An Official Publication of the American Association for Respiratory Care
March 2016 Vol. 40, Issue 3 www.aarc.org $11.50

AARC Times

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– Leonard Nimoy's Final Mission Helps COPD Community

Dave Burnett, PhD, RRT, presented his Editor's Choice abstract at the AARC Congress Open Forum 2015.

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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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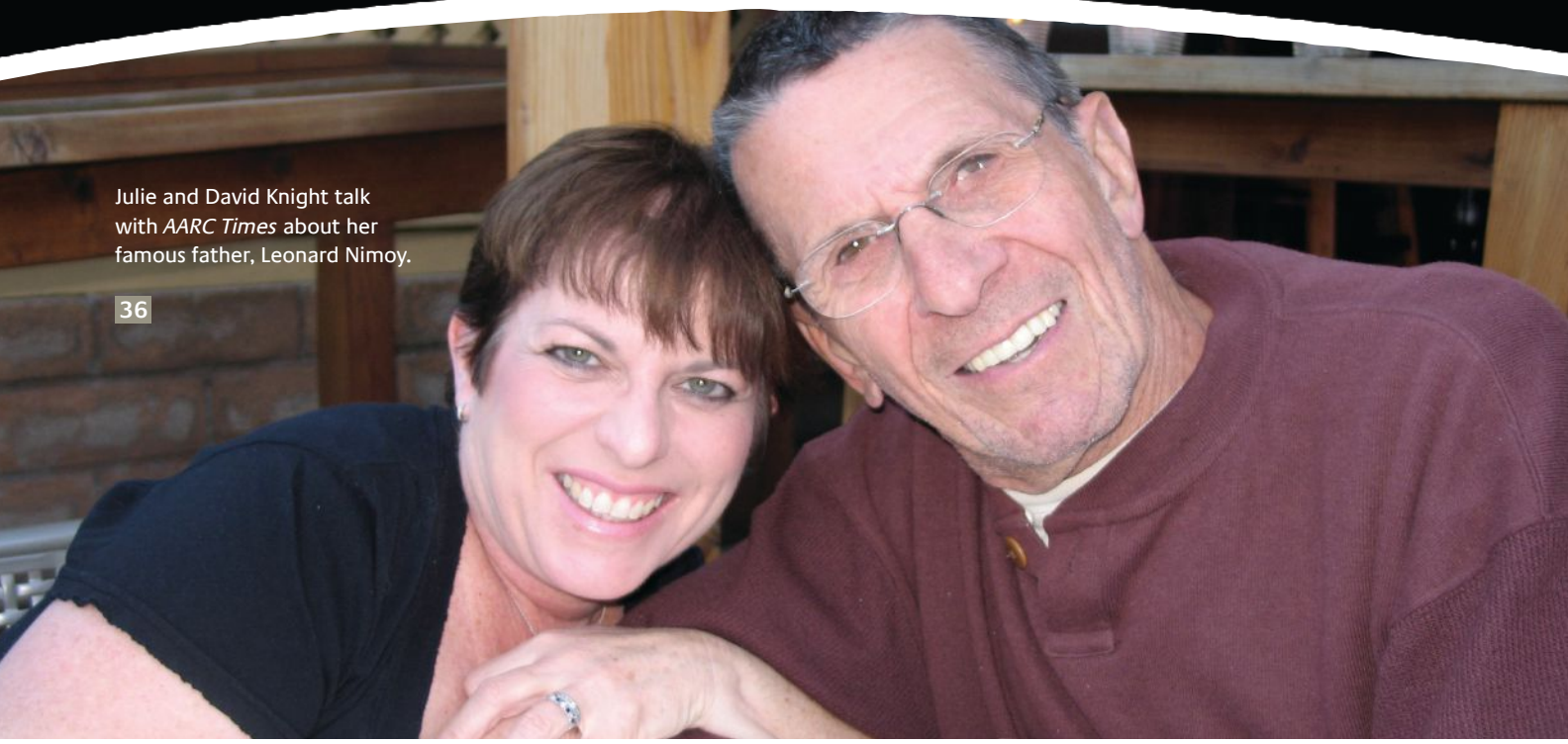

Julie and David Knight talk with *AARC Times* about her famous father, Leonard Nimoy.

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AARC Strategic Plan

The American Association for Respiratory Care has a Strategic Plan that includes its Mission and Vision Statements for 2015-2020.

Bookmark this page: http://www.aarc.org/member_services/mission/.

American Association for Respiratory Care

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AARC Times and Respiratory Care — official publications of the AARC

Daedalus Enterprises, Inc.
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Printed in USA

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

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

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Translating Clinical Practice Guidelines into Practice

by Shawna Strickland, PhD, RRT-NPS, FAARC

What is a CPG

Respiratory therapists are a vital part of the healthcare team and, as such, are involved in clinical decision-making on a regular basis. Many factors influence the direction of patient care: the patient's diagnosis, co-morbid conditions, allergies, availability of equipment, availability of experts, and availability of evidence to support interventions to maximize effectiveness. Finding the evidence to support or reject a proposed intervention can be time consuming and difficult, and, once the evidence is discovered, it might not have practical bedside application. Clinical Practice Guidelines (CPGs) can not only assist in reducing time spent searching for evidence but can also provide practical guidance to direct patient care by addressing a specific patient care problem or question. However, clinical practice guidelines are not used for patient care decisions as often as one would think.

about the author...

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

Types of CPGs

There are two broad types of clinical practice guidelines: reference-based and evidence-based. Reference-based CPGs use the literature as a reference and provide recommendations that are largely developed by consensus of a panel of experts. Evidence-based CPGs attempt to eliminate bias by evaluating the strength of the evidence found in the literature while also integrating individual clinical expertise and patient values. While reference-based CPGs are valid and useful, it should be noted that CPGs with recommendations based on scientific evidence are more likely to be implemented than those based on consensus.[1]

How to make sense of a CPG

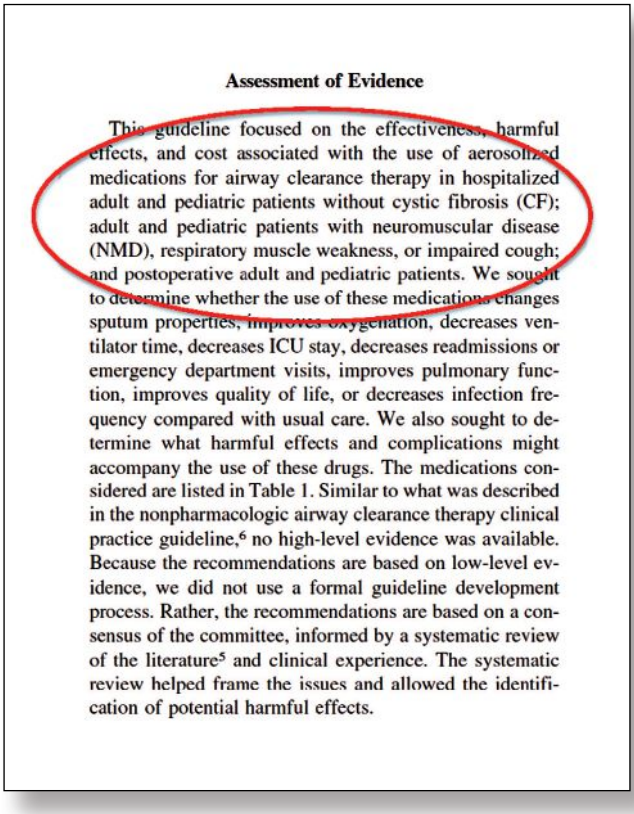
The clinician seeks out a CPG because he/she is trying to determine which patient care intervention is going to be most effective and beneficial to the patient. But how do respiratory therapists take the CPG and translate it into something useful at the bedside? CPGs typically address a specific diagnostic and/or therapeutic question or problem within a specific patient population.

The first aspect for the clinician to determine is the patient population addressed in the CPG. For example, the 2015 AARC CPG "Effectiveness of Pharmacologic Airway Clearance Therapies in Hospitalized Patients" evaluated three different types of hospitalized patients: adult and pediatric patients without cystic fibrosis; adult and pediatric patients with neuromuscular disease, respiratory muscle weakness, or impaired cough; and postoperative adult and pediatric patients.[2] The population is clearly identified to help the clinician decide if the recommendations are relevant to his/her patient (see Figure 1).

The next aspect of the CPG to identify is the intervention. What diagnostic and/or therapeutic intervention was evaluated? In the previously mentioned CPG, the interventions were aerosolized medications used for the purpose of airway clearance as compared to usual care. This means that the evidence evaluated included studies that determined whether or not aerosolizing various airway clearance agents — beta agonists, anticholinergics, mucoactive drugs, and other novel therapies — were more effective than the standard care provided to these patients. Now respiratory therapists can evaluate their options for this patient to select the most useful therapy (see Figure 2).

Next, what outcome measures were evaluated? If using this specific therapy for this specific patient, what benefits, if any, should we expect to see? This is exceptionally useful when talking to the family about diagnostic or therapeutic intervention options and in the determination of

Figure 1



Assessment of Evidence

This guideline focused on the effectiveness, harmful effects, and cost associated with the use of aerosolized medications for airway clearance therapy in hospitalized adult and pediatric patients without cystic fibrosis (CF); adult and pediatric patients with neuromuscular disease (NMD), respiratory muscle weakness, or impaired cough; and postoperative adult and pediatric patients. We sought to determine whether the use of these medications changes sputum properties, improves oxygenation, decreases ventilator time, decreases ICU stay, decreases readmissions or emergency department visits, improves pulmonary function, improves quality of life, or decreases infection frequency compared with usual care. We also sought to determine what harmful effects and complications might accompany the use of these drugs. The medications considered are listed in Table 1. Similar to what was described in the nonpharmacologic airway clearance therapy clinical practice guideline,[6] no high-level evidence was available. Because the recommendations are based on low-level evidence, we did not use a formal guideline development process. Rather, the recommendations are based on a consensus of the committee, informed by a systematic review of the literature[5] and clinical experience. The systematic review helped frame the issues and allowed the identification of potential harmful effects.

Figure 3

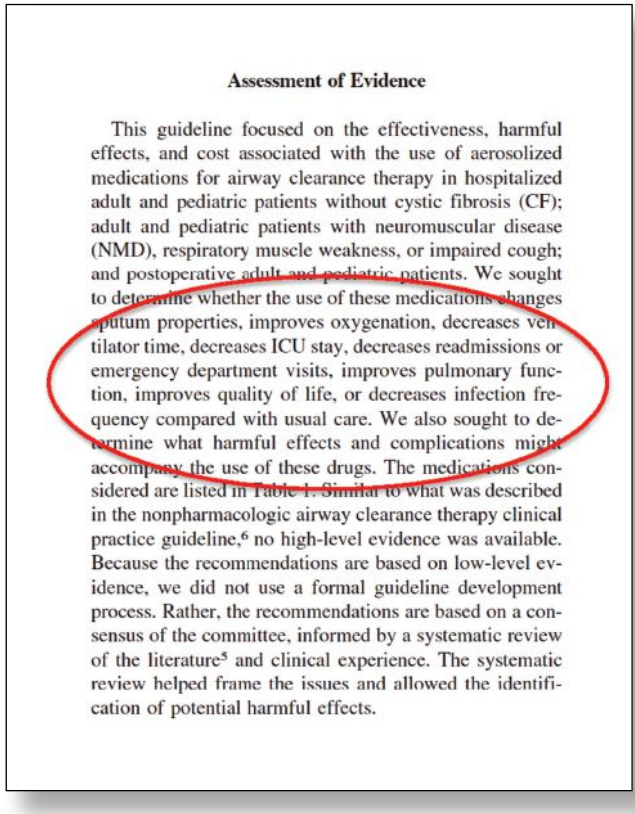


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Figure 2

Table 1. Pharmacologic Airway Clearance Agents Included in This Systematic Review

β Agonists	Anticholinergics	Mucoactive Drugs	Novel Therapies
Albuterol sulfate	Ipratropium bromide	N-Acetylcysteine	Inhaled heparin
Salbutamol	Oxitropium bromide	Dornase alfa	Inhaled heparin + N-acetylcysteine (burn cocktail)
Pirbuterol	Glycopyrrolate	Sodium bicarbonate	Albuterol + N-acetylcysteine
Levalbuterol	Tiotropium bromide	Guaifenesin	Inhaled tissue plasminogen activator
Salmeterol		Mannitol	
Formoterol		Hypertonic saline	
		Normal saline	

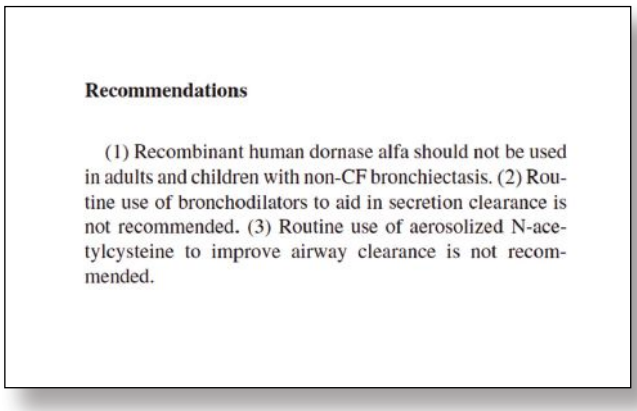
the benefits-burdens ratio. The 2015 AARC CPG looked at outcome measures such as changes in sputum properties, decreased ICU length of stay, decreased readmissions, improved pulmonary functions, and improved quality of life (see Figure 3).

Last, the clinician should read the specific recommendations to determine whether or not this intervention is recommended for this patient population. The recommendations are based not only on the strengths of evidence regarding effectiveness but also on a harms analysis. The evidence may show, for example, that an intervention has a small benefit to the patient but the harms data may show a significant amount of harm. The benefit-burden ratio may swing dramatically toward too much burden or harm for the patient and the intervention would then not be recommended. The 2015 AARC CPG found that there is no evidence to support the routine use of aerosolized N-acetylcysteine to improve airway clearance in hospitalized adult and pediatric patients without cystic fibrosis and the side effects of this intervention are not unsubstantial. Therefore, this use is not recommended (see Figure 4).

How CPGs influence practice

Why aren't CPGs used more often? Some researchers have found that lack of awareness, complex recommendations, lack of confidence that the clinician can perform the recommendation, lack of motivation (old habits die

Figure 4



Recommendations

(1) Recombinant human dornase alfa should not be used in adults and children with non-CF bronchiectasis. (2) Routine use of bronchodilators to aid in secretion clearance is not recommended. (3) Routine use of aerosolized N-acetylcysteine to improve airway clearance is not recommended.

hard), overall trust in the development of the guideline, and lack of alignment with patient values impedes implementation of CPG recommendations.[3,4] RTs are integral in the patient care decision-making process and therefore have a duty to ensure that the diagnostic and therapeutic interventions proposed for patient care are supported by evidence and do not impose an undue burden on the patient. The RT can provide assistance in the decision-making process by understanding relevant CPGs and providing the recommendations to the healthcare team to ensure safe and effective patient care.

References

1. Grol R, Dalhuijsen J, Thomas S, et al. Attributes of clinical guidelines that influence the use of guidelines in general practice: An observational study. BMJ 1998;317(7162):858-861.
2. Strickland SL, Rubin BK, Haas CF, et al. AARC clinical practice guideline: effectiveness of pharmacologic airway clearance therapies in hospitalized patients. Respir Care 2015;60(7):1071-1077.
3. Terasaki J, Singh G, Zhang W, et al. Using EMR to improve compliance with clinical practice guidelines for management of stable COPD. Respir Med 2015;109(11):1423-1429.
4. Cabana MD, Rand CS, Powe NR, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. JAMA 1999;282(15):1458-1465.

Criminal? Seriously? A Hypothetical Example

by Anthony L. DeWitt, JD, RRT, FAARC

Daryl had been plagued with guilt for months. He'd made a stupid mistake. He'd done his best to cover it up. He'd altered the ventilator logs and managed to remove the physician's order page from the records in the minutes after the patient's death. He'd heard rumblings that the local police had been investigating the patient's death, but he was pretty sure he was in the clear, or at least, that he couldn't have been clearly implicated. And it wasn't like he'd tried to kill the old guy. It was a mistake, nothing more. He felt awful, but the ship had sailed.

Things had been going great until the department head asked him to meet him in Human Resources. His heart rate had jumped to over 100, but he was breathing deeply and calming himself. He hadn't tried to hurt anyone. He could admit an error if he had to.

He nearly fainted when he saw the police investigator there. The investigator told Daryl he could get a lawyer if he wanted. Daryl said he had "nothing to hide" and the investigator got right to the point. "Were you aware that Mr. Smith had an order to be put back on the ventilator at 2100?"

Daryl felt his heart race. *How could they know that?* "Uh, I, uh, I don't remember seeing one." It was a lie, but he hadn't been prepared for the question.

The investigator pulled out a copy of the order page that Daryl had removed from the record. "You didn't see this?"

Daryl shook his head violently, as his hands began to shake. "No, never." Daryl likely didn't know that investigators are trained to look for absolutes as signs of mendacity.

The investigator explained that the ward clerk sometimes faxed doctor's orders to sign off on. The physician had a copy of the order. The questions that followed focused on the fact that Daryl had followed the order three times previously. Then the investigator noted how many people had seen Daryl going through the records the night of the patient's death. Daryl stopped answering questions and asked for a lawyer.

"We'll call you one from the jail," the investigator replied.

about the author…

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

Just like there are degrees of white ranging from ivory to bright white, there are degrees of negligence ranging from simple to gross and criminal. The types of negligence are not easy to define, but can be generally defined in the following ways.

Simple negligence is an omission of a duty to act with reasonable care. Failing to take a pulse after giving a bronchodilator might be simple negligence. It is rare that a patient has an adverse reaction, and sometimes even the best of people, in a rush to get things done, take shortcuts.

Gross negligence is the omission of a duty under circumstances that indicate no reasonable person would omit that duty. Failing to auscultate breath sounds on an intubated ventilator patient would be gross negligence because tube slippage, pneumothorax, mucous plugging, and other complications of routine ventilator care create a serious risk of physical harm to the patient. The risks and dangers are too significant, and every therapist understands that airway and breathing are the first two letters of the ABCs of basic life support.

Criminal negligence is a special form of gross negligence. Oregon defines criminal negligence this way:

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Criminal negligence or criminally negligent, when used with respect to a result or to a circumstance described by a statute defining an offense, means that a person fails to be aware of a substantial and unjustifiable risk that the result will occur or that the circumstance exists. The risk must be of such nature and degree that the failure to be aware of it constitutes a gross deviation from the standard of care that a reasonable person would observe in the situation. O.R.S. 161.085 (2015)

In other words, the person who is criminally negligent either is unaware of the risk their behavior creates (for example, not knowing that putting a ventilator patient back on the ventilator might cause death) or they are not aware of the circumstances (for example, the therapist is unaware of a physician's order but would have been if he had checked the chart).

Criminal negligence is normally reserved for those situations where a patient's life or health is seriously impacted and where accountability is necessary to serve as an example or to protect the public. No one is normally criminally negligent for failing to check a pulse unless the failure to do so is unreasonable and creates a serious risk of patient harm.

The case law is filled with examples of clinicians who exhibited gross or criminal negligence. In one case, an anesthesiologist fell asleep during surgery and the patient suffered anoxic brain injury. He was criminally charged. In a case out of California, a therapist continued to chart breath sounds and pulse rates on a patient who had been declared dead hours before. She was cited for gross negligence and her license was disciplined.

Gross negligence is not easy to define, but it's evident when you see it.For example,sleeping through ventilator rounds, or failing to do therapy on a critical asthmatic. Each of these in the right circumstances might equate to gross negligence.

In a perfect world, no one reading this magazine would ever find themselves in a situation where someone suggests they were grossly negligent. But if it happens, the first thing you need is a long honest conversation with your attorney and with no one else. You do not talk to your wife, your department head, your counselor, or anyone else before you speak to an attorney.

It is natural when a person dies to seek out someone to blame. Sometimes that blame is properly apportioned, and sometimes it is not. In Missouri, two therapists were charged with disciplinary offenses for failing to carry out the orders of a physician to put a patient back on a mechanical ventilator at night. One therapist did not contest the charges and lost his license. Another fought (albeit without a lawyer) and prevailed in front of the administrative law judge. Unless you've had the opportunity to visit with an attorney about the circumstances, it is never wise to make a public statement or to allow yourself to be interviewed by police or hospital personnel, no matter how helpful they promise to be. Jail is a very bad place to practice respiratory care. ■

What the AARC Accomplished for Our Profession in 2015 (In Case You Missed It)

by Thomas J. Kallstrom, MBA, RRT, FAARC

What did the AARC do for our profession in 2015? Great question and it deserves a well thought out response. To do this, we should look back on 2015 and early 2016 and review some important and critical initiatives in which the AARC took a leadership role.

Moving the profession forward: 80% by 2020

At the summer board meeting in Phoenix in 2015 the AARC Board of Directors (BOD) took action to move the profession forward, as momentum builds on strategic goals and professional direction projects. Revising its former goal for bachelor's degrees held by respiratory therapists, the BOD made a bolder statement, aspiring that 80% of practicing respiratory therapists will have earned or will be actively working on a bachelor's degree by 2020. The 2014 AARC Human Resource Survey showed that 65% of RTs have a bachelor's degree. To assure the profession is on track to meet the 80% goal, an interim human resource survey will be done in mid 2017 (the half-way mark from 2015 to 2020) to analyze progress.

about the author...

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

Position statement impacting entry to practice

At the fall 2015 AARC BOD meeting, the board approved another bold statement that again will push the envelope in education regarding expectation that: *Training and education for entry to practice as a respiratory therapist should be provided within programs awarding a bachelor's or master's degree in respiratory care (or equivalent degree titles) and all newly accredited respiratory care educational programs must award, as a minimum, the bachelor's degree in respiratory care (or equivalent degree title). Associate degree respiratory care programs currently accredited by the Commission on Accreditation for Respiratory Care (CoARC) should be allowed to continue in good standing as long as they remain in compliance with all other CoARC policies and standards. The AARC supports existing and future articulation agreements between associate and baccalaureate respiratory therapy programs. Respiratory therapists seeking to practice in advanced clinical settings, leadership roles, research, and in professional educator roles should seek higher education at the master's or doctoral levels.*

Partnering with NBRC

The AARC and the National Board for Respiratory Care (NBRC) partnered to make credential renewals an easier process easier than ever before. Although there are several ways to renew NBRC credentials, AARC members will now find the easiest way to renew their credentials is by submitting a minimum number of Continuing Respiratory Care Education AARC CRCE® credits to the NBRC.

By taking and completing AARC CRCE® credit courses, which will automatically build an AARC transcript, AARC members can enter their AARC member number into the NBRC Continuing Competency Program renewal website, which will then import their AARC CRCE® transcript into the NBRC's database. NBRC's database then displays all of the courses, completion dates, and course hours on the NBRC website and shows the number of hours completed and number of hours outstanding to renew the credential. If the respiratory therapist needs to renew more than one credential, the CRCE® courses will be separated by the different credential content categories. This is a positive action what will save

time and effort on behalf of members wishing to take advantage of an easier way to get this done.

Patient advocacy summit 2015

AARC leadership gathered with representatives from patient advocacy groups and patients for a patient advocacy summit on how to best address issues most important to people with chronic respiratory diseases. The summit benefited from participation of the COPD Foundation, U.S. COPD Coalition, and Allergy & Asthma Network featured speakers who addressed key areas of concern for patients and professionals alike.

Valerie Chang, JD, a former judge in Hawaii and founder of the Hawaii COPD Coalition, spoke to the group about her own journey with the disease. Diagnosed with severe emphysema 15 years ago, she found herself too short of breath to do many of the things she once loved. Joseph Lewarski, BS, RRT, FAARC, discussed the importance of the patient-RT partnership in his talk, urging therapists to take their advocacy beyond the bedside by volunteering to be a subject matter expert to a patient advocacy group. Lewarski also stressed the need for patients to speak up for themselves and ask questions of their health care providers. Based on the successful summit, we are planning to do another in San Antonio before our 2016 International Congress.

Leonard Nimoy documentary

In 2015 the AARC worked with the Leonard Nimoy family in a clinical advisory capacity on a film that they will complete and release in 2016 titled, "COPD: Highly Illogical — A Special Tribute to Leonard Nimoy." This documentary aims to educate viewers about COPD through Leonard's and others' personal stories of courage, as well as provide the latest information about treatments and the quest for a cure. You can learn more about this film and how to support the filmmakers at http://copdllap.com/.

The AARC International Congress last November was the venue of the first presentation of the trailer for "COPD: Highly Illogical – A Special Tribute to Leonard Nimoy." We are grateful that the Nimoy family reached out to us, and we look forward to a film that will make the general public more aware of COPD as well as the role of the respiratory therapist.

Helping entrepreneurial members

Respiratory therapists are well known as innovators and entrepreneurs when it comes to concepts or devices that make patient care more efficient. In 2015, the AARC partnered with Edison Nation Medical. This was an opportunity for members who have a concept or an invention to get it patented and then take it to market. There were many members that took advantage of this, and we look forward to hearing about some of the outcomes of their efforts.

Continuing education

In 2015, the AARC debuted our Pulmonary Disease Educator course. Held in Arlington, VA, in the spring and in Dallas, TX, in the fall. This multidisciplinary course allowed participants to explore the necessary pulmonary disease management information that health care providers need to improve long-term pulmonary disease care and patient quality of life.

The course will be held again on March 19-20, 2016 at Rush University. In addition to this live course, the AARC released several new courses in 2016 focused on pulmonary diagnostics and tobacco cessation. They include a neonatal-pediatric specialist course, a pediatric congenital heart defect course, and new courses in sleep medicine. The AARC held 24 live webcasts in 2015 covering a variety of topics, including the 2015 American Heart Association updates, neonatal ventilation, asthma, disaster planning, and palliative care. Over 9,000 CRCE credits were earned in 2015 from this live, free member benefit.

Telehealth

The AARC realizes that one of the areas that we can make a difference in is telehealth. As such, we have gone on record in 2015 to support H.R. 2948, the Medicare Telehealth Parity Act, which was introduced in July 2015. This bill specifically calls out the respiratory therapist as a professional who should be recognized as a professional who can and should provide this service.

The AARC and our PACT representatives from the state affiliates, our association partners, our patients, and the BOD will be front and center in early April 2016 in Washington, DC, as we walk the halls of Congress trying to get this bill moved into law. This is another example of how the AARC seeks to position the respiratory care profession beyond the walls of the hospital in the years to come.

AARC toolkit to position the RT in the physician practice

The AARC realizes it's important that respiratory therapists get some help in better understanding the ever-changing landscape. Thus, we put together a guide that we feel will be most helpful for respiratory therapists that expands their role into the physician's office. The guide is called the "Toolkit for Respiratory Therapists: Marketing Yourself to the Physician Practice 2016."

This is particularly exciting because over the past year Medicare has launched reimbursement programs that allow more expanded services of the respiratory therapist post discharge. The guide lays out in clear step-by-step fashion the concept of Transitional Care Management (TCM) Services and the Chronic Quality Reporting System, both of which respiratory therapists can enhance their role as disease managers in physician practices. I would encourage you to read this document and let it guide you if you choose to take advantage of this opportunity. We hope to see the number of respiratory therapists working in physician's practices grow in the years to come.

CDC/AARC partnering in 2016 with the TIPS campaign

In late 2015 the Centers for Disease Control (CDC) reached out to the AARC, asking us to partner with them in the 2016 Tips from Former Smokers (TIPS) campaign. This will be a great opportunity to position the experience and vast exposure respiratory therapists have with patients and families who need to hear this important message. It will also allow more exposure in a national campaign, which will call out the AARC and respiratory care profession. In its first year, the campaign motivated 1.6 million smokers to attempt to quit. You will hear more about this in the coming months.

CDC Strategic National Stockpile ventilator workshops 2016

The CDC contacted the AARC to deliver three Strategic National Stockpile ventilator workshops in 2016. The four confirmed sites are:

- North Regional Respiratory Care conference in Wisconsin/Minnesota in April 2016
- California Society for Respiratory Care conference in June 2016
- Ohio Society for Respiratory Care conference in July 2016
- Tri-State Respiratory Conference in Arkansas/Louisiana/Mississippi in August 2016

A busy year ahead

These are just a few examples of how the AARC is pushing the profession forward. Times are changing, and the AARC will continue to drive the profession in the coming years. ■

AARC CALLS FOR A SHIFT TO RT BACHELOR'S DEGREE PROGRAMS

Respiratory care is quickly evolving from a profession based on the provision of individual components of care to one encompassing the higher order thinking skills needed to manage chronic respiratory disease patients across the continuum of care.

To ensure the workforce is adequately prepared to meet the challenges it will face in terms of protocol-driven care and disease management, the AARC has issued a new Respiratory Therapy Education Position Statement outlining the educational requirements these changes will require (http://www.aarc.org/aarc-calls-for-a-shift-to-rt-bachelors-degree-programs/).

Specifically, the Association is calling for all new respiratory care educational programs to award, at a minimum, a bachelor's degree in respiratory care. In the following interview AARC President Frank Salvatore, MBA, RRT, FAARC, and Education Section Chair Ellen Becker, PhD, RRT-NPS, FAARC, offer their perspectives on the move.

Q

Why did the Association decide to call for all new RT programs to be at the baccalaureate or above level? How will this help move the profession forward?

A

Frank Salvatore: The time has come for our profession to advance its educational level in order to practice respiratory therapy. Every profession that is in health care has come to the point where they're advocating advanced degrees for entry into and continuation for practice. Look at nursing, which has been advocating for a bachelor's degree for many in practice today.

For respiratory therapy, the natural first step is to begin the transformation for entry into the profession. The AARC must be the organization that drives this change and our creation of this position statement will do that. We're faced with situations in the states where legislatures and/or education departments are demanding less credit hours at the associate's level. Respiratory therapists today need more clinical time in order to fully learn the advanced technologies we work with today, not less time.

A bachelor's degree entry allows new therapists to have not only that extra didactic time, but even more clinical time in order to hone their skills as a student to be better prepared for what will be demanded of them at the bedside.

Ellen Becker: Educators can no longer teach the increased number of required RT competencies in a two-year respiratory care program. Further, there is evidence from the nursing literature that patient care improves when there are greater numbers of nursing staff with baccalaureate preparation.[1-5]

Also, therapists who wish to pursue education, leadership, or research are much closer to earning a graduate degree if they enter with a baccalaureate degree. Well-educated therapists, who provide excellent patient care, and strong leaders with graduate degrees, are needed to move the profession forward.

Q

What does this mean for the average RT out there today who holds the AS degree in respiratory care?

A

Frank Salvatore: Those RTs who are currently practicing have nothing to fear about their ability to perform in their current job roles. They've met today's standards to graduate, enter into the profession, and hold a license. They're already in the profession, and that won't change.

As the president of a professional organization promoting the advancement of the profession, I'd be remiss though if I didn't throw in a comment on post-graduate

education. Too many of our peers rely on inservices and conferences as their source of continued education. There is much to be said for advancing oneself through an additional degree.

For those who currently have an associate's degree, I would strongly suggest if a person's life situation will allow, an advancement in one's degree. Having a bachelor's degree or higher can offer a person more latitude for advancement.

I had my bachelor's degree and realized that in order to move further into management, I needed to have a master's degree. So you can see that stopping at whatever degree you had coming out of school may limit your possible future advancement.

The AARC Board of Directors is not only advocating for a bachelor's degree entry into the professional practice, but if you look at another statement we put out in July of 2015, we're also looking for those within the profession currently to take up the charge to advance their education as well.

Ellen Becker: I began my career with an AAS degree in respiratory therapy and noticed early on how people who advanced in the profession had a minimum of a baccalaureate degree. Times have changed and more RTs will be entering the profession with baccalaureate degrees.

The RTs without a baccalaureate degree should start exploring degree advancement options now not only to improve their patient care skills, but also to remain competitive in the job market. Fortunately, the AARC has several resources to help you get started (http://www.aarc.org/careers/respiratory_therapy_degree_advancement/).

References

1. McHugh MD, Kelly LA, Smith HL, et al. Lower mortality in magnet hospitals. Med Care 2013;51(5):382-388.
2. Aiken LH, Clarke SP, Cheung RB, et al. Educational levels of hospital nurses and surgical patient mortality. JAMA 2003;290(12):1617-1623.
3. Friese CR, Lake ET, Aiken LH, et al. Hospital nurse practice environments and outcomes for surgical oncology patients. Health Serv Res 2008;43(4):1145-1163.
4. Estabrooks CA, Midodzi WK, Cummings GG, et al. The impact of hospital nursing characteristics on 30-day mortality. Nurs Res 2005;54(2):74-84.
5. Tourangeau AE, Doran DM, McGillis Hall L, et al. Impact of hospital nursing care on 30-day mortality for acute medical patients. J Adv Nurs 2007;57(1):32-44.

Q

What does it mean for students in current AS degree programs?

A

Frank Salvatore: Students currently in associate degree programs should not be thinking about stopping their education post-graduation. It is a good idea to obtain both the CRT and RRT credentials, find a job, and then once in that job, start to establish themselves as a clinician. Once that is in place, I'd highly recommend that the RT begin looking at future possibilities and education soon after. The longer you wait, sometimes the harder it is to get back into school mode.

Ellen Becker: Students who are enrolled in AS degree programs will have a wonderful start to their careers. However, it will be critical for AS degree-holding RT graduates to begin exploring degree advancement options early in order to maximize the quality of care they provide to their patients, fulfill their potential as respiratory therapists, and be competitive in the job market throughout their careers. Start by asking your program director about local degree advancement options. Also, speak with prospective employers about employee benefit programs to assist degree advancement. Check the Careers section of the AARC website for additional resources (http://www.aarc.org/careers/). ■

AARC Summer forum

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- **Learn new advancements** from the classroom to the board room

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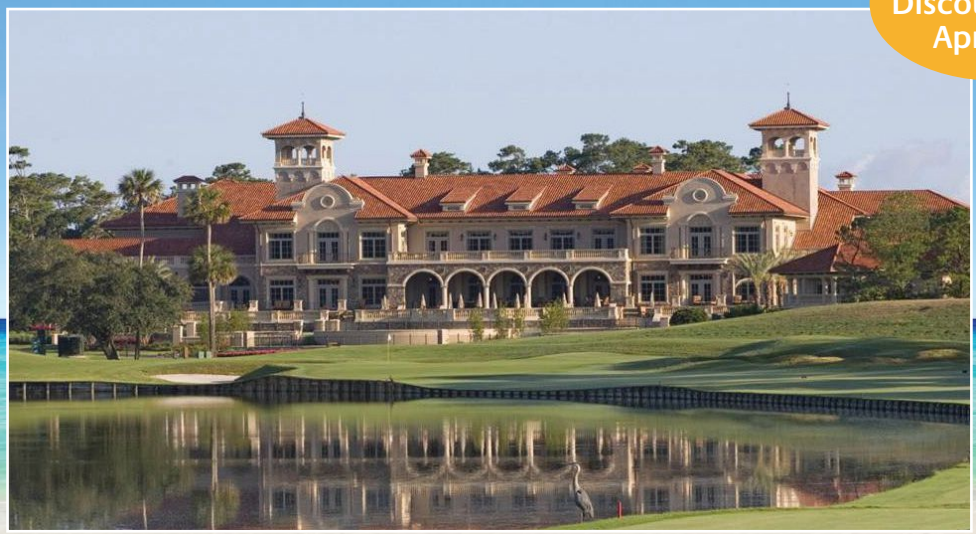

Formulating a Research Question

by Jeffrey M. Haynes, RRT, RPFT, FAARC

Lord Kelvin famously said, "When you can measure what you are speaking about, and express it in numbers, you know something about it; when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind." Because robust randomized controlled trials (RCTs) are not available for every therapeutic intervention, clinicians must sometimes rely on ideas that "sound right and make sense." However, very often, what "sounds right and makes sense" turns out to be wrong. Indeed, over the past several decades, evidenced-based medicine has radically changed the practice of respiratory care. High-volume, eucapnia-targeted ventilation for acute respiratory distress syndrome (ARDS), prolonged deep sedation during mechanical ventilation, and iatrogenic hyperoxemia for acute myocardial infarction are glaring examples of not-so-crazy ideas that we now recognize as harmful.[1-3] This article will review the first step required for impactful research: formulating the research study question.

What should I study?

Research should not be conducted for the sake of doing research. An eloquent study design, which produces results that add nothing to the collective knowledge, is a meaningless exercise. If you ask an irrelevant question, expect to get an irrelevant answer. For example, a statistical exercise in the 1930s found nearly perfect correlation between the stork and human populations in Oldenburg, Germany. One author commented, "Anyone who draws the incorrect conclusion that storks bring babies and proceeds to shoot storks in the hopes of reducing the population will be disappointed!"[4-5] Moreover, it is just as meaningless to repeat research of a question that has already been definitively answered. A good example of a redundant research question is the effect of nail polish on pulse oximetry. This question has been definitively answered many times; however, authors still submit papers to journals on the topic. While such a study may be attractive to an investigator because it is a simple, inexpensive, and low-risk experiment, nothing new is likely to be learned.

An important question can be a novel concept or the continuation of previously published research. There are plenty of areas in respiratory care that need to undergo scientific scrutiny and RT researchers should be at the forefront of evidence-based respiratory care. Bench studies of new ventilators and other devices are important research foci that directly affect the practice of RTs. In addition, testing whether the latest respiratory therapy gadget affects patient outcomes allows clinicians to avoid wasting time and resources on ineffective therapies. RT protocols, PFT quality, patient safety, oxygen therapy and ventilator care are just a few examples of research foci where RTs should be leading the way.

Understanding limitations

Unfortunately, some important questions cannot be answered because of cost, logistics, and ethical considerations. Cost and logistical issues can be in part answered by a statistical technique called power analysis.

Power analysis indicates how many subjects need to be enrolled in a study to answer the research question. The number of subjects should not be a random guess. If you enroll too many subjects, a type I error may occur. A type I error means that there isn't a true difference between study groups; however, the large sample shows statistical significance due to sampling variability. If you enroll too few subjects, a type II error may occur. A type II error means that a true difference between study groups exists; however, the sample is too small to detect the difference. The standard power level is 80%. This means that if a true difference between study groups exists and the variability of each group is similar, repeating your study with the same number of subjects would demonstrate a statistically significant difference (the truth) 80% of the time.

Many years ago, the practice in my hospital was to apply a cool aerosol to patients after extubation. The goal of this practice was to reduce the incidence of post-extubation stridor and hoarseness. I felt that this was practice was unnecessary and set out to study the incidence of post-extubation stridor and hoarseness in extubated patients receiving a cool aerosol versus oxygen via nasal cannula. However, this study idea was quickly abandoned on the basis of practicality after power analysis indicated that I'd need approximately 5,000 subjects in each group. Consultation with someone knowledgeable in biostatistics before moving forward with a study idea is highly recommended.

Some important research questions cannot be answered because of ethical considerations. For example, a rescue therapy for patients at risk for imminent death will never undergo a prospective RCT because it would be unethical to assign a subject to a control group.

Anyone conducting research that involves human subjects or their records should complete a course on the ethics of human research. The National Institutes of Health offers a free course on their website: https://phrp.nihtraining.com/users/login.php. Most clinicians are familiar with historical examples of egregious acts of unethical medical research (e.g., the Tuskegee syphilis study); however, there are much subtler acts that can violate a human subject's rights. All research involving human subjects or their records must be reviewed and approved by an institutional review board. Researchers with an incomplete understanding of subject's rights can unwittingly cause harm, act unethically and even violate laws.

Research can be performed anywhere

Lastly, don't feel that research can only be performed at prestigious academic centers. Important research questions can be answered in smaller, non-academic institutions. The key is to habitually read peer-reviewed studies in your area of interest, learn how to properly perform research, and propose projects that can be safely and successfully completed in your institution. ■

Disclosure: Jeffrey M. Haynes is a consultant for Morgan Scientific Inc., Haverhill, MA.

References

1. The Acute Respiratory Distress Syndrome Network. Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and the acute respiratory distress syndrome. N Engl J Med 2000;342(18):1301-1308.
2. Pandharipande P, Shintani A, Peterson J, et al. Lorazepam is an independent risk factor for transitioning to delirium in intensive care unit patients. Anesthesiology 2006;104(1):21-26.
3. Stub D, Smith K, Bernard S, et al. Air versus oxygen in ST-segment-elevation myocardial infarction. Circulation 2015;131(24):2143-2150.
4. Hunter WG. Six statistical tales. The Statistician 1981;30(2):107-117.
5. Mould RF. Introductory medical statistics. Philadelphia: Institute of Physics Publishing; 1998:182

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Presenting an Open Forum Abstract

Research fosters inquiry, investigation, and innovation, which often results in the discovery of new technology, equipment, and advances in clinical care. Research is one of the principal pillars of academic medicine and the respiratory care profession. It provides the catalyst to advance medical science and improve the health and quality of life for the patients we serve. This structured process provides a mechanism for respiratory therapists to test new ideas, investigate practices, and evaluate equipment and technology, as well as develop and refine processes to improve clinical outcomes.

Overview of the Open Forum

The AARC Congress provides several sessions, or Open Forum symposia, in which clinicians, students, educators, and managers share their research. The idea to provide a forum where respiratory care–related research could be presented and discussed was conceived more than 40 years ago. Seven abstracts were presented at the first Open Forum symposia, held at the 1973 annual convention of what was then named the American Association for Respiratory Therapy.[1,2] As shown in Figure 1, the number of abstracts accepted for presentation have grown exponentially over the years. Today, research presented at the AARC Congress can be divided into three broad categories: original research, case reports, and method or device evaluations. For the 2015 Congress, 12 Open Forum sessions, one editor's choice symposium, and two poster sessions provided a venue for investigators to present their work.

Abstracts accepted for presentation in one of the aforementioned venues reflect respiratory care practice across the continuum of care — from transport and pre-hospital, to acute and critical care, to home care, rehabilitation, and long-term care. Open Forum and Poster Only presentations are grouped by specialty or area of practice (see Table 1). The mechanical ventilation grouping had quite a few abstracts accepted for presentation in the Open Forum. Therefore, three different sessions were dedicated to abstracts pertaining to mechanical ventilation to accommodate all of the presentations.

Table 1. Breakdown of the Open Forum Sessions conducted at AARC Congress 2015

Aerosols/Drugs
Airways Care
Monitoring/Equipment
Asthma/Pulmonary Disease
Case Reports; Diagnostics
Neonatal/Pediatrics
Ventilators/Ventilation: Parts 1–3
Management
Education
O2 Therapy; Sleep/Pulmonary Rehab

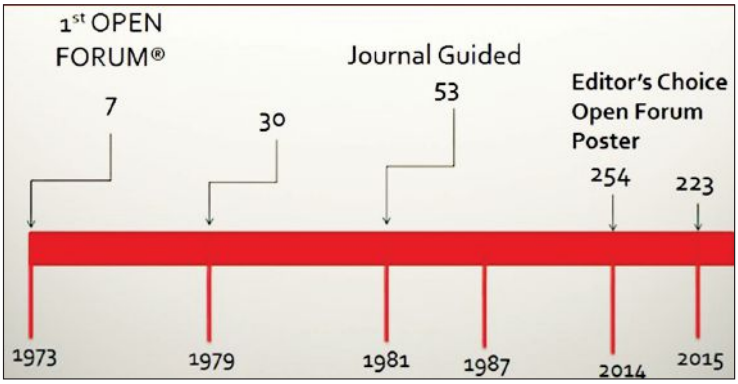

Figure 1. Historical overview of Open Forum research presentations at National AARC-sponsored meetings

At Congress 2015, practitioners presented 223 abstracts in 12 Open Forum symposia, two poster sessions, and one Editor's Choice Symposium (see Figure 2). The October 2015 edition of Respiratory Care, the AARC's science journal, published all of the abstracts.[3]

Figure 2. Breakdown of the 223 abstracts presented at the 2015 AARC Congress by venue.

Finding inspiration for research

Interacting at the bedside, reading literature published in refereed journals, or finding use for new and/or novel devices are rich sources for potential research projects that respiratory therapists can consider. Uncommon clinical cases or a new or improved method of management or treatment of a particular disease process may also serve as inspiration for a case report. But before any study is initiated, it is essential for researchers to follow the ethical policies established for clinical research involving human or animal subjects. The International Committee of Medical Journal Editors provides guidelines for investigating and reporting of research.[4] Respiratory Care also provides guidance for those interested in research. The October 2010 edition provides a good overview of respiratory care research,[5] information on the research design and methodology,[6] and the technical aspects of writing an effective abstract.[7]

It is impossible to highlight all the exceptional abstracts presented at our 2015 Open Forum in this article. However, here is an example of the type of research that is conducted, submitted for consideration, and accepted for presentation in the three main research categories: case report, original investigation, and method/device evaluation. AARC member Kimberly Bennion, MHS,, RRT, of Salt Lake City, UT, was one of these presenters. She reported her experience using airway-clearance devices to facilitate secretion removal and stabilize the respiratory status of a patient with COPD and bronchiectasis.[8] Her abstract described how different airway clearance regimens affect oxygenation and the dyspnea score following a patient's six-minute walk. In particular, this case report demonstrated how a patient's level of pulmonary debilitation may affect their preference for an airway clearance device and the amount of sputum expectorated.

The 2015 Open Forum also featured original research or clinical investigations. Bonnie Powell, BSRC, RRT, of Youngstown, OH, reported on the clinical outcomes of developing and implementing a rapid-cycle process improvement project to reduce unplanned extubations in the neonatal intensive care unit,[9] using Lean principles and Six Sigma methodology.[10,11] Powell and her colleagues were able to reduce the rate of unplanned extubations from 3.8 to 2.7 per 100 intubated days. The Open Forum provided these researchers an opportunity to discuss how the use of a rapid-cycle "plan, do, study, act" initiative can facilitate a culture of safety, influence caregiver behaviors, and reduce harm associated with the unplanned removal of an endotracheal tube.

There are times when it may be prudent to test the novel use of a device before it is used on patients. Method and/or device evaluations provide researchers the ability to critically evaluate the risks and benefits of a process, technique, or piece of equipment without the potential for patient harm. Nancy Johnson, RRT-NPS, and her colleagues from Cleveland, OH, used an adult airway model to evaluate the level of positive expiratory pressure delivered by Theravent™, an over-the-counter expiratory flow resistor.[12] The researchers reported that low levels of positive expiratory pressure, less than 5 cm H_2O, were delivered through this device. The authors concluded that expiratory pressure increased concomitantly with exhaled flow through the airway model.

ABOUT THE AUTHOR

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Writing and submitting an abstract

After the clinical study or device evaluation is complete, authors submit an abstract or brief synopsis of the important elements of the research. Specifically, an abstract is a concise description of the investigation's purpose, design, findings, and implications. These elements are identical to those found in scientific papers published in peer-reviewed journals, such as Respiratory Care, only in a very condensed form. The authors submit their abstracts electronically through Abstract Central, which can be accessed through a link on the Respiratory Care website at http://rc.rcjournal.com/site/open_forum/2016_call_for_abstracts.xhtml. This link also provides submission guidelines and other miscellaneous helpful information (see Figure 3).[13]

Each abstract submission is limited to 250–300 words. Abstract Central automatically tracks the number of words and characters the author enters

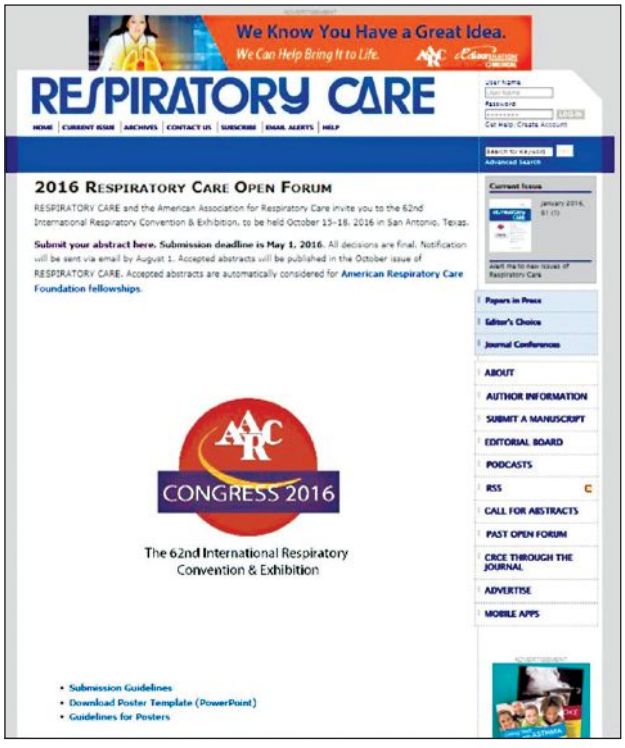


Figure 3. Respiratory Care Open Forum 2016 call for abstracts.

and provides feedback with a hard stop preventing submission of the work if the abstract is too lengthy. Through the electronic submission process, authors report co-authors and affiliations, acknowledge adherence with ethical research principles, and disclose potential conflicts of interest and funding sources. Figure 4 shows the review process of an abstract submitted through Abstract Central.

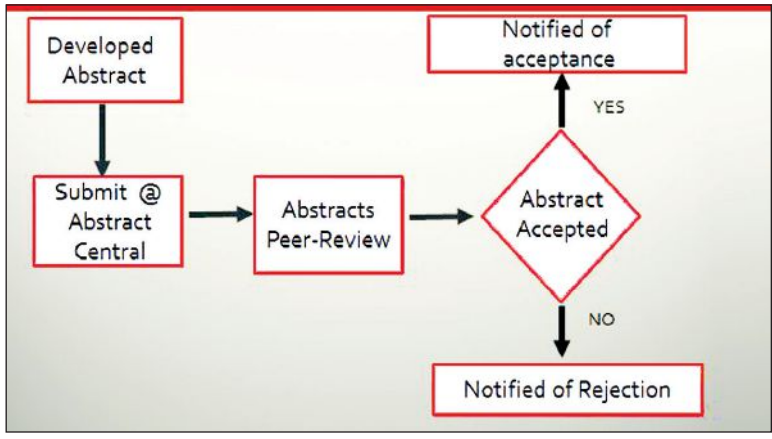


Figure 4. The review process for abstracts submitted through Abstract Central.

The Respiratory Care website (www.rcjournal.com/abstracts) has Open Forum abstracts from 1995 to 2015 available for your review, which makes it easy to visualize how to write yours.

After three experts review the abstract independently, then it is either rejected or accepted for presentation. Respiratory Care emails authors regarding the decision and provides them with constructive feedback from the reviewers. Often authors are so vested in the work that it is difficult to see where clarification may be needed. Authors can use this feedback to help them create a more effective poster presentation and/or manuscript.

Author acceptance letters provide additional information regarding the session date and time the poster will be presented. International authors are reminded in the acceptance letter to schedule an appointment with their embassy as soon as possible to secure the necessary visas for their visit to the United States to present their research at the AARC Congress.

Creating a poster for presentation

The poster is a more elaborate version of the abstract. It contains a more detailed description of all of the components of the abstract: the background, methods, results, and conclusions (see Figure 5). If the authors are creating a single sheet, the poster should be no more than six feet wide and four feet high.

The top of the poster contains a header that lists the abstract title, authors, and affiliations. The text, which follows, typically begins with a reprint of the abstract that was accepted for presentation. The introduction follows, and in one to three paragraphs, clearly defines the research topic. In this section, authors describe the study rationale, significance, research questions, and/or hypotheses tested.

Figure 5. Example of a poster presented at an Open Forum.

Figure 6. Authors interact with AARC attendees during a poster viewing.

Figure 7. Participants can interact with the moderators and others during the symposia.

The methods section of the poster details the procedures the researchers followed. This section of the poster includes enough detail for Open Forum attendees to judge study validity and describes the subjects studied (subject selection, assignment or randomization process, blinding procedures), study protocol, outcomes measured, and analytical plan (statistical tests used and the significance level chosen for any statistical tests). Often authors use figures to show the set-up for the types of apparatus used for the experiment or the process for enrolling subjects.

The results section of the poster describes the outcome or the facts realized from conducting the experiment or study. Tables and figures frequently help present these data. This section does not contain any interpretation of the data; rather, interpretation of the significance of the study — or the take-home message — is described in the conclusions section.

Presenting an abstract at the AARC Congress

Poster-only sessions provide a forum for researchers to display their work and interact with Congress participants in a less formal setting. Posters receive a date for display and public viewing. The poster sessions last 3.5 hours and are located in a section of the AARC Exhibit Hall. Authors are available at their posters for a one-hour time period to discuss their research methodology and findings, as well as answer questions AARC Congress attendees may have (see Figure 6).

The Open Forum is a hybrid session, blending a poster viewing with a moderated podium presentation. Each Open Forum symposium is approximately 90 minutes in length. It is divided into a group poster viewing area in which the attendees and the session moderators can view and discuss the research presented on the poster with the authors. The moderators will then call to order the podium presentation portion of the Open Forum. Attendees take their seats, then each presenter is called individually to the

podium to briefly describe the motivation for the study, the shortcomings or limitations, importance of the results, and the next steps for the research (see Figure 7).

Presenters must summarize and present their take-home message in three minutes or less. For many, this portion of the session may be anxiety producing; however, with planning and practice, a successful presentation can be delivered.[14] The Open Forum moderators keep this portion of the session flowing by soliciting comments and discussion from attendees and often providing insightful comments.

A few abstracts submitted for review and presentation at the AARC Congress are selected for presentation at the Editor's Choice symposia. Investigators present their abstract in an eight-minute PowerPoint presentation. A moderated discussion follows each formal presentation and allows attendees the opportunity to discuss the abstract or ask questions.

SUGGESTED READING

The October 2004 edition of Respiratory Care, Vol. 49, No. 10, which can be accessed at http://rc.rcjournal.com/content/49/10.toc, was dedicated to respiratory care research and has several excellent articles on presenting at the Open Forum.

Valuable opportunity for presenters and attendees alike

Our Open Forum allows Congress attendees to interact with the investigators and discuss the findings of new and cutting-edge research that may impact our profession and shape the future practice of respiratory care. It provides a unique opportunity to seasoned and novice researchers alike. Each year nearly one-fourth of the abstracts accepted for presentation are from first-time presenters.

The AARC provides resources at the Congress to assist first-time presenters or those with an interest in participating at a research forum in the future.

Each year, the AARC hosts a session on "Presenting at the Open Forum" on the first day of the Congress. This interactive session introduces the neophyte research presenter to the customs, roles, and experience of presenting an Open Forum session. Videos illustrate the Open Forum experience from a novice's eyes and include short vignettes of researchers setting up their posters, interacting with the moderators, presenting at the podium, and participating in moderated audience discussions.

Perhaps the most rewarding aspect of the Open Forum is to see first-time presenters return to our annual meetings to present additional work and/or take those next steps in the process to submit a manuscript to Respiratory Care for peer review. ■

REFERENCES

1. Masferrer R. The Respiratory Care Open Forum (editorial). Respir Care 1981; 26(11):1089-1090.
2. Brougher P. Focus on the forum (editorial). Respir Care 1987; 32(12):1113-1114.
3. 2015 Open Forum. Respir Care 2015; 60(10):OF2-81.
4. International Committee of Medical Journal Editors website. Recommendations for the conduct, reporting, editing, and publication of scholarly work in medical journals. Updated December 2014. Available at: http://www.icmje.org/icmje-recommendations.pdf *Accessed January 9, 2015*
5. Chatburn RL. Overview of respiratory care research. Respir Care 2004; 49(10):1149-1156.
6. Durbin CG Jr. How to come up with a good research question: framing the hypothesis. Respir Care 2004; 49(10):1195-1198.
7. Pierson DJ. How to write an abstract that will be accepted for presentation at a national meeting. Respir Care 2004; 49(10):1206 -1212.
8. Bennion KJ. Case study: COPD/bronchiectasis patient outcomes of baseline vs three airway clearance techniques (ACT). Respir Care 2015; 60(10):OF26.
9. Powell BM, Volsko TA. Reducing unplanned extubations using lean methodology. Respir Care 2015; 60(10):OF22.
10 Tague NR. The quality toolbox. 2nd ed. Milwaukee (WI): American Society for Quality; 2005, pp. 247–249.
11. Womack, JP, Jones, DT. Lean thinking: banish waste and create wealth in your corporation , 2nd ed. New York: Free Press; 2003.
12. Johnson N, Deakins K. Evaluation of positive pressure delivered from a non-prescription nasal patch (TheraventTM). Respir Care 2015; 60(10):OF4.
13. Respiratory Care Journal website. Call for abstracts. Available at: http://rc.rcjournal.com/site/open_forum/2016_call_for_abstracts.xhtml. *Accessed January 9, 2016*
14. Campbell RS. How to present, summarize, and defend your poster at the meeting. Respir Care 2004; 49(10):1217-1221.

Taking an Abstract to Publication

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

Congratulations! Your abstract was published in Respiratory Care journal. Now you are wondering what it would take to turn that abstract into a full, published paper.

Good question. I will assume you have never published a paper before.

First, the good news: You have already achieved an important professional milestone and the abstract will form the backbone of the paper, so a lot of creative work has already been completed.

Now, the bad news: You have anywhere from 20 to 100 hours more work to do, depending on the complexity of your study and how much mentoring you can get.

Scientific writing is probably not something you learned in school and is very difficult to learn from books, although you should use them as a reference. The next best thing would be an online class, and such is available through the AARC (see the Research track of the AARC Leadership Institute at http://www.aarc.org/education/online-courses/leadership-institute/). But, the fact is, if you want to be successful and not suffer too much in the process, you need a mentor.[1] Find someone who has published a few papers in peer-reviewed medical journals and who will take an interest in your professional development. What follows is a general idea of what you can expect to do based on my personal research experience of over 35 years and over 100 full-length articles published in peer-reviewed medical journals.

Step 1: Study the topic of scientific writing

Two textbooks detail how to do research specifically for the profession of respiratory care (including how to publish study results).[2,3] The first one is out of print but you might be able to find it in a library. The second one is more up to date and is unique among textbooks on the topic of research in that it illustrates the process of moving from an abstract to a published paper. It shows the draft manuscript as submitted to the publisher, the reviewers' comments, the authors' responses, and the final version that was actually published in Respiratory Care Aside from textbooks, get a copy of the October 2004 issue of Respiratory Care (Vol. 49, No. 10). It is a special issue devoted to research and publication in Respiratory Care. Written by a prior editor of the Journal, it covers everything you need to know, including the top 10 reasons why papers are rejected.

Step 2: Read the instructions for authors in your chosen medical journal

Before you start writing your paper, you should select a target journal to which you intend to submit your manuscript. If you are a respiratory therapist and your study is of relevance to our profession, naturally I would suggest that you try Respiratory Care first. It's not just because it might be the most appropriate audience for your work; our Journal, perhaps more than any other, will make an extra effort to help guide the first-time author through the often daunting process from submission, through peer review and manuscript revision, to eventual publication. Not only that, but many other journals charge a relatively large fee for publication of accepted manuscripts while Respiratory Care is still free. Having selected the journal, read the "Instructions for Authors" provided by the journal editor (generally a downloadable file these days). This will tell you everything from the word limit of the manuscript to file formats for illustrations. Failure to read the instructions will virtually guarantee a rejection of your submitted manuscript.

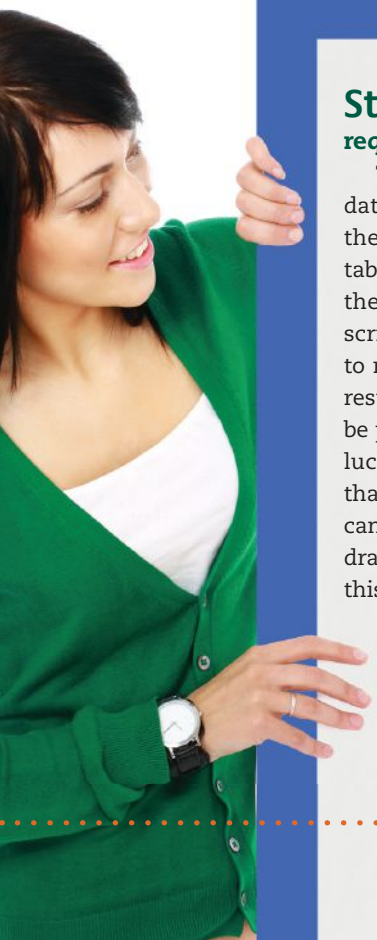
Step 3: Study your reference list

You did search the literature for other research supporting your study, didn't you? Now is the time to go back and re-read those references, highlight important ideas (particularly in the "Methods" sections), and make any notes that will help you when you start writing.[4]

Pay particular attention to how authors express themselves. Most are very good technical writers and you can learn a lot trying to emulate their style. Unfortunately, some are very poor writers, and you can learn what not to do from them.

Step 4: Review your laboratory notebook

I always make a laboratory notebook using Excel, because it allows me to organize the data in tabs (e.g., raw data, analysis, notes taken during the experiment, etc). If you format the data collection section correctly, you will have the tables you need for your manuscript completed ahead of time. Remember, *neatness counts*. It should be a part of your personal style at every stage of the project. Google "how to make laboratory notebook" to find many good ideas. It may have been a few months since you actually conducted the experiments, so now is the time to refresh your memory of what you did. This is where you learn how good of a note-taker you are.



Step 5: Make drafts of the required tables and figures

Take the tables that summarize your data from your lab notebook and make them into separate files (one file per table), as this will be how you upload them when you submit your manuscript. Draw any figures you will need to represent either the methods or the results (rough figures or photos should be part of your lab notebook). If you are lucky enough to work for a hospital that has an art department, see if they can make professional versions of your draft figures. At my institution, they do this for free.

I recommend making the illustrations first because it clarifies in your mind what the end product will be. This will have the effect of focusing your writing and preventing you from "wandering off into the weeds" describing irrelevant issues, as first-time authors often do.

Step 6: Determine authorship and make an outline

Put some thought into deciding who the authors of your paper will be. I assume you will be the lead author, making the first draft, disseminating the draft to the other authors for editing and keeping track of accepted edits (use Review/Track Changes in Word). Think carefully about who is qualified to be an author.[5] Explicit guidance on this topic is available from the International Committee of Medical Journal Editors at http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html.

Now, don't even think about writing the first draft before creating a detailed outline. The basic outline for the average original study is very simple: Abstract, Introduction, Methods, Results, Discussion, Figure Legends, and References. Use the "Outline" view in Word (rather than a bullet list) because it will format the major headings (and any minor subheadings if you choose to use them) automatically and simplifies the transposition of various sections as you craft the outline. Then, when you switch back into the "Print Layout" view, you will be ready to start typing without having to get rid of bullet formats. Using the outline view correctly also makes editing (in later steps) much easier.

Under the major headings of the outline (Introduction, Methods, etc.) make subheads comprised of a few words that represent paragraphs. This will help you organize the logical flow of the text. Rearrange these subheads until it feels right. Now would be a good time to get help from a mentor, as inexperienced writers often get writers block at this stage. If you get blocked, narrow your focus to just one major heading, or just one paragraph. You will find that once the words start flowing, it comes out rather easily. Practice makes perfect — or rather, perfect practice makes perfect, under the guidance of a mentor.

Step 7: Write the Study Purpose Section of the Introduction

The Introduction for a paper generally starts out with a brief description of the background, which will inform your readers of why the study was conducted. There may be a few references included here to establish the context within which your research should be interpreted. But skip that for now. Jump to the end of the Introduction and write out a full problem statement.

If you are blocked, think in terms of what you see happening (the problem) and why it is important (the significance of the study). Somewhere you should actually say, "The purpose of this study was…." If the study involved testing one or more hypotheses, this is how you conclude the problem statement paragraph. Say something like, "Our hypothesis was that…" Look back at your reference articles for good examples of how to do these things. Remember, the study purpose (or hypothesis) is the key that holds the whole manuscript together. It justifies the study methods, sets the readers' expectations of what kind of data they will see in the results, and provides the logical format for the conclusions.

Think of writing the paper as stringing pearls on a wire: study purpose leads to experimental methods leads to specific results leads to conclusions and discussion, which must link back to the original purpose. Many inexperienced writers struggle and are rejected because they broke this chain of logic.

Step 8: Write the Methods section

With your laboratory notes fresh in your mind, start writing the methods section. Make sure (from your literature review) that you are using state-of-the-art measurement procedures and include any calibration information. The ***single most important thing to remember*** is that you must include enough detail so that (1) other researchers can repeat your experiments, and (2) reviewers can judge the validity of your experimental procedures. Knowing just how much detail is enough and what is too much is a matter of experience (ask your mentor).

Also, if you used anything other than simple descriptive statistics (e.g., mean and standard deviations), consider getting help from a statistician when writing about the statistical analyses you performed. Many reviewers of biomedical journals normally do not have enough knowledge and skills to evaluate the validity of statistical methods used in biomedical research articles submitted for consideration. Hence, inappropriate statistical analysis published in medical journals can lead to misleading conclusions and incorrect results.[6]

Make sure you don't put any data or summary results in the Methods section.

Step 9: Write the Results section

The Results section is usually the easiest to write. You just describe the data collected during the experiment. Make sure you have the proper measurement units on all numerical data and, of course, double check any equations or calculations. Equations are the element of a manuscript that most often suffer typographical errors once the journal type-setters get their hands on it, so you will need to check the proofs with your original copy and you need to have confidence that *you* got it right.

Make sure there are no method descriptions in the Results section.

Step 10: Write the Discussion

The Discussion is perhaps the hardest part of preparing the manuscript. This is because you are essentially telling a detective story. It takes experience to state just the facts, but in a way that is engaging and

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enlightening, without repeating what you said in the previous sections. And, of course, it must make reference to the study purpose and show exactly how the results, and your logical conclusions, address that purpose (or tested the hypothesis).

After your brief discussion of what you found and what you think it means you should provide a summary of any previous research on your topic. Show how your study adds meaningful knowledge to what is already known. This is where you can compare and contrast your data to the data of other researchers and explain similarities or differences.

Most journals want you to add a paragraph or two discussing the limitations of your study. The most obvious limitation is that it might be just a pilot study, one that hopefully justifies a subsequent larger study. Other limitations might include problems or restrictions on your measurements, sample populations, deficiencies of models (e.g., simulations versus humans), or mathematical assumptions. Again, study how other authors handle this section for ideas in creating your own style.

Finally, many journals want you to write a short paragraph at the end summarizing your study and conclusions. This is for those readers who don't have time to read the whole paper.

Step 11: Finish the Introduction

With the rest of the paper fresh in your mind, go back and finish writing the Introduction (see Step 7). Be concise and establish for the reader the motivation and context for your study. Remember that some readers start with the Introduction, so see if the rest of the paper is worth reading. If you lose them here, they are gone.

Step 12: Get your mentor to review your first draft

After you have written the whole first draft, have someone (hopefully your mentor) read it to help you straighten out the logical flaws, meanderings, omissions, and typos. Ask them to use the Track Changes feature of Word, inserting notes and suggestions for re-wording the text. After you have the first draft in good shape, send it to the other authors to edit. Again, have them use the Track Changes feature.

Step 13: Repeat

Be prepared to write several drafts of your manuscript before it is ready for submission. It is not uncommon to write a dozen drafts, even for an experienced author. But at some point you have to put your pen down (figuratively speaking). Your mentor will tell you when.

Step 14: Write the Abstract

I always wait until the manuscript is finished before I write the Abstract. Otherwise, any changes to the manuscript will have to be repeated in the draft abstract, wasting time. And if you should forget to update it, you will be embarrassed when the reviewers point out that the abstract does not agree with the text. Remember, like the rest of the manuscript, abstracts usually have word (or character) limits specified by the journal editor. Use the Review/Word Count feature in Word to assess this.

Step 15: Create the title

I always wait until the last step to write the title. This is because the title is essentially a micro version of the paper and must accurately reflect what the paper is about. It is also a marketing device: if readers don't understand or are not captivated by the wording of the title, they won't bother to even read the abstract. And as far as they are concerned, you have wasted your time creating the study and the paper. Of course writing a good title is an art that takes experience (again, this is good time to consult your mentor). Think of memorable titles from papers you have seen. Who could forget Gattinoni and Pesenti's *The Concept of "Baby Lung"*?[7]

ABOUT THE AUTHOR

Robert L. Chatburn, MHHS, RRT-NPS, FAARC, is a professor in the department of medicine at Lerner College of Medicine of Case Western Reserve University in Cleveland, OH, as well as clinical research manager in the section of respiratory therapy at The Cleveland Clinic. He also serves on the editorial board of Respiratory Care.

Step 16: Submit for review

These days, most (if not all) manuscripts require submission of your manuscript online at their website (see https://www.elsevier.com/reviewers-update/story/tutorials-and-resources/from-submission-to-sharing-the-life-cycle-of-an-article). The process is a bit time consuming, but not really difficult, and you can teach yourself as you go using the journal's online instructions. The key here is to organize your files before you begin. These usually take three forms: text (main document, title page, abstract, usually as a single Word file), tables (Word or Excel files), and figures (the journal will specify which file format is required). Knowing how to make the required files for the figures is usually the most difficult thing and you may need a drawing program to achieve the proper file format and resolution. Also, have a prepared "conflict of interest statement" ready to upload (or cut and paste into a form).[8]

Final thoughts

Assuming you have done your homework, the journal editor will accept your submission for review. This means it will be sent to several experts in the profession who are familiar with your topic. They will critique every part of your paper.[9] Prepare for rejection. Invariably, your peer reviewers will have suggestions for improving the manuscript, assuming they don't reject it outright. They usually don't worry about your feelings (I tell all my students up front: put your ego on the shelf). In all the papers I have ever written, only one was accepted without revision.

Once the journal editor has suggested that the manuscript may be acceptable if you address the reviewers' comments, you need to craft a thoughtful response. The best approach is to create a separate paragraph for each of the comments. Often you can say that the suggestion was valid and you have made the change in your manuscript (do this using the Review/Track Changes feature in Word to show the editor the changes were actually made). Sometimes though, the comments are not fair, either because the reviewer did not understand what you wrote (write it better) or simply because the reviewer is wrong. In that case, state your case without emotion and let the editor sort it out.

There is a strangely satisfying feeling to seeing your name on a published paper. And it never gets old. So hang in there and get your name down for all time in the history of medicine.

Good luck. ■

References

1. Chatburn RL. Advancing beyond the average: the importance of mentoring in professional achievement. Respir Care 2004;49(3):304-308.
2. Chatburn RL. Fundamentals of Respiratory Care Research. Norwalk: Appleton & Lange; 1988.
3. Chatburn RL. Handbook for Health Care Research 2nd Edition. Sudbury: Jones & Bartlett Publishers; 2011.
4. Durbin CG, Jr. How to read a scientific research paper. Respir Care 2009;54(10):1366-1371.
5. Sharp D. Kipling's guide to writing a scientific paper. Croat Med J 2002;43(3):262-267.
6. Skaik Y. The panacea statistical toolbox of a biomedical peer reviewer. Pakistan journal of medical sciences 2015;31(4):999-1001.
7. Gattinoni L and Pesenti A. The concept of "baby lung". Intensive Care Med 2005; 31(6):776-784.
8. Irwin RS. The role of conflict of interest in reporting of scientific information. Chest 2009;136(1):253-259.
9. Hoppin FG, Jr. How I review an original scientific article. Am J Respir Crit Care Med 2002;166(8):1019-1023.

How To Read a Research Article

by Brian K. Walsh, MBA, RRT-NPS, FAARC

There are several reasons why a respiratory therapist should read a research article. This article will review a few to highlight the importance of reading and understanding research articles.

The first, and likely the best, reason to read is the professional obligation to maintain competence. Respiratory care is a profession and one of the aspects of being a professional is the capability to self-teach, self-learn and evolve your practice. Respiratory therapists are accused of practicing the same way they were taught in respiratory school. If you ever wonder why our practice varies, it's likely because of the influence of research articles. To maintain relevance, we must review scientific articles.

The second reason to read research is to review an article in preparation for an upcoming meeting or discussion. Our practice should be reviewed as part of a comprehensive quality-improvement process. This is healthy, and we should always look to improve our practice and associated outcomes.

The third reason is for the joy of it. Now, I know you are starting to laugh, but I really do enjoy exploring research articles. It's not the reading or mental exercise I enjoy, it's the practice change that improves the care we provide that warms my heart.

Now that you have picked a research article to read from the reasons above or others, I have a few suggestions in how to tackle a research article.

Be skeptical or suspicious

Read critically. I often skip the abstract and go right to the introduction. Within the introduction the authors are tasked with introducing the problem or topic and convincing you there is a problem and that they believe a new way is needed. Often, if you first read the abstract and stop there, you miss the full message. The abstract is the *hard sell*, is word limited and often very dense. If the introduction doesn't pull you in, then you should move on to another article that does. If the authors' introduction pulls you in, then continue on, but don't assume the authors are right — critically critique their assumptions, logic, and reasoning.

Identify the question

Summarize the introduction in a few sentences. I often highlight three or four sentences and rewrite the question to fully synthesize the problem and question. The research question should be toward the end of the introduction. Rewriting the question helps you identify possible conclusions. I even list some possible conclusions.

A newer section most journals are offering now is a quick look or brief summary section that helps you identify within a few sentences the current practice and what this paper contributes to our understanding.

Identify the method to their madness

The methods section often intimidates the reader. This section is responsible for the perception you are either a researcher or a genius to be able to understand a research article; this is simply not true. The methods section is typically action packed and may take some work to understand, but it can be done. Certain procedures or methods may be understood by the authors and even reviewers. However, this can translate within the authors' mind that everyone understands the methods when the reader does not. This leads to the occasional miscommunication, but don't let that stop you. To truly understand, you may have to look up referenced methods if they aren't explained completely. Diagramming each experiment and the order of events can help. I am a visual thinker and this often helps me more fully understand the results.

Read creatively

Based on your experience and expertise, start to take a guess at the results or conclusions. It's easy to find fault, but there comes a time in the article to get excited about the opportunity and switch to a more creative or positive evaluation. What are some of the opportunities? Could you implement changes in your practice? Could this help your patients?

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PROGRAM 8
Disease Management and the Respiratory Therapist *By Timothy Myers, MBA, RRT-NPS, FAARC*

Drumroll please

The results are often sentences of facts and very dry to read. Because our mind can out process (output) our reading speed (input) this becomes a source of confusion. Since your mind is already creating a dialog and developing conclusions before you completely read the results, you must try not to jump to conclusions. Focus on words like "significant" or "non-significant." Check out the graphs and tables — they are often the best way to fully understand the data. Statistical analysis is standardized by study design and data type. Don't be afraid to look up these methods, as they have strengths and weaknesses that should be understood. Look for p-values < 0.05. P-values less than a given significance level (0.05) suggest that the observed data is inconsistent with the null hypothesis. Some researchers refer to p-values of 0.05–0.1 as a trend. If it didn't reach statistical significance but was coming close, this may be something to watch or to consider studying in the future.

Explore the gab section

The discussion section is a very valuable section of the authors' thoughts and limitations. This section is a synthesis of the introduction, methods, and results that won't be in the conclusion. The discussion section is a place to find some of your unanswered questions. Authors will elaborate on design strengths or weaknesses, unexpected results, and possible future directions.

Read the conclusion *last*

I know this is likely contrary to what others have taught, but reading the conclusion *first* often leads to improper conclusions. The conclusion can only be read in the context of the entire study. If you are provided proof, it's time to turn your healthy skepticism to acceptance and get to work allowing the research to positively influence your practice.

Compare results

If possible, look up the references or similar research. Learn what others think of the research. Is this similar or different to what others have found? If the research paper is a little older, is it cited in review articles? Editorials are a wonderful source to see experts in the profession debate relevance and impact. Not all research articles will have an accompanying editorial, but if they do, it's worth the extra read.

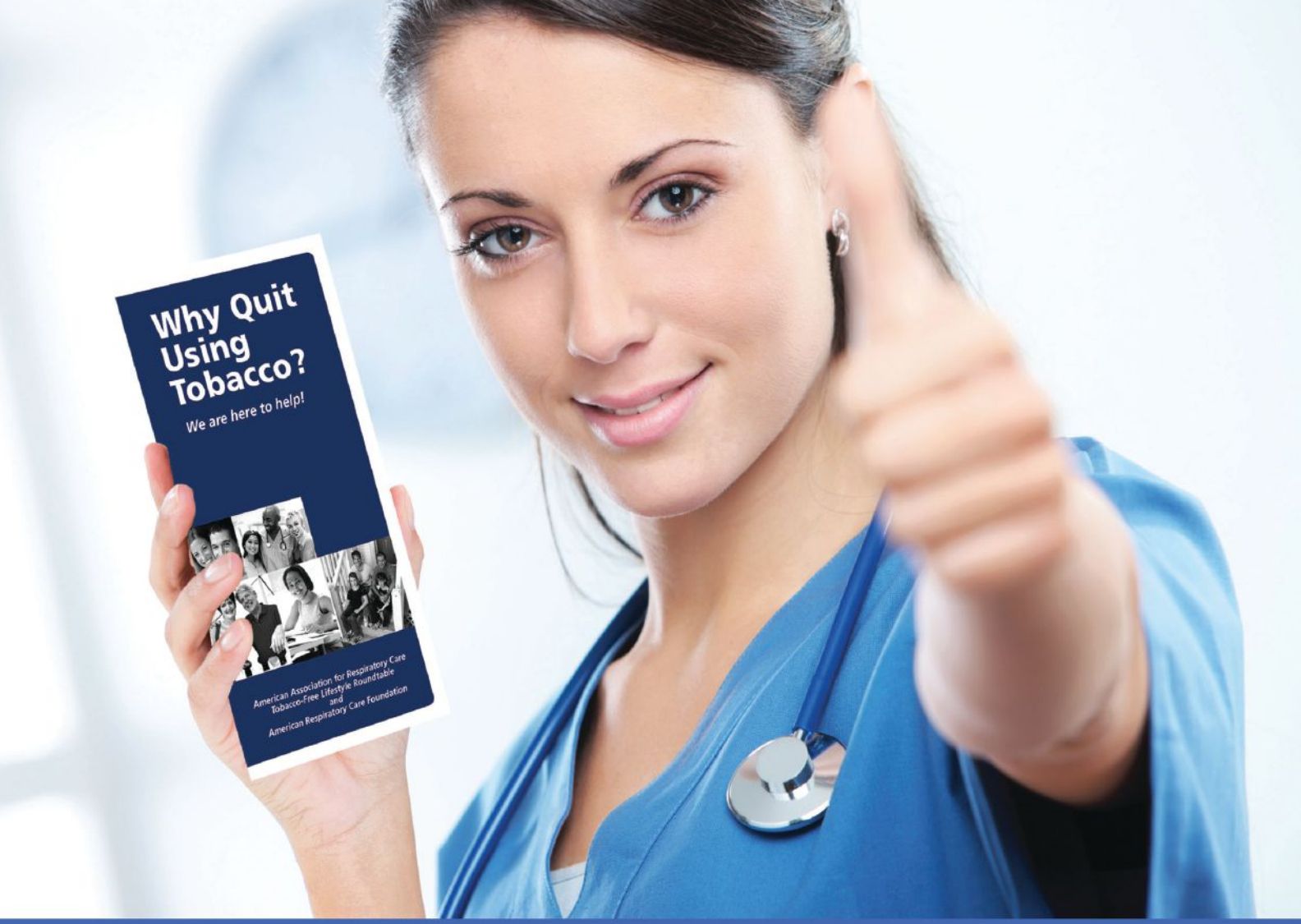
Research manuscripts are the most common way scientific information is distributed because reading is the most common and universal way we learn. In this information age, new knowledge is being published every day, and it can be overwhelming. Reading a research article takes work, but there are a few tricks that can help improve your efficiency.

- **Develop a method of reading that works for you.** Set aside time each week to read or work on your method to improve yourself professionally. This is one of the healthiest habits you can develop.
- **Skim titles in journals.** Respiratory Care is a wonderful resource and is our profession's science journal. Skim the titles and read every month. The editors and reviewers have your best interest in mind. Each month they prepare state-of-the-art articles for your viewing pleasure. If you only had time to read one journal, Respiratory Care would be my choice.
- **Use technology.** Technology can help identify and sort information. Most major medical search engines allow you to set up an account with notifications. When articles are published that meet your search criteria, you will receive a notification. Most journals have Facebook or Twitter accounts that you can follow to get the latest updates. I also use apps like UpToDate and Docphin to help organize topics and review hot topics more efficiently.

While technology is positively impacting our research productivity and acquisition of knowledge, there is no replacement for critical and creative reading of research articles. There are no fancy shortcuts and, unfortunately, knowing the literature alone will not improve your practice. The best achievable result is being able to apply your newly found knowledge from reading a research article to your daily practice. ■

ABOUT THE AUTHOR

Brian K. Walsh, MBA, RRT-NPS, FAARC, is clinical research coordinator in the department of anesthesia, division of critical care, at Boston Children's Hospital in Boston, MA, and a PhD student at Rush University in Chicago, IL. He is the AARC's president-elect.



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Mr. Spock to the COPD Community: Live Long and Prosper!

AARC plays significant role in the development of upcoming film, "COPD: Highly Illogical—A Special Tribute to Leonard Nimoy" by Debbie Bunch

When Leonard Nimoy passed away at age 83 last year, he was well on his way to becoming known for more than just being a TV and film star — his last journey into the unknown was to help ensure that more people with COPD get the care and treatment they need to maximize their quality of life. Now that mission is the subject of a new film, and the AARC served as an advisor to the producers.

The whole world will remember Leonard Nimoy as the iconic Mr. Spock from the famed TV series *Star Trek*. But over the past few years, people in the COPD community have gotten to know the man behind the image. As someone who suffered from chronic obstructive pulmonary disease in the last years of his life, he raised his voice to educate the public about the condition and to advocate for improvements in care.

Now his daughter and son-in-law are carrying on that message in a new film documenting Nimoy's courage in the face of his COPD diagnosis, and the mission he set for himself to ensure more people would understand what the disease is, how it is treated, and how it can potentially be avoided or mitigated through tobacco cessation. In the following interview, Julie and David Knight talk with *AARC Times* about their famous father, their film, and the role the AARC has played in helping it come to fruition.

▶ *AARC Times*: When did Mr. Nimoy start smoking and when and why did he decide to quit?

▶ Julie Knight: My dad had said that he started smoking in the 1940s while he was in his teens. At that time, smoking was considered to be the norm — everyone smoked, including health care professionals. My dad quit smoking around 1985. He was motivated not only for his health, but also I had just given birth to my first child and he didn't want to be smoking around his first grandchild. My dad told my husband David and me that it was extremely difficult for him to stop smoking, but fortunately, he was successful in quitting without any specific methods or treatment. He had constant support from his wife Susan, family, and friends.

▶ *AARC Times*: When did he begin having symptoms of COPD and when was he diagnosed with the condition?

▶ Julie Knight: In retrospect, my dad was experiencing minor symptoms a few years ago before he was officially diagnosed in 2013.

▶ *AARC Times*: How did COPD impact his life?

▶ Julie Knight: Toward the last year of his life, COPD had a huge impact on my dad's quality of life. One example of this

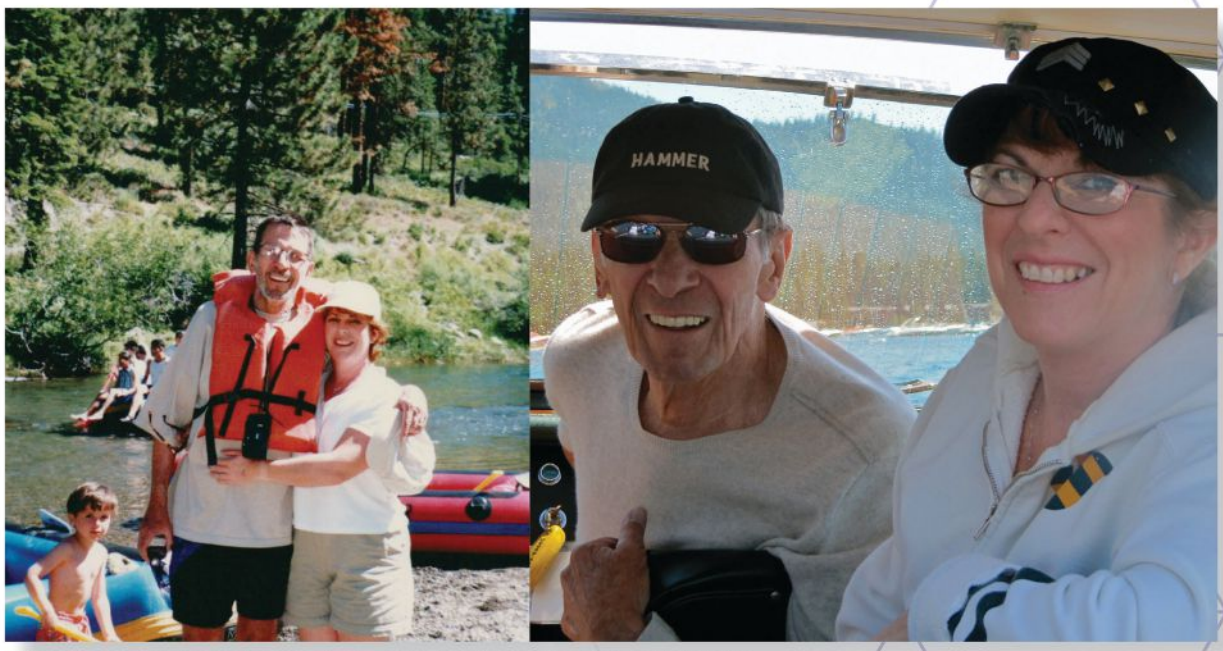
Julie Knight with her dad, Leonard Nimoy. Photos courtesy of Julie Knight

impact was the fact that he was forced to sell his long-time family home in Lake Tahoe, NV. This home was very special to him and he loved being there during the year, and spending many summers enjoying the fresh air and beautiful scenery, relaxing with family and friends, and driving his boat. It was a sad moment for him when he decided it was time for him to sell the house. The elevation proved to be extremely difficult for him to breathe and it took a lot of energy to be there. My dad loved to travel and was always very active. Having COPD made it too difficult to continue his busy lifestyle and he began to spend more time at home, and keeping busy nonetheless.

AARC *Times*: What prompted you to produce a documentary about him and his COPD diagnosis?

David Knight: In 2014, Leonard appeared on the CNN "Piers Morgan" show and announced for the first time that he had COPD. He believed this was very important, as he wanted to not only create awareness about the disease, but to educate and reach millions of people about this difficult condition. Immediately following the interview, Leonard became very proactive about educating people by posting hundreds of messages on his Twitter page encouraging people to quit smoking and explaining how COPD affected his life.

People who support the production of the film with a $50+ donation will receive this t-shirt from Julie and David Knight.



Julie and her dad made many great memories during the time they spent at his place in Lake Tahoe.

Julie Knight: In November 2014, sadly my dad's health had taken a turn for the worse.

David Knight: We wanted to continue Leonard's final mission and message to educate the public and create awareness about COPD. We felt that a documentary film would be one of the best ways to accomplish this goal.

Julie Knight: My dad was very supportive of our idea and encouraged us to move forward with our project.

***AARC Times*: What are the messages you are trying to promote? Is it "don't smoke," "don't start," "get tested early for diagnosis," or something else?**

David Knight: Some of the messages that we'd like to get out there are very simple but important. As you indicated in your question, not only would we like to stress not smoking, don't start, and quit if you are currently doing so, but also, if you suspect that you might have this condition, get to a health care professional immediately so you can get diagnosed. In addition, we believe strongly that once you've been diagnosed, it is crucial to learn how to manage your COPD to achieve the highest quality of life.

***AARC Times*: How did you learn about the AARC and why did you decide to seek out the Association's advice as you worked on the film?**

David Knight: I found out about the AARC from our medical advisor, Dr. Richard Casaburi. Dr. Casaburi spoke very highly about your organization and about the importance that respiratory therapists play in helping to manage the symptoms of patients with COPD. In addition, he spoke about how one of the goals of the AARC is educating patients. We also feel that respiratory therapists play a vital role in the care of COPD patients by being informed about the latest treatments available.

***AARC Times*: In what way has the AARC contributed to the film as an advisor or consultant?**

David Knight: The AARC has contributed greatly to this project by providing advice both on material and information that might be presented, and possible expert guests appearing in the film. That, along with showing our trailer at your recent AARC Congress, has been instrumental in keeping our film project moving forward.

***AARC Times*: Will respiratory therapists be mentioned in the film? If so, in what capacity?**

David Knight: Yes, we actually have one of the top respiratory therapists in the film. He currently works at the hospital where Leonard was treated for COPD. We were very excited to be able to interview him for our film project.

***AARC Times*: How can the respiratory therapy community help to promote/raise awareness of the film?**

David Knight: Julie and I believe strongly in the power of word of mouth and social media. We would greatly appreciate it if respiratory therapists would share our film and website, COPDLLAP.com, on their Twitter, Facebook, or other social media accounts.

Julie Knight: Any donations would be very welcome too. For a $50-plus donation, they'll receive our official COPD/LLAP t-shirt.

***AARC Times*: When will the documentary be released? Will there be any premieres? Will it appear in movie theaters, or will it go straight to cable outlets?**

David Knight: We're targeting the release for "COPD: Highly Illogical" with the 50th anniversary of *Star Trek* in June/July 2016. And yes, several special screenings are being planned. For a complete list of dates/times and locations, please visit our website at COPDLLAP.com.

Julie Knight: In addition, our production company is currently speaking with broadcasters to hopefully air "Highly Illogical" on either television stations or cable outlets. Finally, there is also a possibility that our film could be shown as a theatrical release as well. ■

RC Currents

Patient Advocacy Summit Strengthens Bonds Between RTs and Patients

The day before AARC Congress 2015 kicked off in Tampa last November, AARC leaders gathered with representatives from patient advocacy groups and patients themselves for a patient advocacy summit on how to best address issues most important to people with chronic respiratory diseases.

"It's important for us to be able to hear from patients what we can do to be better advocates for them," said AARC Executive Director Thomas Kallstrom, MBA, RRT, FAARC. "At the end of the day, unless they have advocates like us, often they're left to fend for themselves, and we want that not to happen."

Sponsored in part by GlaxoSmithKline, Boehringer Ingelheim, and Sunovion, the first ever Respiratory Patient Advocacy Summit began with a moving tribute to Nick Jones, a leader in the patient advocacy community, who lost his battle with COPD just a few weeks before the meeting was convened.

According to Bob Sobkowiak, RRT, Jones epitomized the concept of living well with lung disease. "You can live a healthy life. You don't have to be sitting in a little corner around your oxygen concentrator," he said, noting a photo of Nick with his hands raised over his head in a victory stance that was shown to the group up on the big screen told the tale. "As that picture illustrated, Nick was a true champion."

Kip Adams, there to represent GlaxoSmithKline, stressed the need to keep patients like Nick top of mind at all times. "It's all about patients and how we can help patients." His company and others like it don't just make medications for patients, he continued, they also want to improve the lives of patients and the people who care for them.

The summit, which benefited from participation by the COPD Foundation, U.S. COPD Coalition, and Allergy & Asthma Network, went on to feature several speakers who addressed key areas of concern for patients and professionals alike.

Joseph Lewarski

Valerie Chang, JD, a judge in Hawaii who stepped down from the bench in 2006 and founded the Hawaii COPD Coalition in 2007, spoke to the group about her own journey with the disease. Diagnosed with severe emphysema 15 years ago, she found herself too short of breath to do many of the things she once loved. With proper disease management, today she's back on track, and she believes other patients can do the same.

"I would like to let patients know there is a lot they can do to be more active in terms of helping to manage their health, optimize their lives, so that they can live full and active lives even with lung conditions," says Chang. Part of the solution, she notes, is for people with COPD to think of their challenges as resources: durable medical equipment, improper use of inhalers, access to health care, underfunding for lung care, and advocating for lung health to members of Congress.

Joseph Lewarski, BS, RRT, FAARC, discussed the importance of the patient-respiratory therapist partnership, urging RTs to take their advocacy beyond the bedside by volunteering to be a topic expert to a patient advocacy group. He also stressed the need for patients to speak up for themselves and ask questions of their health care providers.

"There was an era when nobody would challenge a doctor; nobody would challenge anybody in a lab coat. That era is over," said Lewarski. "It's a team effort between the patient and the family and the physician and other clinicians. And quite frankly, doctors and other clinicians can't do their job well if you're not honest with them."

The roundtable discussion that ended the session gave therapists, nurses, and patients the chance to talk about priorities for the future, including support for the Medicare Telehealth Parity Act, which would expand coverage for remote monitoring and education of chronic lung disease patients by qualified professionals, including respiratory therapists.

Sam Giordano, MBA, RRT, FAARC, urged everyone to get involved in the process. "They don't have to fly to Washington to make a difference. We just need to tighten up our community and convey our message time and time again."

The AARC will be out in full support of the legislation in April, says AARC Director of Legislative Affairs Kimberly Turner. "On our April 11 Hill Day, we're going to have a lot of people come up and talk to their members and put pressure on them to support this terrific piece of legislation."

The AARC also plans to do more in 2016 to equip respiratory therapists with the tools necessary to better manage chronic lung disease in patients and help them avoid hospital readmissions. ■

Take This to Your Alarm Management Committee

As a member of the National Alarm Coalition sponsored by the Association for the Advancement of Medical Instrumentation (AAMI), the AARC has been working with a range of fellow organizations to further the safe and effective use of alarms in the nation's hospitals.

Now that work has come together in a new resource called the Clinical Alarm Management Compendium. Released late last year by the AAMI Foundation (www.aami.org/thefoundation), the document reflects the papers and webinars on alarm management found on the AAMI website, plus survey results and independent contributions from coalition members.

AAMI states its goal is to get this into the hands of every Alarm Management Committee in each of the nation's 5000+ hospitals. The compendium has something for every hospital to use to improve patient safety by more effectively managing alarm signals — regardless of where the hospital is on its alarm-management journey.

With Joint Commission surveyors now documenting noncompliance with the second phase of the National Patient Safety Goal on clinical alarms, the compendium could not be more timely. The AARC's involvement in the project grew out of a survey conducted by the Healthcare Technology Foundation (HTF) in advance of an AAMI Medical Device Alarms Summit in 2011.

Since respiratory therapists made up 14% of respondents to an earlier survey conducted in 2005-2006, the HTF reached out to the AARC to garner an even more robust response in 2011. RTs ended up comprising 63% of the respondents to that survey, solidifying the Association's place at the table.

The AARC's participation in the AAMI Alarm Management Coalition is just one example of the many ways the Association represents the voice of the respiratory therapist to national groups and organizations seeking to improve patient safety and further the safe and effective practice of respiratory care. ■

Submit Your Open Forum Abstract for AARC Congress 2016 by May 1

The AARC invites you to submit abstracts for the Open Forum at AARC Congress 2016 in San Antonio, TX. Considered by many to be the premier event at the AARC Congress, the Open Forum is your opportunity to gain recognition for your research in cardiorespiratory care by submitting an abstract for presentation at the Congress and having it published in Respiratory Care. We now have three different ways you can present your poster at AARC. See http://aarc2016.abstractcentral.com for more details. The deadline to submit abstracts for the Open Forum is **May 1, 2016**. ■

Five Easy Steps to RC Credential Renewal

The AARC has teamed up with the National Board for Respiratory Care (NBRC) to make credential renewals a quick-click process for Association members renewing credentials with AARC CRCE® courses. Just follow these four easy steps to get the job done:

1. Complete AARC-approved CRCE® courses. Completed CRCE courses will automatically be listed on your AARC transcript when rosters are updated.
2. Visit the NBRC renewal website at http://www.nbrc.org.
3. Enter your AARC member number in the NBRC Continuing Competency Program renewal website. Once your member number is entered, your AARC transcript will be imported into the NBRC's database. The NBRC database will display all your courses, completion dates, and course hours. The NBRC will also show a summary of the number of hours completed and how many hours are still needed (if any) to renew the credential.
4. Click submit and you're done! ■

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...

I am trying to convince the hospital administration to utilize the closed suction catheters for the adult population. The infection control department was asking for the evidence to utilize a closed suction system. As I was looking for evidence, although there are low quality studies, the Cochrane Review published in 2007 suggested that there was insufficient evidence to support closed suction in preventing VAP and decreased mortality. Can you tell me why we should use closed suctioning in the ICU?

Ramesh Unnikrishnan, MSc, RT, RRT
Manipal University
Karnataka, India

Anytime the ventilator circuit is disconnected (or opened) there is a loss of PEEP, which facilitates leakage of secretions pooled in the subglottic space around the cuff and micro aspirations. This can also occur if the ventilator circuit is manipulated in any way. Therefore, events such as open suction, placing nebs inline for aerosol treatments, and changing the ventilator circuit, etc., all have been associated with increasing risk for VAP. Without specific references to this body of evidence, I hope this helps lead you down the right path.

Mark Siobal, BS, RRT-ACCS, FAARC
San Francisco General Hospital
San Francisco, CA

Closed suction units prevent "breaking the circuit," which reduces the opportunity to introduce bacteria that can cause VAP. The CDC guidelines suggest closed suction. See the web address below or go to the CDC website and do a search for VAP guidelines. Good luck!
www.cdc.gov/HAI/vap/vap_faqs.html

Kathy Hogan, BA, RRT
North MS Medical Center
Tupelo, MS

In the last search that I did (and it was a while ago), I found the same thing about VAP. However, there was good evidence to support the use to decreased de-recruitment and loss of FRC with bag/suctioning. You might try looking at it from that route.

Judy Schloss, BSRT, RRT-NPS
University of Minnesota Fairview Medical Center
Minneapolis, MN

While possibly a little dated, the AARC has a clinical practice guideline that addresses this, and a recommendation. http://www.rcjournal.com/cpgs/pdf/09.03.0869.pdf

Timothy Myers, MBA, RRT-NPS, FAARC
American Association for Respiratory Care
Irving, TX

▶ STUDENT CORNER

Opportunity Knocks, or Why Should a Student Become Involved in a State Conference?

by Kerry McNiven, MS, RRT

You're a busy student. Why, at this point in your training to be a future respiratory care professional, should you become involved with your state conference?

The answer can be summed up in one word — opportunity. The first thing you need to do is view yourself as a respiratory care professional *right now* and start taking charge of your career *right now*! By getting involved in your state conference you are making yourself known within the respiratory community. Networking with fellow professionals is a key element to a long and successful career.

Making yourself known leads to ample opportunities like helping to plan the conference, where you can have a voice about guest speakers and which topics would be of interest to you and your fellow students. By working on the committee you have the opportunity to make yourself known by "getting the word out" though your social media channels. By volunteering to help out on the day(s) of the event you will have the opportunity to network with a host of students, practitioners, and managers. By working the registration table you will meet and greet dozens of professionals, any one of whom might someday interview you for a job.

The movers and shakers of our profession serve on the planning committees for your state conferences, and you have the opportunity to meet the other influential professionals in your state through them. They appreciate your interest and will remember you for standing up and making yourself known by participating. These are the individuals you want to network with because where they work and what they do may be similar to your own professional aspirations.

And finally, by simply attending the conference, you have the opportunity to hear expert speakers, talk with vendors, see the latest in equipment and pharmaceuticals, and notice which hospitals support your profession by sending their staff.

An opportunity is knocking. Will you open the door?

Kerry McNiven is director of clinical education for the respiratory care program at Manchester Community College in Manchester, CT.

Share Your Stories in Our New Columns This Year

AARC Times has begun two new columns this year, and we need your stories to fill them up!

The first is called "Storytellers," and it's where AARC members can share stories about their favorite or most memorable patient. Maybe it was an "aha moment" when you knew you had made the right professional decision for that patient. Maybe it was when you first realized how much difference you were making in the lives of that patient and his family. Or maybe it was just something the patient said or did that made you laugh or cry or just be inspired to be a better RT.

The second, "Reflections," is geared toward AARC members who have recently retired from the profession. We'd like for you to look back at your career or some aspect of it and tell us what it meant to you and why.

So start brainstorming and then send your submissions to *AARC Times* Editor Marsha Cathcart at cathcart@aarc.org. ■

Florida Flight 1: Where the RN/RRT Team Is the Norm

Transport programs across the country typically use RTs on their neonatal-pediatric teams, but at Florida Flight 1 in Orlando, the RN/RRT configuration is the norm for all flights — and has been for the past 30 years.

"Florida Flight 1 is strictly an interfacility transport program and was one of the first programs in the country to utilize the helicopter to transport patients with intra-aortic balloon pumps (IABPs) back in 1985," explains AARC member Jon C. Inkrott, RRT-ACCS, one of seven flight therapists with the program. "Therapists in this region of the state manage the IABP devices now as they did back in 1985, so to utilize that specific RN/RT crew configuration made the most sense for this hospital and the patients we would be flying from that time and moving forward."

One of only four transport services in the United States to use the RN/RRT configuration exclusively, the program operates out of Florida Hospital, a large cardiovascular center where the very critical cardiac patient population makes up a good portion of the transports every year. Inkrott emphasizes the program also transports a range of other critically ill patients from around the state as well. "We have been as far south as Miami and as far north as Tallahassee and Jacksonville."

Inkrott says his hospital believes RTs bring the right combination of airway, mechanical ventilation, and hemodynamics expertise to the job and serve as a good complement to the RNs who also make up a crucial part of the team. "When transporting the sickest of the sick, patients with cardiogenic shock who are ventilated and on a balloon pump or an Impella device, sick patients with ARDS or atypical lung pathology who require aggressive mechanical ventilatory support, folks who need emergent airway intervention while in flight — this is the crew configuration that has been the successful model of this program for 30 years," he says.

A recent experience in the air illustrates the fast-paced environment often encountered by the team. The patient, who was suffering from an ST-segment elevation MI, was picked up at a nearby satellite hospital but coded within a couple minutes of liftoff. During the eight minutes left in the short flight back to Florida Hospital, the patient was shocked three times, intubated, and administered two doses of epinephrine and a dose of amiodarone. Return of spontaneous circulation (ROSC) was achieved as the helicopter was touching down, but lost again as the team raced down the hall to an elevator.

"We had a supervisor doing compressions as we pushed the stretcher and subsequently shocked this patient again before getting on the elevator and again achieved ROSC," he says. More than 30 additional shocks were delivered during the cath lab intervention. The patient did not survive, but the experience illustrates the lengths the team will go to save a life.

Another story with a happier ending shows how creative thinking comes into play. The flight team was called to bring a 5-foot-6-inch, 360 pound ARDS patient with pneumonia and RSV who was on APRV with saturations in the mid 80s back to Florida Hospital for a possible ECMO intervention, but at that time Florida Flight 1 was not able to perform APRV on transport.

"Hence, we had to try to support this patient with a different approach," says Inkrott. They trialed the patient on pressure control as well as volume control in various forms and at different PEEP levels, but none were well tolerated. Blood pressure dropped, the patient was placed on vasopressor support, and SpO2s

Florida Flight 1 team members gather in front of their helicopter.

The helicopter flies in for a landing.

decreased into the low 80s. Ultimately, the RT on the team decided the best approach would be to manually ventilate the patient with a PEEP valve for the 32 minute flight, a procedure that was well tolerated and allowed the patient to be delivered safely to the ICU where ECMO was administered and the patient ultimately survived.

"Where I think the critical care background of the respiratory therapist fits best in these roles is having a plan and understanding that plan may go wrong," says Jon Inkrott. "What's the back-up plan? How can you effectively and safely complete this transport and what will the outcome be?"

The RN/RRT configuration has been the right fit for his program. "It's an ICU in the sky with only two people, not 20. The scope of knowledge and practice is immensely broad — exactly what the RT brings to the table." ■

A patient is rushed to definitive care.

The Florida Flight 1 helicopter is always ready for service.

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 AARC Congress 2016.

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. ■

Contribute to Our "Transitions" Column

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

RT Students Attend AARC House of Delegates Meeting in Tampa

Mentoring new leaders in respiratory care is essential to the success not only of the AARC but also of the entire profession. The AARC House of Delegates (HOD) has been working toward that goal since the early 2000s through a program that brings students from across the country to the bi-annual HOD meetings to see how decisions are made in the Association from the inside out.

Another 21 students took part in the program at AARC Congress 2015 last November in Tampa. "In order to ensure the future of the AARC and our profession remains bright, we must provide mentorship and guidance to those entering the field," says Dana Evans, MHA, RRT-NPS, who led the Student Mentoring Committee in the HOD last year. "The students who participate in the program are enthusiastic, energetic, and passionate about becoming respiratory therapists. This program allows them the chance to see that a group of passionate professionals can change the future."

2015 HOD Speaker John Wilgis, MBA, RRT, agrees. "Students are our future! The House of Delegate's Student Mentoring Committee was built to identify students that demonstrated leadership qualities for future development in the profession — either at work, with a state affiliate, or with the AARC."

Evans believes the students who attend the HOD meeting leave with a new sense of confidence in their own ability to impact the profession and bring about change. "We have had many students tell us that they plan to come back as delegates one day," says the AARC member. ■

More than 20 RT students participated in the 2015 HOD meeting in Tampa, including: Diana Perez, Sajjad S. Raza, Megan Covert, Diamond Nogueira, Jennifer McIntosh, Ashley Molina, Vince Longbucco, Shannon Parker, Amanda Givens, Rae Ann Ancheta, Kristi Schmitt, Ngan Nguyen, Vaughan Blacksher, Kelley Kimbley, Keith Englehart, Maureen Boulet, and Jordan Spencer.

Here's Your Chance for a Free Membership Renewal

AARC Times is looking for creative AARC members to enter our AARC Photo Contest. Finalists will receive a **free** one-year membership renewal with the chance of their photo being chosen and featured on the cover of a 2016 *AARC Times* issue. Go to http://www.AARC.org/resources/publications/aarc-times and click on the "Photo of the Year Contest" link. The deadline to submit your photo for the contest is this month, so don't delay! ■

Pediatrics Study: Tax Cigarettes, Save Infant Lives

Infant mortality has gone down in the United States, thanks to higher taxes on cigarettes that have kept more women from smoking during their pregnancies; that's the conclusion reached by researchers from Vanderbilt and the University of Michigan who looked at public data from 1999 to 2010 to determine the association between cigarette tax and price increases over time and infant mortality rates in the United States. Results showed that for every $1 tax increase per pack of cigarettes, about two infant deaths were averted each day. Overall, an estimated 3.2% decrease in annual infant mortality was linked to higher cigarette taxes, which translates to 750 fewer infant deaths per year. The effect was stronger in African-American infants than non-Hispanic white infants. The study appeared in a recent edition of *Pediatrics*. ■

Allergies Now, Heart Disease Later?

Children who suffer from allergic conditions like asthma and hay fever may be facing a greater risk of heart disease down the road, report researchers from Northwestern Medicine.

They studied the association between asthma, hay fever, and eczema and cardiovascular risk factors using data from 13,275 children included in the 2012 National Health Interview Survey. Fourteen percent had asthma, 12% had eczema, and 16.6% had hay fever.

The investigators note all three conditions were associated with higher rates of overweight or obesity, but their findings of a greater risk of high blood pressure and high cholesterol in these children held true even after the results were controlled for obesity. "Given how common these allergic diseases are in childhood, it suggests we need to screen these children more aggressively to make sure we are not missing high cholesterol and high blood pressure," study author Dr. Jonathan Silverberg was quoted as saying. "There may be an opportunity to modify their lifestyles and turn this risk around."

The study appeared in a recent issue of the *Journal of Allergy & Clinical Immunology*. ■

TRANSITIONS

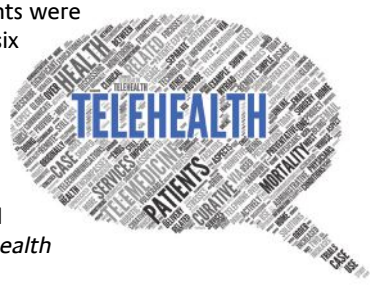
Mark David Babic, RRT, 49, passed away unexpectedly in his home on Christmas Day. Mark was an active volunteer for the AARC and was a member since 1999, when he joined as a student. He was published in both *AARC Times* and Respiratory Care and was a frequent presenter on leadership and disaster preparedness topics at the Summer Forum and AARC Congress. Mark worked most of his career in Cleveland, OH, at the Cleveland Clinic and was survived by his wife Sherry (also a respiratory therapist), his two daughters Lora and Kelly, and his granddaughter Maggie. He will be missed by the Cleveland respiratory therapy community.

Study Supports the Provision of Telehealth Services

A new study out of the University of Missouri finds all parties involved — patients, providers, and onsite equipment coordinators — are largely satisfied with the provision of telehealth services to patients living in remote locations.

The investigators developed specific surveys for patients, physicians, and onsite equipment coordinators served by the Missouri Telehealth Network, developed by the MU School of Medicine in 1994 to connect rural Missourians with physician specialists at MU Health Care. The network now offers 29 different clinical specialty services at 202 sites in 62 of Missouri's 114 counties.

Survey questions were related to perceived benefits such as ease of use, quality of care, and acceptance as an alternative form of health services. Eighty-three percent of 286 patients surveyed felt they received skilled care during their telehealth visit, and 78% agreed they would use the service again. Of 12 site coordinators surveyed, 67% agreed that telehealth appointments were easy to coordinate. Eighty-six percent of 21 physicians surveyed were satisfied with the care they were able to provide patients using telehealth.



The study was published in a recent edition of *The Health Care Manager*. ■

ARCF Accepting Applications for the 2016 International Fellowship Program

If you provide respiratory care outside the United States and would like to share and expand your knowledge, please consider applying for the 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 AARC Congress 2016 to be held Oct. 15–18 in San Antonio, TX.

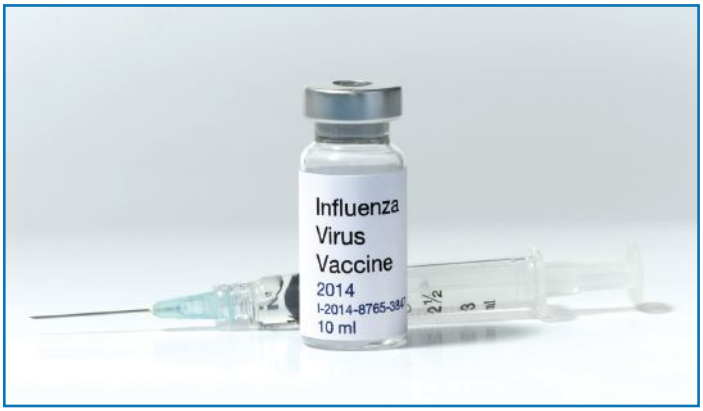
Learn more and apply by June 1 at www.arcfoundation.org/international/fellows/. For more information, contact Crystal Maldonado at crystal.maldonado@aarc.org. ■

Flu Shot Mandate: Hardly Universal

Did your hospital require you to get a flu shot this flu season? If you answered no to that question, you are not alone. New research finds less than half of U.S. hospitals surveyed in 2013 reported requiring their bedside employees to receive the influenza vaccine. Overall, just 42.7% said they required a flu shot, although another 10% said they would require the vaccine in the coming year.

VA hospitals fared particularly poorly on the survey, with just 1.3% requiring a flu shot for clinicians. The VA has since issued a call for near-universal vaccination by the year 2020.

Why don't hospitals require the shot? The survey found several factors come into play, including union resistance and lack of support from administrators. The study was published in a recent issue of *Infection Control & Hospital Epidemiology*. ■



Strange But True...

Good things come in small packages: A simple amoeba nicknamed "Dicty" may be pointing scientists to new targets for the treatment of COPD. In laboratory studies, investigators from Johns Hopkins found the tiny animal possesses a couple of genes that offer a protective effect against cigarette smoke extract.

Molecular memory: U.S. researchers at Environmental Research, Johns Hopkins Bloomberg School of Public Health have found molecular evidence of prenatal exposure to cigarette smoke in children up to the age of five. The finding suggests such "epigenetic signatures" may one day help predict future health problems. ■

Free Radicals Found in E-Cigarette Aerosols

Researchers from Penn State College of Medicine who measured free radicals in e-cigarette aerosols found e-cigarettes produce high levels of highly reactive free radicals, molecules associated with cell damage and cancer.

While the levels of free radicals found in the study were significantly lower than those seen in regular cigarettes, the investigators still believe there is cause for concern. "This is the first step," study author John P. Richie, Jr., was quoted as saying. "The identification of these radicals in the aerosols means that we can't just say e-cigarettes are safe because they don't contain tobacco. They are potentially harmful. Now we have to find out what the harmful effects are."

The study was published in *Chemical Research in Toxicology* late last year. ■

Sunshine Vitamin Falls Short in Helping Asthmatics Avoid Common Cold

Vitamin D has been touted for its ability to help fight off infections, but asthma patients shouldn't expect it to help them ward off the common cold. According to researchers conducting the multi-center AsthmaNet Vitamin D Add-on Therapy Enhances Corticosteroid Responsiveness trial, the vitamin had no effect on the number of colds suffered by study participants.

The trial enrolled 408 adults with mild-to-moderate asthma whose vitamin D levels were insufficient or deficient and who were experiencing asthma symptoms despite low-dose ICS therapy. The patients were randomized to receive either vitamin D supplementation or placebo for 28 weeks, and during that time, about half the participants experienced at least one cold. An analysis of the 82% of participants receiving supplements who achieved vitamin D sufficiency within 12 weeks found achieving sufficiency made no difference in number of colds or their severity.

The study was published ahead of print by the *American Journal of Respiratory and Critical Care Medicine* last fall. ■

Industry Watch

NCCN, BMS team up on lung cancer study

The National Comprehensive Cancer Network® (NCCN) is teaming up with Bristol-Myers Squibb (BMS) to study a molecule that may be involved in non-small cell lung cancer. To improve the scientific knowledge concerning PD-L1 protein expression and help pathologists understand the diagnostic nuances associated with lung cancer treatment, the two organizations are collaborating on a study designed to understand how different assays measure PD-L1 protein expression, measure the concordance of pathologist interpretation of various test results, and evaluate the heterogeneity of PD-L1 protein expression within tumor samples.

Inova Labs receives New Product Award 2015

Inova Labs Inc. has been awarded the New Product Award 2015 for the Activox DUO2™ by HME Business, a part of the HME Media Group. The Activox DUO2 was recognized in the respiratory In-home Equipment category. "Our team at Inova Labs is committed to helping the COPD patient to stay active and sleep well," CEO John Rush was quoted as saying. "We believe the DUO2 System achieves both of these objectives by providing a portable device with best in class combination of weight, size, and battery life for the active patient. At the same time, this integrated system also provides a 5L continuous flow oxygen solution for nighttime use, which sets the standard for quiet, reliable performance."

Enrollment begins in SENSCIS study

According to Boehringer Ingelheim Pharmaceuticals, Inc, enrollment has begun in the SENSCIS™ (Safety and Efficacy of Nintedanib in Systemic SClerosIS) study. The global Phase III trial is investigating the efficacy and safety of nintedanib in people with a rare disease called systemic sclerosis who also developed interstitial lung disease. In total, 520 people will be enrolled in clinical trial centers worldwide.

Respiratory Motion announces new VP

Technology industry veteran Subrata Guha has joined medical device manufacturer Respiratory Motion, Inc. as its vice president of business development. Guha, who most recently led the creation of the Office of the Ecosystems at Siemens Healthcare, brings more than 25 years of global industry experience to the company. He has worked with small, medium, and Fortune 500 companies serving health care, enterprise, service provider, and industrial markets.

Halyard Health receives government contract

Halyard Health Inc., formerly Kimberly-Clark Health Care, has been awarded a contract by the Biomedical Advanced Research and Development Authority to develop a one-of-a-kind, high-speed machine to manufacture N95 filtering facepiece respirators that can be used during a pandemic. "All government agencies agree that a shortage of respirators will occur during a pandemic," Lee Burnes, vice president, research and development, was quoted as saying. "So, we have a real opportunity to demonstrate our expertise and help make a difference in an area of critical need by performing research on the ability to develop an on-demand, high-speed machine that will make use of stockpiled raw materials to produce respirators."

Discovery Labs reports good results for AEROSURF

According to Discovery Laboratories, results from the AEROSURF® Phase 2a clinical program in premature infants 29 to 34 weeks gestational age with respiratory distress syndrome (RDS) showed the safety and tolerability profile of the AEROSURF group was generally comparable to the control group. The data also suggest AEROSURF may be reducing the incidence of nCPAP failure. nCPAP failure rates were 53% in the control group compared to 38%, 14%, (excluding one patient who was inappropriately enrolled), and 38% in the 45, 60, and 90 minute

AEROSURF dose groups, respectively. The trial consisted of two multicenter, randomized, open-label, controlled studies conducted in a total of 80 premature infants with RDS.

BI announces study on IPF drugs

Boehringer Ingelheim Pharmaceuticals, Inc. has announced the initiation of a 12-week study to assess the safety, tolerability, and pharmacokinetics of add-on treatment with pirfenidone to background therapy with OFEV® (nintedanib), versus OFEV taken alone, in people with idiopathic pulmonary fibrosis (IPF). The trial's primary endpoint is the percentage of people with on-treatment gastrointestinal side effects from baseline to week 12. "Boehringer Ingelheim has a long-standing and continued commitment to addressing the significant unmet needs of people affected by serious respiratory diseases like IPF," Danny McBryan, MD, vice president, clinical development and medical affairs/respiratory, was quoted as saying. "This trial is being initiated to provide the scientific and health care communities with important information about the safety of OFEV when combined with another FDA-approved treatment for IPF."

PTC Therapeutics teams up with Massachusetts General

PTC Therapeutics, Inc. has entered into a research collaboration with Massachusetts General Hospital for the treatment of rare genetic disorders resulting from pre-mRNA splicing defects. Under the terms of the agreement, PTC will gain an exclusive worldwide license to compounds that modulate alternative splicing of the IKBKAP pre-mRNA — the predominant cause of familial dysautonomia, also known as Riley-Day syndrome, a rare life-threatening genetic disorder that affects the autonomic and sensory nervous systems of children from birth, causing severe respiratory, cardiovascular, orthopedic, digestive, renal, and vision problems.

Therabron announces personnel changes

Therabron Therapeutics, Inc. has announced changes to the company's management team. Dr. Thomas F. Miller has been promoted to president and CEO and Dr. Aprile Pilon has assumed responsibility for leading and advancing the company's secretoglobin platform in the role of executive vice president and chief scientific officer. Therabron has also named Anita Fauchier as its vice president of regulatory affairs and quality assurance. "I am honored to have the opportunity to assume this role at Therabron, a company committed to generating transformative therapies in the respiratory care space," Dr. Miller was quoted as saying.

Ansun BioPharma reports preliminary data on RSV candidate

According to Ansun BioPharma, preliminary data suggest the in-vitro activity of DAS181 against the respiratory syncytial virus (RSV) may be more potent than Ribavarin, the current treatment for RSV. CEO Ronald Moss, MD, said, "As DAS181 is currently in the clinic being studied for the treatment of other respiratory viruses, clinical trials are warranted to test the efficacy of this drug against RSV infection as well."

Pulmatrix appoints new chairman

Pulmatrix, Inc. has appointed Mark Iwicki as chairman of its board of directors. Terry McGuire, who served as chairman since June 18, 2015, has retained his seat on the board and another director, David Maki, is vacating his seat while remaining an advisor to the company on intellectual property matters. Robert Clarke, PhD, Pulmatrix's president and CEO, was quoted as saying, "Mark's outstanding track record building biopharmaceutical businesses will serve us well as we continue to develop Pulmatrix's pipeline of drugs for cystic fibrosis, chronic obstructive pulmonary disease, and idiopathic pulmonary fibrosis."

The Lancet publishes aspergillosis study

According to Astellas, results from the pivotal Phase 3 SECURE trial evaluating CRESEMBA® (isavuconazonium sulfate) in adult patients with invasive aspergillosis have been published in *The Lancet*. In the randomized, double-blind, active-control study of 527 adult patients at multiple sites around the world, CRESEMBA demonstrated non-inferiority to voriconazole on the primary endpoint of all-cause mortality through day 42. All-cause mortality through day 42 in the intent-to-treat population was 18.6% in the CRESEMBA treatment group versus 20.2% in the voriconazole treatment group.

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

Diagnostic Tablet

The Chartis Tablet from Pulmonx® is portable, has a small footprint, and is designed to be easier for clinicians to use during pre-procedural evaluation to identify optimal patients for Zephyr®Endobronchial Valve therapy. The proprietary endoscopic, catheter-based diagnostic system identifies collateral ventilation by enabling precise and real-time assessment of flow and pressure readings for specific lobes in the lungs. www.pulmonx.com

CPR Combo

The ResQCPR™ System from ZOLL® Medical Corporation is a combination of two medical devices, the ResQPUMP® ACD-CPR device and the ResQPOD® Impedance Threshold Device. The devices are used together during CPR to create an enhanced vacuum in the chest that improves blood flow to the brain and vital organs during states of low blood flow such as cardiac arrest. www.zoll.com

6-Minute Walk Test App

CareFusion's Vyntus® WALK allows clinicians to conduct the 6-minute walk test without the need for external wires or means of connection. The application seamlessly integrates with CareFusion's Windows-based SentrySuite diagnostic platform and software to enable further evaluation, central data management, and reporting, but it also functions in standalone mode, independent of a proprietary database interface. In the latter case, reports can be printed directly from the tablet, scanned into the electronic medical record, or printed to a network PDF location. www.carefusion.com

Disposable Pulse Oximeter

Oxxiom from True Wearables is the world's first wireless, continuous, fully disposable, single-use pulse oximeter. Oxxiom measures arterial oxygen saturation, pulse rate, and the perfusion index. The innovative design combines the electronics and biosensing technology of a clinical grade pulse oximeter into a tiny, easy-to-use device that offers more than 24 hours of continuous monitoring. Weighing only 0.12 ounces, Oxxiom is completely disposable, eliminating the need for sterilization and significantly reducing the risks of cross contamination. www.truewearables.com

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

— 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.

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Mallinckrodt Pharmaceuticals

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Calendar of Events

AARC & State Society Programs

April 17–19

Spokane, Washington

Respiratory Care Society of Washington – 43rd Annual Pacific Northwest Regional Respiratory Care Conference and Scientific Assembly

Contact: www.RCSW.org; Christian Striggow (509) 429-8184

April 18–19

Sioux Falls, South Dakota

Gold Standard Pulmonary Conference, Enrich Your Knowledge!

Contact: sdsrc.vendors@gmail.com

May 6–7, 2016

Columbus, OH

7th Annual Pediatric Asthma Conference

Contact: Nationwide Children's Hospital, (614) 355-0676 or visit http://www.nationwidechildrens.org/asthma-conference

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Other Meetings

June 1–3

Oak Brook Terrace, Illinois

Illinois Society for Respiratory Care – 48th Conference and Exposition

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

Submissions for the next available issue are due February 19.

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

Advertiser Index

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

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A Very Fortunate Career

by Frank Sandusky, MBAHC, RRT

When you read this article, I will have been retired from respiratory care for two years. Today I spend my time gardening, volunteering, and making cookies.

My career as a Registered Respiratory Therapist spanned more than 43 years. However, it feels like just yesterday that I started out as a student/inhalation therapy technician at St. Alexis Hospital in Cleveland, OH.

That day began with the clinical experience. Basically, we supplemented the respiratory staff by doing IPPB treatments, unpaid of course. At the magic hour of 3 p.m., off came the college student lab coats, and on went the department lab coats. We then went to treat the same patients we had seen earlier. This was how clinical training was done back in those days.

I feel very fortunate, as our instructors were exceptional RTs. We also got the chance to do a month-long rotation to Rainbow Babies and Children Hospital (RB&C). RB&C wrote the textbook on pediatric therapy and it is still the finest pediatric hospital in the nation.

about the author...

Frank Sandusky, MBAHC, RRT

I got my exercise

After graduation from my respiratory program, I was offered a position at Fairview General Hospital, now Fairview Hospital, a Cleveland Clinic Hospital. Fairview had lost its anesthesia residency program and I was to replace the anesthesia resident in the critical care units. Back then, the ICU was on the second floor, the coronary unit was on the fifth floor, and the emergency room was on the first floor. The blood gas lab was inside the operating room area, and the respiratory therapy department, where all 10 of our Bird ventilators were stored, was located in the hospital basement. If you haven't guessed by now, there was a lot of running up and down the stairs.

All tubing was permanent as well, and I should also mention that the units didn't have medical air. If we needed an FIO_2 of something other than 100% or 40%, we had to put up cylinders.

This leads up to one of the most memorable days of my career. There were five Bird Mark 7 units with air/oxygen blenders in use. Air cylinders needed to be changed every nine hours. I had found some free time and decided to haul five replacement cylinders to the ICU.

The cylinder storage was located outside the hospital sub-basement — a large wood shed raised about two feet off the ground with a ramp up to the door. Five H cylinder carts were lined up waiting to be loaded, but I opened the door only to find the floor had given way. Eighty full and empty cylinders were now heaped in one large pile. Shortly after this, the hospital purchased a medical air compressor and piped oxygen to all the critical care areas.

Filling patients' needs

In those days, the Food and Drug Administration (FDA) did not oversee respiratory care devices. Most equipment was either made or modified. This included making pediatric oxygen masks from oxygen tubing and a Dixie cup. Adult ventilator circuits were modified for pediatric patients. Respiratory Care had

Frank Sandusky has turned to gardening and volunteering during his retirement.

many articles on how to make or modify devices. Today, many of the FDA-approved devices can trace their origins back to a respiratory therapist who was just trying to fill a patient's need.

Get involved in your profession

As I noted at the beginning of this column, I had a very fortunate career in respiratory care. I was in attendance at the recent AARC Congress to see two of my good friends awarded the Fellows of the AARC designation. For 18 years, we organized a respiratory educational conference in Cleveland. I have met many nationally recognized respiratory therapists and physicians in the respiratory care profession, and I have had several articles published in *AARC Times*.

My best advice to therapists reading this article is to get involved. Contact the AARC, do a research project, write articles, and take an interest in your state societies. It's your profession, so make your mark. ■

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*An abrupt discontinuation of an inhaled pulmonary vasodilator may lead to rebound pulmonary hypertension.[5,6] When a device failure causes the abrupt discontinuation of the therapy, this situation can be referred to as device-related pulmonary hypertension.

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References: 1. The Joint Commission. The Joint Commission announces 2014 National Patient Safety Goal. http://www.jointcommission.org/assets/1/18/JCP0713_Announce_New_NSPG.pdf. Published July 2013. Accessed December 4, 2015. **2.** INOmax DS$_{IR}$ Plus Operation Manual. Hampton, NJ: INO Therapeutics LLC; 2014. **3.** INOmax DS$_{IR}$ Plus MRI Operation Manual. Hampton, NJ: INO Therapeutics LLC; 2015. **4.** INOmax DS$_{IR}$ Operation Manual. Hampton, NJ: INO Therapeutics LLC; 2012. **5.** Atz AM, Adatia I, Wessel DL. Rebound pulmonary hypertension after inhalation of nitric oxide. *Ann Thorac Surg.* 1996;62(6):1759-1764. **6.** Lavoie A, Hall JB, Olson DM, Wylam ME. Life-threatening effects of discontinuing inhaled nitric oxide in severe respiratory failure. *Am J Respir Crit Care Med.* 1996;153(6, pt 1):1985-1987.

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STG-0080A/CO-021562