



## Proceedings from the Canadian Society of Respiratory Therapists Annual Conference May 5–7, 2021

We are pleased to present a select number of abstracts from the proceedings of the 2021 CSRT Annual Conference. Held virtually May 5–7, 2021, this conference included topics delivered by individuals with expertise in various areas of respiratory therapy practice, including topical themes of COVID-19, virtual respiratory care, coping and caring in the profession, and much more.

As evidenced by the following abstracts, the work of our colleagues in 2021 highlighted current research and practice innovations led by RTs. We have made every effort to include all abstracts accepted by the Program Committee before the publication deadline; however, please note that this collection does not represent the entire program (available at [www.csrt.com](http://www.csrt.com)).

The editorial board looks forward to receiving manuscripts from this conference for consideration for publication in the *Canadian Journal of Respiratory Therapy* in order to continue building the body of knowledge specific to our profession.

### EVOLUTIONS IN RT PRACTICE STREAM

#### 01 ULTRASOUND USE IN TRANSPORT – AN RRT PERSPECTIVE

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Point-of-care ultrasound is a useful tool in patient assessment that can help with many situations, leading to early interventions as well. This can be especially important when the patient is in one of Canada's remote Arctic communities of Nunavut, thousands of kilometers from a tertiary care centre with a trauma ER or an operating room. POC ultrasound has been found to be a useful tool in these situations, providing quick diagnostics and interventions prior to or during long flights south to receiving facilities, and RRTs have been at the forefront of its use. This presentation will discuss the RRT's role in ultrasound use in the transport environment of Canada's Arctic, exploring the differential diagnoses determined through scans, and what interventions may be done by the RRT and transport team. Case studies from the presenter's and colleagues' experiences will be explored and discussed as well, revealing how the RRT profession is constantly adapting and improving patient care even in such a unique environment.

#### 02 OPTIMIZING VENTILATION IN THE RURAL ED R. Sorensen RRT CAE MSc FCSRT, R Dubois RRT MA FCSRT *Alberta Health Services, Central Zone, Red Deer, AB, Canada* [rena.sorensen@ahs.ca](mailto:rena.sorensen@ahs.ca)

**Background:** Ongoing critical care interventions such as ventilation are not meant to be delivered in rural sites, however proximity to urban centers, transport team availability, and inclement weather often force

some rural sites to manage critically ill clients despite approving a transition to another center. There is a province wide initiative to manage patients as close to home as possible.

**Objectives:** To explore an RRT-led initiative to safely and appropriately provide short term invasive and non-invasive ventilation interventions in rural EDs. To understand a risk based approach to rural ventilation. To understand the role of virtual support model in rural ventilation.

**Methods:** A collaborative model was used to: 1. incorporate clinical education and simulation training 2. develop a risk assessment matrix 3. Utilize virtual health technology for enhanced technical support

**Results:** Preliminary evaluation results will be shared

**Discussion:** Ongoing evaluation targets include assessing the nature of the virtual health calls, and the ventilation strategies used by sites engaged in the project

**Conclusion:** Based on the strength of respiratory practice leadership it is possible to provide early ventilatory interventions in rural sites when a unique approach to risk assessment, training, and immediate consultation is used.

#### 03 Interprofessional Practice Opportunities: A Panel Discussion

##### RRTS IN STROKE UNITS: MAXIMIZING THEIR TEAM ROLE

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The Stroke and Geriatric Empowerment (SAGE) Unit is an assessment and short stay rehabilitation program designed for adults and is very successful in improving physical function and independence for clients admitted into the program. Accumulated evidences are in support of

rehabilitation of stroke patients in an organized stroke unit. Clients who benefit from this program include individuals who are experiencing frequent falls, have had a recent onset of cognitive impairment and decline in daily functioning, require further rehabilitation from surgery, amputation or illness and lastly have had a stroke or suffer from neurological diseases. Most of these clients already have an underlying respiratory disorder such as COPD, atelectasis, and sleep-disordered breathing. Respiratory disorders are an important comorbidity in stroke that may increase mortality, the risk of recurrent stroke and other vascular diseases, worsen cognition and functional outcome, negatively impact the quality of life, and prolong hospitalizations. Registered Respiratory Therapists (RRTs) have an integral role in the assessment and the implementation of interventions for the patient with stroke who also has respiratory disorders or is at risk of respiratory diseases. Representation of RRTs in our experience on the SAGE program team was less than ideal. Availability of more RRTs time could enhance the elements of stroke rehabilitation and optimize the functional outcomes for stroke patients.

## WHAT'S NEW IN INSPIRATORY MUSCLE TRAINING

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The diaphragm is the main inspiratory muscle; therefore, its function remains vital to ensure adequate ventilation. However, respiratory disease, mechanical ventilation, and neuromuscular disorders can all impact normal diaphragm strength and function, leading to suboptimal breathing parameters.

Inspiratory muscle training involves providing a resistance to inspiration, applying the principle of strength training to the diaphragm and inspiratory muscles. Early studies of IMT appeared in the late 1970's and since then there has been a plethora of research investigating the effect of IMT in various populations including: COPD, neuromuscular disease, mechanically ventilated patients and even in healthy athletes. This presentation will briefly review the most recent evidence on the use of IMT within respiratory-impacted populations, highlighting both positive and negative results to allow participants to decide whether this is a tool that would be useful in their own clinical population.

## LEARNING THROUGH COVID-19 STREAM

**04**

### RESPIRATORY CARE: LEADING PRACTICE EXCELLENCE THROUGH COVID

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When a pandemic hits, impacting the respiratory care and RT practice, the need for a team of experts to fluidly and nimbly make decisions and lead practice changes across the hospital to: 1) keep patients cared for; and 2) keep staff safe, is paramount. At Michael Garron Hospital in Toronto, the rapidly changing COVID-19 pandemic requires significant leadership in the area of respiratory care. The implementation of the Respiratory Care Committee (RCC) is the hospital's solution. The committee representation ranges from senior executive and command centre leaders, to infection prevention and control, clinical practice leaders, ICU/ED/RT leadership, physicians and front line staff RTs. The committee is granted the authority, by the hospital executive, to make all relevant consultations, inquiries, decisions and dictate changes for the respiratory care of patients across the hospital. This is enabled by weekly surveillance, planning, practice change alerts and significant practice

changes and equipment needed to support changes in practice. Acute attention is needed in the areas of: critical care capacity and expansion; ventilator procurement; management of aerosol generating medical procedures; alternative structures for delivering care in negative pressure environments and significant health human resources expansion and redeployment. The RCC is responsible for informing the ethics committee on balancing the polarity between safe respiratory care practice with the needs of the patients and in some cases the need to palliate versus treat based on the evolving situation. The need to make frequent and rapid changes dictates the need for significant support from the clinical practice leadership (RT, RN, MD) with emphasis on the elements of high performing teams: 1. strong communication; 2. role clarity; 3. conflict management; and 4. collaborative leadership. Ensuring staff have the most up to date practice changes and rules of the road as the high risk providers (RT, MD, RNs) is a key component of the success of these changes. The RCC remains a standing committee within the hospital structure to ensure clinical respiratory practice is of the highest quality, standardized, recent and relevant, evidenced based and both nimble and responsive to internal and external influences. This is regarded as a valuable and now irreplaceable hospital structure for leading the delivery of high quality, safe respiratory care.

**05**

### MECHANICAL VENTILATION IN THE TIME OF COVID-19

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The practice of mechanical ventilation has never been pushed so far into the spotlight as it has during the COVID-19 pandemic. Both experienced and non-experienced healthcare providers wanted to learn more about how patients with severe COVID-19 infection could be effectively managed. This lecture will describe some of the many controversies, and growing interests that have arisen during the pandemic and describe the role of the respiratory therapist in providing the best possible care.

**06**

### Pandemic Ventilators: A Panel Discussion

#### THE COVINATOR FT MISSION IMPOSSIBLE: ON HOW TO BUILD A VENTILATOR

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On March 11, 2020, the World Health Organization declared the novel coronavirus (COVID-19) outbreak a global pandemic. For most, this meant a heightened state of awareness, fear of the unknown and a whole spectrum of other emotions. For us, as respiratory therapists it also meant a call to action and capitalization on knowledge, skills and a career worth of preparedness. To help healthcare professionals in the global pandemic fight, many organizations initiated projects involving the use of crowdsourcing to solve problems associated with COVID-19, from developing therapies and diagnostic tests to manufacturing protective equipment and ventilators. On March 18, the Montreal General Hospital Foundation, in collaboration with the Research Institute of the McGill University Health Centre, launched a global innovation challenge, Code- Life-Ventilator-Challenge, calling for teams to design a simple, low-cost, easy-to-manufacture and easy-to-maintain ventilator which could be deployed anywhere needed to save lives. To say that building a low-cost, simple, easy to use and easy to build ventilator is a challenge, is probably the understatement of the year. On March 20, we assembled the Fanshawe-Toyota team and entered the competition with four engineers and two respiratory therapists, venturing into this unknown world to give our best effort to a

seemingly impossible task to design and build the COVINATOR FT. Out of more than 900 participating teams with over 2500 participants from about 90 countries in the first phase of the competition, our team's design was selected along with only eight other teams to compete in the semifinals. This next phase involved improvements to the prototype and preparing of manufacturing packages as well as presenting the project.

The tragedy of this pandemic has taught us many lessons including the importance of working together and thinking outside the box for innovations in order to turn challenges into opportunities. We would like the opportunity to present the journey of building the COVINATOR FT to our fellow respiratory therapist with the hope to spark interest in innovation and to demonstrate the importance of RT input in building equipment they use. We will use our prototype at Fanshawe College for teaching purposes to inspire innovation and encourage students to think outside the box, collaborate in multi-disciplinary teams and every once in a while try to do the impossible.

### **EMERGENCY PANDEMIC VENTILATORS: HOW CLOSE ARE THEY?**

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The world watched in shock as Italy ran out of ICU space and ventilators with the COVID-19 pandemic in the early part of 2020, and collectively gasped as New York came close to repeating the nightmare. Every ventilator on the shelf was quickly claimed, and desperate calls for more were heard. A multitude of engineering teams quickly assembled and attempted to answer that call, and Health Regulatory Agencies such as Health Canada scrambled to find a way to regulate and approve these devices to prevent an Italian-type shortage on their home turf. Several devices emerged from this process, and to varying degrees they approached what could be considered a mechanical ventilator. Now that we are facing a potential second wave of the pandemic and a potential renewed pressure on our health care system, what new ventilators have emerged, and how do they compare to our standard ICU ventilators? Can a quickly-assembled team that has no experience with ventilators make a device that is safe and effective to use? If these were the only ventilators available, could they and should they be used in a situation that has stretched the health care system beyond its breaking point?

This talk will review the ventilators that have emerged on the North American scene. They will be grouped by modes and monitored parameters to form a landscape of capability. A deeper dive will be undertaken to discuss the size of the gap between pandemic ventilators and standard ICU ventilators, and potential risks and shortcomings will be explored. Finally, the talk will wade into the murky waters of professional and ethical considerations of using these devices on patients and explore ways to improve the risk profile of using them.

### **THE ALBERTA PANDEMIC VENTILATOR COLLABORATIVE EXPERIENCE**

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In the early months of 2020, when the COVID-19 infection and hospitalization rates began to climb in Canada, all resources were brought to bear to avoid medical crises described in Italy and New York that lead to our now global pandemic. With the global supply chains at risk, Health Canada led the way, with the Minister of Health approving an interim order to speed up the review of medical devices. Alberta Health Services' (AHS) approach for meeting worst-case ventilation needs when the rest of the world was doing the same was to search for global solutions in distant locations such as China and assist local engineering groups with device design and navigation of the approval process.

The presentation will review the experiences of a small, RT-led group of experts that managed the project. Patty Wickson, RRT, led the group, and will describe the scope of the project and how she was able to find the other members of the group and work with them to formulate a master plan and build an Alberta Pandemic Ventilator collaborative. The effort started with understanding the landscape of available ventilators and finding candidates that were both suitable and available. The second arm of the project focused on assisting Canadian-centered companies, most with minimal levels of medical device experience, with their ventilator designs by providing a direct line to AHS ventilation and regulatory experts. The collaborative group met regularly on-line with all stakeholders present to share experiences with Health Canada and facilitate beneficial connections in the regulatory, manufacturing, and medical device production space. Mark Rimkus, RRT, will present on the development and execution of a plan to test the interim order ventilators and to determine their safety and effectiveness at ventilating COVID patients. The specific approach to understanding the gaps between long-standing ICU ventilators and new-to-market designs will be discussed, as will the risk-analysis approach to understanding potential issues with deploying them on patients.

The presentation will conclude with a discussion of lessons learned, future opportunities realized, and how a wider collaboration across provinces would greatly improve the process with other items such as PPE. The AHS team still collaborates with ventilator designers and manufactures as well as supporting linkages to export their ventilators to other parts of the world. An exciting example to share with the RT community!

## **COPING AND CARING IN THE RT PROFESSION STREAM**

### **07**

#### **BURNOUT SYNDROME IN THE ICU: THE RT EXPERIENCE**

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**Introduction:** Burnout Syndrome (BOS) has been described as a modern day healthcare crisis. In 2017, the Maslach Burnout Inventory survey was conducted among healthcare practitioners at a critical care department in a tertiary care facility. Physicians, nurses and respiratory therapists were surveyed. All professions demonstrated evidence of moderate to high levels of Burnout, however the RTs displayed the highest levels of Emotional Exhaustion and low Professional Accomplishment among the participants. This paper will describe a qualitative thematic analysis into the root causes of BOS among the respiratory therapists working at this health care facility.

**Methodology:** Focus groups of doctors, nurses and RTs were facilitated in February 2018. Eight respiratory therapists participated, representing 15% of the larger department of therapists. The 90-min focus group was facilitated by a trained qualitative researcher and was recorded and transcribed for accuracy. Transcripts were coded for themes and tracked using the qualitative data software Quirkos™.

**Results:** Themes that emerged from focus group discussions highlighted some of the milieu and organizational aspects that contribute to burnout for this respiratory therapy group. Some themes were unique to the respiratory therapist's experience in the ICU while others were common among all health practitioners examined. The themes included Organizational Issues, Poor Team Dynamics and Exposure to High Intensity Situations.

**Conclusion:** The respiratory therapists at this tertiary care facility demonstrated moderate and high levels of BOS, particularly within the domains of emotional exhaustion and lack of professional accomplishment. The themes that emerged from their focus group session included

Organizational Issues, Poor Team Dynamics and Exposure to High Intensity Situations. Respiratory therapists at this organization experience a lack of resources, particularly on night shifts. The pressure of being the educated and the educator in a fast paced ICU is also seen as contributing factor to burnout among this RT team. The role of the RT in end-of-life care ports some moral distress as futile care is both a perceived and real component of ICU care. The lack of recognition and appreciation for the knowledge, skill and resource challenges of the RTs was highlighted as an issue that feeds into poor team dynamics within the ICU, particularly between the nurses and the RTs.

## 08 RESPIRATORY THERAPIST PERCEPTION ABOUT TERMINAL EXTUBATION

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Since the 1980s, laws, regulations and medical knowledge permits and accepts that treatment can be withdrawn to let nature take its course at the end of life. One of the technologies that can be withdrawn is the ventilator, more commonly known as the respirator or life support. Who is responsible to remove or withdraw the ventilator at the end of life? How is this legitimized as being a moral action? Much research has been done to explain the difficulties encountered by healthcare professionals and families. However, one actor is most of the time neglected or completely absent from research; the respiratory therapist. In ICU, ventilators are closely monitored and managed by respiratory therapists. For ventilatory support, doctors are responsible to write the orders, but it is the respiratory therapists that do the action of removing the technology. In this presentation, I will discuss the preliminary results of semi-structured interview (n:20) done with respiratory therapists in Canada about their perception of doing terminal extubation.

## 09 STRESSING AN ALREADY STRESSED PROFESSION: IMPACT OF COVID-19 MORAL INJURY ON RRTS

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This presentation will review preliminary results of a Canadian national study conducted by St. Joseph's Healthcare Hamilton and McMaster University. The aim of this project was to examine mental health and moral injury in RRTs in Canada. Recent research suggests that Ontario Respiratory Therapists' and students' risk for occupation-related PTSD is comparable to that of Paramedics (Foster et al. 2020). Despite these high rates, RT's are often overlooked for debriefings and other psychological supports and resources, potentially placing them at increased risk of PTSD. Throughout the COVID-19 pandemic, the profession encountered an added layer of incredibly stressful and complex situations. The goal of this presentation is to increase awareness of the importance of addressing Mental Wellness of therapists and students.

## 10 2020 & BEYOND: RESILIENCE AND BURNOUT IN NOVICE LEADERS

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As healthcare systems and delivery evolves, novice leaders need to adapt to the increasing complexity and are at risk for burnout. Resilience is the process of adapting positively when faced with adversity. Resilience is not

just a characteristic but a skill that can be developed. Furthermore, resilience is more than just a characteristic of effective leaders and high functioning teams, it's a skill and quality that leaders can develop and then foster in their teams. It's important for novice leaders to recognize signs of burnout and factors that will impact resilience. This presentation will discuss the key features of resiliency and burnout from the perspective of a novice leader navigating the unique challenges of the COVID-19 pandemic as well as the expected challenges and new opportunities encountered along the path of professional growth and development as well as strategies that can be used to promote resilience.

## REFLECTIONS ON PRACTICE STREAM

## 11 HUMAN FACTORS IN CRITICAL EVENTS

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Human factor is an established scientific discipline that studies the inter-relationship between humans, equipment and the work environment. Core aspects of human factors include three dimensions: cognitive, interpersonal and personal resources. This area of study was first used in the aviation industry 40 years ago after studies suggested deficiencies in this field may have been significant in fatal accidents. The evolving use of this science and its emphasis on safety has directly influenced our current approach to anesthesia, critical care and healthcare in general. The main objective of human factor "science" is to optimize the interaction of humans with their work environment and technical equipment in order to maximize patient safety and efficiency of care. The core aspects mentioned above will be explained and elaborated on during the presentation through definition, examples and case studies. The complexity of the relationship between human behavior and technology, tasks, the environment and organization will be addressed. Human factor frameworks have been successfully applied to aid with these considerations thus providing a better understanding of the healthcare system and increased patient safety focus. In summary, a human factors approach is not yet mature in healthcare but its importance is increasingly recognized and its applications are being continually expanded.

## 12 ISN'T IT IRONIC: MY ROAD TO LUNG TRANSPLANT

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This presentation describes the irony of someone who spent nearly 30 years in the respiratory equipment business developing pulmonary fibrosis and ultimately receiving a double lung transplant in Toronto. The presentation covers the timeline from diagnosis to years of management prior to transplant and ultimately recovery. The roles of RT through the entire process are detailed. Awareness of pulmonary fibrosis and organ donation are highlighted.

## 13 VISIBLE MINORITIES AND RT EDUCATION – OPPORTUNITY OR THREAT?

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Canada is blessed with a diverse population and prides itself on welcoming people and cultures from around the world. The healthcare

workforce should be representative of this diversity, in order to best serve and reflect the needs of our population. This presentation provides a synthesis of the emerging literature around the experiences and challenges of visible minorities, immigrants and people of colour in entering programs in health education, and the factors that can hinder their success in those programs. Structural, social and economic challenges are identified, and methods to address these challenges are explored. Respiratory therapy graduates who equitably represent our population, and are academically, clinically and culturally competent, will be well positioned to serve our diverse patients, and advance the profession and practice of respiratory therapy.

RESEARCH AND INNOVATION STREAM

**14**  
**PEDIATRIC MECHANICAL VENTILATION PRACTICES BY CANADIAN RESPIRATORY THERAPISTS**

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**Introduction and literature review:** Currently, there is a gap in knowledge for pediatric mechanical ventilation (MV) management. Limited data exists on this topic as there are considerable ethical liabilities when performing clinical trials on children. Limited research suggests protocols reduce adverse events and improve clinical outcomes. Inconsistent MV practices and the lack of data in children make it difficult to determine the best practices. Protocols are available but vary across centers with minimal compliance. Thus, reducing variations in MV techniques may improve safety, efficiency and clinical outcomes. The European Society of Pediatric and Neonatal Intensive Care (ESPNIC) consisting of physicians, is the first group to establish consensus recommendations on many aspects of pediatric MV management. In Canada, respiratory therapists (RRT) have a large responsibility in MV management, so it would be of interest to see if they agree with ESPNIC.

**Objectives:** To develop pediatric MV consensus recommendations from the perspectives of Canadian RRTs. To compare Canadian RRT perspectives to the European Society of Pediatric and Neonatal Intensive Care

**Methods:** A Delphi Survey technique was utilized to gather Canadian RRTs' consensus on various topics of pediatric MV management. The survey contents were based on the ESPNIC recommendations. A pilot Round was done prior to Round (R) 1 to finalize the survey contents with 53 statements. For R1, demographic information was collected, and participants reviewed and provided their clinical expertise for each statement in the survey. For R2 and R3, participants ranked their level of agreement or disagreement for each statement using a 5-point Likert scale and provided written feedback for statements they disagreed with. Post-study, summaries of the Delphi study were distributed to participants for final review and additional feedback.

**Results:** A total of n=56 participants from 15 different facilities in Canada consented into the study. In R1, 43 participants responded, of which 41 completed and two partially completed R1. The open-text feedback was reviewed and revised into 58 statements for R2. In R2, 51 participants completed the survey; three out of the 58 statements did not receive consensus (≤75%). Based on the written feedback and level of consensus, 10 statements were revised, and one additional statement were included for R3. Forty-nine participants completed R3 and all 11 revised statements received consensus. A total of 59 recommendations on commonly RRT-practiced pediatric MV techniques reached consensus after three Rounds.

**Conclusion:** To date, this is the only Canadian pediatric MV management consensus guideline for critically ill children. This guideline

contains 59 recommendations, organized into 10 subsections: 1) Non-invasive ventilation, 2) Tidal volumes and inspiratory pressures, 3) Respiratory rate and inspiratory time, 4) PEEP and Fio2, 5) Advanced modes of ventilation, 6) Weaning, 7) Physiological targets, 8) Monitoring, 9) General MV, and 10) Equipment adjuncts recommendations. This guideline can serve as a foundational document at different Canadian pediatric critical care units to help standardize pediatric MV practices for future studies.

**15**  
**WHAT VALUE DO RRTS ADD? A COLLABORATIVE RESEARCH INITIATIVE**

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The Respiratory Therapy Practice-Based Outcomes Initiative (RT-PBOI) was implemented to explore, measure, evaluate, articulate and foster the value that respiratory therapists contribute to the provision of evidence-informed respiratory care. Alberta Health Service, CSRT, and the College and Association of Respiratory Therapists of Alberta are collaboratively seeking to examine the value that respiratory therapists contribute to health care teams and patient outcomes in the provision of respiratory care. The RT-PBOI team is prepared to share preliminary findings of their first knowledge translation activity designed to put evidence into action and positively impact patient outcomes and improve administrative decisions.

**16**  
**Student Research And Innovation: A Panel Discussion**

**PRONE POSITIONING FOR COVID-19 NON-INTUBATED PATIENTS**

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In our new and ever-changing world, due to the pandemic, researchers and healthcare providers are looking into ways to combat COVID-19 either through prevention or treatment. Covid-19 can develop into pneumonia or Acute Respiratory Distress Syndrome (ARDS) and present with mild to severe hypoxemia. This can lead to respiratory distress or respiratory failure, often progressing to intubation with an increased risk of mortality. In patients with ARDS, proning is used to increase oxygenation and improve mortality. Many forms of therapy can be used to treat hypoxemia such as high flow nasal cannula or Optiflow. These forms of treatment can be considered an aerosolized generated medical procedure and may be insufficient to correct ventilation/perfusion (VQ) mismatch. Early proning on awake, non intubated patients was researched as early as 2003 but has gained momentum since the pandemic became widespread. Using prone positioning on spontaneously breathing non-intubated patients can treat the effects of hypoxemia, correct VQ mismatch, and improve dyspnea.

This presentation will investigate how proning spontaneously breathing, non-intubated patients affect oxygenation and gas exchange by correcting hypoxemia, VQ mismatch and shunting. Additionally, studies will be reviewed that investigated oxygenation as well as effectiveness in preventing intubation. Limitations include such things as lacking case studies, small sample size, patient tolerance for length of proning, and the continued potential of intubation for some. More research is needed to investigate how to improve oxygenation in COVID 19 patients. Better standardization including control groups may be required to further understand how to treat the refractory hypoxemia response of COVID-19.

## 'PHAGING' OUT A BAD REPUTATION

**L. Cooper BSc SRT**

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Viruses. For almost a year now, these lifeless microbes, or one in particular, have been cited on television and radio news daily, the topic of many conversations between friends and family, and the culprit of many changes to our society in the interest of public health. Thoughts about the topic are likely bleak, however, shifting focus to the more amicable members of the family, the bacteriophage is introduced.

With anti-microbial resistance on the rise, these bacteria-devouring viruses have been explored as synergistic or alternative agents to antibiotic drug therapy. The exceptionally stubborn multidrug resistant pathogens, including methicillin-resistant *Staphylococcus aureus* (MRSA) and *Pseudomonas aeruginosa*, have presented a challenge across healthcare settings. Phage therapy offers a potential solution as effectiveness of antibiotic therapy is diminished.

## ONE LUNG TO RULE THEM ALL

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In recent years, equipment used to educate Respiratory Therapy students, has continued to evolve in the interest of better learning. These improvements offer students more realistic simulated experiences to prepare them for the clinical environment.

The test lung is one piece of equipment that has seen little modification despite profound advancements in mechanical ventilation. Many modern ventilators have tools available allowing clinicians to assess and identify optimal positive end-expiratory pressure (PEEP) levels for patients. When using a traditional test lung, this function cannot be adequately illustrated for the learner. This was the initial reason for developing a more intricate test lung which allows the user to adjust pleural pressures surrounding the lung. By manipulating pleural pressure around the test lung, students may determine ideal PEEP using modern ventilator functions. Additionally, by encasing the test lung and creating a simulated pleural space, students can also attach a chest tube drainage system allowing for a deeper understanding of tidal volume and potentially bubbling when appropriately attached to the test lung. Lastly, this test lung was developed to allow students to appropriately set patient triggers on a ventilator while the lung to trigger its own breaths. The development of this more advanced test lung can be used to afford students a more realistic experience using a ventilator in the educational environment.

### VIRTUAL RESPIRATORY CARE STREAM

17

## VIRTUAL MASK FITTING IN PEDIATRIC PATIENTS DURING COVID-19: A CASE SERIES

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**Introduction:** The COVID-19 pandemic has been an unprecedented threat to our health care system. Clinicians had to pivot and develop

creative and timely “virtual” solutions to provide clinical care. Our aim was to develop a standard approach to virtual “mask fitting” for children who are either being initiated or already on existing long-term ventilation (LTV) at a pediatric hospital.

**Case and outcomes:** We present four cases involving the care of children who required mask fitting for non-invasive bilevel LTV (bilevel) in a single-centre experience. LTV team consultations were delivered via a telemedicine platform (online or phone). With the guidance of respiratory therapists (RTs) caregivers took measurements on their child using a standard clinical protocol for nasal and/or full-face masks. Based on the measurements, an appropriate mask was selected. RTs followed up with patients and caregivers regarding mask fit, and feedback on the process was collected.

**Discussion:** Virtual clinics used for managing patients in our LTV program were feasible and efficient resulting in improved workflow for the RTs and convenience for patients and caregivers. Patients and caregivers had significantly less pressure to attend in-person clinic and expressed high satisfaction in terms of their experience and importantly, meeting respiratory care needs. Within the context of COVID-19, remote patient education and intervention can be delivered effectively, while reducing the risk of exposure from in-person visits to hospital.

**Conclusion:** A virtual/telemedicine program to manage pediatric patients requiring mask fitting for LTV is a feasible option during COVID-19.

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## ARE YOU TIRED OF COVID-19 YET: HAVE SLEEP DIAGNOSTICS CHANGED?

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**Background:** With the advent of COVID-19 diagnostic and laboratory assessments of chronic conditions were postponed and rescheduled. The goal was to reduce unnecessary exposure and potential contamination of health care workers (HCWs) and patients. During this time sleep laboratories were urged to cancel or defer all scheduled in-laboratory or home sleep studies, as well as follow-up examinations of patients who have been previously receiving any form of sleep treatment. The possibility of cross-infection and the risk of spreading the virus using the same device limits access to diagnosis, thus increasing already overwhelmed waiting lists. Although there have been several suggestions and recommendations, currently no definitive guidelines have solved this issue. The usage of home sleep apnea testing (HSAT) may play an even larger role in the future of diagnosis, although there continue to be challenges. A 2-pronged learning approach will be applied First, to present the current guidelines and recommendations, particularly focusing on level 3 and home testing.

**Teaching method:** a digital interactive quiz system called Kahoot to have the learner participate in the overview of the guidelines and recommendations. We will also explore how people are currently approaching the challenges. (Learning theory: gaming theory-based). Followed by a mind-mapping exercise to examine potential solutions and recommendations for future best practice. Several topics will be provided.

**Teaching method:** interactive guided discussion.

**19**  
**COVID-19 VIRTUAL CARE INNOVATION IN HOME MECHANICAL VENTILATION IN ONTARIO: LONG-TERM IN HOME VENTILATOR ENGAGEMENT (LIVE) PROGRAM**

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The LIVE program is an intensive clinical management program delivered via an eHealth platform (aTouchAway™) developed as a solution to the significant health and safety risks that the home mechanically ventilated (HMV) population faced during the early days of the pandemic. Co-developed by patients, families and healthcare providers, the LIVE program overcomes barriers of distance and travel time by bringing the “Right People with the Right Expertise at the Right Time” virtually into the homes of individuals using HMV. This eHealth intervention was developed for a CIHR funded randomized controlled trial which enabled a rapid pivot to an early clinical roll-out. As a result, the intervention became available during COVID-19 across the province to support children and adults from several HMV programs through timely engagement with the Ontario Ventilator Equipment Pool. Our goal was to provide a ‘virtual safety net’ for our patients with the aim of improving quality of life, reducing family caregiver burden, and preventing unnecessary hospital admissions. The program rolled out a novel, multicomponent intervention which enables virtual home visits, customizable care plans, clinical workflows, completion of symptom profiles and tele-monitoring, as well as secure communication via messaging, audio and video calls for patients, families, and healthcare providers. The presentation will focus on the provincial roll-out and implementation of the LIVE program; discuss the components of the eHealth intervention and discuss how children and adults using HMV are an ideal

population for virtual care during the pandemic due to their medical complexity and fragility necessitating the need to bring ventilator experts into the homes of HMV users.

**KEYNOTE SPEAKER**

**20**  
**THE PANDEMIC'S SILVER LINING: A VIRTUAL CARE REVOLUTION IN RESPIRATORY MEDICINE**

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After years of tentative and incremental progress towards more patient-friendly models of care that leverage technology, the SARS-CoV-2 pandemic has been an unprecedented catalyst for accelerating uptake of digital healthcare technologies across medicine. Virtual care has been adopted in respiratory medicine as it has in other disciplines, and limitations in pulmonary function testing capacity have accelerated the adoption of home-based lung function monitoring technologies. However, this unique requirement to monitor lung function, particularly in asthma and COPD, presents a specific challenge to virtual chronic disease management in respiratory medicine. In this talk, we will discuss emerging strategies for virtual management of the respiratory patient, with a focus on airways diseases. This will include technologies for remote lung function monitoring and the role of mobile health apps, smart devices, and wearables for disease monitoring and rehabilitation. We will also address emerging provider- and patient-facing technology for optimizing care and enabling patient self-management both efficiently and virtually.