or clot, stroke, renal failure, electrolyte disorders, hemodynamic instability, and death.

The respiratory therapist's role

One may ask how the respiratory therapist may fit into all of this. Today's RT is an educated practitioner of mechanical ventilation management. Their practice is built around their ability to provide direct patient care and to incorporate protective ventilation strategies into bedside care. Furthermore, many ECLS centers have incorporated RTs as ECLS specialists and in some cases ECLS coordinators. RTs are a natural fit due to their clinical expertise in both respiratory and general critical care.

Conclusion

It is important to carefully select adult patients with respiratory failure/ARDS for ECLS. Patients selected should be at high risk of dying and should have a reversible pathophysiologic process. Moreover, it is important to ensure that traditional methods of support, especially those with the most supportive evidence, have been tried and optimized. This may be more effectively done by using the oxygen index to predict mortality and ensure that optimal ventilator management has been exhausted. RTs possess the clinical expertise to practice as ECLS specialists and to serve in clinical leadership roles of ECLS programs. ■

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Chronic Disease Manager

Oxygen Therapy in the Home

by Kimberly S. Wiles, BS, RRT, CPFT

The evolution of long-term oxygen therapy (LTOT) in the treatment of various respiratory disease states continues to evolve allowing patients to have an active lifestyle outside of their home. Over the years, the portable oxygen devices have transformed from a 20 lb cylinder to a 5 lb portable oxygen concentrator (POC) option that makes and stores oxygen for delivery. With the advent of new technology being developed, comes limitations that need to be understood by the respiratory therapist in all sites of care.

The delivery of LTOT outside of the hospital can be challenging due to environmental and technological limitations. There are significant differences that exist between oxygen delivery in the hospital versus oxygen delivery in the home.

Transitioning from hospital to home

When delivering oxygen therapy in the hospital, it is in a controlled environment with an unlimited supply of oxygen, whereas the home environment is uncontrolled and may create many clinical and economical obstacles to care. The RT's knowledge of the various types of oxygen modalities available in the home is key to a successful transition from hospital to the home. Something as simple as not having the appropriate electrical wiring to accommodate care can be a hurdle, and the knowledge and availability of other modalities is extremely important.

Another factor is understanding the technology. LTOT systems include several options versus the standard continuous flow options that exist in the hospital. The complexity of these devices requires the RT to understand their functionality as well as the capabilities and limitations that exist. LTOT options include devices that have the ability to provide continuous flow oxygen or pulse dose. Pulse dosing technology was introduced several decades ago for both gaseous oxygen and liquid oxygen portables. The pulse dose oxygen conserving device (OCD) provides a pre-set bolus delivery of oxygen when the patient initiates a breath and ceases prior to exhalation. This allows for increased duration of the portable system, thus enabling the patient to remain active outside of their home for a longer period of time. The OCD technology has since been incorporated into most portable units, including the portable oxygen concentrator (POC). When oxygen is delivered via pulse dose, the OCD's sensitivity, flow rate, and bolus size must be considered. No two devices are created equal. Various oxygen modalities exist within the home, and within the modality type, numerous products exist. Home oxygen therapy segments into one of the following categories:

Stationary concentrator
- Electrically driven—produced and stores oxygen
- Continuous flow capability, 1-10 lpm

Portable gas cylinders
- Used for portability with a continuous flow or an OCD regulator

POC
- Electrically driven or battery operated—produces and stores oxygen
- Limited continuous flow capability and OCD delivery

Liquid oxygen
- Continuous flow and OCD delivery

Transfilling concentrator systems
- Standard electrically powered concentrators with portable gas transfilling capability
- Portable gas cylinders with continuous flow or OCD regulators

Fortunately, many options are available for our home care patients, but unfortunately very few standards exist

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for home oxygen therapy devices. It is the responsibility of the RT to understand the functionality and options in the various categories to ensure the appropriateness of the oxygen system matches the patient's clinical needs as well as lifestyle.

Empowered patients

With the advent of the internet, patients can "shop around" for an oxygen system that is desirable to them without understanding the clinical or capability component. A prime example of that is the POC. The use of POC units has exploded over the last decade, which allows multiple options for the end user. Unfortunately, if patients are given the option to choose, they may not choose the most clinically appropriate. It is imperative that maximum oxygen production and bolus delivery are understood so that clinical needs can be met. A POC produces and stores a small amount of oxygen which ultimately affects the oxygen output of the POC. According to a comparative study conducted by LeBlanc et al,[1] who compared three POCs while COPD patients were completing a 6-minute walk test, found that bolus size was an important factor in determining the effectiveness of a POC. The RT must be engaged and understand the current and future oxygen needs and guide the patient in the selection of the device. Another factor to consider is the POC's method of delivery.

Fixed Bolus Volume—This delivery uses a predetermined bolus size that is calculated at each setting. The potential limiting factor in this delivery method is that at higher breath rates some POCs may not be able to keep up with the oxygen production thus decreasing the oxygen purity.

Fixed Minute Volume—This method of delivery is based on minute volume. The amount of oxygen available per minute is fixed and the bolus size delivered is based on the breath rate. As breath rate increases, bolus delivery is less and vice versa. ■

In a study done by Chatburn and Williams,[2] it was noted that there were large differences in performance characteristics among POCs and that this places great emphasis on the RT's understanding of these differences and the importance of titrating the POC to meet the patient's needs. Understanding the mechanics behind OCD technology will enable the RT to make clinical decisions regarding the appropriateness of the device, or if another device is required, to meet clinical objectives.

Prescription accuracy

When using an OCD, regardless of the system, one must keep in mind that OCDs are all different. In other words, a "2 setting on one device is not equivalent to a 2 setting on another device." When oxygen is prescribed based on the testing conducted in the hospital, it is based on continuous flow. If an OCD is used, the 2 setting becomes irrelevant. The continuous flow setting of 2 lpm is not equivalent to the 2 setting on the OCD.

There are gaps that exist when obtaining accurate oxygen prescriptions in the hospital. Usually oximetry is done with a patient at rest to meet payer qualifications. Sometimes a 6-minute exercise test is completed to titrate continuous flow oxygen, but in essence it needs to be done on the home device to achieve accuracy. Casanova et al[3] studied 88 patients with COPD and monitored their pulse oximetry for 24 hours. The study showed that 38% of these patients showed desaturation (≥ 30% of the time with an Spo_2 < 90%) during activities of daily living (ADL) or during sleep. Because we know home oxygen devices vary greatly, does that number mean anything to us?

The AARC clinical practice guideline, "Oxygen Therapy in the Home or Alternate Care Site Health Care Facility: 2007 Revision and Update" recognizes the need for titrating the oxygen so that it can be set appropriately for ambulation, exercise, or sleep.[4] Oximetry testing should be done while the patient is completing ADL. The RT's role not only encompasses the knowledge of the capabilities and limitations of available devices, but a focus must be placed on the clinical efficacy of the device in maintaining adequate oxygenation at activity levels.

Patient/caregiver understanding is another important aspect that needs to be considered. The cognitive level must be assessed in order to ensure LTOT is used safely and effectively in the home. A good understanding of the clinical application and equipment capabilities is essential or the patient is at a disadvantage. If the oxygen system is not providing therapeutic oxygenation this may lead to noncompliance due to the perceived ineffectiveness with therapy and ultimately result in a hospital readmission.

Implementing protocols involving the RT in the discharge process has been emerging throughout the country. By initiating assessment tools and education prior to discharge and involving the hospital RT as an integral part of the discharge team, it facilitates communication of the care plan to the home care entity. This aids in the identification of limitations that may exist in carrying out the plan of care. RTs in all practice settings have the responsibility to make sure our patients have the most clinically appropriate oxygen device to maintain saturation levels and remain compliant with the treatment. ■

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Good Vibrations

by James C. Woods, III, RRT

There he was, waving with the enthusiasm of an old friend, yet we had never met.

I had stopped by to speak with one of my co-workers. I was in charge and was checking in with her to make sure she was doing okay. When I called her name from the doorway, he turned his head and smiled, and then began waving vigorously. I couldn't help but smile. Sara came to the doorway and I asked if she was doing ok and she said she was. I leaned in a little to see her patient and he was still smiling and he waved again. I waved back this time and said "hello." He replied with a boisterous "Hi!" I told Sara to call me if she needed anything and as I turned to leave I found myself smiling again. "Nice guy." I thought.

The next day, I had a floor assignment and he was one of my patients. He was 24 and developmentally delayed. He lived at home with his mother and had started running a temperature. She took him to the emergency department and it turned out he had pneumonia, early in its development, but enough to warrant hospitalization. We were doing vest treatments four times a day and he was making progress.

about the author...

James C. Woods, III, RRT, is a respiratory therapist in the pulmonary unit at Nationwide Children's Hospital in Columbus, OH.

"Hi Carl," I said as I entered his room. "My name is Chip and I will be your respiratory therapist for the day! How are you feeling this morning?"

Carl smiled and said, "Oh, pretty good I guess."

"I have your vest therapy and meds for you so let's get started," I continued.

I logged into our computerized bedside charting system, opened my "MY KIDZ" folder and found Carl's chart. I opened it and found his medication record file and opened that.

I scanned his bio ID and proceeded to scan off his medications for this therapy. It was then that he began to laugh. A chuckle if you will. Then quiet… then another chuckle.

"Is that you laughing?" I asked.

"Uh huh," he answered.

"What are you laughing about?" I asked.

"The vest, it makes me laugh."

"But we haven't started," I said.

"I know, but when I think about it, it tickles." He looked up at me with that wonderful smile of his and then just as quickly looked away.

His mother, who had been silent until now, spoke up. "He giggles all the time when he does his vest. I dunno why but he says it tickles."

"Well that's okay," I added, "It's kind of nice really, if you think about it."

I readied the machine and grabbed Carl's vest. As I walked toward him, he began to laugh. It was as if he knew a secret or he was about to do one of his very favorite things. His anticipation was tangible.

He clapped twice and shifted his position so his legs now dangled off of the side of the bed. He had been sitting one leg tucked under.

He lifted his arms so I could place the vest on him. Velcro secured and all tucked in, I hit the ON button. It was like slow motion, the expression on his face went from anticipation to total enjoyment! His eyes told the story.

Thus began a 20-minute journey into his world of wonderment. His smile was nonstop as he relished in the movement. Eyes closed as he sat, it seemed that he

was feeling the vest everywhere. He would wiggle his legs, stretch his arms, and watch them shake.

He continued to giggle, chuckle, and even chortle. There were a few snorts of laughter. In all my time helping people help themselves, this was one of the best experiences I have ever had. It was, all in all, a very happy experience for Carl and me, as a matter of fact.

The 20-minute smile ride ended and Carl caught his breath. I removed the vest and placed the machine out of the way. He was still smiling as I did my post-treatment assessment and worked on his deep breathing and coughing.

Carl then moved back into his bed and was now seated with his hands behind his head. He turned as I spoke from the doorway. I told him I would be back in 4 hours and I would see him then.

His left arm shot up into the air and his grin surfaced again from ear to ear as he waved goodbye only to be seen again as a hello a few hours later. ■

Editor's Note

AARC members are invited to contribute to this new "Storytellers" column. Send stories to Editor Marsha Cathcart at cathcart@aarc.org and place "Storytellers" in the subject line.

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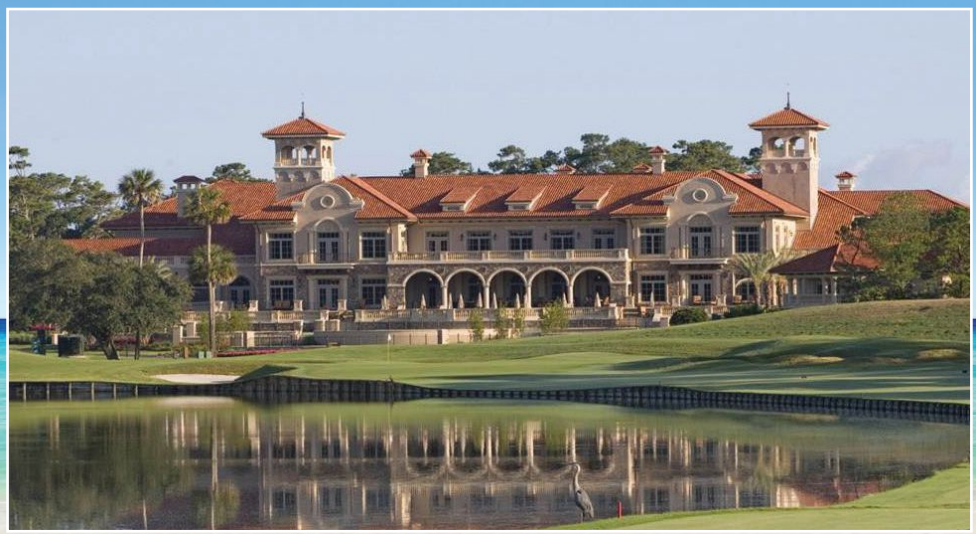


Forever Grateful

Venus Talley has her life back, thanks to a lung transplant she received last July

by Debbie Bunch

Photo by Beth Binkley

Venus and her cousin Dian Whitaker have formed a strong bond.

Lung disease got really personal for one AARC staff member last year when her second cousin went on the transplant list.

Now that she's retired, Venus Talley drives neighbors to their doctors' appointments and shops for elderly relatives. She has time to visit with friends and family and she's looking forward to the day when she can help plan her daughter's wedding. These are all normal things for a woman who has reached the age of 62. But for Venus these tasks seem like a dream come true because just a year ago, she really thought she'd never have the chance to do any of them again. Today she has a new lease on life, thanks to another family who faced the ultimate sorrow and gave the ultimate gift.

Family history

"I was first diagnosed with COPD in 1998 by my family physician," says Venus, a widow who hails from California but lived in Arkansas for many years before making her home in Dallas, TX. "Alpha 1 was diagnosed by my pulmonologist in October 2010."

The Alpha 1 diagnosis came after her pulmonologist did a little digging into Venus' family history and learned that her mother and three of her sisters passed away from emphysema. Two of them were smokers, but the other two were not. By the time Venus received the news that she had the genetic form of COPD, her health was already well into decline. "It affected my breathing to the point where walking, swimming, and even talking on the telephone became

Venus and Dian enjoy doing scrapbooks of their family together.

very difficult." She was forced to retire from her job as an administrative specialist for the state of Arkansas, where she served in a 24-hour care facility for people with intellectual disabilities.

"It had become extremely difficult to get to work after completing my daily self-care chores and all the a.m. medications," she says. Those medications began with inhalers, and then progressed to oxygen at night, which she was on for about five years before switching to oxygen 24 hours a day for about three years. Any type of exertion led to shortness of breath and she came to rely on her son, Justin, to do her daily household chores and accompany her when she did leave the house so he could change her tanks when needed.

The AARC connection

The prospect of getting a new set of lungs first surfaced in October 2011 when her physicians sent her to St. Louis, MO, for an evaluation. At that time, however, she was deemed "too healthy" to go on the list. A year later numerous hospitalizations for pneumonia led her pulmonologist to refer her to Baylor University Medical Center in Dallas for another evaluation. She was finally placed on the transplant list in January 2014.

Venus eventually moved to Dallas to be closer to the hospital and continued to rely on Justin for her day-to-day care. She also got to spend more time with her second cousin, Dian Whitaker, who, as it turns out, was then a member of the AARC Executive Office staff.

"Our grandmothers were sisters," says Dian, who retired at the end of 2015. "The first time we met, we were grown. We hit it off right away." The two served on the committee that arranged their big family's annual reunion for more than five years and got to know each other really well through that joint activity. When Dian learned her cousin was on the transplant list, she and other family members were heartbroken. "Venus is a go-getter and that meant she had to give up so many things, including working," says Dian. "But she was more positive about it than we were… she always said, 'God is in control; if it's for me, I'll get it.'"

Dian and the rest of the family needed more information about Venus's condition, but despite working as an accounting clerk for the AARC, Dian didn't immediately think about the RT connection to her cousin's COPD. "I know we hear all about it in our monthly meetings, our magazine, the website. But when it hits home, sometimes you just don't think," she recalls now. It was her daughter, Tina Sawyer, head of the customer service team at the AARC, who ultimately suggested her mother tap into the expertise right there in the AARC office, and Dian did. She started sending Venus the AARC's magazines when she was still in Arkansas, and after getting a little more information about COPD, she became more positive and shared the information with her family.

Venus appreciated the support, too, noting that RTs taught her various breathing techniques and advised her on different medications. "And they explained to my children what signs to look for prior to an exacerbation," she says.

Venus and her brother Jay Ansley before her lung transplant.

Venus drew strength from her daughter, Destiny Talley, and son, Justin Johnson.

Venus, upbeat right before surgery, is surrounded by her children and family members, Terry and Glendale Thomas.

The day arrives

In mid-June of last year, Venus suffered an acute exacerbation that put her in the hospital. She was in the hospital when the news of the donor lungs came through on July 7. "I had been there for three weeks and was scheduled to be discharged later that day," she recalls. "The call came to my cell phone as 'RESTRICTED' at 2 a.m. I ignored it assuming it was a wrong number."

Shortly thereafter, a nurse opened the door to her room and asked her why she wasn't answering her phone. Then she handed her a cordless phone. "It was Transplant wanting to know if I was still interested in a bilateral lung transplant," Venus says. The news was overwhelming. "This took my breath away — the nurse kept telling me, 'breathe, Ms. Talley, breathe.'"

There would be no more sleep for Venus the rest of that night. She was so excited she couldn't close her eyes. She called her daughter, Destiny, who had just gotten back to her home in Shreveport, LA, after being in Dallas with her mom. "I will never forget the excitement in her voice," she says. "She was at the hospital two and a half hours later." Destiny, who works as a school counselor, would spend the rest of the summer with her mom to help during her recovery.

After calling Destiny, Venus called Justin and was met with a peal of delighted laughter. The transplant people had actually called their home number first, so he already knew that the offer of a new set of lungs was on its way.

On the road to recovery

Dian heard about the transplant through another cousin who was her "point of contact" for news about Venus within the big family. It was still the middle of the night and her first thought was that it was bad news (as a mother and grandmother, she says she has long been conditioned to worry anytime the phone rings in the middle of the night). "I couldn't find the light, my glasses, or the phone," she recalls now. Needless to say, she couldn't have been happier at the news.

Because the family is so large, everyone decided from the outset that if/when Venus got her new set of lungs only her two children would go to the hospital for the surgery. "Her daughter, Destiny, would send texts out twice a day to the contacts and they would send them on," says Dian. "And the recovery began."

Venus says waiting for the surgery to begin was the hardest part of the process. "I was initially told 4:30 p.m., but finally went in at 7:20 p.m." The first couple of days after the operation are hazy in her memory, but she knows she had a few complications that required the placement of a trach tube. However, those issues quickly resolved, and before she knew it, she was up and walking around the ICU.

Awesome RTs

Today, Venus says she couldn't feel better or be more full of life. "I am walking, doing exercises, cleaning my house, doing my own shopping and cooking, making my bed — things so many people take for granted," she says. In addition to helping her neighbors, she's made several trips to Arkansas, Louisiana, and Houston that she would never have even considered making before the transplant. She's used those trips to raise awareness of the importance of organ donation.

"I get strange looks from children and some adults, due to wearing my mask," she explains, referring to the mask she must wear out in public to guard against infection. "I take that opportunity to tell them about my transplant and encourage becoming a donor. I thank God every morning for this precious gift of life."

Venus has written a letter to the family of her donor and hopes that when it's delivered (rules dictate a year must pass before contact can be made) they'll want to reach out to her so she can tell them what their gift has meant to her and her family. "Grateful doesn't scratch the surface of my feeling for the generosity of this donation," she says. "I am living proof it makes a difference."

As for the RTs who worked at her bedside at Baylor, she can't say enough about the care they provided. "I had awesome respiratory care — they listened to me and took what I had to say into account during treatments." ■

Cabin Creek Clinic is located in Dawes, WV.

A Coal Miner's RT

AARC member finds her niche in a federally qualified health center in West Virginia

by Debbie Bunch

In the early 1970s, coal miners in Dawes, WV, decided they'd had enough of doctors hired by the coal companies to provide health care for the employees. They wanted unbiased assessments of their conditions — many of them chronic lung diseases caused or worsened by the environment in which they worked — and thanks to generous donations from a community that really couldn't afford to give much, Cabin Creek Clinic was founded to serve miners and their families.

Today the clinic is a federally qualified health center (FQHC) that not only provides primary care to underserved populations but is also home to a state-of-the-art Breathing Center run by AARC member Chaffee Tommarello, BSRT, RRT, CPFT, AE-C.

She explains how she got involved: "In 2013, Jay Rockefeller, U.S. Senator from West Virginia, was approached by the Dorney Koppel Foundation. Their vision is to make pulmonary rehab available in rural areas. Senator Rockefeller suggested that they contact

Cabin Creek as a potential site for a rural pulmonary rehab program."

Full range of services

As many AARC members know, the Dorney Koppel Foundation was established by Grace Anne Dorney Koppel and her husband, former *Nightline* anchor Ted Koppel, to ensure more people with COPD would have access to the kind of pulmonary rehabilitation program Grace Anne attended following her own diagnosis of COPD. Respiratory therapists have been an integral part of the effort, and after spending the majority of her career working in hospitals, Tommarello was thrilled to be coming on board to help start the program. "I always enjoyed patient education, but I couldn't really see a way to do more of it while employed by the hospital," she says. "Like virtually all hospitals, we had our share of 'frequent fliers' and I couldn't see how to use my knowledge and experience to break the cycle."

She found the opportunity to do that and more at Cabin Creek. Her first job was to set up a program for spirometry testing that would facilitate the identification of patients who could benefit from the newly created pulmonary rehabilitation program. She started performing all spirometry for the main Cabin Creek site and provided educational programs on spirometry to clinicians staffing four satellite sites.

Patient education, asthma action plans, and tobacco cessation counseling quickly fell under her umbrella as well. "Most of our patients are suffering with COPD, cystic fibrosis, asthma, pulmonary fibrosis, or black lung," says the center director. The PR program enrolls about 15 patients at a time and provides the full range of services you'd expect to see in any high-quality center. One of only four PR programs located in FQHCs (the other three are Dorney Koppel centers as well), the Cabin Creek program provides a vital service to the community. "We are about 30 minutes from Charleston, which has the closest PR program," says Tommarello. "Most of our patients don't have the ability to get to Charleston twice a week to participate in that large program so, as a practical matter, these services were inaccessible to them."

As director of the Breathing Center at Cabin Creek Clinic, RT Chaffee Tommarello is making a big impact on a small community where the needs are great.

She credits the Koppels with making the PR program possible. "As most of those familiar with PR know, PR is not a money-maker — it is break-even at best. If it were not for the generosity of the Dorney Koppel Foundation, we never could have purchased the capital equipment to start our PR program."

Black Lung Program

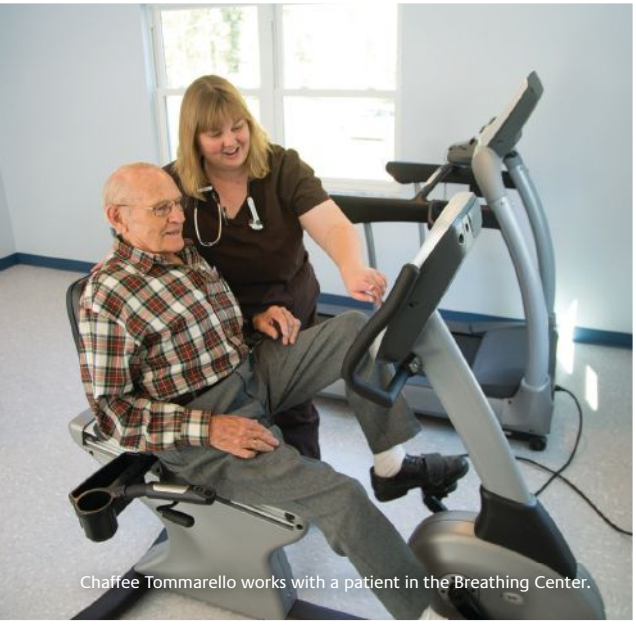
In 2014, Cabin Creek circled back to its roots by becoming a federally designated Black Lung Program as well, and the PR and Black Lung programs were consolidated under the Breathing Center moniker. It was the perfect fit not just for Dawes, but also for that entire area of the state. "We live and work right in the coalfields of West Virginia," says Tommarello. "Coal has been the major employer in our community and the surrounding communities for decades."

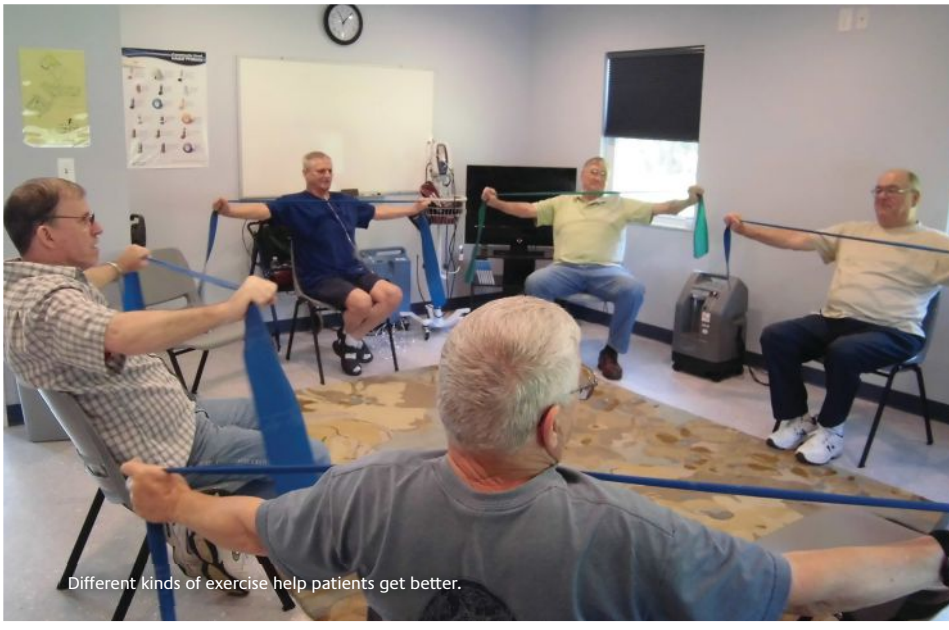
Tommarello and her colleagues, including AARC member Krista Clark, CRT, provide counseling and testing to area citizens suffering from Coal Worker's Pneumonconiosis as part of the Black Lung Program mandated by the Black Lung Benefits Act. They also help these patients seek the government benefits they may be eligible for under state and federal programs set up for coal miners.

"There are both West Virginia State Occupational Pneumoconiosis and federal benefits available to those with black lung, but it is like running a gauntlet to obtain these benefits," she says. "We help patients understand these benefit systems and we perform testing to see if they qualify for benefits."

The Dorney Koppel pulmonary rehab program offers a range of exercises to keep patients engaged in their recovery.


Patient Steve Fields appreciates the help he receives from Melinda Dangerfield, LPN, left, and Chaffee Tommarello, BSRT, RRT, CPFT, AE-C.


Chaffee Tommarello works with a patient in the Breathing Center.


Different kinds of exercise help patients get better.

Working with hospitals

Keeping patients healthy and out of the hospital is another objective of the clinic, and to that end, Tommarello and her colleagues are also working with area hospitals to provide follow-up visits for patients who were admitted with a primary pulmonary diagnosis. They look at factors that could have led to the admission, such as running out of respiratory medications, malfunctioning oxygen concentrators or nebulizers, and improper cleaning of supplies and equipment. "We see them briefly before they see their provider to develop a 'better breathing plan' and we facilitate changes in the patient's care." The goal is to ensure patients have the medications, properly working equipment, and knowledge about caring for their condition that they need to avoid another hospitalization.

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The Breathing Center addition to Cabin Creek sits at the back of the property.

Tommarello manages the Medical Emergency Procedure for Cabin Creek as well, and notes that the clinic has recently formed a partnership with the American Cancer Society to develop a protocol to help current and former tobacco users obtain low-dose CT scans for early screening for lung cancer. "I facilitate the Project ECHO group we have with other PR sites and our pulmonologist consultant at West Virginia University."

A research project is also underway to help other communities learn more about providing pulmonary rehabilitation in a rural setting. Among the pre- and post-PR outcome measures they are gathering for the study are the 6-minute walk test, negative inspiratory force, a respiratory knowledge test, the St. George's Respiratory Questionnaire, the modified Medical Research Counsel Dyspnea scale, and smoking status.

"We are still working with the statisticians, but the early results show we have statistically significant improvements in all categories. We hope to publish further details this year."

A lasting impact

For Chaffee Tommarello, heading up the Breathing Center at Cabin Creek Clinic is a dream job she wouldn't trade for the world. "I love my job," she says. "Virtually every week I have a patient or a patient's family member in my office in tears because their life has been so remarkably changed by having these services available. I am so grateful to Cabin Creek and the Dorney Koppel Foundation for providing an environment where respiratory therapists can have a meaningful, lasting impact on patient health." ■

Spreading the Transformative Power of Pulmonary Rehab

In 2001, Grace Anne Dorney Koppel heard the kind of news no one wants to hear. Doctors told her she was unlikely to survive more than 3–5 years with her severe COPD.[1] She decided to prove those doctors wrong and now, more than 15 years later, she's still doing just that, traveling the country and even the world to spread the word about COPD and how it can be effectively managed with the right medications and care.

Chief among that care is pulmonary rehabilitation, something she learned firsthand when she went through a program that markedly improved her lung function and allowed her to do all of the things she has done since. Among her biggest accomplishments are the Grace Anne Dorney Pulmonary Rehabilitation Centers she has founded in underserved areas of the country. In addition to the center located at Cabin Creek Clinic in Dawes, WV, centers are now in several other West Virginia towns, as well as in Leonardtown, MD.

Grace Anne shared her passion for pulmonary rehabilitation with AARC members during her AARC Congress 2011 keynote address, when she explained why she has devoted so much of her time and energy to this mission. "I want all who have COPD to become 'strong in the broken places,'" she said. "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." ■

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1. Bunch D. Creating Strength in the Broken Places. November 2014 *AARC Times*; Vol. 38; Issue 11; pp 38-40.

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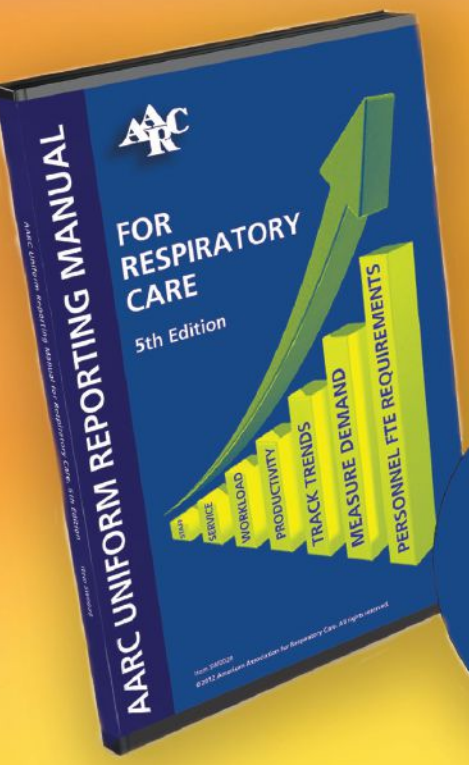

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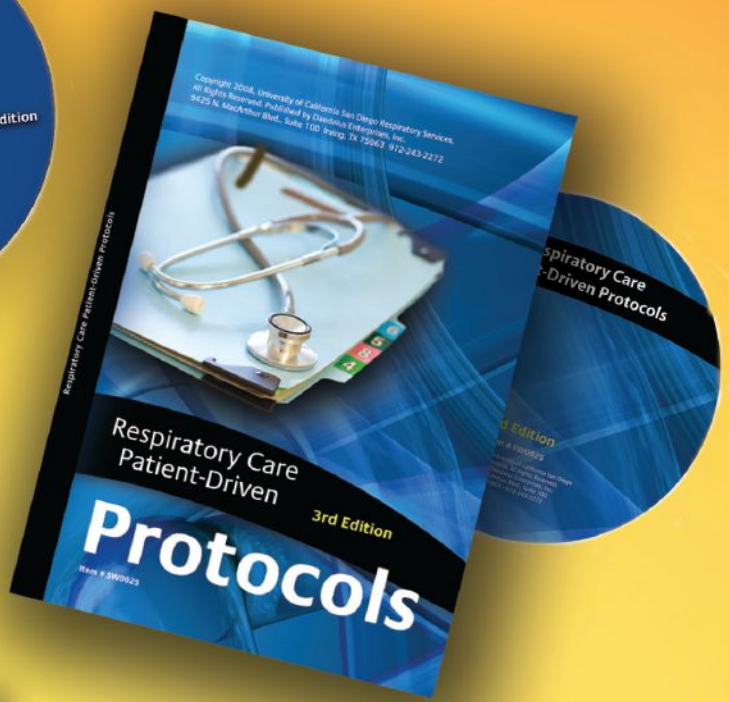

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RC Currents

AARC Activates Disaster Fund for Victims of Severe Weather

In late February, the AARC activated the Disaster Relief Fund for AARC members who sustained property loss or damage as a result of the tornados and severe weather that hit several states along the Gulf Coast.

AARC members living in state- and federally-declared disaster areas in Louisiana, Mississippi, Alabama, and Florida may apply for a grant of up to $500, either online at https://secure.aarc.org/disaster_fund/application.html or by mail, using our downloadable application form posted at http://c.aarc.org/headlines/11/04/application.pdf.

The AARC Executive Office will review each application then send it to the applicant's state society president for verification and a recommendation of action.

The AARC established this special fund in 1992 and has been used numerous times following hurricanes in Florida and Hawaii, earthquakes and fires in California, flooding in the Midwestern states, tornadoes throughout the country, and in the aftermath of Hurricane Katrina. The Disaster Fund is open for six months from the date of the disaster and is all about AARC members helping fellow members. If you would like to contribute to the AARC's Disaster Fund, you can donate online at http://appserver.aarc.org/WEB/Online/Donate/DisasterReliefDonation.aspx or call the AARC's Customer Service Department at (972) 243-2272 and say you want to make a donation using your credit card. ■

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If you provide respiratory care outside of the United States and would like to share and expand your knowledge, please consider applying for our International Fellowship Program.

The International Fellowship Program is a sponsored activity of the American Respiratory Care Foundation (ARCF). Since 1990, health professionals from more than 50 countries have shared experiences, knowledge, and lasting friendships through this exceptional program.

The three-week program takes each participant to two host cities in the United States and concludes with attendance and acknowledgement at the AARC Congress, scheduled this year for Oct. 15-18 in San Antonio, Texas.

Learn more and apply by **June 1** at www.arcfoundation.org/international/fellows/. For more information, contact Crystal Maldonado at crystal.maldonado@aarc.org. ■

International Fellowship Program Looking for City Hosts

Every year the American Respiratory Care Foundation sponsors an International Fellowship Program that brings physicians, therapists, and nurses from other countries to our shores to learn more about American-style respiratory care in two cities. It can't happen without city hosts in each of the localities, and now is the time to step up and volunteer.

This year's fellowships will take place in the fall just prior to AARC Congress 2016, Oct. 15-18 in San Antonio, Texas.

Learn more about the program and apply by the **June 1** deadline at www.arcfoundation.org/international/fellows/city_host.cfm.

For more information, contact Crystal Maldonado at crystal.maldonado@aarc.org. ■

TRANSITIONS

Kevin Barker, RRT, RPFT, 59, passed away unexpectedly in March. He had been an active member in the Kentucky Society for Respiratory Care, where he served on a number of committees and was a member of the board of directors from 1985 to 1995. He worked at several Kentucky hospitals over his career, including Lourdes Hospital and Baptist Hospital, and also spent some time at Livingston County Health. According to Kevin's colleagues, he loved his profession, loved the people he worked with, and left a positive mark on the world and those who knew him.

Royster "Rick" Leonard, BA, RRT, died in December. A member of the AARC since 1972, he earned his bachelor's degree from the University of North Carolina in 1970 and spent 40 years working in hospitals, educational programs, and respiratory companies, including Duke Children's Hospital and United Hayek Medical Devices. He served in many capacities at the North Carolina Society for Respiratory Care, including as president, treasurer, and member of the board of directors, and he also published a number of papers dealing with respiratory topics.

Educators: Help Recognize Outstanding Students

The American Respiratory Care Foundation (ARCF) is accepting applications for its undergraduate and postgraduate Education Recognition Awards now through **June 1** and is asking RC educators to help get the word out to their students. So check out the list of available awards and then encourage your best and brightest students to apply.

The ARCF offers awards to students who are currently enrolled in accredited respiratory care educational programs and to respiratory therapists who are pursuing an advanced degree. Awards include registration and airfare to attend the AARC Congress, scheduled this year for Oct. 15-18 in San Antonio, Texas.

To see all of the awards bestowed by the ARCF every year, go to the Foundation's Grants, Awards, and Fellowships page at www.arcfoundation.org/awards/. For more information, contact Crystal Maldonado at crystal.maldonado@aarc.org. ■

Check Out the AARC New Members List Online

Want to know who has joined the AARC recently? Go to http://c.AARC.org/new_members on the first of each month to view the names of your friends and colleagues who have been approved as "Active Members" of the Association. ■

Volunteer Your Time and Expertise to Your Profession

by Brian K. Walsh, MBA, RRT-NPS, FAARC, 2017–2019 AARC President

For those of you who are reading this, I first want to thank you for paying your dues and taking the first steps in becoming a mature professional. Now that I am midway through my term as AARC president-elect and dreaming up big plans for my term as president, I realize that my dreams for you and our profession will be null and void if I don't receive vital assistance from my colleagues — AARC members. You have heard of the 80/20 rule, right? Twenty percent of the individuals involved doing 80% of the work. Well, it's no different in a volunteer organization. I am asking you to come out of the shadows, mature as a professional, and volunteer your time and expertise to our professional organization.

Having RT volunteers not only facilitates our growth as a profession and association but also presents all volunteers with the opportunity to develop and advance their leadership skills, increase their professional contacts, and give back to the patients we serve and the profession we love. Respiratory care has given me opportunities to provide for my family; meet, teach, and learn from wonderful individuals; and help a few people breathe better along the way. It's been a wonderful and exciting journey and I am privileged to give back. And so should you! Volunteers have always been the heart of the AARC and its leadership. Our strength and advancement comes from the countless hours of support volunteers provide through their time and knowledge toward the betterment of their patients, colleagues, and profession.

There are many people like you who need and use the professional tools the AARC provides. Why not get in on the ground floor and collaborate with your fellow RTs to develop new tools to help us improve and grow as respiratory care professionals?

We need you to volunteer your expertise and skills to work on various committees in order for the AARC to accomplish the important work needed. Although the AARC has a staff to do some of the heavy and complex work, it is really members like you who help set the direction and pace at which we travel.

There is enormous momentum and potential for our profession right now. No one individual can accomplish everything we need to do. I know that dedicated respiratory therapists supporting the AARC's efforts can make vast strides for ensuring high-quality patient care in the continuum of care and securing the RT's rightful place in the changing health care system.

AARC members always help keep a constant flow of creativity and energy for what we can do as a collective. We need everyone's input. With the ever-increasing responsibilities respiratory therapists have, we need you to help us identify and meet your professional needs.

This is your Association, and now is the time for you to take the next step in your professional journey and get involved. We have committees specifically designed to serve the strategic goals of the AARC. Creating a diverse group of individuals to serve on these committees is one of our biggest, yet most rewarding, challenges. It is this special mixture that makes it possible for the AARC to continue being the vital professional organization it always has been by mentoring in new talent. It also ensures the future of the respiratory therapist in the health care environment as we witness some of the most sweeping changes in history. Truth be told, we haven't always accomplished these goals, but it's not from a lack of trying, it's from a lack of volunteers like you.

Please consider this a friendly challenge — and think about how you can help your Association, the profession, and the patients we serve. Take time now to network with your fellow AARC members — perhaps someone active in your state society — whom you believe could contribute special talents or services to the AARC. Encourage them to volunteer so that we can capitalize on the vast amount of expertise available in our Association membership.

I leave you with a nerdy joke by Albert Einstein: "You are living, you occupy space, you have a mass — YOU MATTER!" The sky's the limit when you join me by volunteering your time, talents, and abilities.

You can write to me at the AARC Executive Office: 9425 N. MacArthur Blvd., Suite 100, Irving, TX 75063; c/o Kuykendall@AARC.Org. Tell me how you would like to serve and provide a copy of your resume so I can consider how to best use your talents.

We can continue to reach milestones in the respiratory care profession if we all work together. Thank you for supporting your professional organization, the AARC. I look forward to working with you. ■

▶ STUDENT CORNER

First Impressions Matter

By John Jarosz, MS, RRT

A good thing to remember when you start looking for your first job is that you only get one chance to make a good first impression. You will be exposed to most of the RT departments that may be hiring in your area during your clinical rotations. Not only do you get to see what these departments are like, the department staff and the managers will get to see you in action.

Being a high performer during clinical rotations has, in my opinion, been the best indicator of how successful students will be when they start their job hunt. When you start to apply for a job, be honest, keep it simple, and be proactive but not overly aggressive. Be honest when filling out your job applications and on your resume. It's too easy for managers and human resources personnel to follow up on the information you provide. Unexplained discrepancies during any of those processes will most likely lead to not getting an offer, especially in a highly competitive job market.

Keep your resume to one page. You really can show some work history, your education, and any accolades on one page. Most managers aren't that interested in a lengthy job history that isn't respiratory therapy related. Make sure any information you provide is true and can be confirmed.

I encourage students to start looking for positions several months prior to graduation. A little investigative work during clinical rotations will help you find where the openings are now and where potential openings may be in the future. I encourage you to be confident and knowledgeable when interviewing. You should be as comfortable with the department to which you are applying as managers are with the students they are considering for the position. ■

John Jarosz is the respiratory care program director at Nebraska Methodist College in Omaha, NE.

Contribute to Our "Transitions" Column

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

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

DNA Signature Could Lead to Earlier Cancer Diagnosis

National Institutes of Health researchers have identified a striking signature in tumor DNA that occurs in colon, lung, breast, stomach, and endometrial cancers. The signature results from a chemical modification of DNA called methylation, which can control the expression of genes like a dimmer on a light switch. Higher amounts of DNA methylation, known as hypermethylation, decrease a gene's activity.

The researchers believe their discovery will spur the development of a blood test that can be used to diagnose a variety of cancers in their early stages, when treatments can be most effective.

A paper on the finding appeared in *The Journal of Molecular Diagnostics* on Feb. 5. ■

The class of 2016 at Doña Ana Community College in Las Cruces, NM.

New Mexico Students Go Above and Beyond

Community service is a part of most RT educational programs, but the class of 2016 at Doña Ana Community College in Las Cruces, NM, really went above and beyond this year. In addition to hosting four car washes and a golf tournament to raise money to attend the New Mexico state society conference and convert their student memberships in the AARC to active membership status, these students gave back to their community big time.

"This class volunteered twice at Casa de Peregrinos, which is a food pantry in Las Cruces that serves people in our community and county," says Program Director Virginia Durant, MA, RRT. "Nearly one-quarter of our residents live below the poverty level, and in the rural colonias there are many actually living far below that, with family incomes averaging $5,000 per year."

She notes that volunteers keep the pantry up and running, and having the RT students come in twice really made a difference to families in need. They also took an interest in the health of those families by participating in the annual "Run with Your Doc" 5K hosted by the college to benefit a local clinic for homeless and indigent community members who desperately need health care services.

Congratulations to the class of 2016 at Doña Ana, all 13 of them now newly minted active members of the AARC: Bianca Norero, Gerardo Gonzalez, Hugo Muraco, Jerica Gomez, Joanna Chavira, Laura Aguirre, Lori Brown, Lynette Baca, Manuel De La Torres, Martina George, Ryan Serna, Valerie Kling, and Vivian Booth. ■

CT Screening Guidelines for Lung Cancer: Time for a Change?

The U.S. Preventive Services Task Force recommends CT screening for adults age 55-80 who have smoked at least one pack a day for 30 years and are still smoking or have quit within 15 years. However, that criteria should be changed, according to international researchers who set out to identify which populations of at-risk individuals are being missed by the current lung cancer screening criteria.

The investigators retrospectively tracked two groups of people with lung cancer: a hospital cohort made up of 5,988 individuals referred to the Mayo Clinic and a community cohort consisting of 850 residents of Olmsted County, MN. Long-time heavy smokers who had quit smoking for 15 to 30 years accounted for the greatest percentage of patients with lung cancer who didn't qualify for screening. The newly defined high-risk group constituted 12% of the hospital cohort and 17% of the community cohort.

"The common assumption is that after a person has quit for so many years, the lung cancer rate would be so low that it wouldn't be noticeable," said lead author Ping Yang, MD, PhD. "We found that assumption to be wrong. This suggests we need to pay attention to people who quit smoking more than 15 years ago because they are still at high risk for developing lung cancer." The study appeared in a recent edition of the *Journal of Thoracic Oncology*. ■

Where Patients and Students Meet

Colorado Governor John Hickenlooper performed a breathing test at the state society's lobby day a couple of years ago while patient Edna Fiore and then student Grace Noynay, BS, RRT, looked on.

Student Adam Valenzuela assists a patient during a recent Pulmonary Fibrosis Walk/Run.

Most respiratory care students will spend their entire careers caring for respiratory patients at their bedside, and during the clinical rotations they complete prior to graduation to ensure they have the skills and expertise necessary for the profession.

But patients are more than just a sum of their ailments. They are people, too, and a program that's been in place at the Colorado Society for Respiratory Care (CSRC) for several years is helping students connect with patients on a more human level.

Kari Woodruff, BSRC, RRT-NPS, CSRC delegate to the AARC House of Delegates, and a past president of the CSRC, says the program began when the society's Patient Chapter came about in 2006. It was developed by two past presidents of the CSRC, Allen Wentworth, MEd, RRT, and Mindy Lemons. They were talking with a couple of patient advocates who wanted to bring all of Colorado's lung health support groups together in a central location, and the CSRC website seemed to be the perfect place.

"These patients also wanted to partner with the CSRC on a patient conference, now known as the Thomas L. Petty, MD, Moving Mountains Lung Health Conference," says Woodruff.

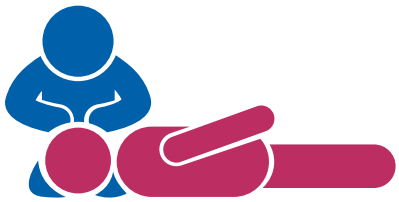
The Student Chapter was developed in 2007. "The premise at the time was to get students involved in the AARC early so they would stay involved and become our future members, leaders, and board members," she says. As the group evolved, it became the state society's go-to resource for volunteer activities across the state — including those involving the patient support groups — and the Patient Chapter began requesting that a Student Chapter member attend their monthly meetings. The patients returned the favor by speaking at the RT schools.

Woodruff believes it's been a win-win situation for both groups, and patients and students in the state agree. "To me, the most satisfying part of answering student questions is providing awareness of the importance of a smile and letting the patient know he's a name — not bed A, Room 435," says Patient Chapter Co-Chair, Emil Olson.

Fellow patient Edna Fiore says the interaction gives students a new appreciation for what patients really need from them, too. "The CSRC Patient Chapter affords the respiratory care community a firsthand perspective of the evolving emphasis on self-management and patient-centered care."

As for the students, they can't say enough about what they've learned from interacting with patients in their classrooms and at community events. "The CSRC helps create everlasting relationships between patients and students by allowing students to interact with and learn from patients, which in turn gives students exposure on how patients live with their respiratory conditions," says recent graduate Julie Hamilton, BS, RRT.

Graduate Whitney Mayhew, RRT, agrees. "It is so gratifying to see as students that the profession we have chosen is so beneficial and rewarding to the patients that we see and to us as therapists." ■



RT to the Rescue!

Marisol Flynn, CRT, wasn't thinking about saving a life when she went to her local Costco earlier this year. She was thinking about water — cases of it for two fundraisers, one being held by her son's 7th grade class and the other by her employer, CareOne in Wayne, NJ.

But when she got in line to pay, she heard people calling out for a doctor or a nurse. "As I approached the commotion, I saw the man lying on his back," recalls the AARC member. "Unresponsive, not breathing, and no pulse." After experiencing a moment of panic, she knew what she had to do. "I was the only health care provider there at that moment. With confidence, I knew I had to do CPR."

Flynn says she simply went back to the A-B-Cs she learned in her BLS course. "Unlike a hospital setting, there is no technology available or all hands on deck," she says. "Quick response to perform CPR is key."

A female employee of the store — who Flynn later learned was a store supervisor — stayed right by her side the entire time. "She was on point at all my requests," says the RT. "Performed chest compressions like a trooper when shown proper placement on his chest." That gave her a break and also allowed her to set up the store's automated external defibrillator (AED) in case it was needed.

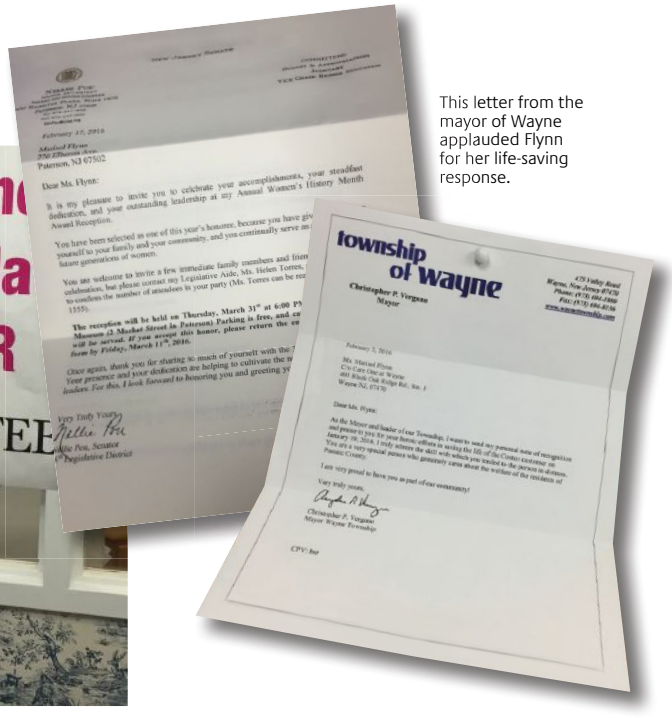
The AED didn't indicate the need for a shock, so Flynn and her helper continued CPR until the Wayne police arrived with an oxygen tank and a manual resuscitator. At that point, the man had a weak pulse but his breathing was agonal. "I then took over with the head-tilt/chin-lift technique and gave manual breaths using the resuscitator connected to oxygen," she says.

The paramedics arrived shortly thereafter, put him on their monitor, and placed an IV. When the crowd that had assembled around the man saw he was once again breathing, cheers rang out through the store.

Flynn emphasizes that what she did at Costco that day was no different than what any RT would do in a similar situation and she certainly never expected to be lauded for her efforts. But when she mentioned the experience to a dietician colleague the next day at work, word quickly got around, and soon she was being featured in an article in the local newspaper; hearing kudos from family, friends, and colleagues; and even receiving a letter from the mayor of Wayne calling her efforts "heroic." In mid-February she also got a letter from State Senator Nellie Pou telling her she had been selected as one of this year's honorees at the Senator's Annual Women's History Month Award Reception as well.

As for the man she saved, Flynn just wants him to know he remains in her thoughts. "My blessings to him and his family. ■

Marisol Flynn was at Costco to buy cases of water for a couple of fundraisers, including this one at CareOne, to support breast cancer research, when she heard the cries for help.



This letter from the mayor of Wayne applauded Flynn for her life-saving response.

Flynn was thanked by the mayor of Wayne, NJ, and also was honored at a state senator's Annual Women's History Month Award Reception.

As Seen on *AARConnect*

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

AARConnect...

We are evaluating the ambulation of our ventilator patients at our hospital facility. I would be interested in hearing about any helpful information or protocols that have worked at your facility.

Robert Cortez, RRT
Southwest General Hospital
San Antonio, Texas

We ambulate ventilator patients on a daily basis and some of these patients are also receiving nitric oxide and ECMO. It takes a group effort between the various disciplines. We don't use protocols but we do make patient-individualized plans.

John Campbell, MBA, RRT-NPS, FACHE
Newark Beth Israel Medical Center
Newark, NJ

We also have an early mobilization procedure for our ventilator patients. It is multidisciplinary, and it took us a little over a year to get everyone comfortable with it, but it has been very successful. It was designed and initiated by our PT team.

Karee Ramdass, BSRC
Mercy San Juan Medical Center
Carmichael, CA

We have been mobilizing patients for about two years now. We have a multidisciplinary approach as well. We began trying to use Nursing, Respiratory, and an MCT. We have since progressed to the point where we have rounds daily, looking for input and setting goals from Dietary, Physical Therapy, Respiratory, Social Work, Physician, Nursing, Pharmacy, Chaplain, and the Quality team... We are working on developing a mobility scale to help us set goals and plan for patients to not just mobilize, but to have more meaningful use of their therapy (developing tools to help cognitive and fine-motor skills as well). The end goal is to stop delirium and decrease overall hospital length of stay.

Amy Owens, BS, RRT-NPS
East Alabama Medical Center
Opelika, AL

Strange But True...

The stronger gender: Researchers from Johns Hopkins have found that estrogen protects women — but not men — from the influenza virus. They reached that conclusion after exposing nasal cells in men and women to the influenza virus and then adding in estrogen. In women, the addition of estrogen led to less replication of the virus. ■

All on a piece of paper: Canadian investigators have developed a simple test featuring an all-inclusive patch of reactive material printed on a piece of paper that changes color to indicate the presence of a biological marker for a specific bacterium, virus, or even cancer when exposed to just a tiny drop of blood, sweat, or other bodily fluid. They believe the test could accurately diagnosis a disease before symptoms even develop. ■

Resource Use Skyrocketed During Enterovirus D68 Outbreak of 2014

Investigators from Children's Hospital Colorado who compared resource use in their hospital during the enterovirus D68 outbreak that took place in the late summer--early fall of 2014 with forecasted values for that time period found the outbreak resulted in a significantly higher resource burden:

- Respiratory ED visits increased by 36%, respiratory hospital admissions increased by 80%, and respiratory pediatric ICU admissions grew by 79%.
- Albuterol sulfate use increased by 86%, steroid use increased by 72%, and second-line asthma medications increased by 101%.
- Days spent on the ventilator were 27% higher than expected, intermittent positive airway pressure therapy was 30% higher, administered doses of inhaled medications were 54% higher, and respiratory therapist procedures for every hour worked were 70% higher.

The study was reported in a recent edition of Infectious Diseases in Children. ■

Too Much Inflammation

In older adults with pneumonia, the body's natural use of inflammation to fight off infection may be backfiring, according to Canadian researchers publishing in a recent edition of *PLOS Pathogens*. They found that higher levels of inflammation in the blood of elderly mice caused some types of white blood cells to enter the bloodstream before they were fully mature, making those cells less effective in battling the infection.

While reducing levels of inflammation in younger mice had no effect on their ability to fight pneumonia, reducing levels in the older mice helped them to clear the infection and recover. "Our study in mice is consistent with clinical studies that recommend using anti-inflammatories as part of treatment to improve older adults' defense against pneumonia, and that points to the development of better care," noted study author Dawn Bowdish. ■

New CF Test in the Works

A fast, inexpensive, and highly accurate test for cystic fibrosis developed by investigators from Stanford University is expected to help ensure more infants are diagnosed with the disease in time for early interventions. The new test identifies all of the genetic mutations associated with the condition and is based on a new way to extract the CF gene from a tiny sample of DNA taken from the dried blood spots that are collected on cards for newborn screening.

"In our new assay, we are reading every letter in the book of the CF gene," study author Curt Scharfe, MD, PhD, was quoted as saying. "Whatever mutations pop up, the technique should be able to identify. It's a very flexible approach." Stanford University is considering filing a patent on the technique. Dr. Scharfe and his colleagues reported on the approach in a paper published in the Feb. 1 online edition of The Journal of Molecular Diagnostics. ■

ECAC Linked to Underlying Lung Disease

Expiratory central airway collapse (ECAC) may be more strongly associated with underlying lung disease than researchers have previously believed.

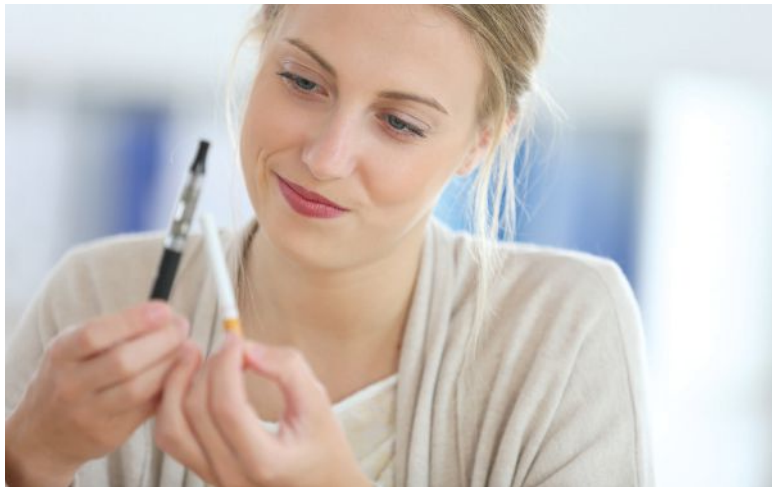
In a study published by the *Journal of the American Medical Association* earlier this year, investigators performed two chest CT scans that included the trachea on 8,820 current or former smokers, one during inhalation and one during expiration. Five percent were observed to have ECAC, and those subjects were more likely to have respiratory disease-related health impairment and a lower quality of life as measured by the St. George Respiratory Questionnaire.

The researchers believe ECAC may help explain some respiratory symptoms, such as shortness of breath, that do not seem warranted by the level of lung disease seen in some patients and in smokers who do not have COPD based on standard lung testing. "It's possible that ECAC might be a contributing factor to these sorts of unexplained symptoms," said study author Surya Bhatt, MD, from the University of Alabama at Birmingham. "As the use of CT scans to assess lung disease increases, monitoring ECAC in the appropriate patient group could be extremely valuable to clinicians." ■

E-cigarettes Don't Work as Stop-Smoking Aid

For years, the e-cigarette has been touted as a way to help people quit smoking. But according to researchers from the University of California San Francisco, they aren't getting the job done.

In a meta-analysis of 20 studies that compared smokers who used e-cigarettes as a stop-smoking aid with those who did not use e-cigarettes, they found the odds of quitting smoking were actually 28% lower in smokers who used e-cigarettes versus those who did not. "The irony is that quitting smoking is one of the main reasons both adults and kids use e-cigarettes, but the overall effect is less, not more, quitting," study co-author Stanton A. Glantz, PhD, was quoted as saying. *The Lancet Respiratory Medicine* published the study earlier this year. ■



Flu Puts More Poor People in the Hospital

U.S. researchers who studied influenza-related hospitalizations in 14 states conclude that people living in census tract-level poverty are nearly twice as likely to be hospitalized with the flu as those living in non-poverty census tracts.

The researchers note that the finding held true across all the states in the study, as well as across all age and racial/ethnic groups. People living in poverty areas were also more likely to require intensive care and mechanical ventilation during an admission for influenza. They were less likely to have received an influenza vaccination. The study was published in a recent edition of *Morbidity and Mortality Weekly Report*. ■

Industry Watch

The Joint Commission appoints patient safety officer

The Joint Commission has appointed Ronald M. Wyatt, MD, MHA, to the newly created position of patient safety officer. Dr. Wyatt will continue to serve as the Joint Commission's medical director in the division of health care improvement, a position he has held since joining the organization in 2012. In his added role, he will focus on health care quality and patient safety at both the organizational level and the health care system level. He will also promote quality improvement and patient safety to internal and external stakeholders, and expand the Joint Commission's role as an influencer in public policy and legislation.

OxySure doubles production capacity

OxySure Therapeutics, Inc., maker of emergency oxygen products, reports it has doubled its production. OxySure Production Manager Richard Bryant was quoted as saying, "Through recent investments in infrastructure and additional manufacturing staff, we were able to reduce our current backlog from two months to one month." The company also plans to add additional production capacity by adding some anticipated process changes, as well as further acquisitions of equipment and additional manufacturing staff.

AstraZeneca to move forward with Phase IIa study

Dynavax Technologies Corporation and AstraZeneca have signed an amendment to their existing research collaboration and license agreement under which AstraZeneca will now conduct a Phase IIa safety and efficacy trial of AZD1419 in asthma patients. In a previously reported Phase Ia study of the safety of four weekly doses of AZD1419 compared to placebo in 45 healthy volunteers, ascending doses were well tolerated with no serious adverse events. Additional endpoints assessing pharmacodynamics were met, with dose-dependent induction of interferon-regulated genes in sputum and blood cells.

Benson Medical Instruments reports good results for spirometer

Benson Medical Instruments' CCS-200 Plus Computer Controlled Spirometer received high marks in a recent *Clinician Reports* product review study. Eight health care practitioners who use the CCS-200 Plus in occupational health programs rated the spirometer on six separate criteria, including ease of use, hygiene, and breadth of reports. All of them gave the CCS-200 Plus a solid "A" overall. "We feel confident that we are getting reliable test results for our clients while meeting NIOSH/OSHA requirements," says participant Heather Jackels, LPN. "An added bonus for us is the convenience of a shared client database with our CCA-200mini Audiometer."

EHMD lowers risk for BPD

According to Prolacta Bioscience®, a company that pioneered the development of human milk-based neonatal nutritional products, a study on the benefits of exclusive human milk-based diets (EHMD) was published in *Breastfeeding Medicine*. Investigators found that premature infants weighing less than 1,250 grams at birth who were fed an EHMD showed a significantly lower incidence of bronchopulmonary dysplasia, necrotizing enterocolitis, and mortality, along with a reduction in late-onset sepsis and retinopathy of prematurity. Researchers compared data on more than 1,500 infants from four large centers who received a diet of mother's milk added to a cow milk-based fortifier and/or preterm formula, with those who received an EHMD.

FDA allows Aeolus study to go forward

Aeolus Pharmaceuticals, Inc. has received notice that the FDA has removed the clinical hold on the company's Investigational New Drug application for AEOL 10150 as a treatment for the lung

— 2016 —

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

The AARC'S CORPORATE PARTNERS

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

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

AARC CORPORATE PARTNERS

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Changing lives with every breath

Fisher & Paykel HEALTHCARE

and delayed effects of acute radiation exposure (Lung-ARS). The lifting of the clinical hold will allow the company to initiate its planned human safety study in healthy normal volunteers. There are no current treatments for Lung-ARS.

Breathtec Biomedical announces addition of advisor

Breathtec Biomedical, Inc. has appointed Guy LaTorre as an advisor to assist in ongoing product development and licensing matters for the company's breath analysis devices for the early detection of life-threatening diseases. He brings to the position more than 25 years of experience in the development and commercialization of medical devices and consumer products in a startup company environment. LaTorre will work closely with the University of Florida-based product development team at the Yost Research Group.

Ritesh Patel named to AAFA board

Ritesh Patel, EVP, chief digital officer, U.S., at Ogilvy CommonHealth Worldwide, has been named to the board of directors of the Asthma and Allergy Foundation of America (AAFA). Patel's involvement with the AAFA began at the behest of AAFA Chair Heidi Bayer, who met Patel during his work with the Food Allergy Bloggers Conference and nominated him to become a board member. "This subject is of immense personal and professional interest to me and I look forward to contributing to the AAFA's mission to help those who suffer daily from asthma and allergies," Patel was quoted as saying.

Theravance Biopharma announces enrollment figures

According to Theravance Biopharma, Inc., 50% enrollment has been surpassed in each of the three ongoing clinical trials comprising the company's Phase III program for revefenacin (TD-4208), an investigational long-acting muscarinic antagonist in development for the treatment of COPD. The Phase III program includes two replicate efficacy studies and a single 12-month long-term safety study designed to support the registration of the product in the United States. Theravance Biopharma and its affiliates are partnering with Mylan N.V. and its affiliates on the development and commercialization of nebulized revefenacin products for COPD and other respiratory diseases.

Proteostasis Therapeutics receives Fast Track designation

Proteostasis Therapeutics, Inc. has received FDA Fast Track designation for PTI-428, an investigational oral treatment for cystic fibrosis. PTI-428 is a novel and orally bioavailable cystic fibrosis transmembrane conductance regulator (CFTR) modulator belonging to the amplifier class. Amplifiers are CFTR modulators that selectively increase the amount of an immature form of CFTR protein, thereby providing additional substrate for other CFTR modulators, such as correctors or potentiators, to act upon.

Nu-Med Plus files for patent

Nu-Med Plus, Inc. reports it has filed for a utility patent as a continuation of its provisional patent covering its low-cost nitric oxide delivery technology. The company's Hospital NO Delivery System aims at reducing the high cost of nitric oxide treatment. "The Nu-Med Plus mission is to expand its intellectual property portfolio and protect its low-cost inhaled nitric oxide technology," Nu-Med Plus President and CEO Jeff Robins was quoted as saying. "By continuing the patent process of filing for a utility patent, we will add continuing value to the company and increase our competitive benefit."

RSV vaccine program discontinued

According to Mymetics Corporation, its subsidiary, Bestewil Holding BV, has received notice from RSV Corporation (RSVC) that it will no longer pursue the development of a vaccine technology for respiratory syncytial virus (RSV). "Due to fast evolving market dynamics in the RSV vaccine market, and in particular the development by several major pharma companies of promising candidates already at clinical stage, we have decided to focus our priorities on other areas and therapeutic needs," says George Siber, MD, chief scientific officer of RSVC. "We're very appreciative of the efforts by the Mymetics team to advance the project." ■

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

Industry Update

Featuring information on products and equipment from manufacturers

Food Allergy Alerts

AllerGuarder's Bluetooth-powered wristband and app defense system sends alerts about a child's dangerous food allergies to anyone who has downloaded the free app and comes in contact with the child. The child's identity is fully protected from strangers, but those given special "Trusted Friend" status — relatives, friends, school staff, etc. — receive detailed personal and medical information. Additionally, AllerGuarder provides a pre-programmed message that parents can easily forward to encourage family members, friends, teachers, and coaches to download the free app. www.allerguarder.com

INO Delivery System

A new delivery system and formulation for the generation of inhaled nitric oxide for potential therapeutic use outside the hospital and clinical environment is now available from Nu-Med Plus, Inc. The newly developed system uses the thermal decomposition of a complex compound as the source of nitric oxide. Contemporary research on additional applications involving the therapeutic need for vasodilation and increased delivery of oxygen to diseased and injured tissues is underway. www.nu-medplus.com

Visual Compliance Tool

Monaghan Medical Corporation's new Manometer Adapter for its Aerobika® Oscillating Positive Expiratory Pressure (OPEP) device serves as a visual compliance tool for the Aerobika® OPEP to assist respiratory therapists and patients in assessing respiratory therapy that calls for active exhalation. With the addition of a Manometer Adapter, respiratory therapists, clinicians, and patients can literally see with their own eyes how well the patient is using the device.

Cuff Pressure Controller

Previously available as an option for Hamilton Medical's HAMILTON-G5 ventilator, the innovative IntelliCuff technology now has its own housing in the IntelliCuff® pressure controller. Available for use with all mechanical ventilators, this ergonomic, hand-held device continuously measures and automatically maintains cuff pressure during mechanical ventilation of adults, children, and neonates. It also delivers cost savings and greater efficiency within daily routines, and can be used in ICUs and operating rooms and for inter-hospital transport. www.hamiltonmedical.net

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

Calendar of Events

AARC & State Society Programs

June 1–3

Oak Brook Terrace, Illinois

Illinois Society for Respiratory Care – 48th Conference and Exposition

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

August 3–5

Biloxi, Mississippi

Tristate Respiratory Care Conference

Contact: http://www.tsrcc.net; Raymond Pisani, (985) 518-3346; tristaterespiratorycare@gmail.com

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September 8–9

Verona, New York

36th Annual NYSSRC Symposium

Contact: http://www.nyssrc.org

Submissions for the next available issue are due April 15.

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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From "Inhalation Therapy" to Protocol Driven Care

by Doug Orens, MBA, RRT

After concluding a respiratory care career that spanned four decades, retirement began a new chapter in my life, but I'll never forget my nearly 40 years as a respiratory therapist. They were filled with many rewards, challenges, and educational opportunities. I had the occasion to meet and work with many exceptional people in the health care profession. For my last 32 years, I worked at the Cleveland Clinic in Cleveland, OH. I started there as a staff therapist and retired as the director of respiratory therapy.

about the author...

Doug Orens, MBA, RRT

Changes abound

As I reflect on my years in the profession, I am amazed by how many changes have taken place. When I began my career, respiratory therapists were called "inhalation therapists." In the early 1970s, RTs were thought of primarily as technical members of the health care team. In acute care hospitals, we set up oxygen and performed pulmonary function testing. Therapists also assisted with mechanical ventilation in ICUs, drew and analyzed blood gases, and provided respiratory therapies (such as aerosol therapy). At the time, one of the most prevalent therapies provided by therapists to both acute care patients and outpatients was intermittent positive pressure breathing (IPPB). The overuse and cost to the health care system of IPPB resulted in the Sugarloaf Conference in 1974, which determined a lack of scientific evidence to support the high use of IPPB.[1] Following the reduction in the use of IPPB, our profession began to evolve and grow into the highly technical and clinical practice we know today.

There have been many innovations in both the technical and clinical areas of respiratory therapy. When I look back at my early days in the field, I can see that the equipment was very basic compared to today's advanced technology. Some of the ventilators we used as primary volume ventilators were the MA-1, Emerson Post-op, and Engstrom. The Bird Mark 7 and 9, and PR-I and II were used as pressure ventilators. Today's microprocessor ventilators provide a myriad of modes of ventilation. Monitoring and diagnostic technology allow for rapid determination of patient outcomes, yet there is still a need for respiratory therapists to display their skills at the bedside.

Protocols were a game changer

As we are acutely aware today, evidence-based medicine helps to determine best practices in health care. Protocols represent one example of best practice. These tools have become a fixture in today's delivery of health care and are certainly a part of our profession's landscape. Respiratory therapy protocols apply the delivery of appropriate respiratory care to patients who exhibit symptoms or have a past medical/surgical history requiring care. Respiratory therapists have the opportunity to use their clinical and critical thinking skills when implementing protocols.

One of my most valued accomplishments was being part of the team that developed the respiratory therapy consult service at the Cleveland Clinic.[2] Our team was not the first to implement protocols, but we developed a comprehensive program that allowed us to study and report various outcomes of our program.

A series of algorithms were created for each major therapy to determine the suitable treatment for patients. We formed a triage system to determine the patient's severity level and how frequently they needed therapy based on severity. We modified patient care plans in real time by conducting consult rounds each shift. To ensure quality, we audited current patient care plans to be sure they were appropriate.

It was quite rewarding to watch this service grow and become part of the culture of providing care at the Cleveland Clinic. I will always have fond memories of being part of their respiratory therapy team. ■

REFERENCES

1. Pierce AK, Saltzman HA, Eds. Conference on the scientific basis of respiratory therapy. Am Rev Respir Dis 1974;110(6 Pt 2):1-204.
2. Stoller JK, Haney D, Burkhart J, et al. Early experience with a respiratory therapy consult service at the Cleveland Clinic Foundation. Respir Care 1993;38(11):1143-1154.

Retirement has given AARC member Doug Orens more time to spend with his four grandchildren, Bently, Brady, Branden, and Emma Wells.

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