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AARC Times

Interprofessional Collaboration

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Interprofessional Collaboration

by Georgianna Sergakis, PhD, RRT, AE-C, FAARC

Introduction to interprofessional collaboration

Respiratory therapy education and practice has increased in both complexity and breadth due to the evolution of health care. The lengths to which a respiratory therapist (RT) must be prepared to provide competent and safe care involves both art and science. Today's RT must possess not only knowledge and technological expertise, but also critical thinking skills and interprofessional skills that contribute to patient-centered care.

Interprofessional education (IPE) is defined as "when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes."[1] The Interprofessional Education Collaborative (IPEC) was established in 2009 and has since published two guidance documents (2011 and 2016).[2,3] The guidance documents established the basis for and support of IPE in the health professions. The IPEC Core Competencies are now the foundation for IPE and Interprofessional Collaborative Practice (IPCP). IPCP is defined as "when multiple health workers from different professional backgrounds work together with patients, families, [careers], and communities to deliver the highest quality of care."[3] The IPE and IPCP competencies are now recognized under the shared domain of Interprofessional Collaboration (IPC). Table 1 outlines the IPEC core competencies.

In 2009, there were six professional organizations responsible for the work of the IPEC. The partner organizations have now grown to include 21 organizations. The AARC joined the collaborative and represents the respiratory therapy profession in the national development and guidance for IPC. IPE is also recognized as a central part of the respiratory therapy education in RT accreditation standards. IPE is a requirement and is specified in CoARC Standard *4.05*, which states "Graduates must be able to function within interprofessional teams and communicate effectively with diverse populations. The curriculum must prepare students to work with a variety of populations including, but not limited to, individuals of various ages, abilities, and ethnicities."[4]

Evidence to support IPC

IPE has been found to increase student knowledge, skills, and attitudes about collaborative teamwork in a variety of educational settings and with various health care professions.[5] The use of collaborative

practice is also illustrated in several research publications that specifically involved respiratory therapy. Zamjahn and colleagues reported that IPE improved the knowledge of roles and responsibilities and suggested that the students participating would explore future collaborations with the professions represented.[6] Faculty attitudes toward IPE have also been examined, with positive results suggesting that these faculty would engage in IPE and value IPE as part of the respiratory therapy curriculum.[7] Interprofessional clinical simulation for respiratory therapy students from a variety of professional programs is also supported by positive outcomes and increased understanding of respiratory therapy competencies and RTs' roles and responsibilities.[8-9]

There is also evidence that interprofessional training for collaborations in the clinical environment may support positive outcomes in a variety of situations. These include specific collaborative interventions like early mobility,[10] COPD discharge planning to prevent readmission,[11] and prolonged mechanical ventilation.[12] A Cochrane Review of the literature concluded that IPC may slightly improve clinical processes, efficiency, and patient outcomes when compared to usual care.[13]

Challenges and opportunities to educate RT students on IPC

The complex interplay of time, logistics, preparation, and scheduling often make IPE a challenge. First, the IPE planning team involves representation from two or more programs, which itself presents challenges. The more professions that join the session, the more challenges that might present. I come from an IPE team that involves 11 different professions in the IPE clinical simulation experience, and I can attest that it can be done and it can be successful, despite these challenges. However, the IPE team must build in the time (sometimes up to one year) to carefully plan the details of the experience and must consider several variables: faculty buy-in, administrative support, time, faculty preparation, synchronization of the level of student preparation, logistics, and cost, not to mention setting goals and objectives to select the most appropriate delivery method.

Despite the challenges, the respiratory therapy community should view IPE as an opportunity overall. IPE allows the respiratory therapy program to showcase the skills and contributions of the RT to the interprofessional health care team. IPC also allows the RT student or professional to appreciate and contribute to the interconnectedness of the therapies and care plans that optimize patient-centered care. IPC allows a patient problem or situation to be examined from a variety of perspectives, and this diversity of thought benefits comprehensive patient care. Perhaps most importantly, IPE allows the student to practice in an authentic care environment. In the real world, respiratory therapy, or any health care profession for that matter, is not practiced in a silo. Daily interactions with other professionals are the standard of care, and students should have an opportunity to practice these skills in the safety of the student learning environment. This should include opportunities to debrief and reflect on the value of the experiences to their understanding of roles, responsibilities, teamwork, and interpersonal communication.[14] Opportunities to create a climate of mutual respect and understanding in the student learning environment have the potential to carry-over into clinical practice if nurtured and viewed as an opportunity for growth in the clinical environment.

IPE strategies

One of the most common strategies for the delivery of IPE, perhaps because of the multiple barriers that are present, is a case study discussion. In this method, students from multiple professions are connected, either in-person or virtually, to discuss a patient case. However, there are several other innovative strategies that improve upon the fidelity of the interprofessional clinical environment and increase the number of competencies that can be addressed. These other strategies include: mock electronic medical record collaborations, video conference discussions, and case competitions. In addition, the use of high-fidelity interprofessional clinical simulation allows the IPE team to develop scenarios that address the IPEC Core Competencies. Other innovations that are opportunities for IPE and IPCP to unite toward the

common goal of IPC include interprofessional gaming, telehealth teams, standardized patient interactions, student-run clinics, interprofessional clinical training units, community outreach and engagement, and other service-learning initiatives.[15]

IPC in daily practice

You may be asking what you can do as a practicing RT to integrate these critical IPCP competencies into your day-to-day practice. RTs have a professional obligation to model these competencies in the interest of patient-centered care and to address the recommendations set forth by IPEC and similar agencies. The Institute of Medicine, in their 2015 report, highlighted the connection between IPE and IPCP and concluded that, "without a purposeful and more comprehensive system of engagement between the education and health care delivery systems, evaluating the impact of IPE interventions on health and system outcomes will be difficult."15 Not only does IPC lead to better outcomes, but there is evidence to support that respect for the roles and responsibilities of the RT are also positive outcomes of IPC.[1,2,15]

The newest generation of RT graduates will be coming to respiratory therapy departments prepared to work collaboratively and to see mutual respect and understanding modeled by all members of the health care team. Perhaps nothing is more de-motivating than to come to the workplace with the skill set and not see it in practice or as part of organizational culture.

An RT can both participate in IPC daily, as well as get involved in institutional activities that promote collaboration. Some key aspects to examine these opportunities include an exploration of the opportunities (spaces to collaborate in the physical environment as well as through synchronous and asynchronous distance methods), willingness of your team or organization to promote IPC, and the ability to engage in patient-centered models of care that promote the goals of the team. Some particular strategies that promote/encourage IPC are bedside rounding, huddles, discharge planning and the medical home model. If the RTs are not incorporated into these aspects of the institutional operations, suggest that change.

The only way that we will achieve culture change and true IPC is for each RT and other health care team member to contribute to this goal. If your institution has an interprofessional council, get involved or assure that respiratory therapy is at the table. If they don't have such an entity, start one. In short, be the change we need to elevate the RT profession to optimize patient-centered care.

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Table 1. IPEC Core Competencies.

Competency 1 (Values/Ethics for Interprofessional Practice)	Work with individuals of other professions to maintain a climate of mutual respect and shared values.
Competency 2 (Roles/Responsibilities)	Use the knowledge of one's own role and those of other professions to appropriately assess and address the health care needs of patients and to promote and advance the health of populations.
Competency 3 (Interprofessional Communication)	Communicate with patients, families, communities, and professionals in health and other fields in a responsive and responsible manner that supports a team approach to the promotion and maintenance of health and the prevention and treatment of disease.
Competency 4 (Teams and Teamwork)	Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan, deliver, and evaluate patient/population-centered care and population health programs and policies that are safe, timely, efficient, effective, and equitable.

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Role of Respiratory Therapists in Quality Improvement

by Ramandeep Kaur PhD (c), RRT, RRT-ACCS, AE-C

The Institute of Medicine published two momentous reports, “To Err Is Human: Building a Safer Health System” and “Crossing the Quality Chasm: A New Health System for the 21st Century” in 1999 and 2001, respectively, that shed light on gaps in patient safety and in health care quality and emphasized the need for redesigning highly complex health care delivery systems to enhance clinical performance and improve patient outcomes.1 As a result, health care systems across the nation were faced with increased scrutiny to reform their organizational models to provide safe, effective, patient-centered, timely, efficient, and equitable patient care. To attain these goals, many health care organizations flipped the traditional top-down leadership model to harness the potential of the frontline health care workforce to improve the quality of care being provided to patients. This emerging health care transformation could be seen in the respiratory care field as well. The role and value of quality improvement (QI) initiatives in the respiratory care profession is emerging. However, there is a lack of formal education and training for respiratory therapists to engage in departmental QI initiatives. This article discusses the value-based health care model, the definition and benefits of QI initiatives, and the basics steps of implementing a QI project.

Value-based health care model

In simple terms, Value = Quality/Cost. Value-based health care is a type of reimbursement model that connects the cost of health care delivery to the quality of patient care provided.[2] The Centers for Medicaid and Medicare Services (CMS) have designed value-based programs that are geared toward paying providers, including physicians and hospitals, based on the quality rather than on the quantity of health care provided to the patients. The Hospital Readmission Reduction Program (HRRP) and the Hospital-Acquired Conditions Reduction Program (HACRP) are two such examples that reward health care systems for providing quality care to Medicare patients.3 Under HRRP, hospitals are financially penalized if they have higher than the expected 30-day readmission rate for pneumonia, heart failure, COPD, etc. Similarly, under HACRP, hospitals that rank in the worst-performing 25% of all hospitals with respect to HAC quality measures (e.g., with the highest number of hospital-acquired conditions such as pressure ulcers) receive reduced reimbursement from the CMS. The fundamental concept of the value-based model is to deliver effective, efficient, and evidence-based medical care so that patients can achieve and maintain good health for a longer period of time and, therefore, decrease the financial burden on the health care system.

Definition of quality improvement

The Agency for Healthcare Research and Quality (AHRQ) describes quality in health care as "doing the right thing, at the right time, in the right way, for the right person, and having the best possible results." In a complex health care environment, the QI process is a systematic approach of using real-time data to understand how effective clinical processes are in delivering the desired patient outcomes.[4] This process involves a substantial shift from our traditional methods to adapting evidence-based clinical practices that deliver the highest performance in terms of effectiveness, quality, safety, and value. QI initiatives differ from traditional clinical audits in their ability to go beyond data collection and implement solutions that have the capability to reduce medical errors, improve patient safety, increase clinical efficiency, and reduce waste.[5]

Benefits of quality improvement

QI interventions lead to significant enhancements in health care delivery. The data generated from a QI initiative enables stakeholders to identify gaps and generate solutions that could enhance clinical processes in terms of effectiveness, efficiency, and safety. Moreover, QI projects aid in leveraging data and analytics to drive patient outcome, optimize clinical operations, improve efficiency, and practice value-driven care.[1] Furthermore, QI projects enable departments like respiratory care to demonstrate their value to their health systems in terms of reducing costs and improving patient outcomes (e.g., by decreasing the number of days on a ventilator, reducing length of ICU stay, etc.). A well-conducted QI initiative has the potential to enhance the quality and cost-effectiveness of health care being delivered to the patients.

Implementing a quality improvement project

The first step in planning a QI project is to identify quality and safety gaps within the department. This stage involves the selection of quality and safety metrics that are aligned with organizational goals to yield a balance of quality and safety outcomes (e.g., a reduction in COPD readmission rate, improved extubation outcome, fewer device-related pressure injuries, etc.). Data from the root cause analysis, daily safety briefings, and safety events can also identify common contributory factors and provide insight into potential improvement opportunities within the department.[6] To achieve the desired outcome, goals must be specific, measureable, attainable, realistic, and timely with appropriate metrics to measure the outcome.[7] To conduct a QI initiative, the most common QI methodologies utilized in health care are the plan-do-study-act (PDSA) cycle, Lean methodology, and Six Sigma

PDSA cycle

PDSA, also known as rapid cycle research, is a four-stage problem-solving model that is commonly used to improve processes.[8] PDSA is a reiterative process that begins with the planning phase to build the team, select goals, and establish objective measures to determine if a specific change will lead to a desired outcome (Plan). The second stage involves the real-time implementation of the proposed intervention (Do), followed by the identification of significant process improvements or gaps (Study). The last stage includes refining and standardizing the process to implement it for routine use (Act). If proven successful on a small scale, the change could be implemented on a larger scale using the PDSA cycle to improve patient outcomes.

Lean Methodology

This method relies on the concept of kaizen, a continuous quality improvement process that involves all stakeholders from top leaders to the frontline members.[1,8] In health care, the core idea of this methodology is to reduce waste and eliminate processes that do not add value to the patients. The top eight wastes that apply to every industry are defect, overproduction, waiting, nonutilized talent, transportation, inventory, motion, and extra processing. Reducing respiratory equipment-related skin breakdown by timely skin assessment and minimizing medication errors are just two examples that impact respiratory care delivery.

Six Sigma

This methodology is based on a statistical concept and focuses on improving quality by reducing process variation, eliminating defects, and reducing cost.[8] Six Sigma is a validated methodology to reduce errors and standardize care in a complex health care environment.[1] In health care, Six Sigma and Lean Methodology are often pooled together into a hybrid improvement version called "Lean Six Sigma." To ensure success, it is imperative to track, plot, and display the quality indicators over time using run charts, dashboards, etc., and share the information with all stakeholders. Lastly, authors should utilize a reliable and consistent format when disseminating QI findings in presentations, abstracts, posters, and publications.

Conclusion

Continuous QI is an emerging initiative in the field of respiratory care. There is a need for frontline respiratory therapists to receive education and become engaged in QI initiatives to improve the quality of respiratory care and help their organizations provide safe, effective, patient-centered, timely, efficient, and equitable health care.

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CPT Codes: The Good, the Bad, and the Ugly

by Susan Rinaldo Gallo, MEd, RRT, FAARC, CTTS

Many respiratory therapists (RTs) are introduced to CPT® (Current Procedural Technology) codes when they become a department manager. The American Medical Association (AMA) is responsible for developing and publishing CPT codes and has a copyright on these codes. The majority of CPT codes that are available for respiratory therapy departments are found in the CPT code book that the AMA publishes each year.[1] The codes used by inpatient facilities are Level I codes and contain five digits, all numeric. At first, CPT coding can seem like a foreign language, but it must be learned. As managers and clinicians become familiar with CPT coding, reality comes crashing down when they discover that there are no CPTs to cover 40–50% of what RTs do — hence, the title of this article!

It is extremely important that managers understand CPT coding so they can work with their administrators to develop a fair productivity measurement for their department. Productivity measures determine how many therapists can be hired to get the work done. The majority of respiratory departments use CPT codes exclusively to determine productivity. This is not ideal due to the lack of codes for much of what RTs do. An enhanced version of relying solely on CPT codes is a system in which the procedures that have CPT codes are heavily weighted to compensate for the all the procedures that lack codes. However, the most ideal system is one that counts all procedures performed by RTs to determine productivity.

There are many resources available to help mangers learn about CPT coding (see Table A). CPT codes were designed to describe care provided in the outpatient setting, and it is important to understand that CPT codes for inpatient respiratory care procedures do not result in revenue for the hospital. CPT codes produced by inpatient respiratory care departments are not sent to Medicare, Medicaid, or other third-party payers. The hospital does not use these codes when billing for inpatient care. This is because hospitals receive a set amount of money based on the patient's diagnosis-related group (DRG), Medicare's Inpatient Prospective Payment System (IPPS), or managed care contracts with insurance companies. All of the services rendered to the patient are bundled into one payment. Respiratory CPT codes are used for internal purposes such as budgeting, productivity, and other internal measures.

A description of each code is included in the CPT book. As an example, code 94640 is described as follows: "Pressurized or non-pressurized inhalation treatment for acute airway obstruction for therapeutic purposes and/or for diagnostic purposes such as sputum induction with an aerosol

generator, nebulizer, metered-dose inhaler or intermittent positive pressure breathing device." Most of the codes have notations below the description indicating other AMA publications that further define the use of the code, e.g., "CPT Changes: An Insider's View." These other publications specify how and when the code can be used; i.e., they are the "rules" related to the code. Professional coders who work at inpatient facilities have access to these publications and hence the rules. RT managers need to establish communication with these individuals and rely on their expertise.

CPT Coding – The Good

The majority of the respiratory therapy codes are listed in the medicine/pulmonary section of the CPT book. Very good ventilator management codes are available; code 94002 for the initial day of ventilation and 94003 for subsequent days. One of the rules related to these codes is that they cannot be used for patients in the emergency department.[2] Another rule related to these two ventilator codes is that these codes can be used when patients are on ventilators any part of the calendar day. So, if a patient is placed on a ventilator at 11:00 PM, the code is valued the same as the patient who is placed on the ventilator at 1:00 AM. This rule is a good example of how the code description alone does not tell the whole story related to the code.

There is a sufficient number of codes to cover diagnostic testing and pulmonary function studies (PFT). Although PFT codes were consolidated a few years ago, there are still more than 20 codes that can be used by a PFT lab.[3] Most of these codes include a technical component for performing the procedure or test and a professional component for interpenetration of the results, which is generally done by a physician. It is not obvious that there are two separate components to each code; this happens at the billing level.

There are some good codes that describe many procedures we do every day. Some code examples are as follows: 94618 – pulmonary stress testing which includes the 6-minute walk; 94644 and 94655 – continuous inhalation treatment with aerosol generator, first hour and additional hours; 94660 – CPAP; 94669 – mechanical chest wall oscillation; 94664 – demonstration and/or evaluation of patient use of an aerosol generator, e.g., metered-dose inhaler or nebulizer; and 94780 – car seat testing for infants. There are a few codes that we can use that are found outside of the pulmonary section of the CPT book. These include 36600 – arterial puncture, withdrawal of blood for diagnosis; 31500 – intubation, endotracheal, emergency procedure; and 31502 – tracheotomy tube change prior to establishment of a fistula tract.

The AARC has been working diligently with Congressional leaders to ensure that RTs are included as providers in the telehealth bills being considered. In the mean time, there are a few, newer codes related to telemedicine and non–face-to-face health care that include wording favorable to RTs. Because RTs, along with nurses, are considered clinical staff by the AMA, the following codes, which are listed in the evaluation and management section of the CPT book, can be used when RTs provide specific services: 99457 and 99458 – remote physiologic monitoring treatment management services; and 99490 – chronic care management services.

CPT Coding – The Bad

There is a lack of codes to represent the scope of practice of RTs. There are no codes for things such as patient assessment and evaluations, attendance at patient care rounds, protocol management, airway assessments, extubation, assisting with intubations, trach weaning, rapid response attendance, and patient education. These processes contribute to quality patient care and allow the RT to practice at the top end of their license. These processes also require a considerable amount of dedicated therapist time, which should be considered when measuring productivity.

CPT Coding – The Ugly

The restrictions related to CPT codes are frequently increasing and changing. As an example, 94640 – pressurized or non-pressurized inhalation treatments, has changed significantly in past few years. Prior to 2014, we were able to code each treatment as a separate event. If we administered four treatments to an inpatient in one day, we coded four treatments. Since 2018, we can only code for one episode of care or treatment regardless of the number of treatments given.[2]

CPT coding presents significant challenges for the RT. The care RTs provide is evolving with new procedures and technology, and the AMA has been slow to implement codes to describe the therapies provided. The inability to accurately assign codes to every therapy provides a skewed picture of the department's workload and can lead to over- or understaffing. Outside of the hospital, RTs are in short supply because there are limited CPT codes to use and they cannot bill separately for their services. However, this situation is changing as efforts to reduce the costs of care continue. In the future, we can hope to see expanded CPT codes designed specifically for RT use.

Table A. Coding Resources

CPT 2020 Professional Edition, American Medical Association

Medicare Payment Guide for Respiratory Therapy/Cardiopulmonary Services, MedLearn Publishing, 2020

Coding Essentials for RT/Pulmonary Function, MedLearn Publishing, 2020

AARC Coding Guidelines, aarc.org/wp-content/uploads/2014/10/aard-coding-guidelines

Billing Codes Listserv, aarc.org/communities

Uniform Reporting Manual, 5th edition, AARC

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Does Mask Selection Impact PAP Adherence?

by Kimberly Pitts, RRT-NPS, RRT-SDS, RPSGT, CCSH

Background

Obstructive sleep apnea (OSA) is associated with a multitude of comorbidities including atrial fibrillation, coronary artery disease, depression, diabetes, hypertension, pulmonary hypertension, reflux, and stroke/transient ischemic attack. There is also an overlap syndrome associated with COPD. Positive airway pressure (PAP) therapy remains the gold standard for treatment of OSA, but adherence to treatment remains suboptimal with 46–83% of patients being non-adherent excluding those who refuse treatment.[1]

PAP therapy splints the upper airway to overcome obstruction and is delivered with a mask covering the nose or the nose and mouth. There are currently more than 50 masks on the market, accounting for all sizes, from a variety of manufacturers. Patient adherence to therapy is largely dependent on a properly fitting mask that a patient can tolerate. Finding the proper mask is challenging, but may simply be a matter of trial and error. There are as many different nose shapes as there are masks — narrow, wide, long, short, deep.

In the past, all patients diagnosed with sleep apnea had a PAP titration study in a facility-based sleep center. With the increased use of home testing and the prescribing of auto-titrating PAP therapy, the patient's introduction to a PAP mask may occur in a durable medical equipment (DME) office. Therefore, it is important to find a mask that provides the necessary treatment while being tolerated by the patient. There is a strong correlation between adherence during the first week of therapy and long-term adherence.

Adherence requirements

Adherence must be defined prior to discussing how to achieve it. Medicare defines adherence to therapy "as use of PAP > 4 hours per night on 70% of nights during a consecutive thirty (30) day period anytime during the first three (3) months of initial usage."[2] A patient failing to meet these adherence standards is required to undergo a repeat facility-based sleep study. It seems more practical and financially responsible to provide patient support and education to improve adherence. We, as practitioners, should be working with patients during this initial period to ensure adherence and to document improvement in

symptoms. Patients who notice subjective improvement in daytime functioning are more likely to continue with therapy.

Factors to consider prior to mask fitting[3]

- Has CPAP been tried before? If yes, what masks? What were the difficulties?
- What is the normal sleeping position? Side? Prone?
- Does the patient frequently change positions?
- Is there facial hair?
- Is the patient claustrophobic?
- Are there sinus issues?
- Does the patient complain of dry mouth? Is this due to medications?

Mask selection and sizing

Every therapist and sleep technologist has a go-to mask, but no mask works for every patient. The American Academy of Sleep Medicine (AASM) recommends initiating therapy with a nasal mask[4] rather than an oral or oronasal mask as nasal masks are less invasive and more easily tolerated. Nasal masks include nasal pillows and under-the-nose cushions. While nasal masks are recommended to initiate therapy, some patients prefer oral or oronasal masks, commonly referred to as full-face masks, as they allow airflow through the nose and mouth. Those who have nasal damage limiting airflow may benefit from a full-face mask. For years, patients experiencing claustrophobia were offered nasal masks, but experience has shown that many prefer the full-face mask because it allows patients to open their mouth without creating a leak.

Every brand of mask has a unique sizing guide that aids in determining the correct size. Mask fitting should occur in the normal sleeping position. For side and prone sleepers, there are specially designed CPAP pillows with a cutout to minimize displacement of the mask; I frequently recommend a travel pillow for this use as they are significantly less expensive. It is important to take the necessary time to find a comfortable mask for the patient. A mask must fit snugly enough to eliminate leaks, but not so tight that it causes skin breakdown.

Desensitization

Many patients are overwhelmed during initial use because they are told to strap the mask on and fall asleep with the threat of discontinuation if they are non-adherent. Therefore, I encourage new patients to try using the PAP device while awake to improve tolerance. Gradual tolerance is attained by holding the mask on the face while watching television or listening to music, adding the headgear only when comfortable. Once the headgear is added, many patients report falling asleep on the couch or in a recliner. Most manufacturers offer a 30-day mask exchange allowing patients to trial various masks in order to find the right mask. Some patients have a variety of masks and rotate them such as using a full-face mask when experiencing a cold, but using a nasal mask for normal use.

Common problems and suggested solutions

There are several common problems associated with PAP masks that contribute to non-adherence. Patient complaints include discomfort of the mask, intolerance of pressure, claustrophobia, and removal of mask during sleep.[5] Prior to initiating treatment, whether in a sleep lab, hospital, or a DME office, patients should be educated on the purpose of treatment; understanding the need for and benefits of treatment may encourage use. Providing education and support throughout initial treatment may

improve long-term adherence as failure occurs most often during the initial 90-day period; therefore, it is important to check in often with the patient.

Pressure intolerance may be eliminated by utilizing the ramp feature, which provides an initial lower pressure that gradually increases to the prescribed pressure over a pre-set time. Most machines also offer "expiratory pressure relief," making it easier for patients to exhale against the positive pressure. Dry mouth or nasal congestion may be eliminated with a heated humidifier. Lastly, patients unable to tolerate CPAP may tolerate bi-level positive airway pressure.

Additional recommendations

The American Academy of Sleep Medicine has several recommendations regarding PAP initiation and follow-up including the use of telemedicine, the use of nasal masks over oral or oronasal masks, and use of heated humidification.[4] Telemedicine can be used to troubleshoot adherence issues or monitor usage as many PAP units can be monitored remotely. Heated humidification reduces the incidence of nasal stuffiness or dry mouth as well as possibly reducing the pressure to treat the obstruction. Lastly, the use of a nasal interface has been found to be better tolerated. Addressing difficulties early reduces the risk of voluntary therapy discontinuation.

Conclusion

The selection of a properly fitting mask is the first step on a long journey of PAP adherence. A team of individuals including multiple clinicians, providers, and the patient must communicate to ensure success with PAP therapy. As the incidence of sleep apnea continues to increase, we must work to improve adherence because this will improve the health and the quality of life of our patients.

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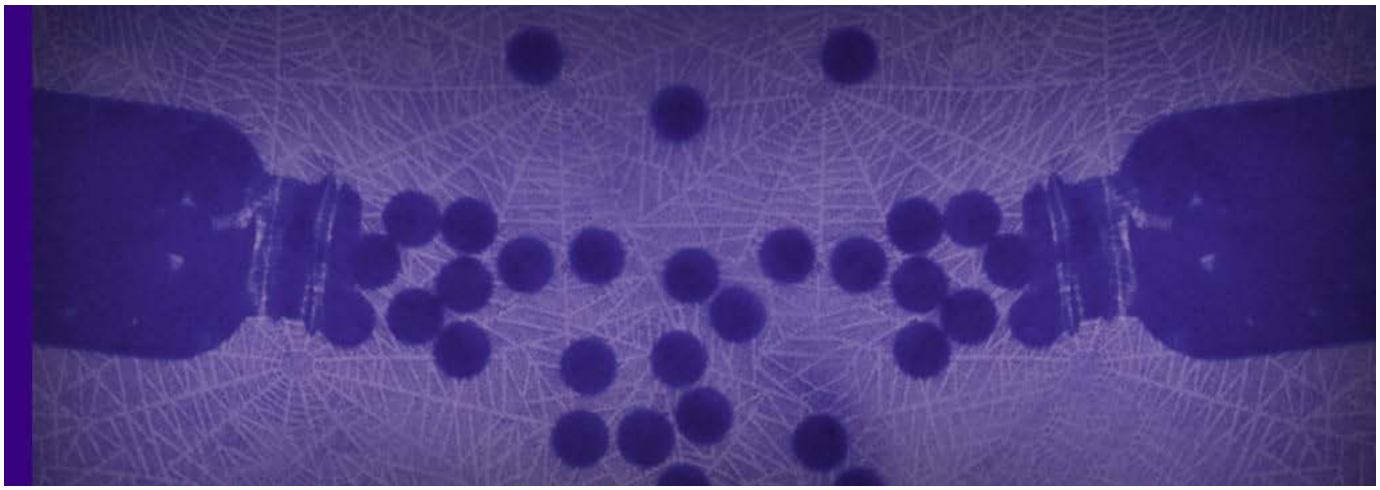
Teaching Strategies for Adult Learners

by Mary LaBiche MED, RRT and Zina White, RRT



L to R: Mary LaBiche MEd, RRT and Zina White, RRT

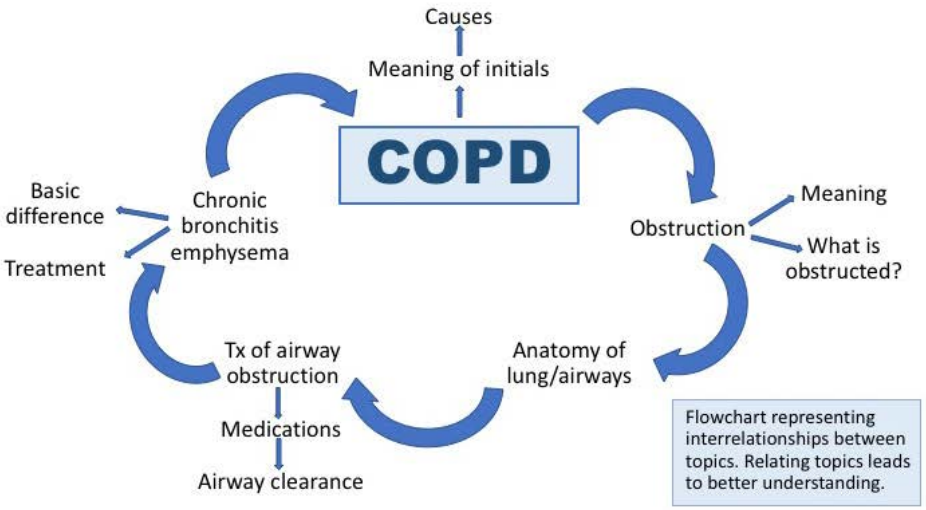
Adult learners present a unique teaching challenge to educators. For some, the fact that they haven't been in a classroom for many years can be a barrier to learning. Keeping learners motivated can also be a challenge. This especially true when trying to teach new behaviors to patients who may not immediately see the benefits of changing long-held habits. As patient educators, we must find ways to keep adult learners engaged and interested by providing incentives for learning. In teaching adults to manage their pulmonary symptoms, we have found several strategies that lead to more consistent success.

Importance of information

Learners need to know why they are being taught the information and why it is meaningful to them[1]. Getting patients to internalize the idea that taking better care of themselves can give them a better quality of life is a great incentive for learning. Before each lesson, we explain why the topic is important. Giving meaning to the material helps engage the learner and answers the question that is on most of their minds: "What am I supposed to get out of this?" Patients become interested in the material when they see how it is useful in their care and well-being. Keeping that in mind, we don't just tell them what is important, we also tell them why. Starting lessons with a discussion about what topics they would like to cover or what problems they are having is a great way to cover material that is importance for the learner.

Keep teaching times short

We use multiple short sessions instead of longer sessions when teaching new material. These sessions usually last about 20 min. Short sessions promote the retention of information. We also limit the amount of information we present in each session. Doing so gives us the opportunity to present the concepts more clearly with reinforcement, such as sharing multiple examples to support the ideas. Another benefit of dividing content into multiple short sessions is that it lessens the risk of exhausting the learner's attention. Teaching pursed lip breathing and diaphragmatic breathing while Veterans/students give a return demonstration can be taught in a short time frame while engaging Veterans. Building on the importance of pursed lip breathing in daily activities can provide a short but powerful lesson.



Keeping the learners interested

Simply reading material from a PowerPoint presentation is a guarantee for losing interest. Whenever possible, involve the learners in their education by using open-ended questions, like "How did this affect you?" and "Would this work for you?" Open-ended questions help start a discussion. Encouraging patients to relate the concepts to their own lives is a great teaching method. The discussions also let patients know they are not the only ones struggling with some of these problems, which can ease some of the stress that can inhibit learning. It also promotes camaraderie among participants. Engaged learners typically retain information better than passive learners.

Having the Veterans/students demonstrate or give examples of the material being presented will help keep them interested. While teaching Activities of Daily Living the Veterans/students can show how to put groceries away and breathe correctly. Sweeping is another chore that can be demonstrated by the learners. Pushing a wheelchair filled with items can mimic pushing a lawn mower or grocery cart.

Whenever possible refer to previous topics

Referring back to previous relevant topics helps tie the material together and improves retention. A discussion on lung anatomy and causes of airway obstruction is a great opportunity to bring up medications and how or why they work. Teaching stress management and breaking the dyspnea cycle is a great time to review pursed lip breathing and diaphragmatic breathing. The discussions do not have to be long, but the relationships and reasoning boost understanding, and understanding the disease process

and why things work together encourages patients to maintain compliance with their medications and treatments.

Using patient scenarios and asking patients what they would do in a situation is a great way to assess whether patients understand the material being taught. An example of this is," What would you do if you were short of breath?" The answer should be step by step and in the right order. First, stop and rest; second, use pursed lip breathing; third, take an inhaler if necessary. Examples of other scenarios include:

What do you do if you are coughing up green and yellow secretions?

When would you call 911?

What steps can you take to decrease your blood pressure?

What are the signs of a stroke, and what should you do if they are detected?

The scenarios are often asked to the group. This can reinforce important information and develop critical thinking skills. We want our patients to be able to assess what is going on and decide what to do. This decision may involve getting help or just stopping what they are doing. This involves some critical thinking. But for patients to learn this critical thinking, we must teach them in this way. Using scenarios is a great way to develop critical thinking and decision-making skills.

Review, review, review

Something heard only once is more likely to be forgotten than information that is reinforced over time. Repetition leads to retention and better understanding. Much of the knowledge presented to pulmonary rehabilitation patients, such as anatomy, medications, and treatments, is new and foreign to them. Repeating the information in as many ways as possible will help with retention. Sometimes we go over the material again in the same way after a few weeks. Class time can be spent on reviewing material instead of going over anything new. This provides a way to determine whether more time needs to be spent on a topic. This is another time to incorporate case scenarios. If the information is important, then it warrants being repeated.

Referees for our Quiz Bowls. Patricia Jefferson, RRT, Chief, Respiratory Care, SLVHCS-Southeast Louisiana Veterans Health Care System, Vernon Pagson, RRT, Assistant Chief, Respiratory Care SLVHC, and Lynette Johns-Major, RRT, MHS, Respiratory Care Supervisor/Educator SLVHCS. Due to the competitive nature of our Veterans the referees play an integral part of our Quiz Bowls while having fun.

Make learning fun

Making learning fun is a great way to get learners engaged in learning[2]. This is one of the most important aspects of teaching adult learners. There are several ways to incorporate fun into teaching. At our institution, we have had much success with our quiz bowls. Veterans/students are given study guides

with questions. Studying the review sheets is a great way to have your learners review and learn the material.

Study guides can't be used during the learning games. All of our current Veterans and "graduates" from our Pulmonary Rehab Program are invited to attend the learning games. Game show formats like Jeopardy and Family Feud have been used. Points are awarded for correct answers. Team and individual formats can be used. Prizes and awards are given out to the winners." Usually everyone is a winner". Competition and fun have proven a great way to enhance learning.

Crossword puzzles and word searches can also be used. Small unexpected prizes or awards for correct answers during review sessions can bring out the competitive spirit and keep things fun and entertaining.

Summary

We have seen changes in our patient response to learning since we started using these techniques. Many patients will show their eagerness by asking what is being covered today. The patients have also shared their learning materials with spouses and friends, and often look back at previous information. We provide folders for the handouts given during educational sessions. Some of our patients have said they don't want to miss Pulmonary Rehab because they don't want to miss class time. The changes to our educational sessions have benefitted patients and instructors, because when learning is fun for the learner, it is also fun and more interesting for the instructor. Patient satisfaction with our Pulmonary Rehab educational Program has increased since implementing these changes.

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32nd Annual AARC Zenith Awards

by Debbie Bunch

The AARC presents the Zenith Award each year to the top corporations in the respiratory care industry during our annual International Respiratory Convention & Exhibition at AARC Congress. Considered the “people’s choice” award of the respiratory care profession, the Zenith Award is highly prized by the recipients, who proudly display it on their company websites and in their AARC Exhibit Hall booths.

Now it is up to you to choose the Zenith winners for 2020. This is your opportunity to say “thank you” to your favorite industry team members and the companies that research and develop new products and enhancements to make life better for patients, whose representatives are just a phone call away when you need them, who stand behind their products and their promises.

The AARC will present the Zenith Awards to executives representing the winning companies when the Association convenes AARC Congress 2020 in Orlando, FL, beginning Saturday, November 14. Your vote could place your favorite company in the spotlight during this year’s Awards Ceremony.

When making your choice, evaluate the manufacturers, service organizations, and supply companies that have done the most outstanding job for you over the past year according to these criteria:

- Quality of equipment and/or supplies
- Accessibility and helpfulness of sales personnel
- Responsiveness
- Service record
- Truth in advertising

Vote online now for the Zenith Awards.

Challenge accepted!

by Karen S. Schell, AARC President, DHSc, RRT, RRT-NPS, RRT-SDS, RPFT, RPSGT, AE-C, CTTS

A call to take part — challenge accepted!

"We don't grow when things are easy, we grow when we face challenges." — *Picturequotes.com*

How true is that? Growth comes from pain, difficulty, transitions, heartbreak, etc. Growth doesn't come from stagnation. Growth comes from change. Change comes from within . . . and it comes from you. Growth happens when you let it, when you accept it, and when you want it.

Life is full of challenges. Some people seem to meet every challenge with confidence, while others struggle to overcome them. We get a sense of satisfaction from facing challenges head-on — it brings a sense of accomplishment and can be very fulfilling.

When you are first confronted with a problem, it can seem daunting. Whatever you do, give yourself some time to get used to the problem. "It's impossible," said Pride. "It's risky," said Experience. "It's pointless," said Reason. "Give it a try," whispered the heart. Take the chance. Life has so many surprises. You don't always need a plan. Sometimes you just need to breathe, trust, let go, and see what happens. Be open to change. Be open to self-growth, and it will come. Give yourself another day, another chance. You will find your courage eventually. Don't give up on yourself just yet. You can't control everything — sometimes you just need to relax and have faith that things will work out.

"We fall. We break. We fail . . . but then, we rise, we heal, we overcome." — *Valerie Johnson*

COVID-19 has presented our profession with many challenges. When we first heard about it, it seemed overwhelming and complicated. We started with finding out more, asking questions, and trying to understand it. We put things into perspective, no matter how awful it was, and the more we learned, the more we engaged. We took the problem and changed it to an opportunity to grow. The more we grow, we overcome.

You can have all your ducks in a row, your inbox empty and your priorities in place, but sometimes, despite all of this, things will go sideways and you will be faced with bad news, a crisis, or a challenge. It might be a small thing, or it might be something huge that you can't bluff your way out of — challenges

are what we are confronted with and have to address. This may sound like bad advice, but sometimes when you can't get out of something, you might as well dive in. You might as well embrace your new situation.

It is naïve to think you can lead a life without problems — problems are just part of what we do. Take the pain and enjoy the problem. The bigger the obstacles, and the bigger the challenge, the more you grow as an individual and the more you can share your expertise. We all face challenges constantly in every area of our lives. Most people have a hard time accepting and dealing with these challenges. The truth is that you will have to deal with difficult problems throughout your life, whether it is in your personal life or in your professional life. Most of us become afraid and run away from our problems because we don't want to accept the way it is. Running away from your problems is the worst thing you can do to deal with the challenges that come your way.

Respiratory therapists are facing many challenges with COVID-19 and other issues in our profession. We are here, we have been called to take part in ways we never imagined. We have been in control, staying calm and making smart decisions. We accept the reality of the way things are, clearly accepting the moment, to take the next step in caring for our patients every day in the best possible way.

The fact is that there are some people who are not going to like what you say, and there will be others who do like what you have to say — your job is to accept the way people are and not get worked up emotionally and mentally over someone not liking you or what you do. When you think too much about that, you will have a very tough time accepting reality and you may think that something is not right about what you are doing. Overanalyzing like this can cause you to not act. Action is needed by all of us to accept our challenges. Many people don't like change and they resist it because it pushes them outside their comfort zone. You may be unhappy or happy with change or challenges. But you must realize that those two states are not permanent. You must train your mind to be at peace regardless of what you are experiencing. You can create your own story and success in life. Because we can see that we have grown stronger in the face of our challenges, we have greater confidence that we can grow stronger still. This is the basis of feeling capable. RTs are capable, and this is our chance to show others.

This is our time. Be present. It means being present in the life you have right here, right now. As Buddha teaches, there is freedom in taking life as it comes to us, the good with the bad, the wonderful with the tragic, the love with the loss, and the life with the death. When we embrace it all, then we have a real chance to enjoy life, to value experience, and to seek the treasures that are there for the taking. When we surrender to the reality of who we are, we have the chance to do what we can do in the best possible way.

Practice gratitude. It is easy to count our troubles rather than our blessings, but such an attitude undermines our ability to draw from the good that we have been given and to see our lives fundamentally as a gift. A change in perspective can make all the difference. Recognizing the good and receiving it with gratitude is a recipe for emotional health and well-being. This attitude enlarges the possibility that we can make use of the good we have been given and even use it to cope with the difficulties that we inevitably inherit.

We are all learning: No one gets it right every time. A more compassionate attitude toward ourselves only helps us stay in the game. The dynamic process of life — trying, succeeding, failing, and trying again — is the only way to develop lasting confidence in ourselves. We learn through experience that we can both succeed and recover from failure. We also learn to be humble and to develop a view of ourselves as limited creatures who will always need the help and support of others. We tend to those who hurt. We try to heal them. We express our concern. We take responsibility for our mistakes; we learn to say we're sorry. We try to make amends. We learn to forgive; we accept the forgiveness of another. As monks do every day, we fall down and get up, fall down and get up again.

Challenges are opportunities to grow. That growth takes place out of potentiality, your potentiality, which is infinite and highly active in every moment of life. Come to know yourself as that. You are pure potential experiencing life through what seems like a limitation. Challenges are spikes in that imaginary limitation barrier that guide you to awareness. Be yourself, be aware, grow to your potential, accept the challenge, and be *part of the changes* ahead for our profession

about the author…

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Immunity (And Not the Biological Kind)

by Anthony L. DeWitt, JD, RRT, FAARC

One of the ideas being floated in Congress and in certain state legislatures is to provide to health care workers immunity from lawsuits arising out of the COVID-19 pandemic. The idea has not yet become law, although it certainly may at some point. Whether the immunity is going to be useful is another question.

Immunity from malpractice lawsuits is more a gift to professional malpractice insurance companies than it is to the health providers themselves. Most physicians (and thousands of therapists) carry some form of malpractice insurance, and in most cases that insurance protects their personal assets from a plaintiff's claims in litigation. But while the physician usually has little to worry about, the insurance company must pay counsel to fight the lawsuit. It must pay experts. It must pay deposition fees. And, it usually has to pay these costs even when the lawsuit has little to no merit. This can, and sometimes does, drive up insurance costs. It also ensures that every litigant gets their day in court.

Every professional has multiple defenses built into their state's law. Negligence is only negligence if the harm that arises from it is foreseeable. For example, if a therapist provides a nebulizer for bronchospasm, and the patient suddenly loses all circulation to his right leg, the possibility that the two could be connected is pretty remote. The doctrine of factual causation (ie, that the plaintiff must show that the defendant caused the harm) comes into play and makes a lawsuit in that scenario unlikely. If the patient truly had a remarkable and unforeseen reaction to the bronchodilator, and it is shown by science that it did cause the loss of circulation, then the doctrine of legal causation (sometimes called "proximate causation") comes into play. Proximate cause limits the scope of liability to those injuries that bear some reasonable relationship to the risk created by the defendant. So, for example, when a pediatric patient is given aspirin and develops Reyes syndrome, the development of that syndrome is foreseeable based on decades of data and thus proximate causation exists. But in the example above, it simply does not. Proximate causation would defeat that claim.

The problem, again, is that it takes discovery depositions and expert testimony to make the matter subject to dismissal. None of that is cheap or easy.

One of the things health care workers often complain about is the use of the "retrospectascope" as a tool for litigation. Remdesivir is now being touted as a potential cure for COVID-19. Inevitably there will be

claims that clinicians "should have known" that it would work, and that the failure to try it on a litigant's deceased loved one is evidence of negligence. But this analysis puts the cart directly in front of the horse.

Lawyers defending negligence claims arising in this manner often cite the Latin phrase "*post hoc ergo propter hoc*." It is a logical fallacy to the effect that since death followed the failure to give remdesivir, the death must have been caused by the failure to give the drug. Simply put, the law doesn't allow clinicians to be put into a time machine and judged by information available in July that wasn't available in January.

One reason immunity may be a good thing for many hospitals, however, is that hospitals are often self-insured up to a certain point. This means that they pay the costs of their own representation up to a certain dollar figure (often $500,000 or more). Therefore, when a boatload of cases come in alleging negligence by the hospital's employed physicians in not giving remdesivir, each separate claim has a $500,000 limit before external insurance kicks in. The Laffey Matrix, which is the guideline used by the District of Columbia federal courts in determining legal fees, establishes that rates in excess of $800 an hour are reasonable for lawyers with 20 years or more of experience. As the saying goes, talk is cheap until you hire a lawyer. Legal fees could quickly push a hospital into bankruptcy.

Immunity against a lawsuit based on COVID-19 does two things. First, it discourages the majority of lawyers from suing in the first place. Second, it provides that if the defense counsel moves to dismiss the case at the earliest possible time, that motion is routinely granted, and legal fees are limited to under $1,000 in most cases (assuming there is no appeal).

Of course, the wording of the statute is what will make the immunity statutes, if they are enacted, either useful or useless. A statute that banned all medical negligence claims based on dates would be a retrospective law, and that would be unconstitutional. A statute that predicated the immunity on actual exposure to the virus, or treatment for it, might mean that a patient whom therapists could not treat for hours because they were busy with COVID-19 patients could sue for negligence if that patient died from an unrelated cause. In this regard, the immunity does little good where the virus is a contributing cause based on triage and other medical factors.

So, it comes full circle. While immunity may be useful, the way it is enacted will determine how useful it is. Lawyers are sure to challenge such statutes as unconstitutional and as denials of equal protection under the law. Those challenges will require defense counsel as well.

As I have repeated often here, and will do so again, the best malpractice insurance you cannot buy is a great relationship with your patients. People do not sue people they like. Smiles, warm words, and compassion go a long way toward making patients see you as a person, and not as a tool of an overstretched corporation delivering health care..

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RC Currents

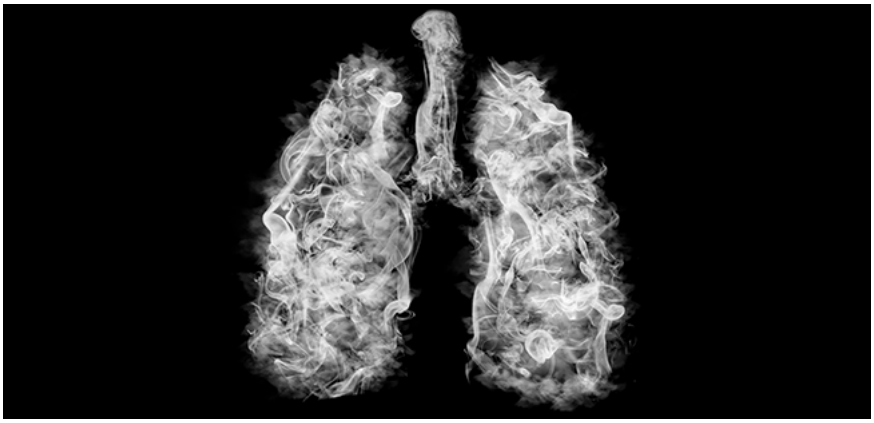
IN THE NEWS

Asthma Ups Ventilation Days for Younger Patients with COVID-19

Younger people with asthma who need a ventilator during a bout with COVID-19 may be at increased risk for more days on the ventilator, report researchers from Rush University Medical Center who looked at data on 935 patients who tested positive for COVID-19. Among that group, 241 had an established diagnosis of asthma. Patients with COVID-19 between the ages of 20 and 59 years old who also had asthma needed a ventilator to assist with breathing for five days more on average than non-asthmatic patients with COVID-19. Among other findings from the study —

- Asthma was significantly associated with longer intubation time in patients between 18 and 49 years of age and between 50 and 64 years of age, but not in those 65 years of age and older.
- Duration of hospitalization was longer among patients with a history of asthma compared to those without in patients aged 50 to 64 years, but not in the younger or older age groups.
- Patients aged 50 to 64 with asthma on average spent two more days in the hospital than the non-asthmatics in this age group.
- Asthma was not associated with a higher rate of death or with acute respiratory distress syndrome among COVID-19 patients.

The study was published in the *Journal of Allergy and Clinical Immunology: In Practice*.



Children Willing to Overlook Vaping Dangers

If you think educating young people about the dangers of vaping will lead them to avoid the practice, you may be wrong. Researchers from the University of Michigan who conducted a text-message–based survey of teens and young adults reported that even though most admitted that vaping is dangerous to their health, the social aspects of vaping convince them to do it anyway.

The survey used "juuling" to define e-cigarette use and involved 1,129 young people. Seventy-nine percent said they think juuling is dangerous, and another 7% said it might be. Nearly 72% said it could also lead to use of cigarettes and other drugs. Respondents in the 14–17 year age group were somewhat more likely to say that social factors were the main reason that people their age use e-cigarettes, but 58% of those between the ages of 18 and 24 also cited social factors.

The authors believe more needs to be done to ensure young people don't have ready access to vaping products. They also suggest anti-vaping education should begin in middle school and should include a discussion about how social factors can lead someone to vape even when they know they shouldn't. The study was published in a recent edition of *JAMA Pediatrics*.

New Antibiotic for Drug-Resistant Infections in the Works

Researchers from the University of Pittsburgh have discovered a new antibiotic that they believe will be able to fight even the worst drug-resistant bacteria. Administered via the windpipe, the antibiotic proved to be more effective than traditional last-resort antibiotics used to fight drug-resistant bacteria when tested in cell cultures and mice. What's more, it appeared to work without notable side effects. The experimental drug was built from an engineered cationic antimicrobial peptide, a synthetic and more

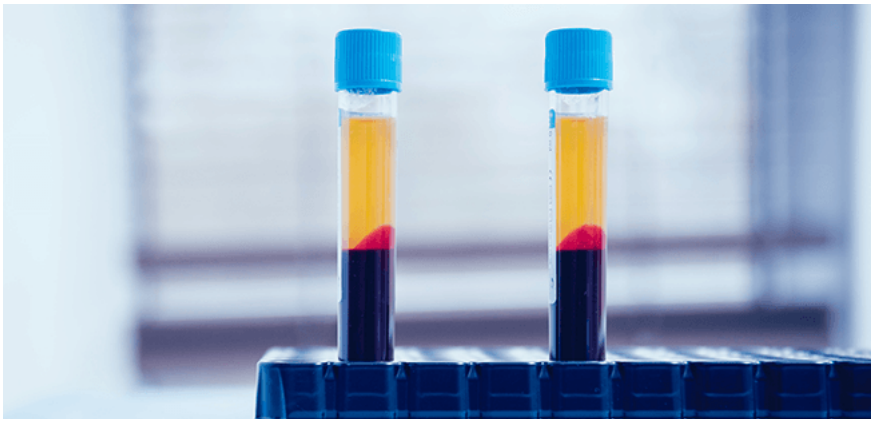
efficient version of naturally occurring antimicrobial peptides that form a first line of defense against infections in humans.

“This considerable improvement in lowering toxicity, coupled with the new drug’s strong stability and activity against superbugs, is good evidence that this compound will be well-suited for clinical applications in treating respiratory infections,” said study author Y. Peter Di, PhD, MBA. He and his colleagues aren’t sure how well the drug will be tolerated long-term and caution that more testing will be required before it can be used in people. That said, they are exploring its potential use in patients with cystic fibrosis and ventilator-associated pneumonia. The study appeared in a recent edition of *Science Advances*.

Immune Response to SARS-CoV-2

Can the immune system mount the kind of substantial and lasting response to SARS-CoV-2 needed for a vaccine to be effective? The first cellular immunology data suggest the answer is yes. Researchers publishing in a recent online edition of *Cell* report a robust antiviral immune response to SARS-CoV-2 in a group of 20 adults who had recovered from COVID-19. They believe their findings show that the body’s immune system is able to recognize SARS-CoV-2 in many ways, dispelling fears that the virus may elude ongoing efforts to create an effective vaccine.

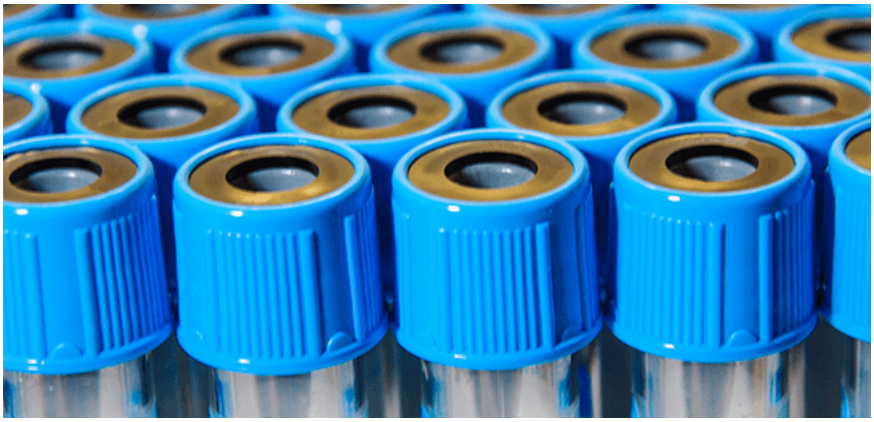
“If we had seen only marginal immune responses, we would have been concerned,” said study author Alessandro Sette, a professor in the Center for Infectious Disease and Vaccine Research at the La Jolla Institute for Immunology. “But what we see is a very robust T cell response against the spike protein, which is the target of most ongoing COVID-19 efforts, as well as other viral proteins. These findings are really good news for vaccine development.”



Study Finds Positive Results for Plasma Therapy

In the first published study to look at outcomes for patients who received convalescent plasma transfusions to treat COVID-19, researchers from Houston Methodist report 19 out of 25 patients improved with the treatment and 11 had been discharged from the hospital at the time of the report. The study also showed no adverse side effects from the therapy. The investigators said that patient outcomes seen with plasma therapy are similar to those seen with the antiviral drug remdesivir. The study was published prior to peer review on the preprint server, medRxiv, in May. It has been submitted to a peer-review journal for publication.

Now additional research is in the works as well. A randomized controlled trial is currently being considered at Houston Methodist to look more closely at variables such as timing of the transfusion after the onset of symptoms, the number and volume of transfusions adjusted for patient biometrics, antibody levels in donor plasma, and numerous other parameters needed to effectively evaluate how to optimize the therapy.



A Little Dirt Might be a Good Idea

Researchers conducting studies in laboratory mice generally focus on disease-free specimens for trials involving new influenza vaccines. According to investigators publishing in *The FASEB Journal*, mice that have been exposed to other illnesses would make the studies more reflective of real-world situations.

The University of Iowa investigators studied two groups of laboratory mice: one raised in standard clean conditions, and one that shared a cage with pet-store mice. Half of the mice in each group were given a flu vaccine and all of the mice were exposed to the influenza A virus. On average, the dirty mice showed more extensive lung damage from their illness than the clean mice, suggesting they were hit harder by the infection. Among mice that had been vaccinated, dirty mice also showed an impaired ability to clear the influenza virus from their systems, indicating the vaccine was less effective in these mice than in clean ones.

“These results suggest that clean mice, when exposed to either a pathogen or vaccine, can often mount an efficient immune response,” said study author David Meyerholz, DVM, PhD. “In dirty mice, much like humans where the immune system is regularly challenged by environmental and seasonal pathogens, the ability to mount an immune response appears to be less efficient. We want to better understand the reason why this happens, which could help us generate more effective vaccines.”

Interferon May Treat COVID-19

Canadian researchers who examined the course of COVID-19 in 77 patients with moderate disease in Wuhan, China, have found that treatment with interferon (IFN)-α2b significantly reduced the duration of detectable virus in the upper respiratory tract and reduced blood levels of interleukin (IL)-6 and C-reactive protein (CRP).

The investigators considered IFN-α therapy for COVID-19 because they previously reported that interferons had therapeutic benefits during the SARS outbreak of 2002 and 2003. Patients were either treated with IFN-α2b, arbidol (ARB), which is a broad-spectrum antiviral, or a combination of IFN-α2b plus ARB. Viral clearance was defined as two consecutive negative tests for virus at least 24 hours apart. IFN-α2b treatment accelerated viral clearance by approximately seven days and significantly reduced circulating levels of IL-6 and CRP, whether alone or in combination with ARB. The influence of age, comorbidities, and sex did not negate the effects of IFN treatment on viral clearance times or on the reduction in the inflammatory proteins IL-6 and CRP. “Rather than developing a virus-specific antiviral for each new virus outbreak, I would argue that we should consider interferons as the first responders in terms of treatment,” said study author Dr. Eleanor Fish, from the University of Toronto. “Interferons have been approved for clinical use for many years, so the strategy would be to repurpose them for severe acute virus infections.”

The study was published in *Frontiers in Immunology*.

Why Women Work Harder to Breathe During Exercise than Men

In a study conducted in six men and five women who performed two maximum exercise tests, Canadian researchers have reported that women have to work harder to breathe during strenuous exercise than men.

Each of the participants gradually increased their level of exertion on a stationary cycle until they were exercising as hard as they could while breathing through a mouthpiece attached to a large bag. During one session, the bag was filled with normal room air. During the other, the bag was filled with a mixture of oxygen and helium. Each bag contained the same amount of oxygen, and participants were not told which mixture they were breathing on which day.

The researchers monitored pressure inside the esophagus during the tests to measure the amount of work required to breathe. When the bag contained the helium mixture, the results showed no difference in the work of breathing between men and women. When it contained room air, breathing required significantly more work for women than for men.

The authors explained that the helium mixture is much less dense than room air and, as a result, flows in a more laminar manner. Turbulent flow in the airways causes more resistance, which requires more work to overcome. "Two big factors that determine whether flow is laminar or turbulent is the size of the airway and the flow," said study author Paolo Dominelli, PhD, assistant professor at the University of Waterloo. "At rest, the rate of air flow is very low, so even though women have smaller airways than men, air flow is still laminar. As exercise intensity increases, you breathe faster, and at some point the air flow goes from laminar to turbulent. Air flow in men's airways will also eventually turn from laminar to turbulent, but this requires a higher rate of air flow than is required in women." An abstract on the study appeared in *The FASEB Journal*.

Blood Assay May Reveal Clotting Issues Sooner

Blood clotting problems have been common in patients with COVID-19, particularly those who develop severe disease. Researchers from the University of Colorado believe a whole-blood assay that looks at how clotting is occurring could help uncover these cases sooner.

They reached this conclusion after studying 44 patients treated for COVID-19. Those whose bodies were not breaking down clots were more likely to require hemodialysis and had a higher rate of clots in the veins. These patients were identified by thromboelastography (TEG) assays showing no clot breakdown after 30 minutes, along with a D-dimer level greater than 2,600 ng/mL. Eighty percent of patients with both positive test findings were placed on dialysis compared with 14% without either finding. Patients with positive test findings also had a 50% rate of venous blood clots compared with 0% for those patients who tested negative for both.

"These study results suggest there may be a benefit to early TEG testing in institutions that have the technology to identify COVID-19 patients who may need more aggressive anticoagulation therapy to

prevent complications from clot formation," said study author Franklin Wright, MD, FACS. The study was published ahead of print in May by the *Journal of the American College of Surgeons*.

End-of-Life Care Confusing for Families

Aggressive medical treatments that are unlikely to change a patient's prognosis are often deemed "inappropriate" or "futile." But do family members understand what those terms really mean? A new study out of UCLA suggests many of them don't.

The researchers conducted focus groups with 39 participants aged 18 and older who either had hospitalized relatives or had been hospitalized themselves. None were trained in the medical field. Key-take home messages from the sessions included —

• Participants initially had difficulty understanding the concept of potentially inappropriate treatment and said the current nomenclature was inadequate.

• Participants said there was suboptimal physician–patient communication and public discussion about end-of-life issues.

• The participants were skeptical that medical treatment could be completely inappropriate or futile, and expressed fear that the concept of medical futility could undermine patient-and-family autonomy.

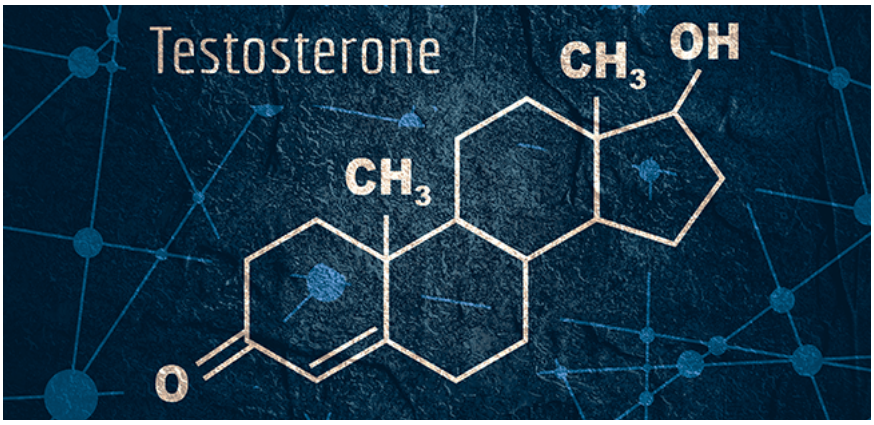
• While participants eventually grasped the concept of futile treatment after being presented with a series of hypothetical cases, most still felt that families should pursue aggressive treatments despite physicians' recommendations against them.

"Our study showed that most laypersons believe that families have the right to pursue aggressive treatments over the refusal of physicians, promoting patient autonomy while subjugating concerns about limited societal resources," said study author Dr. Thanh Neville. "These issues will likely become more relevant as resources for medical care become increasingly scarce in an overstretched health care system, such as during the COVID-19 pandemic." The research appeared in a recent edition of the *Annals of ATS*.

New Collection and Handling Guideline from CAP

The College of American Pathologists (CAP) has published a new evidence-based guideline aimed at clarifying procedures and methods to optimize test outcomes for patients with lung disease. "Collection and Handling of Thoracic Small Biopsy and Cytology Specimens for Ancillary Studies" divides the recommendations into six main categories of procedures and considerations for the diagnosis of lung cancer or infectious diseases such as tuberculosis.

The interdisciplinary panel of pathologists, thoracic specialists, and other experts who developed the guideline represented eight collaborating medical societies. Together they reviewed more than 3,100 articles to develop the 16 recommendations included in the document. "Often times, people give little thought to how specimens are collected, but as our guideline demonstrates, pathologists and clinical teams are always focused on improving procedures to ensure we get the best results for patients," explained Sinchita Roy-Chowdhuri, MD, PhD, FCAP, the pathologist leading the guideline development. The guideline was published online by the *Archives of Pathology and Laboratory Medicine* this past spring.



Lowering Testosterone to Combat COVID-19

Using existing data, Columbia University researchers have identified a viral entry protein on lung cells called TMPRSS2 that they believe would be a good target for a treatment aimed at keeping SARS-CoV-2 out of those cells. Because hormones can greatly alter TMPRSS2 levels, they believe the treatment of choice could be lowering testosterone.

"The new coronavirus cannot enter cells without the help of the TMPRSS2 proteins on our lung cells," explained study author David Goldstein, PhD. "Our analysis suggests that decreasing testosterone will lower TMPRSS2, interfere with viral entry, and reduce the severity or duration of COVID-19." They noted a previous study reported that men have higher TMPRSS2 levels on their lung cells than women, and

older people have higher levels than younger people in general. A few people have extremely high levels, and older people are more likely to be in that group.

The investigators are now looking at use of the drug degarelix, which quickly and completely eliminates testosterone from the bloodstream, in patients with COVID-19 who have serious conditions but are not in the ICU at the time of enrollment in the study. If the strategy works in these patients, they believe other anti-androgen agents that reduce but do not eliminate androgen signaling may be an option for patients with milder COVID-19 disease.

The current study has been published prior to peer-review on preprint.org.

Sleep Matters in Asthma

Can sleep affect outcomes for patients with asthma? According to researchers who surveyed 1,389 adults age 20 years and older who self-identified as having asthma, the answer may be yes. They reported that short sleepers — defined as sleeping five hours or less per night — were more likely to have an asthma attack, dry cough, and overnight hospitalization during the past year. They also had significantly worse health-related quality of life and more frequent general health care use during the past year as compared to normal sleepers.

But sleeping too much was a problem, too. The odds for long sleepers — defined as sleeping nine or more hours a night — to have some activity limitation due to wheezing was higher when compared to normal sleepers. However, no significant differences in other patient-reported outcomes and health care use were observed between the long and normal sleepers, defined as sleeping 6–8 hours per night.

Overall, 25.9% of the group were short sleepers, 65.9% were normal sleepers, and 8.2% were long sleepers. Short sleepers were more likely to be younger and non-white, while long sleepers were more likely to be older, female, and a smoker. The study appeared in a recent edition of the *Annals of Allergy, Asthma and Immunology*.

Telemedicine Approach to Infectious Disease Care

A telemedicine approach could help protect health care workers caring for infectious disease patients, report researchers from the University of Virginia Health System. The investigators shared outcomes of the strategy, which they used to treat Ebola patients during the 2014–2016 outbreak, in a recent edition of the *Annals of the American Thoracic Society*.

The Isolation Communication Management System (iSOCOMS) was used to monitor the movement of a patient from an ambulance to the biocontainment room, where a camera and monitor in the room

allowed for continued communication. One provider remained in the room with the patient while the observing provider was able to take notes unencumbered by PPE and use an electronic stethoscope through iSOCOMS and a bedside computer. This provider was also able to communicate directly with the patient via the monitors as well as monitor any clinicians in the room for their correct use of PPE and warn them if breaches were noted.

“The benefits of iSOCOMS in reducing PPE use, improving patient experience, extending the capacity of our workforce, and providing a means for providers to see patients in their own hospital without always going into their rooms are clear,” said study author Kyle B. Enfield, MD, MS.

CAP Blood Biomarkers in Children

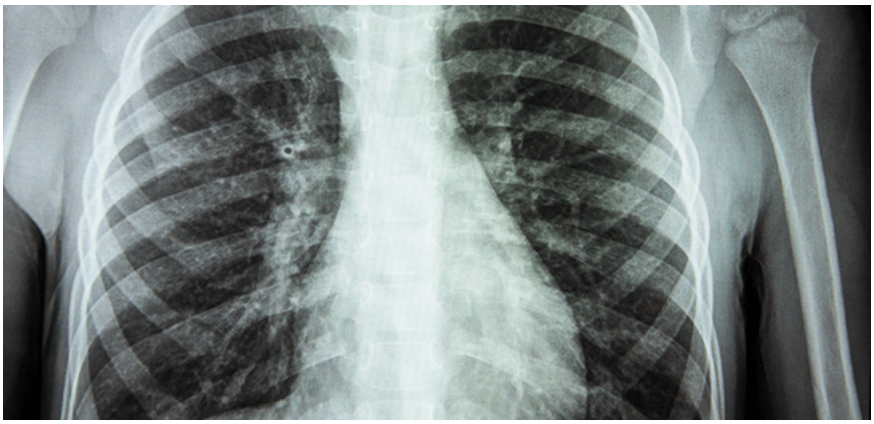
Researchers from Ann & Robert H. Lurie Children’s Hospital of Chicago have found that blood biomarkers reflecting the body’s response to infection generally are not useful in determining disease severity in children with community-acquired pneumonia (CAP). That said, however, two of the markers — C-reactive protein (CRP) and procalcitonin — may have a role to play in identifying the most severe outcomes in children with CAP.

The investigators reached these conclusions after evaluating 477 children, three months to 18 years old , who presented to the emergency department with signs and symptoms of lower respiratory tract infection. Researchers examined the predictive value of biomarkers in relation to complications of CAP, as well as more common indicators of disease severity and requirements for hospitalization, such as use of intravenous fluids, supplemental oxygen, positive pressure ventilation, and broadening of antibiotics. Elevated CRP and procalcitonin levels were seen in children with complicated pneumonia, empyema requiring chest drainage, positive pressure ventilation, sepsis, and the receipt of vasoactive infusions. The number of children with these severe outcomes, however, was small, so the investigators stressed that definitive conclusions cannot be made from these findings. The study was published by *Pediatrics* in May.

ALS Linked to Early Teeth Development

A new study out on, which was conducted in conjunction with investigators at the University of Michigan, suggests that teeth may hold clues as to who is at risk for amyotrophic lateral sclerosis (ALS). The researchers used lasers to map growth rings that form daily in the teeth and discovered evidence in the growth rings formed at birth and within the first 10 years of life that patients with ALS metabolize metals differently than patients without the disease. Specifically, the study showed dysregulated uptake of a mixture of essential elements, including zinc and copper, as well as toxins like lead and tin, in 36 patients with ALS compared to 31 controls.

"This is the first study to show a clear signature at birth and within the first decade of life, well before any clinical signs or symptoms of the disease," said senior author Manish Arora, PhD, MPH, BDS. "We hope in the long term, after validation of this work in larger studies, that this will lead to preventive strategies." The investigators also believe the study reveals biological pathways that could potentially be modified with drug development. The study appeared in the *Annals of Clinical and Translational Neurology* in May.



X-Ray Scores Predict COVID-19 Severity

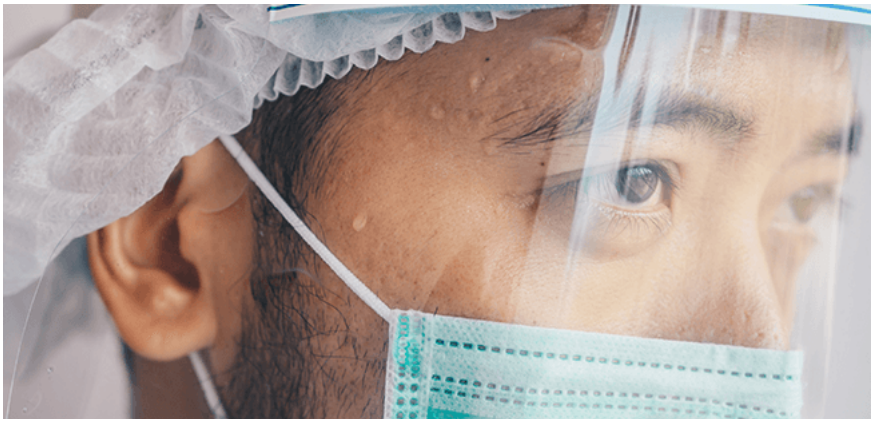
In a first-of-its kind study, researchers from the Mount Sinai Health System of New York have found that performing chest x-rays on young and middle-aged adults with COVID-19 while they are in the emergency room can help identify those who will go on to have severe disease requiring intubation.

The finding was based on an analysis of the records of 338 COVID-19–positive patients between the ages of 21 and 50, 62% of whom were male. All patients had an x-ray taken in the emergency room. Researchers divided the x-rays into six zones (upper right, upper left, middle right, middle left, lower right, and lower left) and developed a scoring system from zero to six to quantify severity. The total score depended on how many zones showed evidence of disease. Lower severity scores ranged from zero to

two, and higher severity scores from three to six. Of the 338 patients, 145 were admitted. Results showed —

• Patients with the highest chest x-ray scores were 6.2 times more likely to require hospitalization and 4.7 times more likely to be intubated.
• A more specific breakdown showed that of the 34 patients with a "zero" score, two were intubated; out of the 15 patients with a "one" score, one was intubated; 38 patients had a score of "two," and six were intubated; of the 14 patients with a score of "three," two were intubated; out of 32 patients with a score of "four," 10 were intubated; for the seven patients with a score of "five," three were intubated; and four of the five patients with a score of "six" were intubated.
• Men were more likely than women to have higher chest x-ray scores and be admitted, but were not more likely to be intubated.
• Obese patients were more likely to have higher chest x-ray scores and require hospitalization.
• No significant differences in outcomes were seen between patients of different race and ethnicity when adjusted for other factors such as age, gender, comorbid medical conditions, and weight.

The study was published in a recent edition of *Radiology*.



Negative Pressure Helmets and Tents

University of Michigan researchers recently described two new negative pressure devices they believe could play a role in keeping health care workers safer while treating patients with COVID-19. Dubbed "Aerosolve," the devices consist of a portable negative-pressure helmet that is worn by the patient and a portable negative-pressure procedural tent.

The helmet allows health care workers to more liberally use heated high-flow nasal cannula therapy, noninvasive ventilation, or nebulized medications with infected patients. "The helmet design is compact and creates and maintains a personal negative-pressure environment that the patient can wear during transport, imaging, and testing," said Benjamin Bassin, MD, one of the project team leaders.

The portable negative-pressure procedural tent circulates and removes air, including droplets exhaled by the patient, through an attached vacuum motor and high-efficiency particulate air filter, clearing it of the virus before it is released into the room. "The tent is unique in that it allows us to access and perform a greater number of procedures the patient may need compared to the helmet," said Nathan Haas, MD, another member of the team. "The entire apparatus is disposable and can be used with a single patient, with the exception of the manifold base, which can be cleaned and reused."

The devices were developed in conjunction with FlexSys, Inc., which was founded by University of Michigan Professor of Engineering Sridhar Kota, PhD. FlexSys and the university are seeking commercial partners to supply the helmets and tents to hospitals.

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 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

Phase 2 studies of COVID-19 drug enroll first patients

The first patients are enrolling in two Phase 2 clinical trials for COVID-19 using Pulmotect's PUL-042, an inhaled immunomodulatory agent to prevent and treat coronavirus infections, delivered by PARI's LC Sprint Reusable Nebulizer. The placebo-controlled studies will evaluate the efficacy and safety of the PUL-042 inhalation solution in reducing the severity of COVID-19 in adults positive for SARS-CoV-2 infection and in preventing infection and progression to COVID-19 in subjects exposed to SARS-CoV-2. "We have demonstrated PUL-042's unique ability to stimulate the immune system in the lungs to protect against a wide range of pathogens in multiple animal models," said Pulmotect CEO Colin Broom, MD. "Pulmotect is optimistic that its immune-stimulating technology could be useful in mitigating the threats of SARS-CoV-2 and future emerging pathogens and in protecting vulnerable populations."

New patent for ReddyPort NIV components

According to ReddyPort, the U.S. Patent Office has issued a patent to cover the company's positive-pressure ventilation (PPV) appliance modules and related systems and methods. The ReddyPort PPV appliance module allows clinicians to perform procedures through the noninvasive ventilation (NIV) mask without disrupting therapeutic pressure, which is essential to improve satisfaction for patients and clinicians. The patented appliance modules in combination with the ReddyPort Elbow are integral components to enable better NIV care. "We are on a mission to bring innovative solutions for NIV patients," said ReddyPort CEO Scott Bostick. "This is especially important during the COVID-19 pandemic when clinicians need solutions to improve NIV success."

COVID-19 infection prevention study gets underway

The COVID-19 Research Outcomes Worldwide Network (CROWN) Collaborative is testing whether the antimalaria drug chloroquine can prevent COVID-19 infection or decrease its severity in frontline health care workers. An estimated 30,000 workers from across the globe will participate in the clinical trial, which is being funded by the COVID-19 Therapeutics Accelerator, an initiative with contributions from an array of public and philanthropic donors. Washington University School of Medicine in St. Louis, Missouri,

is the clinical coordinating center. Participants will be divided randomly into four groups. Three of the groups will receive chloroquine at various doses, with the fourth group receiving a placebo. Participants will take chloroquine or the placebo for the first three months and then will be monitored for two months.

BREATHE trial updates

Roivant Sciences has announced several updates for its adaptive, randomized, double-blind, placebo-controlled, multicenter BREATHE trial to evaluate the impact of intravenous treatment with gimsilumab on mortality in COVID-19 patients with lung injury or ARDS. The independent Data Monitoring Committee for BREATHE unanimously recommended that the trial continue after good results were reported in a pre-specified safety assessment evaluating data from the first 10% of randomized subjects after six days of follow-up. In addition, Roivant amended the protocol to permit the use of investigational antivirals such as remdesivir during the study, as well as treatment with convalescent plasma prior to enrollment. As of this writing in late spring, 56 patients had been enrolled in the study, and a total of seven sites had been initiated in New York, Philadelphia, Detroit, New Orleans, Dallas, and Atlanta.

Airborne transmission of viruses in buildings

A team of researchers at the Department of Energy's Lawrence Berkeley National Laboratory is launching a study of the risk of airborne transmission of viruses within buildings and how to mitigate those risks. Computer models will be used to study the transport and fate of aerosols emitted by an infected person in different configurations of room air distribution. Identifying scenarios where infectious doses could potentially be transmitted in various building types, such as residences, classrooms, nursing homes, restaurants, and offices, will be a priority of the modeling activity. From there the team will conduct physical experiments and use detailed air-flow models to examine the impact of building controls, such as ventilation and filtration, on simulated respiratory fluid dispersion and concentrations.

Iowa researcher helps inform British study on COVID-19

Research by University of Iowa virologist Wendy Maury, PhD, has helped facilitate the launch of a new clinical trial in the United Kingdom of a drug that might help treat patients with COVID-19. The drug, known as bemcentinib, was developed by BerGenBio ASA as a potential treatment for cancer. Bemcentinib is a small molecule inhibitor that targets a cell protein called AXL. Dr. Maury's new studies suggest that SARS-CoV-2 uses AXL to enter into some cells, and that bemcentinib profoundly inhibits virus entry into those cells. These preclinical findings suggest that bemcentinib is potentially useful for the treatment of early SARS-CoV-2 infection. Bemcentinib has been selected to undergo rapid testing in a study being funded by the UK Department of Health and Social Care and UK Research and Innovation.

A better bed

Eight Sleep has introduced the Pod Pro, a high-tech bed that offers a personalized sleep experience. Pod Pro retains vital features of the original Pod while introducing new Room Climate and Weather Response, a Comfort Blend Integrated Topper, GentleRise Wake Up Technology, and double the number of sensors, enabling new Heart Rate Variability monitoring and a Daily Health Check report. The advancements in the Pod Pro are part of Eight Sleep's journey to transform any ordinary bed into an advanced health platform that fuels both performance and longevity. "As a pioneer of the sleep fitness category, we are committed to innovation and creating products that deliver science-backed results," said Eight Sleep Co-founder and CEO Matteo Franceschetti.

Decontamination technology uses hydroxyl radicals to clean the air

PA Consulting and Hydroxyl Technologies Ltd. have partnered to develop Airora Professional, a patented decontamination technology based on hydroxyl radicals that actively combats airborne and surface virus and bacterial infections, including coronaviruses, influenza, norovirus, *E. coli*, and MRSA. The technology uses hydroxyl radicals that occur naturally in the open air but are absent indoors. These hydroxyls rapidly react with viruses and bacteria, destroying their cell walls and genetic material to neutralize them, without harming humans and animals. Unlike filter-based systems, which can only clean the air that passes through them, Airora creates a continual supply of hydroxyls, which sanitize the air and surfaces within an entire room around the clock. The companies hope that, with the right partners, within a few months they could launch a scaled solution applicable to settings ranging from hospitals and homes to bars and restaurants.

20-year-old drug being studied for COVID-19

Researchers from the University of California, Irvine (UCI) are embarking on a study to see if the drug Aviptadil, which has a 20-year history of use in human clinical trials for lung ailments, is effective in treating patients with COVID-19. The Phase 2b/3 clinical trial will be conducted in COVID-19 patients suffering from ARDS. Part of the drug portfolio of the Swiss company Relief Therapeutics Holding, Aviptadil has been studied for use in sarcoidosis, pulmonary fibrosis, and pulmonary hypertension. UCI joins the University of Miami and Thomas Jefferson University Hospital in Philadelphia as sites for the new study. The trial will eventually grow to about 120 patients, with estimated completion later this year.

New allergen vacuum enters market

RAYCOP has advanced its allergen vacuum technology with its new, hand-held RS Pro model. The RS Pro is the only allergen vacuum to eliminate 99.99% of allergy-causing dust mites and pollen using heat and the same UVC sanitizing light that hospitals use. The vacuum also includes HEPA filtration and air redirect suction technology to protect fabrics while reducing allergens. “I founded RAYCOP to reduce my patients’ symptoms without a lot of medication,” said Dr. Michael Lee, RAYCOP founder and immunologist. “We’re all spending more time at home right now, and keeping symptoms at bay is a priority.”

Protective testing platform reduces need to change PPE

The Manufacturing Advocacy and Growth Network, in collaboration with University Hospitals and The Ohio Manufacturing Alliance to Fight COVID-19, has developed a new protective testing platform for health care workers assessing the spread of COVID-19. These specially designed barriers could decrease the need for valuable PPE, speed up the testing process, and better protect frontline health care workers. The new barriers are based on a concept from Brigham and Women’s Hospital in Boston and allow medical professionals to administer COVID-19 tests using arm-length gloves connected to a protective barrier. This eliminates the need to change, and often dispose of, valuable PPE items after each test. Instead, professionals can follow a simple cleaning protocol. In addition to providing a faster, safer, and more efficient testing process, the portable booth will facilitate movement to various location-specific hotspots.

FDA approves first home saliva test for COVID-19

Rutgers' RUCDR Infinite Biologics received an amended emergency-use authorization from the FDA late last spring for the first SARS-CoV-2 coronavirus test that will allow people to collect their own saliva at home and send to a lab for results. The decision follows the FDA's recent emergency approval granted to RUCDR Infinite Biologics for the first saliva-based test, which involves health care workers collecting saliva from individuals at testing sites. The new at-home saliva self-collection assay, developed by RUCDR in partnership with Spectrum Solutions and Accurate Diagnostic Labs, allows for broader screening than the standard method using nose and throat swabs at a health care facility or testing location that requires a physical interaction with a health care professional.