



CANADIAN SOCIETY OF RESPIRATORY THERAPISTS  
SOCIÉTÉ CANADIENNE DES THÉRAPEUTES RESPIRATOIRES

## Posters from the Canadian Society of Respiratory Therapists Annual Education Conference

May 24–26, 2018 • Vancouver, British Columbia

We are pleased to present abstracts from the poster presentations that were displayed at the CSRT Annual Education Conference in Vancouver, British Columbia, on May 24–26. As evidenced by the following abstracts, the work of our colleagues in 2018 highlights current research and practice innovations led by respiratory therapists and students.

The editorial board looks forward to receiving manuscripts from this conference for consideration for publication in the *Canadian Journal of Respiratory Therapy* to continue building the body of knowledge specific to our profession. Please note these abstracts have not been peer reviewed.

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### RT POSTERS

#### 01 IS THERE ANY INCENTIVE? A REVIEW ON THE USE OF INCENTIVE SPIROMETRY IN POSTOPERATIVE ABDOMINAL SURGERY PATIENTS

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**INTRODUCTION:** Postoperative pulmonary complications (PPC) frequently manifest in patients undergoing abdominal surgery. The costs of PPCs are both monetary and at the expense of the patient, resulting in increased length of stay, morbidity, and mortality. A common PPC treatment and prevention device is the incentive spirometer (IS). IS mimics the actions of deep breathing while providing the patient with visual feedback. We look to the evidence to find any benefit in using an IS versus simple breathing exercises in the prevention of PPCs.

**METHODS:** A search using PubMed, EMBASE, the Cochrane Library, and Google Scholar to find evidence (RCT or greater) supporting the use of IS was performed. Inclusion criteria: adult abdominal surgery patients, articles from within the last 10 years, and separate groups comparing IS to breathing exercises. Desired clinical outcomes included: lung volumes, length of stay, pneumonia, and respiratory failure.

**RESULTS:** Eighty three articles were identified and assessed by the researcher. Seven articles were included in the review: three RCTs, two SRs, and two CPGs. Most articles measured changes in lung volumes

and length of stay in hospital. The overall level of evidence was low and no articles found evidence supporting the use of IS over deep breathing as a PPC prevention strategy.

**CONCLUSION:** While IS remains a common practice in postoperative patients, the evidence presented in this review finds no benefit when compared to simple breathing exercises in preventing the development of PPCs. Our review suggests that the role of IS in PPC prevention should be re-evaluated and further research with improved study designs be completed.

#### 02 HEALTHCARE UTILIZATION AND COSTS OF HOME MECHANICAL VENTILATION

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**INTRODUCTION/OBJECTIVE:** Individuals using home mechanical ventilation (HMV) frequently choose to live at home for quality of life, despite financial burden. Previous studies of healthcare utilization and costs do not consider public and private expenditures, including caregiver time. This study determined public and private healthcare utilization and costs for HMV users living at home in two Canadian provinces, and examined factors associated with higher costs.

**METHODOLOGY:** Longitudinal, prospective observational study (April 2012 to August 2015) collecting data on public and private (out-of-pocket, third party insurance, caregiving) costs every 2 weeks for 6 months using the Ambulatory Home Care Record. Functional Independence Measure (FIM) was used at baseline and study completion. Regression models examined variables associated with total monthly costs. *A priori* variables selected using Andersen and Newman's framework for healthcare utilization, relevant literature, and clinical expertise. Data in 2015 Canadian dollars.

**RESULTS:** We enrolled 134 HMV users; 95 with family caregivers. Overall median (interquartile range) monthly healthcare cost was \$5275 (\$2291–\$10,181) with \$2410 (58%) publicly funded; \$1609 (39%) family caregiving; and \$141 (3%) out-of-pocket (<1% third party insurance). Median healthcare costs were \$8733 (\$5868–\$15,274) for those invasively ventilated and \$3925 (\$1212–\$7390) for non-invasive ventilation. Variables associated with highest monthly costs were Amyotrophic Lateral Sclerosis (1.88, 95% CI 1.09–3.26,  $p < 0.03$ ) and lower FIM quintiles (higher dependency) (up to 6.98, 95% CI 3.88–12.55,  $p < 0.0001$ ) adjusting for age, sex, tracheostomy, and ventilation duration.

**CONCLUSIONS:** For individuals using HMV and living at home, most healthcare costs were publicly supported or associated with family caregiving. Highest costs were incurred by the most dependent users. Understanding healthcare costs for community-residing HMV users will inform policy decisions to optimize resource allocation, helping these individuals live at home while minimizing caregiver burden.

### 03

#### YOU CAN ESCAPE, BUT DID YOU LEARN? USING ESCAPE ROOMS TO MEASURE KNOWLEDGE AND INCREASE AWARENESS

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**INTRODUCTION AND OBJECTIVE:** In healthcare there are endless new initiatives communicated to staff via email or meetings. Are these channels of communication effective? When reflecting on how to raise awareness around Patient Safety and Required Organizational Practices (ROPs) in preparation for our hospital Accreditation, we needed to engage staff who are inundated with initiatives while providing patient care. At Trillium Health Partners (THP), a multi-campus, hospital with over 10,000 staff, in Mississauga, Ontario, we created a novel educational tool: a patient safety focused Escape Room. We evaluated this approach noting improved team communication, increased patient safety awareness and confirmation that Escape Rooms are a valuable knowledge translation tool.

**METHODOLOGY:** We created a simulated patient room with mannequin set up for five patient safety problems focused on Accreditation ROPs.

Interprofessional teams worked collaboratively on the safety problems, unlocking the clue for the next station. A survey captured participant baseline knowledge of patient safety incidents and accreditation standards and was compared to lasting learnings 1-month post-Escape Room activity.

**RESULTS:** Participants completed a pre-assessment survey ( $n = 134$ ), and post-assessment ( $n = 37$ ) survey 1 month following the event. Results indicated 89% of participants felt their awareness of common patient safety events increased; 100% of participants felt the escape room was a great team building activity; and, 100% of participants wanted to see this method used to spread future educational priorities across our organization.

**CONCLUSIONS:** Participants were highly engaged in the Escape Room activity, finding it to be a creative educational and team building tool. Surveys revealed an increase in awareness of ROPs and patient safety information. Logistically, it was time intensive to create the Escape Room across multiple sites, however, we are encouraged by these results and intend to continue using this education approach in the future, and assess sustained learning over time.

### 04

#### CARING SAFELY THROUGH STANDARDIZED HANDOVER DURING INTRAHOSPITAL TRANSFER OF CARE

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Building upon a Charge RT handover tool that was developed and implemented in 2016/2017, we have further identified a need to develop and implement a tool that will be utilized across multiple patient care areas at the time of transfer. This initiative also aligns closely with SickKids Caring Safely Campaign.

Safety events have occurred during the transfer of patients between various areas of the hospital. Often the lack of communicating relevant information is the underlying cause of these safety events. Developing and implementing a standardized handover tool is important for patient safety, improving communication between Respiratory Therapists, and as such, will provide each Respiratory Therapist with a higher level of professional accountability and work satisfaction. Performing a needs assessment will allow us to identify common barriers to proper communication and themes of "high risk behaviours" during patient transport. This process will allow us to develop and implement a handover tool that will address gaps identified and support safe patient transfer. Learning Objectives: (1) To enhance the safety culture within the Respiratory Therapy Department by identifying a transfer of information strategy that encompasses high reliability, error prevention and leadership methods. (2) To develop a standardized interdepartmental handover tool utilizing the I-PASS format, for use when transferring a patient between the inpatient areas. (3) To implement the handover tool in such a way that will lead to compliance of usage and satisfaction in the Respiratory Therapy Department. Our presentation will focus on the development and implementation of a standardized handover tool and the impact that has on the Respiratory Therapy Department from a safety lens.

### STUDENT POSTERS

### 05

#### IS MANNITOL MORE INDICATIVE THAN METHACHOLINE IN A BRONCHIAL PROVOCATION CHALLENGE FOR DIAGNOSING ASTHMA?

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**BACKGROUND:** Recent research shows that one third of patients diagnosed with asthma did not have asthma but were treated with medication regardless. Two very common tests that should be performed prior to the diagnosis of asthma are the methacholine bronchial provocation test and the mannitol bronchial provocation test. Both tests have different mechanisms of action but achieve bronchial hyperresponsiveness regardless which is measured through spirometry.

**OBJECTIVE:** To compare the mannitol and methacholine bronchial provocation tests in terms of their diagnostic validity and sensitivity and specificity.

**METHODS:** A systematic literature review was conducted in November 2017 using the databases Ovid MEDLINE and Embase. A secondary search was conducted using the references of relevant articles with no additional citations retrieved. The studies included in this review are all cross-sectional.

**RESULTS:** A primary search yielded 87 citations with a secondary search providing no further citations. After all inclusion and exclusion criteria were applied and abstract and full-text reviews were conducted four citations were included in the present review.

**DISCUSSION:** The primary outcomes measured in three of the included studies were the sensitivity and specificity of the mannitol and methacholine bronchial provocation tests in regards to the diagnosis of asthma. The fourth study only focused on mannitol. The tests were deemed positive base on a pre-determined drop in FEV1 from baseline. The included studies shows very similar diagnostic validity between the two tests with mannitol potentially having a higher specificity.

**CONCLUSION:** All studies reviewed showed similar results between the two tests and the potential of higher specificity with mannitol will have to be further investigated. At present, there is no universally accepted gold-standard bronchial provocation test.

## **06 BENEFICIAL EFFECTS OF DELAYED CORD CLAMPING ON THE RESPIRATORY SYSTEM IN PREMATURE INFANTS**

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**BACKGROUND:** Recent studies have shown that 93% of newborns born at <28 weeks gestation were diagnosed with RDS. Treatment usually requires a level of respiratory support and most often synthetic surfactant is delivered to promote lung function. Evidence suggests delayed cord clamping (DCC) is likely to result in better outcomes in both pre-term and term neonates. Controversy for DCC arises when there is a need for resuscitation of the newborn at birth, which is often a risk with premature infants.

**OBJECTIVE:** To determine whether DCC has respiratory system benefits for premature neonates <37 weeks gestation.

**METHODS:** A systematic literature search was conducted using the following databases: Ovid and CINAHL. Randomized controlled trials (RCT) were preferred but were not selected for during literature search to allow for the most relevant literature to be obtained. A secondary search was conducted by reviewing the references of relevant publications.

**RESULTS:** After conducting the primary and secondary search 69 publications were identified for review. After applying inclusion and exclusion criteria through both abstract and full-text review 7 publications were included in the literature review. Six of the publications were RCTs and one was a cohort study.

**DISCUSSION:** The respiratory parameters evaluated were incidence of RDS, required respiratory support (mechanical ventilation and oxygen therapy), intubation rates, and surfactant administration. All of which were secondary outcome measures in the reviewed literature.

**CONCLUSION:** While the literature reveals the potential for DCC to reflect respiratory benefits, further evaluation of this treatment on premature neonates <37 weeks gestation is paramount in order to perfect

the care that is delivered to this patient population at risk of severe lung immaturity and the development of respiratory distress syndrome which may lead to chronic lung disease later in life.

## **07 DOES LESS INVASIVE SURFACTANT ADMINISTRATION VIA THIN CATHETER FOR PRETERM INFANTS WITH RESPIRATORY DISTRESS SYNDROME REDUCE THE INCIDENCE OF BRONCHOPULMONARY DYSPLASIA?**

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**BACKGROUND:** Respiratory distress syndrome (RDS) is a common neonatal condition in premature infants which often requires the use of exogenous surfactant administration in its treatment regime. Currently, the most common technique for surfactant delivery is intubation with short-duration mechanical ventilation; however, lungs of premature infants are susceptible to ventilator induced lung injury which could increase the risk of developing bronchopulmonary dysplasia (BPD). Therefore, as an alternative to intubation, less invasive surfactant administration (LISA) using a thin catheter has been increasingly studied with proposed benefits in reducing the incidence of BPD.

**RESEARCH QUESTION:** For preterm infants with RDS, does less invasive surfactant administration via thin catheter compared to intubation for surfactant administration reduce the incidence of BPD?

**METHODS:** A literature search was conducted across the databases: PubMed, CINAHL, and Google Scholar. Only English randomized control trials (RCTs), systematic reviews (SRs), and meta-analyses published within the last 10 years were included.

**RESULTS:** Two RCTs, one systematic review and one meta-analysis were reviewed. One RCT found that BPD rates were significantly lower among patients using the LISA technique ( $p = 0.008$ ) compared to intubation for surfactant administration. The other RCT reported that there was no significant difference in BPD rates between intervention groups ( $p = 0.20$ ). The SR found that the LISA technique resulted in a significant reduction of BPD at 36 weeks' gestation ( $p = 0.03$ ). The meta-analysis concluded that fewer infants in the thin catheter group developed BPD as compared to the intubation group with a 34.4% reduction, although, the results failed to reach statistical significance ( $p = 0.141$ ).

**CONCLUSION:** The existing evidence evaluating the LISA technique as an alternative to intubation for surfactant administration is conflicting. There is some evidence that suggests that the LISA technique may reduce the incidence of BPD but further research is recommended, specifically multi-centre RCTs with larger sample sizes.

## **08 SOLDIERING ON: IDENTIFYING RESPIRATORY INFECTION FACTORS FOR DEPLOYED MILITARY PERSONNEL – A SYSTEMATIC REVIEW**

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**BACKGROUND:** Studies prove that the military setting is suitable to breed infection and disease outbreaks, rigorous physical labour, cramped living conditions, and limited access to medical services all contribute to a potentially fatal environment. Currently, respiratory infections are responsible for over 300,000 medical interventions annually. Investigating plausible indicators can help with prevention and early indication of outbreaks with these populations.

**OBJECTIVE:** The objective of this review is to determine if enough research exists to identify a set of independent risk factors that increase the likelihood of contracting respiratory infections in deployed military

personnel. With these factors, could a respiratory assessment tool be created and protocolized to improve health care outcomes for these populations?

**METHODOLOGY:** A systematic literature search was conducted in November 2017 using the following databases: PubMed with Ovid Medline® composites, CINAHL Full Text, and Scopus. A combined total of 253 citations are identified and processed through PRISMA standards in order to filter out ineligible publications.

**RESULTS:** All studies reviewed held objectives in assessing respiratory infections within military populations, with set identification criteria for febrile respiratory infections (FRIs). The majority of the study population was primarily focused on the United States Military throughout the reviewed articles, with studies in California, Texas, and Maryland. Two articles consisted of international military services: the Singapore Armed Forces and the Kajaani Garrison Finnish Army of Northern Finland.

**DISCUSSION:** The primary outcome measured for all included studies were the independent factors associated with FRIs or an increase thereof. In multiple studies, increasing age, smoking history, sex/gender, previous respiratory-related events, and clinically documented patient data were identified as factors that increased the likelihood of an infection for deployed populations. However, limitations in evidence exists, as there was inadequate or absent discussion on factors, such as military rank and daily hygiene regimes.

**CONCLUSIONS:** The risk factors that were identified in the review were compiled successfully into a health assessment tool, which theoretically can be protocolized into an existing health care program. However, further research is needed to strengthen the complexities in differences between different military forces and the range of deployment locations.

## 09

### HIGH-FLOW NASAL CANNULA OXYGEN THERAPY VERSUS NON-INVASIVE MECHANICAL VENTILATION FOR REDUCED INTUBATION RATES IN ACUTE HYPOXEMIC RESPIRATORY FAILURE

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**BACKGROUND:** Acute hypoxemic respiratory failure (AHRF) is a leading cause of patient admission to the ICU, often necessitating the need for endotracheal intubation. For years, non-invasive ventilation (NIV) has been used as a preventative therapy for AHRF prior to intubation. Despite showing favorable results with acute COPD exacerbations and congestive heart failure, there is no evidence to indicate NIV as the preferential treatment for AHRF. Recent studies have found high-flow nasal cannula oxygen therapy (HFNC) to be effective for reducing intubation rates in pediatrics with AHRF. Recognizing this, there may be a potential for HFNC to be implemented in adult ICUs.

**RESEARCH QUESTION:** For adult ICU patients with AHRF, is the use of HFNC more effective than NIV at reducing endotracheal intubation rates?

**METHODS:** A systematic literature search was conducted in the PubMed, EMBASE and Cochrane Library databases. Randomized control trials (RCTs) and systematic reviews (SRs) published in English within the last 10 years were included.

**RESULTS:** Two RCTs and three SRs were examined, all of which supported HFNC as a potential alternative to NIV. Rate of endotracheal intubation was evaluated as the primary outcome in all trials. No trial reported statistical significance ( $p < 0.05$ ) to favour HFNC therapy over NIV therapy. There was however, a similar incidence of intubation noted between the two therapies, with improved patient comfort reported in favour of HFNC.

**CONCLUSION:** No clear evidence exists to favour HFNC over NIV for reducing rates of endotracheal intubation in AHRF. Despite this, HFNC

has shown to be as effective as NIV, with improved patient comfort noted. Acknowledging this, a change in clinical practice may be warranted. Further high-quality research with large sample sizes is required before a definitive conclusion can be drawn

## 10

### EFFECTIVENESS OF ONLINE/WEB-BASED SMOKING PREVENTION AND CESSATION PROGRAMS IN ADOLESCENTS

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**BACKGROUND:** Roughly 5 million Canadians over the age of 12 are considered smokers. Smoking is known to cause major health risks such as lung cancer, COPD, and a decrease in quality of life. Over half of adolescent smokers have attempted to quit but may not have had adequate resources to be successful. In Manitoba, it is estimated that smoking costs the healthcare system an additional \$244 million per year. Studies have shown that online programs may be effective in smoking cessation/prevention in adolescents.

**OBJECTIVE:** To determine whether online/web-based smoking prevention/cessation programs are effective for adolescents.

**METHODS:** A systematic literature search was conducted using CINAHL and OVID databases. Randomized control trials that were relevant and met inclusion criteria were reviewed.

**RESULTS:** Thirty eight studies were collected from a primary search of the two databases. Once all inclusion and exclusion criteria were applied, 13 articles were reviewed. After review, five randomized control trials remained for systematic review.

**DISCUSSION:** Selected studies showed that online programs are effective in reducing smoking initiation if the participant is emotionally involved, and has sufficient exposure. One study showed that structured planning to quit, led to higher rates of cessation compared to a rapid/spontaneous decision to quit. Another study showed that a text message-based program was effective in decreasing the number of cigarettes smoked by urban adolescents. Developing and implementing an online program in Manitoba could improve overall health by decreasing smoking rates, and would help to save the province millions of dollars a year. **CONCLUSION:** Online/web-based programs appear to be effective in reducing smoking rates among adolescents. However, a separate program for prevention and cessation may be needed as a program that is effective for prevention, may not be effective for those who already are smokers.

## 11

### IS POINT-OF-CARE LUNG ULTRASOUND MORE ACCURATE THAN CHEST RADIOGRAPHY FOR DIAGNOSIS OF COMMUNITY ACQUIRED PNEUMONIA IN ACUTELY DYSPNEIC PEDIATRIC PATIENTS?

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**BACKGROUND:** Community-acquired pneumonia (CAP) remains the primary infectious cause of pediatric death. Chest radiography (CR) represents the diagnostic reference standard; however, routine implementation is not recommended concerning radiation exposure. Non-radiating lung ultrasound (LUS) represents an alternative to CR. Despite accumulating adult-oriented evidence, investigation in pediatric applications remains limited, despite elevated risk of radiation-induced deficits.

**QUESTION:** Is point-of-care lung ultrasound more accurate than chest radiography for diagnosis of community-acquired pneumonia in acutely dyspneic pediatric patients?

**METHODS:** A literature review of PubMed, EMBASE, and CINAHL databases was conducted using key terms “lung ultrasound,” “chest radiography,” “pediatric,” and “community acquired pneumonia.” Peer reviewed English publications between 2008 and 2018 of human subjects <21 years of age, including randomized controlled trials (RCT), prospective cohort studies (PCS), systematic reviews (SR), and meta-analyses (MA) qualified.

**RESULTS:** One RCT demonstrated 39% reduction in CR necessity following LUS for diagnosis. Furthermore, LUS expedited emergency department length of stay ( $p < 0.05$ ). Six PCSs demonstrated favorable diagnostic sensitivity and specificity, reflecting high accuracy. Two SR-MAs supported LUS as a feasible CR-substitute. Furthermore, LUS was superior in detection of sub-centimeter lung consolidations.

**LIMITATIONS:** Predominantly single-center observational studies with small sample populations comprise presently available data, limiting generalizability. Absence of GOLD-standard CT-chest data limits definitive comparison.

**DISCUSSION:** Qualitative and observational evidence illustrates potential value of LUS diagnostics. LUS is a safe, inexpensive, and accurate imaging modality. Furthermore, expedited hospital duration, radiation avoidance, and accessibility mitigate established CR challenges. Additionally, LUS promotes prudent antibiotic administration relative to reliance on non-specific physical assessment.

**CONCLUSION:** Insufficient evidence exists to confirm superior accuracy of LUS relative to CR for CAP diagnosis in pediatric populations. More robust experimental design research is necessary to address knowledge gaps.

## 12 THE USE OF ISONIAZID AS PROPHYLAXIS IN PATIENTS CO-INFECTED WITH TUBERCULOSIS AND HIV

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**BACKGROUND:** Tuberculosis is an air borne bacteria called mycobacterium tuberculosis that can be transferred from person to person when it is in its active stage of the infection. This bacterial infection is spread in microscopic droplets suspended in the air when someone with active tuberculosis coughs, spits, laughs, sneezes or sings. Tuberculosis primarily affects the lungs but can also involve other organs. HIV is a virus that can be spread from person to person through bodily fluids. It attacks the body's immune system making the infected individual more prone to contracting other infections. Therefore someone with HIV is very susceptible to infection if they are exposed to mycobacterium tuberculosis. A co-infection of these diseases causes more rapid progression of the diseases and poorer outcomes than if they had only one out of the two. Once active, the immunosuppressed individual may have a difficult time fighting off the infection and lead to very poor outcomes including death. Isoniazid is a U.S. Food and Drug Administration approved antibacterial medication used to treat tuberculosis.

**OBJECTIVES:** To determine whether isoniazid is effective as a preventative therapy to avoid active tuberculosis in patients co-infected with HIV and latent tuberculosis.

**METHODS:** Primary literature search conducted in November 2017, using the databases Ovid and CINAHL, with a secondary search conducted within the reference lists of articles found in these databases. By combining the search terms, the databases presented 4061 results. Once the inclusion and exclusion criteria were applied, 70 results remained. Once the duplicates were removed and articles were scanned for relevancy, seven articles remained.

**RESULTS:** The remaining seven articles were further narrowed down to four, due to their content. All four of the articles used isoniazid as the intervention and compared it to either a placebo, or a different type of drug intervention. The results of these studies presented evidence that

isoniazid was more effective at preventing active tuberculosis in HIV patients, compared to placebo or alternate therapy.

**DISCUSSION:** The primary outcome measured was how many patients progressed to active tuberculosis infection despite taking isoniazid prophylactic treatment. This was done by comparing it to either a different treatment or to a placebo to further evaluate the effectiveness of isoniazid versus other treatments, or doing nothing at all.

**CONCLUSION:** Isoniazid is more effective at preventing active tuberculosis infection than not taking any preventative therapy at all. Further research needs to be done comparing its efficacy versus other methods of preventative therapy.

## 13 EMERGENCE DELIRIUM: CAUSATION, CORRELATION AND IMPROVEMENTS NEEDED

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Emergence Delirium is a common complication often seen in the post-anesthetic care unit and is poorly understood as well as poorly managed. Often confused with delirium found in the Intensive Care Unit, Emergence Delirium lacks a clear differentiation clinically and is often not even recognized. Due to its significant impact on postoperative care, employees, and patient well-being, there is a need for more specialized studies to be conducted on its etiology. Not only having patient-associated impacts, there is also increased hospital-associated costs, longer duration of stay, and more staff being implemented in patient management. Attending healthcare providers need to be made aware of the condition and current research in relation to risk factors, diagnosis, and future treatment options. Associated risk factors that have been seen to increase the incidence of Emergence Delirium are the extreme spectrums of age, the presence of preoperative anxiety, particular anesthetic techniques, specific surgical procedures and poor postoperative pain management. The high need for further research will also be touched on as the condition has a significant impact on the course of patient care and hospital resources. Emergence Delirium contributes to a delayed recovery process, resulting in longer lengths of stay, more resource utilization, higher hospital costs and more staff needed for patient management. The lack of a specific quantification process and measurement tools make recognition of Emergence Delirium under-recognized and undermanaged. A single direct cause of Emergence Delirium still remains unknown, and further research needs to be conducted in regards to compiling a specific scale and protocol to follow in the postoperative process.

## 14 THE HYPOTHALAMUS-PITUITARY-ADRENAL AXIS INDUCED ADRENAL INSUFFICIENCY AND ONSET OF CHRONIC LUNG DISEASE IN PRETERM NEONATES

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The hypothalamus-pituitary-adrenal (HPA) axis, is a negative feedback system which functions to maintain homeostasis when faced with a stressor, by secreting cortisol – a glucocorticoid hormone. Neonatal HPA axis is a complex neural system and is functionally dependent on timely parturition, the help of enzymatic and hormonal processes and positive and negative feedback circuits. This system is a vital component in intrauterine development and is essential for extrauterine survival. Relative adrenal insufficiency, defined by the lack of cortisol secretion in preterm neonates is brought upon by immature neural development secondary to premature labor. The lack of cortisol thus impedes normal surfactant production making problems pertaining to the respiratory system prominent with increased susceptibility to chronic lung diseases such as BPD.

Studies have shown that adrenal insufficient neonates will generally present with low basal cortisol levels with a positive response to exogenous glucocorticoid administration with increased blood serum cortisol production. Furthermore, when comparing preterm to term infants, preterm infants are born with lower cortisol levels and present with increased susceptibility to the onset of RDS than term infants. Finally glucocorticoid therapy, hydrocortisone in particular, mediates similar effects of endogenous cortisol and has been shown to have improved outcomes in patients suffering from adrenal insufficiency by reducing the need for respiratory support. Hydrocortisone therapy however is limited due to lack of extensive studies despite it improving outcomes of certain neonatal pathologies; the use of the drug is to be routinely monitored and used in minimal doses. Overall, as more studies are being conducted on premature infants, there has been an increase in the administration of prenatal steroids in the instance of premature labor, and initiating corticosteroid therapy earlier in infants born prematurely in an attempt to reduce the likelihood and onset of respiratory distress secondary to adrenal insufficiency.

## 15 ARE VAPES AN EFFECTIVE DEVICE FOR SMOKING CESSATION OR A GATEWAY TO CONVENTIONAL TOBACCO SMOKING?

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**BACKGROUND:** With tobacco smoking still being a leading cause of deaths worldwide, smoking cessation has become an area of great focus in the recent years. Vapes or e-cigarettes have been getting increasing attention in its effectiveness as a smoking cessation device as it the only device that provides the same illusion and behavioral resemblance to a traditional cigarette.

**OBJECTIVES:** To investigate if vapes or e-cigarettes aid in smoking cessation or promote smoking.

**METHODS:** A literature search was completed in November 2017 using the following databases: PubMed and Ovid. Randomized controlled trials were only selected to be included in the search. After all inclusion and exclusion criteria were applied, four studies were chosen. Reference lists of selected studies were also reviewed for relevant studies.

**RESULTS:** All included studies were randomized controlled trials with adult participants over the age of 18 years who were current smoker. The intervention used in the studies included e-cigarettes with a nicotine level between 0 and 18 mg and traditional tobacco cigarettes or nicotine patch as a comparison.

**DISCUSSION:** Studies included in this review measured the effect of e-cigarettes on cravings and withdrawal symptoms, smoking reduction or abstinence, and eCO and cotinine levels. Most studies showed evidence that e-cigarette use leads to an overall reduction in tobacco smoking.

**CONCLUSIONS:** Although the majority of the studies included in this review revealed that e-cigarettes result in a significant decrease in smoking, further research needs to be conducted to prove its effectiveness for complete smoking abstinence, as well as the harms and risks associated with its use.

## 16 IS HYPERBARIC OXYGEN THERAPY AN EFFECTIVE TREATMENT FOR POST-CONCUSSION SYNDROME AND TRAUMATIC BRAIN INJURY?

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**BACKGROUND:** The concept of delivering high amounts of oxygen at a greater atmospheric pressure has been proven to increase the amount

of oxygenated blood in the body ("What is Hyperbaric Oxygenation? How Does it Work?," 2018). The usefulness of hyperbaric oxygen therapy (HBOT) for the treatment of traumatic brain injury (TBI) has been wildly debated and sometimes controversial. As TBI's increase in prevalence, it is important to recognize potentially positive and useful treatments.

**OBJECTIVES:** To evaluate the effectiveness of HBOT in the treatment of symptomatic and behavioral concerns caused by TBI.

**METHODS:** Inclusion criteria were based on the study being a randomized control trial (RCT), a confirmed diagnosis of post-concussion syndrome or TBI and HBOT must be used as the primary treatment intervention. The two limits placed on the search were reports of English origin and human studies.

**RESULTS:** A primary electronic search was completed using three databases producing 122 articles. Once duplicates were removed and full-text articles were reviewed, eight RCT's remaining for analysis. A total of five outcomes were evaluated: intracranial pressures, cognitive scores, quality of life, Glasgow Coma and Outcome Scores (GCS/GOS) and motor skills and coordination.

**DISCUSSION:** HBOT showed improvements in GOS scores in three articles while one article stated that HBOT was not suggested in the treatment of fine motor speed and balance. Most articles believed the use of HBOT had favorable results in the treatment of traumatic brain injury. HBOT enhances the body's natural healing process by increasing diffusion distance of oxygen into the impaired tissue and promotes neurovascular regeneration.

**CONCLUSION:** HBOT has shown to have positive results in the treatment of traumatic brain injuries however more research needs to be done to include greater subgroup analysis and more diversity in participant selection.

## 17 PERCUTANEOUS DILATION TRACHEOSTOMY METHOD IN PEDIATRIC PATIENTS

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**BACKGROUND:** Compared to surgical tracheostomy (ST), percutaneous dilation tracheostomy (PDT) is a much newer method, having only been introduced in the 1980s. PDT is quickly becoming the method of choice when performing tracheostomies in adults due to benefits such as being relatively quick and easy to perform, having a lower cost and fewer complications, and eliminating risks associated with transfer as PDT can be done at the bedside. Although it has become a popular procedure method in adults, PDT is rarely done in children due to perceived difficulties posed by pediatric anatomy. Currently PDT is generally contraindicated in pediatric patients.

**OBJECTIVES:** To determine whether the percutaneous dilation tracheostomy method should be used more often than the traditional surgical method in pediatric populations.

**METHODS:** A systematic literature search of three databases (OVID Medline, Scopus and PubMed) was conducted in November 2017. A secondary search was conducted on the reference lists of identified articles to recognize additional sources. Articles were included in this review if their main purpose was to study outcomes of pediatric patients undergoing percutaneous dilation tracheostomy.

**RESULTS:** The primary and secondary search of selected databases identified 70 articles after removal of duplicates. Abstract analysis and review of the full text identified seven articles which were included in this literature review.

**DISCUSSION:** All seven articles analyzed complications associated with pediatric PDT. Two studies compared complication rates and benefits of PDT and ST. Five studies included patients younger than 10 years old. Overall PDT is shown to be performed successfully on pediatric patients with a low rate of complications.

**CONCLUSIONS:** Percutaneous dilation tracheostomy can be safely performed on pediatric patients, including infants, who do not have severe underlying conditions. The long-term complications of this procedure still need to be studied, as well as the limitations on what patients are appropriate for PDT. Increased operator experience with the procedure and increased accessibility to equipment are major factors in increasing the use of PDT in pediatrics and improving patient outcomes.

### **18 MANAGEMENT OF ACUTE SEVERE ASTHMA IN MECHANICALLY VENTILATED PATIENTS: CURRENT AND EMERGING STRATEGIES**

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Asthma is a common chronic inflammatory lung disorder of all age groups, predominantly affecting pediatric populations. The term “acute severe asthma” (ASA) refers to the acute exacerbation of asthma that results in acute signs and symptoms and severe cardiopulmonary

abnormalities. The term “status asthmaticus” refers to severity of asthma exacerbation which is refractory to continuous administration of short acting beta agonists. The current worldwide prevalence of asthma is around 300 million which may be increased to 400 million by 2025. In Canada, approximately two out of three asthma patients who are treated in the general practice suffers from uncontrolled asthma. Amongst the chronic diseases, asthma poses the biggest economic burden on health-care system. ASA patients consume a significant amount of healthcare resources since they require hospitalization, sudden unplanned medical interventions, long hospital stay, and have increased morbidity and mortality. ASA patients account for only 5% of the total asthma population but the costs associated with acute severe asthma is 50% of the total asthma cost. Around 2–6% of patients who are in the hospital with ASA ended up requiring intubation and mechanical ventilation. Ventilator management of ASA patient is challenging because of hyperinflated lungs and air trapping. This poster will discuss the management of mechanically ventilated ASA patients to determine the best practices in strategies of their care. This poster will include mechanically ventilated ASA patients of all age groups derived from peer-reviewed research and review articles published in the last two decades.