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election 2021

Meet the Candidates

Inside This Issue

FEATURES

Meet the Candidates – Election 2021

Members of the AARC will soon vote for the candidates running for 2021 officer and director positions in the AARC leadership on an online secure website. Read through the candidate biographical information now so you're prepared to vote this September.

By Debbie Bunch

CLINICAL ARTICLES

Clinical Perspectives | Addressing the Problem of Frequent Readmission to Hospital for Asthma Patients

Considering the uncertainties surrounding asthma, it is vital to devise a solution that can be implemented by both respiratory therapists and patients to help reduce the ever-increasing readmission rate.

By Ahmad Alessa, MS, RRT, RRT-NPS, RRT-ACCS, RRT-SDS, CPFT, RFPT

Trending | COVID-19 & Smoking/Vaping

The lungs are one of our innate immune defenses, protecting us against insult from inhaled or aspirated chemicals, bacteria, and viruses. Our lungs cannot function optimally when they have been insulted by smoking and vaping.

By Mary Martinasek, PhD, CPH, MCHES, RRT, and Rheese McNab

Management | Leadership Lessons Learned During COVID-19

Our profession has changed for the foreseeable future if not forever and from our lessons learned, we grow smarter and win the little battles to ultimately win the war against COVID-19.

By Jacqueline F. Odom, MPH, RRT, and Dennis J. Guillot, Ph.D, RRT, FAARC

COLUMNS

Reflections

Ray Masferrer, RRT, FAARC, shares his experiences from his 54 years in respiratory care.

General Counsel | Situational Awareness

Anthony L. DeWitt, JD, RRT, CRT, explains how situational awareness relies on your inherent powers of observation and knowledge of human behavior to help you avoid confrontations and self-defense situations.

Executive Office Update | We Will Never Forget Them

AARC Executive Director Thomas Kallstrom, MBA, RRT, FAARC, discusses the toll the COVID-19 has taken on the RT community.

RC Currents

Check out the latest news and industry updates of the profession.

Industry Watch

Read the latest updates important news about the health industry, service industry, pharmaceutical companies, and the events that affect the profession.

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AARC STAFF SPOTLIGHT

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Meet the Candidates – Election 2021

by Debbie Bunch

Members of the American Association for Respiratory Care will soon vote for the candidates running for 2021 officer and director positions in the AARC leadership on an online secure website. **Voting runs Sep. 9 – Oct. 9 via email ballots.**

As an AARC member, you have the important responsibility of choosing individuals to lead the profession and our professional association. All of the candidates are introduced briefly here in *AARC Times*. A biographical sketch about each candidate and their answers to questions posed by the AARC Elections Committee are available for your review online.

Be on the lookout for an AARC email containing the unique link to your ballot and the instructions to vote. You can vote only upon receipt of the email, and you will vote using the unique link the AARC has generated to take you directly to your ballot.

Active AARC members of record as of Sep. 4, 2020, will be eligible to vote. Only Active and Life members of each specialty section may vote for the chair of their respective sections.

Read through the candidate biographical information now so you're prepared to vote this September. Your thoughtful consideration of this information before voting will help ensure the most qualified people will lead your professional association.

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Advocate Children's Hospital

Addressing the Problem of Frequent Readmission to Hospital for Asthma Patients

by Ahmad Alessa, MS, RRT, RRT-NPS, RRT-ACCS, RRT-SDS, CPFT, RFPT

Asthma continues to attract the attention of health workers around the world due to its high prevalence and the increased cases of hospital readmission after initial diagnosis.[1] Asthma is a heterogeneous disease, characterized by chronic airway inflammation with complex and variable symptoms of breathlessness, wheezing, coughing, and chest tightness. Currently there is no cure for those suffering from this condition.[2] We do not yet know the cause of asthma, but some environmental and genetic factors have been found to increase the likelihood of developing asthma. These include the number of siblings, the country of origin, early exposure to antibiotics, and exposure to viruses and allergens.[1] Considering the uncertainties surrounding the disease, it is vital to devise a solution that can be implemented by both respiratory therapists (RTs) and patients to help reduce the ever-increasing readmission rate.

This study is based on the health belief theory/model (HBM), which was developed by U.S. social scientists who worked in the public health sector in the 1950s.[3] The HBM is a theoretical model that can be used to guide health promotion and disease prevention. This model helps identify why people fail to adopt disease-prevention approaches or evade screening tests for early disease detection. The HBM has two health-related behavioral components. One of them aligns with the desire to get well if one is already sick, while the other is the belief that a given action will cure or prevent the illness.[3]

The first four factors are perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. In perceived exposure, the individual has a misguided view of their probability of acquiring asthma. Perceived severity suggests that the reference is on the person’s feelings about the seriousness of getting the disease. Perceived benefits, on the other hand, align with one's perception of the impact or success rate of diverse options to alleviate asthma. Lastly, the perceived barriers are about an individual's feelings when conducting a given health action.[3]

The next two principles are the cue to action and self-efficacy. The cue to action is the provocation that activates the decision-making process, which encourages an individual to consent to the recommended health action. The cues can be external, internal, or both. External signals are elements like a newspaper article, an illness in someone close, or others’ advice. An internal cue may be pain and wheezing. Self-

efficacy, on the other hand, is about the confidence levels of an individual in their potential to successfully engage in a given act; this element is key to patient adherence to a course of treatment.

The causes of readmissions and negative effects of asthma

Various factors can increase a patient's chances of being readmitted. First, self-management training may be a contributory factor.[4] In a study of 44 adults diagnosed with asthma, the results indicated that maladaptive problem-solving and coping approaches can affect asthma health burdens.[4] Indeed, faulty coping strategies taught to patients can play a role in increasing the rate of readmissions.

Other studies have confirmed that readmission rates are increasing due to factors that may not entirely be within the control of the patients and the health care providers. For example, recent studies support the notion that patients with anxiety, sinusitis, prior in-patient hospitalizations, previous admissions, history of gastroesophageal reflux disease, emergency department visits, and numerous medications are more likely to be readmitted within 30 days after discharge.5 The use of systemic steroids, food allergy, psycho-social issues, sex, and passive exposure to tobacco are linked to the readmission of children with asthma.[6]

The most common adverse effect of asthma is the financial burden. According to the Asthma and Allergy Foundation of America (AAFA), asthma-related expenses were $53 billion in 2002, increasing to $56 billion in the succeeding five years.[7] Between 2008 and 2013, asthma cost the government $50.3 billion in annual medical expenses plus $29 billion from asthma-related fatalities.[7] The same study also noted a $3,266 annual per-person incremental medical cost due to asthma.[7] Thus, these expenses give credence to the severity of the impact of asthma to the country.

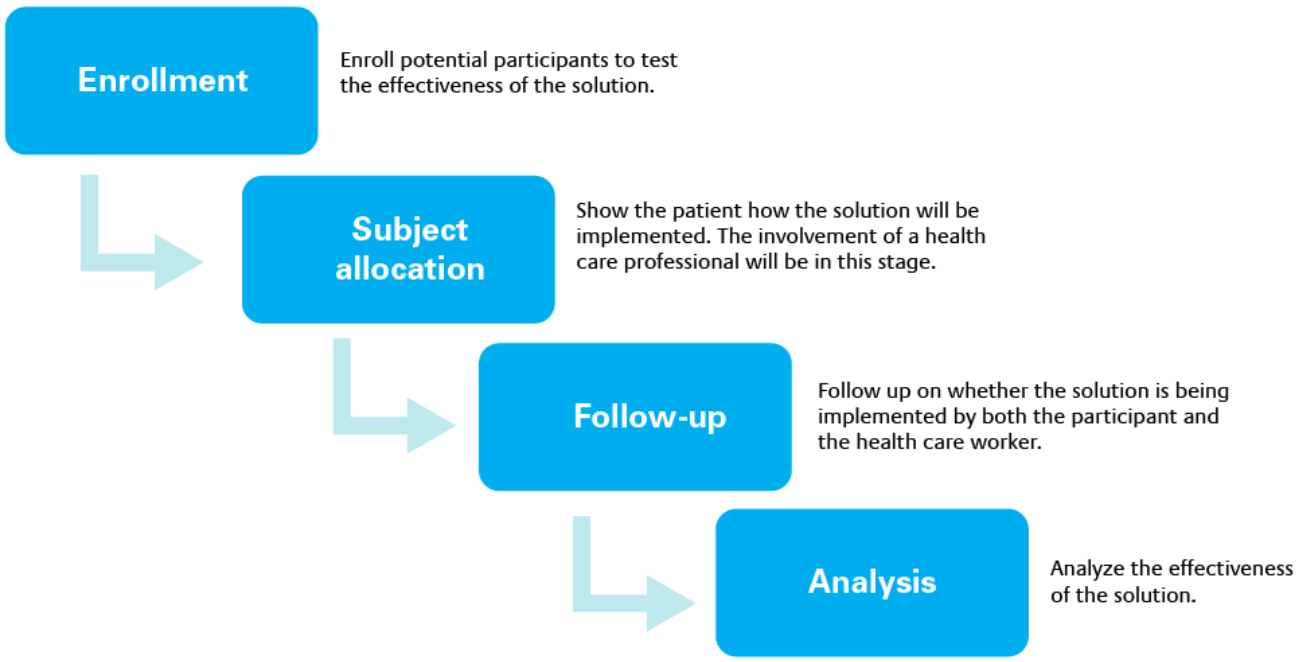

Figure 1: Flow Chart for Proposed Solution

Process and procedures of implementation

The solution entails the active involvement of the patient in the management of asthma to reduce readmission rates (Fig. 1). To be effective, the method will involve an RT and the patient. This approach

will also include technology as a resource due to the prevalence of telehealth in the management of chronic health conditions.

The first step is the appointment of patients or individuals who can conduct the relevant aspects of the solution. They need to be adults or family members participating in providing primary care to patients with asthma. If it is not possible to place them in any of the two categories mentioned, these individuals need to be close to the RT in an environment where they can receive the right care, before further steps of the implementation are taken.[8]

The technological aspect of this solution will include patient and family education on asthma. The available health care professional, such as the RT, will teach the participants how and where to acquire the necessary information relating to asthma management through the technology available at their disposal (e.g. smartphones, tablets, laptops).[9]

Among the relevant training to be given, all of which should be evidence-based instruction based on international guidelines (e.g., GINA 2020), the patients must be educated about the right inhaler technique. This training should include having the patient "teach back" to the trainer. Technology can also be used to access resources like YouTube that offer illustrations or demonstrations of some medical practices. Alternatively, the RT can create an online tutorial that is not only accessible by the target patient, but also by other professionals and patients with asthma. The RT can then direct patients to the channel to ensure that they have access to the right information.

Telehealth is another aspect of technology that applies to this solution. This application increases the interactions between patients and their health care providers in a team approach with shared decision making, even after the patients have been discharged. Hence, through the app, the RT can monitor whether the patient is adhering to the recommended treatment plan.

It is relevant to note, however, that the technological option may limit some people from accessing asthma management options. This may be due to a lack of expertise in using the technological platforms or limited internet access. In that case, it is in the best interest of the patient for the RT to teach the patient and other family members about options they can implement despite limited technological resources. Through the hands-on approach, the designated RT may, for instance, personally demonstrate how to provide relief when a person with asthma experiences obstructed airways or breathing difficulties. This way, the RT can help the family members understand what is known as assisted inspiration, which involves the use of hands.

The prevalence of readmissions due to asthma needs to be taken seriously due to the increasing severity of this health condition. Moreover, the social and financial burdens characterizing this illness calls for steps to be taken in controlling or managing it. The home-based management solution, which is characterized by increasing awareness about the condition through available technologies, will play a crucial role in reducing these readmissions. The engagement of the hands-on approach to neutralize an exacerbation can also reduce the escalation of this health condition.

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COVID-19 and Smoking/Vaping

by Dr. Mary Martinasek, PhD, CPH, MCHES, RRT and Rheese McNab

From an outbreak that first appeared in Wuhan, China, COVID-19 has evolved into a global pandemic that is affecting communities all over the world. However, coronaviruses are not new to humans.[1] They were first identified in the 1960s, and several of the older strains account for 10–30% of respiratory illnesses such as the common cold and rhinorrhea. Coronaviruses get their name from the crown-like protrusions that appear on the surface of the virus. These protrusions or spikes are the feature of the virus that enable it to attach to and attack human cells and thus produce disease.

From an historical perspective, the first SARS (severe acute respiratory syndrome) virus, called SARS-1, infected humans in China and had a case fatality rate of 10%, meaning that for all the cases identified, one out of ten people died. In 2014, the second deadly coronavirus emerged in Saudi Arabia with a case fatality rate of 34%. The current virus, SARS-2, differs genetically from the 2002 SARS-1 virus. However, both viruses are spread through respiratory aerosol and attack humans through the same human receptor, ACE-2 (angiotensin-converting enzyme), which is located throughout the body.[2] In the respiratory system, ACE-2 receptors are found in goblet cells and epithelial cells, and in the pulmonary vasculature. This receptor normally serves as a regulator for heart function and blood pressure. The transmission of viruses often occurs through the oral and nasal mucosa, hence the recommended public health measures of washing hands, physical distancing and wearing masks. Once in the body, SARS-2 causes the disease COVID-19 (CO = corona, VI = virus, D = disease, and 19 = the year 2019, when it was first identified).

The lungs are one of our innate immune defenses, protecting us against insult from inhaled or aspirated chemicals, bacteria, and viruses. Our lungs cannot function optimally when they have been insulted by smoking and vaping. Smoking causes inflammation in the lungs, overproduction of mucus, impaired mucociliary clearance, increased permeability, and increased cytokine expression.[3] Cytokines are part of our immune response working to stave off insult and injury. Increased permeability leads to increased lung injury. All of these factors indicate a less than optimal lung defense system amidst this novel coronavirus. With this evidence, smokers may be more vulnerable to contracting the virus and more susceptible to severe symptoms due to the negative impact tobacco use has on lung health.

Based on the body of literature, smoking has been found to be associated with increased severity and death in hospitalized patients.[1] In addition, a systemic review of studies conducted in China with COVID-

19 patients showed that smoking is most likely related to negative symptoms of COVID-19. This review found that among patients with adverse health outcomes of COVID-19, around 3-27.3% of them were current smokers or had a history of smoking. While there is still much research to be done regarding smoking and its association with the risks of acquiring the disease, we do know that smoking exhibits risk factors. For example, expression of the ACE-2 gene is higher in current and former smokers as compared with nonsmokers.[4] In general, smokers are more vulnerable to lung infections because their immune system is weakened.[5] Additionally, nicotine, whether in vaping devices, cigarettes, or other inhaled tobacco products, induces airway epithelial dysfunction, making the lungs even more vulnerable.[6]

Vaping using an electronic nicotine delivery device (ENDS), in particular, disrupts lung lipid homeostasis and innate immune function. Lipid homeostasis in the distal airways is essential for adequate gas exchange. Electronic nicotine delivery devices alter the lipids in lung macrophages and impair the physiology of alveolar macrophages.[7] The alveolar macrophages are critical for maintaining the integrity of the surfactant complex. Additionally, prolonged exposure to ENDS vapor may impair one's immune resistance, which may result in the delayed response to viral infection and increased susceptibility to inhaled pathogens. Studies have found that ENDS vapor can potentially increase susceptibility to pneumococcal infection and the virulence and inflammatory ability of respiratory pathogens.[8,9] The hand-to-mouth motions of cigarette smoking or vaping also create a potential pathway for a virus. Much of what has been advised by the Centers for Disease Control and Prevention (CDC) is to avoid touching your face and mouth.[10] The World Health Organization (WHO) has also issued a statement to encourage individuals to stop smoking hookah/shisha because of increased risk of infection.[11] This is likely due to the sharing of mouthpieces and the lack of regulation on cleaning these devices, which is similar when it comes to vaping/smoking. These warnings are in addition to the consistent recommendations that smokers quit tobacco use.

During these troubling times, some media outlets have circulated misleading information suggesting that smoking may be beneficial.[12] Such reporting can have negative repercussions on the public; leading people to take desperate measures such as the uptake of smoking, as well as panic-buying and misuse of nicotine products. As Respiratory Therapists we must examine media reports for background sound science and ensure that untruths are not perpetuated. Many individuals are trying to quit smoking and we will want to continue to encourage cessation. Some utilize FDA approved products and others are utilizing ENDS devices.

The increased use of ENDS has urged health professionals to understand the potential long-term negative health effects that these devices have on the general population. Research continues to evolve around ENDS suggesting more education and regulation is needed. In particular, when used as cessation devices there is uncertainty around exactly how much nicotine is in a particular device and which devices contain carcinogens. Many people are unaware of the propellants in these devices and the risk for nicotine toxicity and addiction. Respiratory Therapists can advocate for greater regulation on ENDs devices. As Respiratory Therapists, it is important to know the factual literature, discern poor research from good research, and educate your patients and those around you. As such, it is crucial that Respiratory Therapists are knowledgeable about the risks associated with different nicotine and tobacco products and the appropriate and approved cessation interventions used to help patients.

The COVID-19 pandemic has caused great concern in the public health community and has placed an increasing amount of urgency on the scientific community to find a suitable treatment or a vaccine. The negative changes that tobacco smoking causes in our bodies lead us to believe that smoking can only cause additive harm. Other media outlets have claimed that smoking has no effect on the progression toward a more severe diagnosis of COVID-19.[14] However, these are unproven claims that are not backed by sufficient scientific data and research, and the harmful effects on the general public must be taken into consideration. Although the relationship between smoking and the onset of severe conditions of

coronavirus is uncertain, it has been noted that "identified vulnerability conditions for this progression (cardiovascular and respiratory disease, diabetes) in mostly senior patients are strongly correlated with long-term harms from smoking."[15]

Nicotine and tobacco use should not be advised as having a therapeutic role in treating patients with COVID-19 due to the already known adverse health effects that smoking/vaping has on the human body and the immune system. It is known that early exposure to nicotine, a highly addictive drug as negative effects on brain development, especially in young adults whose brains are not fully developed. These effects include cognitive impairment, memory issues, and mental health concerns. The respiratory system effects of inhaling aerosols from these vape devices include many unknowns. The propellants in vape devices (propylene glycol and glycerin) are class 2B carcinogens and respiratory tract irritants, the novelty of these products is lacking long term implications. Assumed long-term effects from the carcinogens (formaldehyde, acrolein, acetaldehyde) in the aerosols can only be extracted from other product use. Many of the components in both ENDS and conventional cigarettes can cause respiratory distress and disease due to the lung damage that may result from prolonged use of these products.[16,17] As the available literature has already taught us, smoking can lead to a "greater likelihood of severe illness and worse outcomes from coronavirus."13 Smoking is still the leading cause of preventable deaths worldwide, and now more than ever the public is advised to quit tobacco use.

Below are resources to help your patients, family members, and community quit smoking and/or vaping and understand COVID-19. Utilize these resources to find free services and products for your patients and others who want to quit vaping/smoking.

- CDC Coronavirus Resource: https://www.cdc.gov/coronavirus/2019-ncov/index.html
- Smokefree.gov: https://smokefree.gov/quit-smoking/smoking-and-covid19
- AARC Resources: https://www.aarc.org/resources/clinical-resources/tobacco-resources
- Smokefree.gov: https://smokefree.gov
- 800-QUIT-NOW (800-784-8669): All states have quitlines with counselors who are trained specifically to help smokers quit. Call this number to connect directly to your state's quitline. Hours of operation and services vary from state to state.
- American Lung Association: https://www.lung.org/quit-smoking/i-want-to-quit
- Vaping Cessation for Teens: https://teen.smokefree.gov/quit-vaping/how-to-quit-vaping
- Ditch Juul: https://truthinitiative.org/research-resources/quitting-smoking-vaping/how-quit-juul

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Leadership Lessons Learned During COVID-19

Jacqueline F. Odom, MPH, RRT and Dennis J. Guillot, PhD, RRT, FAARC

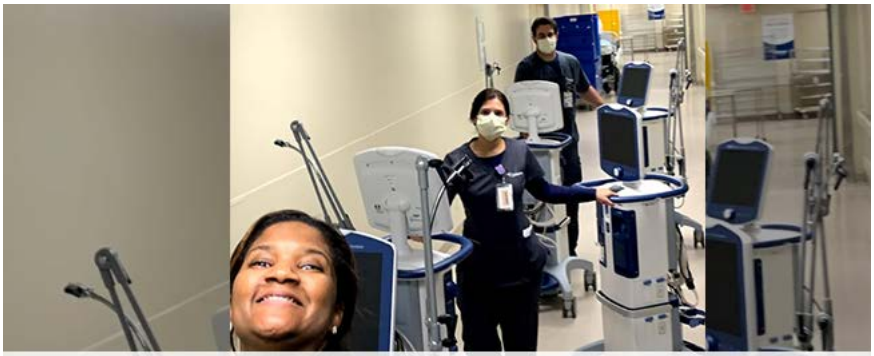
Leadership Lessons: COVID-19 the Teacher

Coronavirus disease (COVID-19), 2019 novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) . . . these are names that many of us in the respiratory care world had never heard of at the start of 2020. We quickly became more familiar with these terms and the virus than we ever cared to, and we were on the front lines in battle. Government officials, media outlets, and the general public were introduced to new terms as well, like respiratory therapist (RT), ventilator, SpO2, isolation PPE, N95 mask, and many others terms that are part of our everyday life in respiratory care. Our profession has changed for the foreseeable future, if not forever, and from our lessons learned, we grow smarter and win the little battles to ultimately win the war against COVID-19.

Melanie and Janet try to figure out how to drink their morning coffee without breaking the "Mask On" policy.

In a Friday evening phone call with my section leader, there was an estimated need to run 100 ventilators daily (our usual average is 40 daily), but my immediate thought was, “If you think 100, we should plan for 200.” Through the remainder of the weekend, my waking hours were spent on the phone and on the computer doing the math and gathering information. Having been through many hurricanes on the gulf coast over the years, my plan was to prepare for the longest and worst hurricane, “Hurricane COVID-19.” On Monday, after preparing my mind and my heart for what I was about to tell my dedicated team, the words were "Things are about to get real; strap in and hang on, but we are here in it together and we will

get out of it together." After much of the COVID rush was behind us, what the team seemed to appreciate the most was my directness and my very real approach to what we were about to embark on as a team and as a hospital. The lesson for me was that I must always deliver truth and honesty to the team, no matter what challenge lies before us. Raymond Pisani, BS, RRT, RRT-ACCS, RRT-NPS, FAARC, summed it up this way: “Be a positive leader. Let your team know that you're feeling the same as they are. Fear, anxiety, the unknown. We are all going through this together.”



As the 980's and other equipment rolled in, the team spent hours and into the night trying to get things ready and set up.

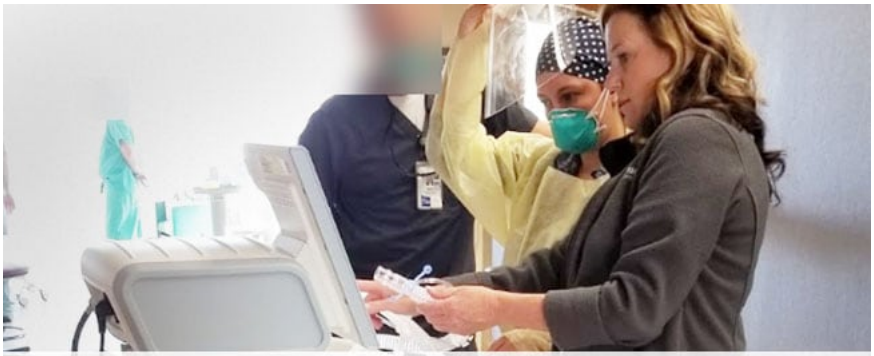
When COVID-19 hit, our leadership team at Ochsner Medical Center in New Orleans had to rethink our patient–ventilator assessments (PVA). We quickly had to accommodate the 200% increase in ventilator counts within the first 10 days with the same amount of staff. We performed our patient–ventilator assessments on patients with COVID-19 patients every six hours instead of the prior practice of checking every two hours (non-COVID-19 patients were checked every four hours) to reduce the exposure of work teams and to manage workloads better.

Shelby asks for HEPA Filters. With this being a needed form of communication, the RTs became pros at writing in mirror image.

We kept our general philosophies the same, but “all hands on deck” was the mode. Terri Nelson, MBA, RRT explained, “My leadership philosophy has always been to lead by example. This has not changed since COVID-19. COVID-19 kept me further grounded as a leader. When such an unprecedented illness/pandemic affects the lives of millions, it keeps you humble, drives your purpose, and gives you even more reason to persevere for the patients and your team.” Prior to COVID-19, meetings, conference calls, analytics, and presentations totally engulfed my time as a department manager. During the peak of the virus, our executive leadership allowed department managers to give frontline support to staff. This really showed the staff that the leaders were on their side. My hope is that department leaders can continue to provide some level of frontline support post-COVID-19.

Ochsner set up a triage center called the Respiratory Evaluation Unit (or REU).

Operationally, protocols would be one of our biggest winners from this experience. When I was asked by a physician what should we do to care for COVID-19 patients, I simply said, why are we not treating our patients like we treated them prior to COVID-19? We don't treat tuberculosis, flu, HIV, MRSA, etc., any differently. Staff member Margaret Rooney, CRT, stated, "RTs are speaking up better and being better patient advocates." After the crisis and workload slowed, we continued to advocate for all patients, and the physicians trusted our judgement by asking for and implementing our protocol and treatment recommendations.


Jackie (right) teaches others how to set up the V60 as an invasive ventilator. The team did not have time to have the proper in-service, so they went to each and every RT that day and night and taught them the process.

Additionally, the hospital leadership's view of our productivity changed, and thus management of staffing improved. Interestingly, when the 200% increase in ventilators and the new protocol of minimal therapy for all COVID-19 patients went into effect, the charge volume dropped dramatically. This illustrated the fact that managing ventilators does not hold the same weight as giving aerosol treatments or checking daily oxygen. During the peak of COVID-19, measures of productivity showed that we were overstaffed by 28%. Hospital leadership observed that as acuity and ventilator numbers grew, we needed more staff, not less. We were grateful for the opportunity to demonstrate this phenomenon to our leaders. Adrian Sampson, MHA, CRT, shared, "COVID-19 has really highlighted and changed our day-to-day practices for the better. It has brought self-awareness to our workflow, decision making, and infection-control measures."

Terri (back right), the manager, teaches the team how to set up the V60 for invasive ventilation. Mark (background, center), purchasing coordinator, listens on so he could prepare the equipment for the RTs.

Crisis time: Time to learn

One of our RTs, Holly, who is a mother and the sole provider for her family, became deathly ill with COVID-19. As Holly's health declined, she expressed a will to survive at all costs for her family and accepted that she may need to be intubated and possibly trached. Holly said often, "All I do is cough," "I am proning myself," and "I can't take a deep breath for my MDI." At the time, current COVID-19 treatment called for intubation with no noninvasive ventilation or aerosol therapy. Our medical director and Holly gave us permission to do whatever it took to manage her recovery. Holly was hospitalized for some time, but she was never intubated because we believed in the continuous use of traditional modes of therapy. Treating Holly as our own family member helped staff gain greater trust in their skills and knowledge. Making a daily investment in our team's health is very important to me, as I knew that staff could contract COVID-19 because of their daily exposure. Additionally, I chose to follow and treat COVID-19 patients as their respiratory therapist early on. Patients experienced success with my treatment recommendations but, more importantly, the work teams needed to see that I would be the first to do the difficult therapies on the front line. I support and believe in our "all hands on deck" mode!

Survivor guilt: family, work, or both?

The guilt that we all felt every day as we left our families for the hospital, and again on the way home as we left our team, certainly weighed heavily on our hearts. The recalled the survivor's guilt that many of us felt from Hurricane Katrina. Hearing, "Mom, when will you be home, what can we eat tonight, why do you have to work even when you're home?" These echoes from my family never ended. When I left my work team, I felt the guilt of "they need me, they are drowning, they are scared." There is no textbook that teaches you how to raise children, nor one to teach us to lead through a crisis such as COVID-19. You must trust yourself and trust that you have built a team of high performers. Victoria Di Gregorio, CRT, shared, "Each day during huddle we started off with a prayer, then I gave words of encouragement, admiration, love and empathy. Then, [I] help[ed] them cope with their fears and concerns, and provide[d] a safe zone for them to cry and let off steam."

COVID-19 did little to change the way that we provide care on a day-to-day basis in our department. Certainly we had to make few adjustments during a very difficult time. Our visibility, knowledge, and skills increased the trust of other staff and, more importantly, the physicians. Once the crisis subsided, we were able to go back to business as usual with some wins and very few modifications to our daily practices. I did my best to stay true to myself, our work team, and my family. I appreciate them all so much more now after this experience, and I am sure you do as well.

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Reflections

by Ray Masferrer RRT FAARC
Editor Emeritus, RESPIRATORY CARE

As per the editors' request, this article is a reflection on my 54 years in respiratory care. It is my hope that by reading my stories you will be able to relate to them, learn from my trials and tribulations, and, in the end, perhaps carry with you some of my findings and views as you move forward in your chosen profession as a respiratory therapist.

I migrated to the United States from Cuba in 1960 without knowing a word of English and with $7 in my pocket. I never attended a respiratory therapy school . . . there were no such schools back in 1963 when I was preparing to attend the University of Dallas as part of my plan to be a lawyer, and I needed a job to pay for school and to survive. I went to work in inhalation therapy at Parkland Hospital in Dallas at $1.15 an hour, or $46 a week before taxes.

That episode of my life at Parkland Hospital is the first of four episodes I want to tell you about today. At the beginning, it was just another job and it wasn't at all romantic. The main parts of the job included moving large cylinders of oxygen and compressed air to and from patient rooms. I also washed and sterilized equipment and supplies. That was a time when just about everything was reusable — this is the exception nowadays, but back then it was the rule. On my first day at work, Labor Day, Sept. 2, 1963, I was being shown the layout of the hospital and the numbering system for the patient rooms when the emergency pager came on and my guide was asked to go to room 641 and help. When we got to the room, the patient was having a hard time breathing and the doctor was getting ready to perform a tracheostomy, right there in the room, which by the way had no air conditioning and the windows were open to let air in. The doctor made the cut through the neck into the trachea and immediately asked for a suction machine. I have never forgotten the sound made by the suctioning and the machine, but right then and there I decided that inhalation therapy was as close as I could get to help someone in need of medical care without being a physician or a nurse. I could make a difference during every shift and still pursue my goal to be a lawyer. I told myself that I wanted to learn everything the practice of inhalation therapy could offer. Remember, this was a time with no respiratory therapy schools or textbooks on the subject. There was, however, a relatively new book entitled The Lung by Julius Conroe, a pulmonary physician from San Francisco. The book detailed the anatomy and physiology of the lungs in a manner never described before. Reading that book a few times gave me a tremendous base that has served me ever since. Just about all of the respiratory therapy equipment available was powered by compressed

oxygen or air, or a combination of the two, and there were no books or papers explaining how they worked or their benefits, if any. I made it a point to learn the equipment inside out by taking it apart and putting it back together, and after about a year I would brag I could do it with my eyes closed.

Sometime around my third year in college, I got to know and worked with two brilliant pulmonary physicians at the University of Texas Southwestern Medical School and Parkland Hospital, Dr. Alan Pierce and Dr. Bill Miller, both deceased now. For someone like me, they are still very much alive and their legacy and mentoring are still felt by the hundreds of therapists and physicians they trained. Stories about their impact would take many pages, but I will just tell you how they affected me and how they played a very significant role in my life. This is my second story.

As I began working with Pierce and Miller, I heard them refer many times to research articles published in medical journals as learning points to use when treating patients. That aroused my curiosity, and I took it as an incentive to learn more about pulmonary medicine and respiratory care, and to try to have scientific facts whenever I opened my mouth on how to best take care of patients. By this time, Dr. Pierce was medical director of Respiratory Care at Parkland, and he granted me access to a Xerox machine — something new at the time — so I could copy articles from journals. I would take the articles home, stack them on the night table by my bed, and read them when I went to bed and whenever I woke up.

The more I read and the more I tagged along when Pierce and Miller made patient rounds with the medical interns, residents, and pulmonary fellows, the more I realized I knew very little about anything and that I needed to learn a whole lot more if I was going to amount to anything in the field of inhalation therapy. Reading articles and my association with Pierce and Miller and others made me to want to be connected with people smarter than me and to learn from them everything I could.

My third episode began in 1967 when I graduated from college. At the time, one of the greatest things that can happen to a person was about to happen to me: my first child was going be born in August. My plans to go to law school were put on hold. I now needed in the worst way a good job with a good salary. When this all started back in 1963, there were no schools dedicated to inhalation therapy, but Dr. Pierce had decided he wanted to have someone with a college degree to run the inhalation therapy and the pulmonary function departments, even if that person had a liberal arts education like mine. A month before I became director of those departments with a monthly salary of $500, Parkland Hospital, at Dr. Pierce's urging, had decided that a larger staff was needed to provide all the treatments being ordered by the medical staff. At 22 years old, I was put in charge of 73 people responsible for providing inhalation therapy 24 hours a day, 7 days a week. Most of the new staff consisted of 3 licensed vocational nurses and nurse aides transferred from other departments in the hospital. Most of them were women and were old enough to be my mother — and they made sure that I knew that! I was not only responsible for staffing and providing inhalation therapy around the clock, but I was also responsible for teaching the new staff what little was known back then about the art and science of inhalation therapy. I took that responsibility as a great challenge, and it was a terrific opportunity for me. Right then and there, I decided not only that I wouldn't fail, but also that I wanted to be the best respiratory therapist anywhere, even if I could never prove it.

As part of my continued efforts to read articles published in peer-review medical journals, and my way of questioning the benefits and harms of what we were doing in our daily practice, I felt I wanted to share my findings with others inhalation therapists outside Parkland Hospital. Dr. Pierce strongly encouraged me to do so, and in 1968 I submitted my first article to the Inhalation Therapy journal published by the AAIT, which today is the American Association for Respiratory Care. Soon thereafter, the late Phil Kittredge, the editor of Inhalation Therapy, invited me to help him with the Journal. And that is where my fourth and final story begins.

I now had a great opportunity to do work with the Journal that could contribute to the advancement of respiratory care not only at Parkland Hospital, but for all care providers interested in respiratory therapy. It is mandatory for a medical profession like ours to have a peer-review journal, not only to advance the art and the science of respiratory care, but also to question the advantages and disadvantages of everything we do, and to demand that only procedures and techniques that are scientifically proven to be beneficial to patient care be practiced by health care providers. My association with the journal RESPIRATORY CARE (the new name given to Inhalation Therapy back in 1973) really put me on track toward my goal to learn everything about providing respiratory care and to apply that knowledge to patients under my care. It also helped me associate with people who knew more than me and to learn from them. During my years as a respiratory therapist, I was lucky to meet and become friends with the best and the brightest RTs and pulmonary physicians. For the last few years before retiring in 2017, I worked closely with 2 RTs whom I consider the smartest and best RTs anywhere, Rich Branson and Dean Hess, Editor-in-Chief and Managing Editor of RESPIRATORY CARE, respectively. The Journal also allowed me to pass on what I learned to those wishing for the same. My association with the RESPIRATORY CARE journal began in 1968 and lasted 50 years, I'm happy to say. Looking back at my years in respiratory care, our contributions to get the Journal to what is today is what I am most proud of. To this day, I read all the articles in the Journal (that doesn't mean that I understand everything). I also read articles in other journals.

There was a time when people questioned the need for a profession like inhalation therapy. Today that is not a question anymore. There are data proving the benefits of what we do, and RESPIRATORY CARE makes sure that these data, as well as new data, are readily available and published immediately.

What has stayed with me after 54 years as a respiratory therapist?

• Being a health care provider is very self-satisfying and good for your ego, but it will also tear you apart many times and you must learn how to deal with the bad times. Trust me, in the long run the good outweighs the bad, by far.

• I learned more than I ever thought I could. But there is much more you and the rest of us need to learn. Medical care is that way — it changes by the hour and many factors contribute to those changes. Learning never ends. Aim to be the best respiratory therapist anywhere.

• As you practice respiratory care, you will come in contact with people who can expand your knowledge, not only about how to best take care of patients, but about life in general. Take advantage of those opportunities and treasure those relationships.

• To be the best that you can be, you have to look at the job as more than a 40 hours/week job . . . you are going to have to look at the bigger picture. You are going to have to put in extra time to keep abreast of what is new; you need to train yourself to read the medical literature; you need to do voluntary professional work; you must question and find positive answers to how patients are treated; and you need to establish and keep professional relationships. The opportunities for you are countless, and you can advance as far as you want, but it is up to you and no one else.

• Last, but most important, everything comes down to patient care and your responsibility to always do what is right for the patient . . . and I emphasize always. Every patient is different in just about every aspect. You have many tools and techniques available to treat patients, but remember that none of those tools is 100% effective. Whenever you care for a patient, think of how you want someone dear to you to be cared for and do that for your patient!

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Situational Awareness

by Anthony L. DeWitt, JD, RRT, FAARC

It is a common story, and it happens every day in America. A health care worker or family member is assaulted either on the way to work or on the way home from work. Employees working in health care are four times more likely to experience workplace violence than other private employees, according to data from the Occupational Safety and Health Administration.[1] In spite of this, therapists go to work every day and do their job, often oblivious to the danger that's out there.

One of the great honors I have as a lawyer is being able to teach on the subject of self-defense. I do this for a number of organizations, and I truly enjoy it. Self-defense is a human right; a person attacked has the right to defend. The right to defend stops when the attack stops. Although laws reflecting the castle doctrine and stand-your-ground may permit a person to use deadly force against another person if they're attacked in their home, the same rules do not apply to hospitalized patients. It is almost never okay to strike a hospitalized patient. It is ethically offensive to do so.

One thing that I stress when teaching the law of self-defense is a subcategory called situational awareness. About 95% of self-defense situations I've analyzed over the years could have been avoided if the person who wound up defending themselves had simply called 911 instead. Recently, a public defender, alarmed by noises outside his residence, went outside to investigate. There he encountered a man who threatened him. The attacker charged the curious lawyer and started biting him about the face and head. The public defender had to resort to an act of self-defense to save his life. Had he simply stayed behind a locked door and called 911, the police would have taken the man who attacked him into custody and no one would have been hurt.

However, self-defense in the hospital is more difficult. There isn't a 911 to call. Sometimes hospital security can help, but even then, the situation has gotten way too far out of control. Situational awareness relies on your inherent powers of observation and your knowledge of human behavior to help you avoid confrontations in the first place, and avoid self-defense situations in particular.

In health care, providers frequently encounter noncompliant patients. While we try to persuade them, many become angry and confrontational. Once a person has reached this level of discord, the best practice is to engage in de-escalation techniques. Several excellent articles on de-escalation are available on the internet.[2-4] Suffice it to say that argumentation is not effective. If you have presented the options

clearly and are met with anger or hostility, the problem is not with your information — the problem is with your patient's view of things. If the patient has erected barriers to understanding of the disease process or treatment options, you may not be able to break down those barriers. That's especially true when you fail to use therapeutic communication (eg, "What I hear you saying is you don't want to take your treatment because the Real Housewives show is on . . . perhaps I could come back later.") and instead use the time-honored technique of louder but slower ("This …is …for …your …own …good!").

At some point, however, de-escalation and therapeutic communication may simply not work, and you need to be alert for signs that the patient will behave aggressively. These signs are what self-defense experts call "pre-assault indicators." In other words, rarely does a person go from calm and peaceful to full-blown aggression without giving off subtle (and sometimes not so subtle) indications of their intent. Being alert to these kinds of pre-assault indicators can give you an edge in the patient interaction and allow you to withdraw and avoid a painful confrontation.

As a therapist, when I treated patients I always went to the wall side of the room such that the patient was between me and the doorway. Doing this gives the patient the impression that he doesn't have to go through you to get out of the room; it can be empowering, and they tend to have a feeling of being in control of their own therapy. However, as an attorney, I have always set up deposition rooms so that the person I am questioning has to go past me to get to the door, giving them the subtle impression that they are not free to leave and that they are under my control. They are not, of course, and a good lawyer always lets the client in on the secret. These kinds of things figure into interactions with people as surely as night follows day. A patient who feels trapped may be far more dangerous than one who feels he can escape; of course, the problem for the therapist is that being on the wrong side of the bed makes the therapist feel more vulnerable.

With a patient who begins to show signs of aggression (eg, clenched fists, aggressive movements like sitting up or swinging the legs off the bed, etc.), it may be a good idea to abandon the position where the patient is between you and the door. In fact, at the first sign of confrontation, you should move away from the wall side of the room and to the point at the foot of the bed where you can get out the door quickly, if need be.

It is against most state and federal laws to assault a health care worker, but these crimes are rarely prosecuted because hospitals tend not to report them, and they often demand their staff not report them. For that reason, it's a good idea not to get assaulted in the first place. Just as de-escalation techniques can be found on the internet, so too can resources for detecting pre-assault indicators.[5,6]
Another smart technique for helping staff avoid bad patient encounters is to share difficult interactions during report with the next shift. If a patient behaves badly for you, alerting the next shift to these behaviors could prevent both an assault and harm to a patient.

Finally, I recommend that every health care worker, but especially individuals who are of small frame and body build, learn escape techniques from a seasoned martial artist. I suggest looking for a local martial arts academy that conducts self-defense seminars with simple techniques to avoid being controlled by bigger, stronger men and women. These include the simple technique of pulling against an attacker's thumb to escape a person's grasp, all the way to arm bars and locks that can be used in more dire situations. These techniques are not meant to harm patients but to protect them and their caregivers from greater harm. Some of these are also available on the internet, but they need to be practiced with a skilled practitioner for full benefit.[7]

If you have not considered these issues previously, now is the time to do so. The life and career you save might be your own.

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We will never forget them

by Thomas Kallstrom, MBA, RRT, FAARC

It has been a long and arduous journey since the outbreak of COVID-19 in our nation, and it is far from over. You have played a huge role in caring for and managing afflicted patients in our nation's hospitals and outpatient locations. As a result, there has been a lot of attention focused on our profession. People who had no idea what a respiratory therapist was learned and continue to learn about us and our essential role as a front-line health care provider. I encourage you to visit our COVID-19 site and review the media interviews: https://www.aarc.org/rts-thank-you-for-fighting-covid-19/#newslinks.

At the end of June, the CDC reported 84,759 confirmed cases of COVID-19 among health care workers, of whom 470 died as a result of caring for COVID-19 patients. We know for certain that there are respiratory therapists in those numbers. Even one is heartbreaking, but as of today we are aware of 13 respiratory therapists who have died of COVID-19 in the line of service. Our communities talk about those RTs being heroes, and they're right. We will not forget about these RTs' sacrifice as they provided comfort and care to the dying.

To show our appreciation for their sacrifice, the AARC Board of Directors has authorized monies to be made available to the surviving families of licensed respiratory therapists who died while caring for patients with COVID-19. Their families will receive $500. The American Respiratory Care Foundation will also donate two commemorative blocks in the AARC Virtual Museum, one for each RTs' family and one for each RTs' employer.

Moving forward, there are plans to have a COVID-19 section added to the AARC Virtual Museum. This will allow us as a profession to share what we have gone through as a health care provider in the hospital. We hope that it will allow individuals in the future to learn how respiratory therapists made a huge difference in saving lives during this pandemic. This COVID-19 section of the museum will stand as a historical resource that will be available for decades to come. I invite you to go to the links below to learn more about our virtual museum.

If you become aware of a licensed respiratory therapist who contracted COVID-19 while working and then died from complications of the disease, please contact me. There are likely respiratory therapists that we are not aware of who died. My email is kallstrom@aarc.org.

As a respiratory therapist, I am proud to have served patients for over 40 years. I also know that all respiratory therapists are heroes. In this pandemic, you selflessly serve, caring for others in their most desperate time of need. We are grateful for your sacrifice, and we will never forget those who died serving our patients.

AARC Virtual Museum Links:
https://museum.aarc.org
https://fs20.formsite.com/advertisingaarc/form21
https://museum.aarc.org/galleries

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Thomas J. Kallstrom, MBA, RRT, FAARC, is executive vice president of the ARCF and executive director of the AARC.

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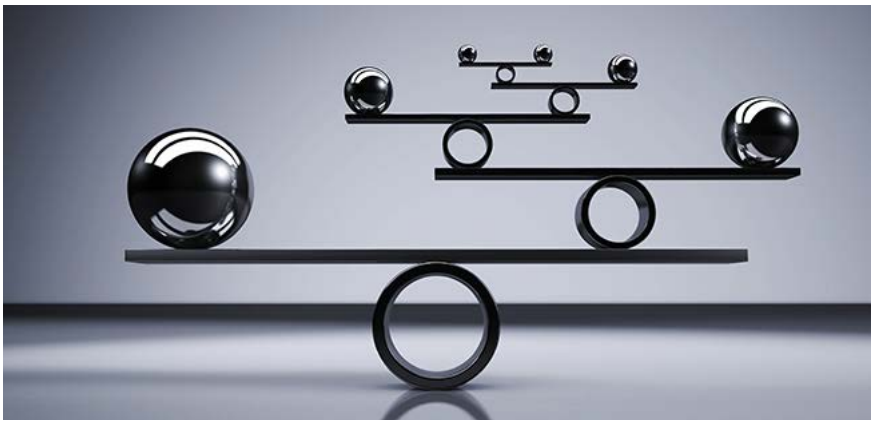
RC Currents

IN THE NEWS



Balancing Staff: Finding What Works for Your Team
By Scott Cerreta, BS, RRT

I manage a cardiopulmonary department in a 72-bed rural hospital in Arizona. In addition to in-patient services, our out-patient clinic provides walk-in services for EKG, Holter, simple spirometry, patient education, and sputum induction. These services are provided by a respiratory therapist without physician supervision. Scheduled clinics with physician supervision include exercise treadmill tests, stress echocardiograms, nuclear medicine, and pulmonary function tests. These robust out-patient services account for about half of the department's total productivity.

For a long time, the only productivity tool in my department was a "total volume" report, which was submitted on a monthly basis. Each month was compared to the two previous years and other months of the same fiscal year. Every task performed had the same value: one point. While this report is universal for many departments and is understood by administration, it fails to meet the best-practice recommendations for respiratory care productivity. For example, high-acuity therapy (eg, vents, noninvasive ventilation, and high-flow high-humidity therapy) was counted per day and not per check. Even though 12 vent checks were performed in a 24-hour period, it only earned one productivity point.

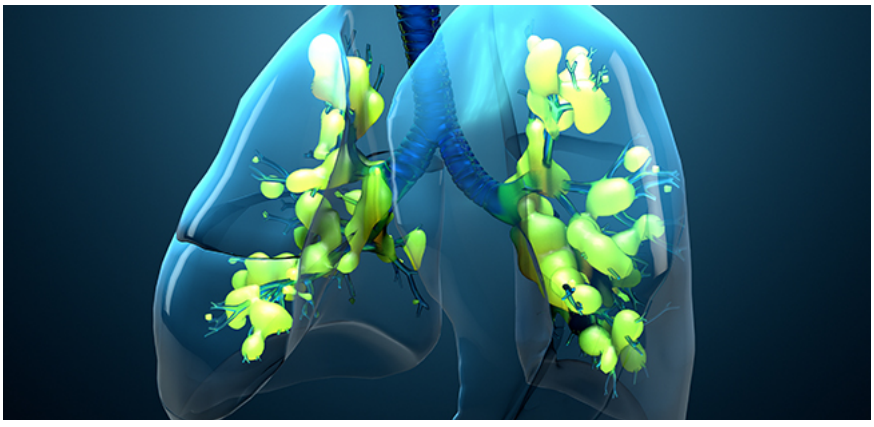
That is half the value of performing a single eight-minute oxygen check per shift, which comes in at two points.

We developed two essential tools to deal with the discrepancies. First is a Work Load estimator (ie, projected work), and second is a Work Rate calculator (ie, actual work). Master spreadsheets in Excel are imbedded with formulas that converts standard tasks into minutes of work. During the shift report, the lead therapist evaluates the total Work Load for the shift and assigns this work to each scheduled therapist. This tool helps estimate workload and provides fair assignments. However, all clinic work is unscheduled, so considerations are made for this in assignments as well. As each therapist starts their shift, they grab a Work Rate calculator. As the day progresses, the therapist ticks the work performed. At the end of the shift, there is a very detailed report for what work was done, who did it, what ward was the busiest, and how much unscheduled work was performed in the clinic.

Since the department operates in a clinic environment that consumes a lot of time answering phones, confirming orders, booking patient appointments, and other nonallocated time, we set the productivity benchmark at 50% for the day shift and 65% for the night shift. There are 720 minutes available in a 12-hour shift. A day shift therapist who performs 360 minutes of work is 100% productive. Because night shift therapists do not deal with the busy clinic, they need to perform 468 minutes of clinical work to be 100% productive.

The last step we took to meet best-practice standards was setting a target efficiency. We set it at 75-85%. These values are written into the instructions for the Work Rate calculator so everyone can see them. Target efficiency is reported each month, along with the total volume report. When your monthly staff efficiency value is over 85%, you need more staff. When the monthly staff efficiency value is less than 75%, you need less staff. This is a very simplistic but powerful interpretation of a complicated Work Rate report that has enabled us to make effective staffing decisions that administrators can understand and support.

Recently, my department requested a new part-time per-diem position to strengthen our team during the winter season. It was approved without any additional justification. While other departments have struggled for years with requests to increase their staffing, this is an example of trust earned through the implementation of an effective data strategy that makes sense to the administrative team.



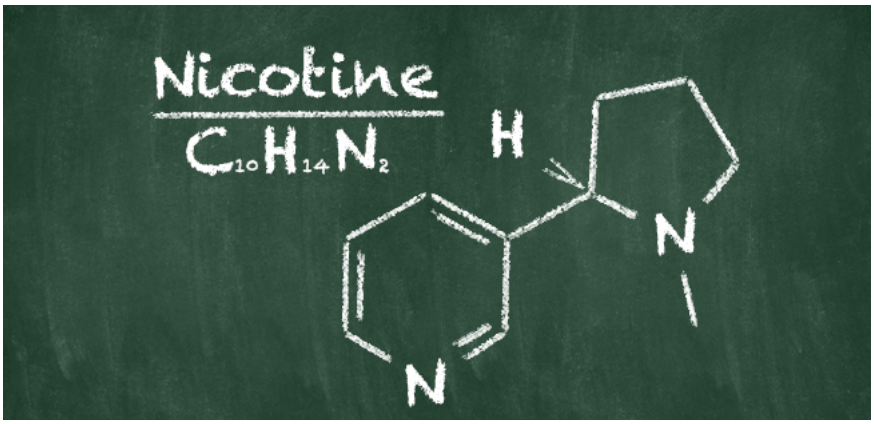
No Evidence of Two ARDS Phenotypes in COVID-19

Researchers have speculated that there may be two different phenotypes at play when it comes to ARDS related to COVID-19. The premise is that patients can either develop typical ARDS, which has recently been called “H type,” or that they develop an atypical type dubbed “L type” ARDS. The H type is characterized by high elastance, resulting in greater lung weight due to pulmonary edema. These patients

can be treated with positive pressure ventilation. The L phenotype would have low elastance, lower lung weight, and low shunt, leading to the conclusion that the problem in these patients might be that blood vessels in the lungs are not functioning properly.

Dutch investigators publishing in a recent edition of the *Annals of the American Thoracic Society* believe they have debunked that theory. The researchers performed CT scans right after intubation and before transport to the ICU in the first 38 patients with suspected COVID-19 who were admitted to their hospital. They estimated the lung consolidation area for patients classified as having either an H- or L-phenotype, classified lung morphology as focal or non-focal, and conducted a number of other calculations. No relationship was seen between lung weight and lower respiratory compliance in patients with a non-focal lung morphology.

"Our finding was that most patients do not fulfill the criteria of one phenotype or the other," said Lieuwe D.J. Bos, MD, PhD, from Amsterdam University Medical Center. "I do not feel encouraged to split patients into the two proposed phenotypes to guide ventilator management, but rather treat patients with the uniform, high-quality care that we always deliver to patients with lung injury."



Nicotine May Drive Brain Metastasis in Lung Cancer Patients

Continuing to smoke after a lung cancer diagnosis is hardly good for the lungs. According to researchers from Wake Forest School of Medicine, it's really bad for the brain as well. Trying to quit with the help of nicotine replacement therapy, though, might do more harm than good.
In a study conducted among 281 patients with advanced lung cancer, the investigators found that brain metastasis was much more common in patients who continued to smoke than in patients who had never smoked or had successfully quit. Further study conducted in mice indicated that the spread of lung cancer cells to the brain is driven by nicotine.

Specifically, the researchers noted that nicotine stimulates the formation of M2 microglia, a type of immune cell that secretes several molecules capable of enhancing tumor growth. In humans, brain tumors contain large numbers of M2 microglia. Treating mice with parthenolide, a compound found in the medicinal herb feverfew, prevented nicotine from stimulating the formation of M2 microglia and inhibited the spread of lung cancer cells to the brain, thereby improving the animals' survival.

"Many cancer patients find it difficult to quit smoking even after their diagnosis due to nicotine addiction," Watabe says. "E-cigarette, nicotine patch, and nicotine gum are commonly used as nicotine-replacement therapies to help these patients cease smoking. However, our results clearly show that nicotine has profound and long-term effects on brain metastasis progression, suggesting that cancer patients should be cautious in their use of nicotine for smoking cessation."

The study was published in the *Journal of Experimental Medicine* earlier this year.

Tenants Favor Smoking Bans

UCLA researchers who surveyed nearly 5,000 household tenants in 12 Los Angeles City Council districts about their experiences with secondhand smoke in their homes found that nine out of ten favor policies that would ban smoking from their buildings. Owners of multi-unit housing properties in Los Angeles also expressed strong support, with 92% saying they favor smoke-free policies.

Other findings included —

• 55% of tenants who live with someone with a chronic disease reported they had been exposed to secondhand smoke in their homes in the past year.
• 54% of tenants with children reported exposure to secondhand smoke.
• 54% of Latino tenants and 51% of black tenants said they had been exposed — more than any other races or ethnicities.
• Three in five tenants reported living in buildings with some form of smoking ban, whether in common areas or individual units, but noted these policies can be difficult to implement.

"We found that one in two tenants said that they were exposed to secondhand smoke and that there is a need to reduce that exposure in order to protect all tenants and children from harmful health effects," said Peggy Toy, director of the Health DATA Program at the Center for Health Policy Research and lead author of the study. She noted that owners are supportive of a citywide policy but concerned over accountability and enforcement that would hold owners liable if tenants violated the policy.

Chest CTs in Kids with COVID-19

Researchers from Mount Sinai have published what they believe is the largest case series to date describing chest CT findings in pediatric patients with COVID-19. The investigators reviewed the CT findings and clinical symptoms of 30 pediatric patients age ten months to 18 years at six centers in China from Jan. 23 to Feb. 8. Negative chest CT findings were seen in 23 (77%) of the patients, and when 11 of the 30 patients underwent a follow-up CT, no change was noted. Given these findings, the investigators question the utility of CT scans in the diagnosis and management of children with COVID-19.

However, in the small subset of patients with positive findings, bilateral, lower lobe-predominant, ground-glass opacities with peripheral lung distribution, crazy paving pattern, and the halo and reverse halo sign were common. A correlation between increasing age and severity of the findings was noted as well. The study was published in the *American Journal of Roentgenology* in May.

EHRs Fall Short

The electronic health record (EHR) is supposed to catch potentially harmful or deadly drug interactions before they cause problems, but that's not the case up to a third of the time, report U.S. researchers publishing in *JAMA Network Open*. In tests using simulated medical records, the researchers found that EHR systems consistently failed to detect errors that could injure or kill patients.

The research looked at the results of tests conducted by an EHR safety evaluation tool called the Leapfrog CPOE EHR test, which simulates actual drug orders that have harmed or could potentially harm patients. Almost all of the scenarios were based on actual adverse drug events that harmed or killed patients in the real world.

For example, in one scenario a 52-year-old woman is admitted to the hospital with pneumonia. Prior to hospitalization, she was taking warfarin once a day to combat deep vein thrombosis. After admission, she receives warfarin three times a day. This excessive dosage goes undetected by the hospital's EHR system for five days. As a result, the patient has a large hemorrhage and dies of causes directly related to the overdose of warfarin.

The scenarios were fed into EHR systems at 2,314 hospitals nationwide over a 10-year period between 2009 and 2018 to see how their systems would perform. In 2009, these systems correctly issued warnings or alerts about potential medication problems only 54% of the time. By 2018, EHRs had improved, but not by much, detecting about 66% of these errors. "These systems have only modestly increased their safety during a 10-year period, leaving critical deficiencies in these systems to detect and prevent critical safety issues," concluded the investigators.

Schools Where Vaping Is Most Common

A new study out of the University of Michigan sheds some light on the types of schools most likely to have a high proportion of students who vape. Using data from the 2015 and 2016 Monitoring the Future survey conducted among 8th, 10th, and 12th graders in 580 public and private schools, they found vaping was most heavily concentrated in schools with more white students, in those located in the South and West, and in those where more students smoke traditional cigarettes. In some schools, as many as 60% of the students said they had vaped during the last month.

The authors believe school-use trends are important because teenagers are so heavily influenced by what their peers are doing. “Imagine how different a school environment would be to a teenager if none of their peers were vaping, compared to three out of every five of their peers,” said study author Sean Esteban McCabe, professor at the University of Michigan School of Nursing and co-director of the Center for the Study of Drugs, Alcohol, Smoking, and Health. “These would feel like two different worlds to a teenager.”

The study was published in a recent edition of the *Journal of Adolescent Health*.

Fragmented Sleep May Promote the Development of Atherosclerosis

Researchers from the University of California, Berkeley have linked fragmented sleep with the development of atherosclerosis. The finding came after they examined diagnostic data from more than 1,600 middle-aged and older adults in the Multi-Ethnic Study of Atherosclerosis database. After controlling for confounding factors, the investigators analyzed results from the subjects’0 blood tests, calcium scores, and several measures of sleep, including wristwatch-assessed sleep across a week and a night in a sleep laboratory that measured electrical brainwave signals.

Results clearly linked disrupted sleep patterns to higher concentrations of circulating inflammatory factors and, specifically, white blood cells known as monocytes and neutrophils, which are key players in atherosclerosis. “To the best of our knowledge, these data are the first to associate sleep fragmentation, inflammation, and atherosclerosis in humans,” said study lead author Raphael Vallat. The study was published in *PLOS Biology* in June.

Progress Made on New Antibiotic

Progress is being made in the quest for a new antibiotic capable of fighting drug-resistant infections. Researchers from the University of Liverpool and University of Utrecht have used high-resolution solid-state nuclear magnetic resonance imaging and microscopy to show, for the first time, how synthetic teixobactins, which were discovered in 2015 and shown to kill multi-drug resistant bacteria like MRSA without developing resistance, bind to an essential component of the bacterial membrane called lipid II to kill the bacteria.

While more study will be needed to make teixobactins into an antibiotic for human use, the researchers believe the new finding is a step in the right direction. “So far, we have demonstrated that we can make teixobactins, which are effective in treating infections from resistant bacterial pathogens, and understand their binding modes in a bacterial membrane,” said study author Dr. Ishwar Singh, from Liverpool’s Centre of Excellence in Infectious Diseases Research. “Now we need to expand our understanding on mode of action on a library of teixobactins with different bacterial membranes to develop a catalogue of molecules which have potential to become a drug for human use.”

The study appeared in a recent edition of *Nature Communications*.

CPR in the Age of COVID-19

Out-of-hospital CPR depends on a rapid response from first responders and trained bystanders. A new study based on emergency medical services data in Washington state suggests the benefits of the practice still outweigh the risks in this era of COVID-19.

The investigators analyzed emergency medical services and hospital treatment data, along with death certificates, for all out-of-hospital cardiac arrests to estimate the frequency of COVID-19 infection among the total out-of-hospital cardiac arrest population served. As of April 15, the researchers found that —

• The community had 15 deaths per 100,000 population from COVID-19, higher than 42 other states at that time.
• COVID-19 was diagnosed in less than 10% of out-of-hospital cardiac arrests.

• Assuming the risk of transmission to bystanders performing hands-only CPR without personal protective equipment is 10%, treating 100 patients could result in one bystander infection.

• Given a 1% mortality for COVID-19, approximately one rescuer might die in 10,000 bystander CPR events.

• By comparison, bystander CPR saves more than 300 additional lives among 10,000 patients with out-of-hospital cardiac arrest.

"We believe the current findings support telecommunicators and bystanders maintaining the most efficient approach that prioritizes rapid identification of cardiac arrest and immediately proceeds to chest compressions and use of a defibrillator," the authors write. "Delaying bystander CPR to [put on personal protective equipment] should only be considered when the prevalence of COVID-19 infection is substantially increased." The study was published in a recent edition of *Circulation*.

Cancer Drug May be Effective for COVID-19

Researchers from the National Institutes of Health have found that the cancer drug acalabrutinib may have a role to play in fighting COVID-19. In a study conducted among 19 patients with severe disease, the drug, which inhibits the Bruton tyrosine kinase (BTK) protein associated with inflammation, eight of 11 patients on supplemental oxygen were able to come off of the oxygen and were discharged from the hospital. Four of eight patients on mechanical ventilation were weaned from the ventilator, and two were eventually discharged. Two of the patients in the mechanical ventilation group died.
Lab results showed —

• Levels of interleukin-6 (IL-6) decreased after treatment with acalabrutinib.

• Lymphocytes counts rapidly improved in most patients.

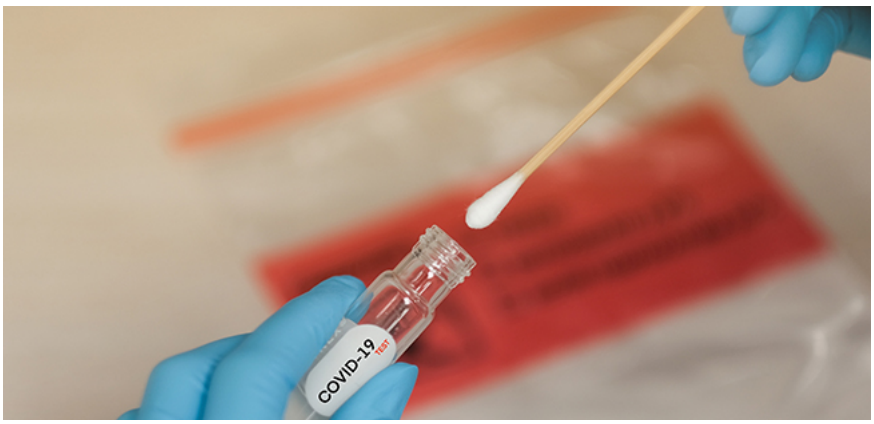
• In comparison with samples from healthy volunteers, patients with severe COVID-19 had higher activity of the BTK protein and greater production of IL-6.

The results from this small study, which was published in *Science Immunology*, have been used to inform the design of a randomized controlled clinical trial to examine the safety and efficacy of acalabrutinib in patients with severe COVID-19.

Lung Cancer Drug Improves Disease-Free Survival

According to Yale Cancer Center researchers, patients with early-stage non-small cell lung cancer (NSCLC) with EGFR gene mutations can benefit from treatment with the targeted therapy osimertinib following surgery. The trial results showed that osimertinib offered a two-year, 89% disease-free survival (DFS) rate compared to a DFS rate of 53% in patients randomized to treatment with placebo. Side effects were considered manageable. The study will continue to follow patients for overall survival outcomes.

"The disease-free survival data revealed are profound," said Roy S. Herbst, MD, PhD, co-leader of the study. "The hope was osimertinib would provide an alternative to chemotherapy for patients with early-stage lung cancer. Instead, we were thrilled to discover an incredible benefit for these patients in the fight against this deadly disease." The research was presented at the virtual meeting of the American Society of Clinical Oncology in May.



Universal Coronavirus Testing for Kids Undergoing Surgery

Testing all children scheduled for surgery for SARS-CoV-2 is probably a good idea, report researchers from the Children's Hospital of Philadelphia (CHOP) who analyzed universal screening procedures at

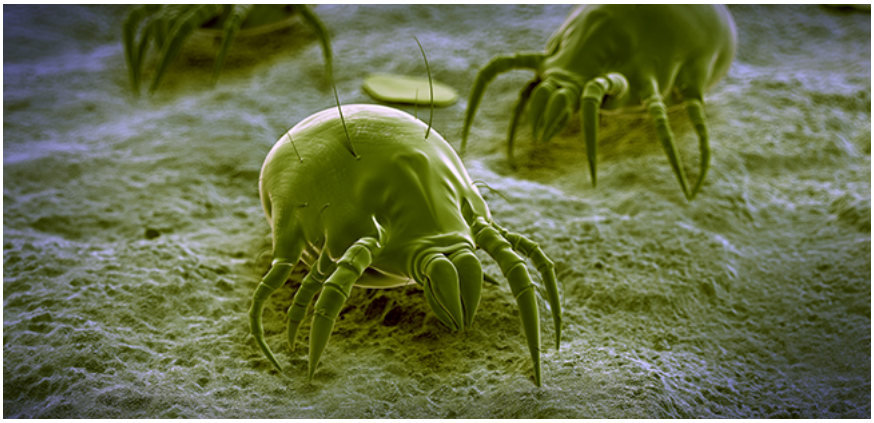
CHOP and two other major children's hospitals. Of the 1,295 patients included in the study, the overall incidence of COVID-19 was 0.93%, and half had no symptoms. Other findings include —

• A significant variation in positive rates was seen across hospitals, ranging from 0.22% to 2.65%.

• At CHOP, 55.56% of positive patients were from a single township, indicating that the incidence in children may vary depending on COVID-19 infection rates in the patients' communities.

• In children who did have symptoms, the most common symptoms were fever and a runny nose, but overall symptoms were not useful in differentiating those who tested positive for COVID-19 from those who tested negative.

The authors note the study was conducted during a time when all three hospitals had cancelled elective surgeries, and thus the data reflect pediatric patients who required time-sensitive surgery and may not represent the incidence in children undergoing elective surgery. But they still believe these findings show the value of universal screening to protect patients and clinicians from exposure to the virus. The study was published in *JAMA Surgery* earlier this summer.



T Cells May Control House Dust Mite Reactions

Scientists at the La Jolla Institute for Immunology outlined their discovery of a previously unknown subset of T cells that may control allergic immune reactions to house dust mites (HDM) in a study published in Science Immunology.

The investigators tested cells from people with asthma and HDM allergy, people with asthma but no HDM allergy, people with only HDM allergy, and healthy subjects using a tool known as single-cell RNA-seq, which allowed them to see exactly which genes and molecules are produced by specific T cells in response to HDM allergens. Results showed that a subset of helper T cells, called interleukin (IL)-9 Th2-expressing HDM-reactive cells, is more prevalent in the blood of people with HDM allergy and asthma compared with those who are only allergic to HDM. Further analysis indicated that those IL9-TH2 cells are enriched in a group of molecules/genes that increase the cytotoxic potential of those cells.

In contrast, T cells that express an "interferon response signature" and were enriched for a gene that encodes a protein called TRAIL were more prevalent in non-allergic subjects, suggesting that TRAIL may dampen the activation of helper T cells. This finding may mean that people with this specific cell population have less T-cell–driven inflammation in response to HDM allergens, providing a clue as to why some people develop allergies and asthma while others do not.

New Clues to ALS

University of Maryland School of Medicine researchers have identified a genetic pathway that may play a role in the development of amyotrophic lateral sclerosis (ALS) and a form of dementia related to ALS. "We mapped out the process by which ubiquilin-2 gene mutations disrupt an important recycling pathway that cells use to get rid of their trash," explained Mervyn Monteiro, PhD. "Without this recycling, misfolded proteins build up in the nerve cell and become toxic, eventually destroying the cell. This destruction could lead to neurodegenerative disorders like ALS." The investigators believe these findings could lead to new approaches for treating the condition. The study was published in the *Proceedings of the National Academy of Sciences* earlier this summer.

Oximetry Toolbox

Researchers from Technion-Israel Institute of Technology have developed a toolbox of oximetry biomarkers aimed at analyzing information contained in the oxygen saturation physiological time series so that it can be better utilized in monitoring and treating people with COVID-19. The toolbox has been integrated into the open-source software PhysioZoo, which was developed jointly by the Artificial Intelligence in Medicine laboratory at Technion and the Bio-electric and Bio-energetic Systems Laboratory. The software, called PhysioZoo, can be freely downloaded here.

Why Nonsmokers Get COPD Too

Columbia University researchers publishing in JAMA suggest that small airways, relative to lung volume, may help explain why one in four people who end up with COPD have never smoked cigarettes.
The finding is based on an analysis of health data from more than 6,500 older adults enrolled in three major lung studies in the United States and Canada. Results showed that people with smaller airways relative to lung size — called dysanapsis — had the poorest lung function and the highest risk of COPD. They were also eight times more likely to develop COPD than those without dysanapsis. The researchers believe this represents a second pathway for COPD, one related to reduced lung function from an early age. "This low starting point increases the risk for COPD in later years, even in the absence of rapid lung function decline," said study author Benjamin M. Smith, MD. "Based on our data, dysanapsis may account for a large percentage of these cases."

Strange but True . . .

Walk, then breathe: In reptiles and mammals alike, the ribs expand to create a space in the chest that draws in breath. But the ribs didn't start out as an aide to breathing. According to researchers publishing in *Scientific Reports*, they were originally used to aid in movement. The breathing part came later, when early amniotes evolved the ability to express these rib movements on both sides simultaneously, allowing for the expansion and contraction of the trunk that support inhalation and exhalation. Before then, amniotes used their heads to breathe, like fish always have and frogs still do today.

Fashion forward: Researchers from Tufts University have developed biomaterial-based inks that can be incorporated into "smart clothing" to measure chemicals released from the body or in the surrounding environment by changing color. They believe the inks could simultaneously detect and quantify a wide range of biological conditions, molecules, and possibly even pathogens over the surface of the body using conventional garments and uniforms.

Up the toilet (not down): Toilets are designed to take away unwanted waste and the pathogens it may contain. A new study out of China shows they be may spreading them too. Using a computer simulation, the investigators illustrated how a flushing toilet could create a cloud of virus-containing aerosol droplets large enough, widespread enough, and long-lasting enough to infect people nearby.

Bats to the rescue? SARS-CoV-2 is thought to have originated in bats. Texas Tech researchers are taking a closer look at how host–pathogen interactions between bats and viruses have molded unique adaptations in bats — such as dampening the immune response instead of letting it get out of control — that have allowed them to harbor these viruses without getting sick themselves. They believe the research may inform ways to help humans keep viruses in check as well.

Contribute to the AARC "Transitions" Column

The AARC "Transitions" column is devoted to sharing news about the passing of AARC members. Submit news about your colleagues' recent passing using our Transitions online form. Please provide any information about the member's recent death, such as an obituary, so that we can share it with our members and pay tribute.

Tell Your Story

Every therapist has a story to tell about a favorite or most memorable patient that would interest others in the profession. 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 of a 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. Our "Storytellers" column is the place to share them. Send your story to heather.willden@aarc.org

Industry Watch

Notre Dame researchers work on new antimicrobial fabric

Funded by the National Science Foundation through a Rapid Response Research grant, scientists and engineers from the University of Notre Dame are using existing water-filtration technology to create a new fabric that will not only capture viruses, like the coronavirus, but also deactivate them. The material's unique formula will allow the researchers to mimic the pathogen-capturing process used in air filtration while also including a biocidal or antimicrobial function. "Our team previously created a proprietary composite nanofiber material for water filtration that we believed could be fairly easily translated and utilized to filter air," said Nosang Vincent Myung, a co-lead on the project.

New anti-infective in the works for CF

Microbion Corporation of Bozeman, MT, has been awarded up to $17.1 million from CARB-X and the Cystic Fibrosis Foundation (CFF) to advance the development of its antimicrobial drug pravibismane for the treatment of pulmonary infections related to cystic fibrosis (CF). The funding will enable Microbion to complete preclinical and Phase 1 studies and support manufacturing the drug for clinical studies. "Infection is a top concern of both patients and CF clinicians and remains a leading cause of lung function loss among people living with cystic fibrosis," said CFF Chief Scientific Officer William Skach. "As people with CF increasingly combat chronic infections and antibiotic resistance, now, more than ever before, we need novel, safe, and effective anti-infectives."

AstraZeneca donates to ATS Crisis Fund

AstraZeneca has donated $500,000 to the American Thoracic Society's COVID-19 Crisis Fund. Launched to support the society's all-encompassing efforts to fight COVID-19, the Crisis Fund will help clinicians and scientists develop and disseminate research, education, and scientific recommendations to providers in the pulmonary and critical care communities. "The direct, immediate support we are providing to ATS will ensure that the pulmonary and critical care community has the resources, education, and support it needs to battle COVID-19 — at a time when there is a significant burden on the health care community," said Mina Makar, senior vice president, U.S. Respiratory and Immunology, at AstraZeneca.

Smartphone-powered virtual diagnostics solution

Coala Life, a Swedish innovator in remote cardiac and respiratory monitoring, has launched the first smartphone-powered virtual cardiac and respiratory diagnostics solution with real-time, p-wave–based detection of nine common arrhythmias. The Coala is also powered by algorithms that enable physicians to remotely detect murmurs and auscultate heart and lungs during a patient's daily life. "The transition to telemedicine and virtual diagnostics is here to stay. The Coala is a powerful tool for real-time diagnostics and ideal for patients with suspected or confirmed cardiac disease, as well as monitoring pulmonary issues such as COPD," said Gil Vardi, MD, a cardiologist and partner with the St. Louis Heart and Vascular Clinics, which are working with the company to provide integrated around-the-clock monitoring services to support specific reimbursement requirements.

Lung denervation system gets go ahead from FDA

According to Nuvaira, its Lung Denervation System has been designated as a Breakthrough Device by the FDA. The system is designed to reduce the risk of moderate-to-severe COPD exacerbations in patients on optimal medical care. In March, the FDA's review of safety data on the first 50 patients enrolled in Nuvaira's AIRFLOW-3 pivotal trial resulted in full IDE approval for completion of the 400-patient study; in April, CMS approved the AIRFLOW-3 trial for the purposes of Medicare coverage. These decisions are expected to support rapid FDA approval and positive reimbursement access in the U.S. market.

NCQA adjusts HEDIS measures to support telehealth

The National Committee for Quality Assurance (NCQA) has approved a sweeping set of adjustments to 40 of its widely used Healthcare Effectiveness Data and Information Set (HEDIS) measures in support of health plans, clinicians, and patients who are relying on telehealth services in record numbers as a result of the disruption brought on by the COVID-19 pandemic. The changes will apply to the measurement of health care quality starting this year and will align with recent telehealth guidance from CMS and other federal and state regulators. The 40 HEDIS measures that have new accommodations for telehealth include two in the Respiratory category: Use of Spirometry Testing in the Assessment and Diagnosis of COPD, and Asthma Medication Ratio.

Uncontrolled asthma treatment demonstrates non-inferiority

Full results from the Phase IIIb ARGON study have been published online by *Respiratory Medicine*, reports Novartis. The open-label study compared once-daily treatment with the single inhaler, high- and medium-dose Enerzair® Breezhaler® containing indacaterol acetate, glycopyrronium bromide, and mometasone furoate (IND/GLY/MF) with a free combination of twice-daily, high-dose salmeterol xinafoate/fluticasone propionate plus once-daily tiotropium (Sal/Flu plus Tio) delivered in two different devices. Results showed IND/GLY/MF was non-inferior to Sal/Flu plus Tio and improved the quality of life in people with uncontrolled asthma. Among secondary analyses, improvements in lung function, asthma control, health status, and reductions in moderate exacerbations were observed with the high-dose once-daily IND/GLY/MF compared to high-dose Sal/Flu plus Tio.

Portable ventilator for emergency use

Lawrence Livermore National Laboratory and medical device startup company BioMedInnovations have reached an agreement to develop a commercialized ventilator that can be easily built from readily available parts. Branded as SuppleVentTM, the portable ventilator is designed to meet the functional requirements of COVID-19 patients suffering from ARDS and other serious breathing difficulties. The suitcase-sized device has a simple user interface and large LCD display for monitoring pressures and air flow, circuits for inhalation and exhalation that are controlled by highly accurate pressure regulators, and alarms to alert users if pressures fall out of range or if a system failure occurs. It can operate in a continuous ventilation mode but can adapt to patients who spontaneously breathe and is designed to be retrofitted to include additional functionality in the future. The device has been authorized for emergency use by the FDA.

Bluetooth-connected thermometers may track COVID-19 spread

University of Nebraska researchers are looking at how data from Bluetooth-connected Kinsa thermometers may help forecast COVID-19 hotspots in Nebraska weeks before new outbreaks are officially reported. With a boost from that data and machine learning, they are also constructing a model that might better predict how the spread of the novel coronavirus will respond to the relaxation of social distancing guidelines. Since late 2014, Kinsa has sold or donated more than a million thermometers that, with a user's approval, can anonymously and wirelessly transmit temperature data to the cloud. Since the thermometers transmit the ZIP codes associated with the high temperature readings, the prevalence, timing, and geography of fevers can be tracked to the county level. Given that fevers often emerge as a response to influenza viruses, the company has shown that its data can help reasonably predict the number and seasonality of flu cases in a typical year. That predictability has yielded an opportunity to track and even predict outbreaks of the novel coronavirus.

New insomnia drug hits the market

Eisai, Inc., the U.S. pharmaceutical subsidiary of Eisai Co., Ltd., has announced the availability of DAYVIGO® (lemborexant) CIV for the treatment of adults with insomnia. The FDA approval of DAYVIGO was based on findings from a lemborexant clinical development program that included two pivotal Phase 3 studies. The trials evaluated DAYVIGO vs. placebo and active comparator for up to one month and DAYVIGO vs. placebo for six months in about 2,000 adult patients with insomnia. Results showed that DAYVIGO helped some people with insomnia fall asleep faster and stay asleep longer compared to placebo, and the effects at first use were generally consistent with later time points.

Researchers hope to unleash PAC-MAN on SARS-CoV-2

A team of scientists from Stanford University is working with researchers at the Molecular Foundry, a nanoscience user facility located at the Department of Energy's Lawrence Berkeley National Laboratory, to develop a gene-targeting, antiviral agent against COVID-19. The technique, which has been dubbed "PAC-MAN," uses the gene-editing tool CRISPR and was already in development for influenza when COVID-19 emerged. Like all CRISPR systems, PAC-MAN is composed of an enzyme — in this case, the virus-killing enzyme Cas13 — and a strand of guide RNA, which commands Cas13 to destroy specific nucleotide sequences in the coronavirus's genome. By scrambling the virus's genetic code, PAC-MAN could neutralize the coronavirus and stop it from replicating inside cells.

Mobile app predicts COVID-19 severity

A new mobile app from researchers at NYU College of Dentistry can help clinicians determine which patients with the novel coronavirus are likely to have severe cases. Using data from 160 hospitalized COVID-19 patients in Wuhan, China, the investigators identified four biomarkers measured in blood tests that were significantly elevated in patients who died vs. those who recovered: C-reactive protein, myoglobin, procalcitonin, and cardiac troponin I. Then they built a model using the biomarkers, along with age and sex, and trained the model using a machine learning algorithm to define the patterns of COVID-19 disease and predict its severity. The model was validated using data from 12 hospitalized COVID-19 patients from Shenzhen, China, which confirmed that its severity scores were significantly higher for the patients who died vs. those who were discharged. The model was further validated using data from more than 1,000 COVID-19 patients in New York City.