



# CJRT · RCTR

Fall 2004, Volume 40 (4)



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*La revue des professionnels de la santé respiratoire au Canada*

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**Official Journal of the CSRT**  
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**Cover Photo**  
 Blown of the broom — Joan Norgren, RRT at the Ottawa Hospital, gets ready to cast a spell on patients at the Rehabilitation Centre. Everyone agrees she is the best looking pulmonary witch on the premises.  
*Photo by Carole Leblanc*

For more photos please check  
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# Welcome!



Doug Maynard

Welcome to the fall issue of the *CJRT*. There has been lots of activity at the CSRT over the summer, much of which will be reported on in this issue.

The CSRT has some big issues to deal with in the coming months. At the Spring AGM the membership voted on making a bylaw change that would allow for a mail in voting process for the purposes of changing CSRT Bylaws. All bylaw changes must receive the approval of Industry Canada before they are enacted. Industry Canada rejected this bylaw change.

The CSRT wanted this change to enable the organization to canvass the entire membership, particularly on issues that may have regional variability, where the outcome might be influenced by the location of the Annual General Meeting.

One such issue is in regards to the CSRT's implementation of the Mutual Recognition Agreement. In this issue you will see a special message from the CSRT Board of Directors that will give you more information on this important issue. You will also be receiving information regarding this issue by mail. The CSRT is now going to call a special meeting of the members, specifically for the purposes of resolving this issue. I strongly encourage you to read this special message from your Board of Directors, and contact the CSRT Head Office if you have any questions.

Another major issue is the implementation of the National Competency Profile. This new profile will be the entry level standard for respiratory therapy. This document will also serve as the basis for school accreditation and exam development. This document will be rolled out at a meeting of educators in Banff, AB in early October. What makes this event so special is that every regulatory and credentialing body for respiratory therapy in Canada will be using this common standard.

The CSRT also continues to provide representation for RT's on various national committees. In this issue we have a report from Kathy Johnston, who represented the CSRT at the Neonatal Resuscitation Program Committee meeting in Montreal.

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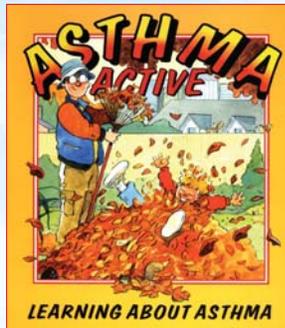
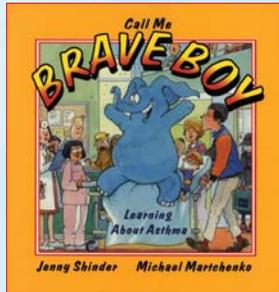
## New Educational Asthma Materials

The Canadian Lung Association has developed some new children's educational asthma materials.

"Call Me Brave Boy", is targeted to children aged 2-6. This picture book is designed for a parent or caregiver to read to a child who has asthma. It is illustrated by Michael Martchenko, Canada's foremost children's book illustrator and written by Jenny Shinder, a parent of a child with asthma.

"Asthma Active", an activity book targeted to children 7-12 years of age, is full of educational games that teach about asthma in a fun way.

To order these free materials, please contact our Asthma Action Helpline at 1-800-668-7682.



## Compassion in Action

### A Message From Darcy Andres, CSRT Forum 2005 Chair

I would like to take this opportunity to invite you to come and enjoy some western hospitality at the 2005 CSRT Annual Education Forum and Exhibition. The Conference will be held June 2 to 5, 2005 at the Shaw Conference Centre in downtown Edmonton.

The Organizing Committee has been hard at work for several months planning this event. The education modules for the forum include Critical Care, Anesthesia & Perfusion, Leadership, Neonatology & Pediatrics, Diagnostics and "Taking Care of Me." We have already confirmed several well-known speakers for our education symposium including:

**Dr. Peter Papadakos**, University of Rochester will be presenting talks on ARDS: Treatment in Evolution, Update on Sedation and Management of Massive Lung Trauma,

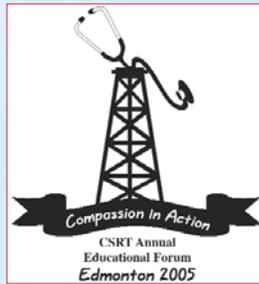
**Dean Hess**, Massachusetts General Hospital will present Approaches to the Discontinuation of Mechanical Ventilation and Selection of Aerosol Delivery Devices;

**Craig Scanlon**, University of Medicine and Dentistry of New Jersey will talk on Assessing Competency and Fostering Leadership Development through Mentoring

**Richard Branson**, University of Cincinnati will present Nutritional Support and the Pulmonary Patient and Mechanical Ventilation: Past, Present and Future.

As well, panel discussions on Leadership and Opportunities and Barriers in Respiratory Research are also scheduled. Finally, an Educator's Congress is scheduled for the afternoon of June 2. These sessions will focus on various aspects of education and adult learning.

What! All work and no play? Not likely — what's a conference without some fun? Arrangements have been made for several social activities throughout the convention. The official opening of the forum will take place on Thursday evening, June 2. The exhibitors will be hosting a wine and cheese reception. The Fun Night will take place on Thursday, June 3 at Red's in the West Edmonton Mall. Plans are underway for a mini Olympics competition, simulated car races and the Sputum Cup competitions. I'm sure there will also be



many other surprises throughout the evening. On Saturday, June 4 there will be a formal banquet and awards presentation. The keynote speaker for the evening will be Mr. Stephen Lewis, Veteran Diplomat and UN Special Envoy for HIV/AIDS in Africa.

As you can imagine, organizing an event such as this requires a significant commitment from many people. I'd like to take a moment and introduce the members of the 2005 Organizing Committee:

Speakers — Dallas Schroeder  
Exhibitors — Ann Hudson-Mason and Linda Fontaine  
Registration — Janet Thomson and Leanne Grant  
Social Events — Maggie Murphy and Cindy Bouw

I would like to thank each of these people for their support and assistance with planning this event. As well, the ongoing assistance and support of Doug Maynard and Rita Hansen from the CSRT Head Office has been invaluable!

As always, your feedback is important to all of us. Please send any comments or suggestions to [Darcy.Andres@calgaryhealthregion.ca](mailto:Darcy.Andres@calgaryhealthregion.ca)

## Edmonton, Alberta

### What's in Edmonton?

Consider extending your stay beyond Forum 2005 and take in some of the many activities Edmonton has to offer:

- the world's largest shopping centre and Alberta's number one attraction — West Edmonton Mall, with seven theme parks and an endless variety of shopping and restaurants
- explore Canada's largest living history park — Fort Edmonton Park, as well as the Provincial Museum of Alberta, Muttart Conservatory, the Alberta Legislature Building and Odysseum (Edmonton's space & science centre)
- take a nature walk, voyageur canoe ride, gold panning and other recreational activities year-round in the longest stretch of urban parkland in Canada, the North Saskatchewan River valley
- attractions of the Old Strathcona heritage area
- try your luck at one of six casinos
- tee off at one of the 70 golf courses in the region.
- discover the of wildlife at Elk Island National Park within a few minutes of the city
- drive from Edmonton are the majestic Canadian Rockies — Jasper and Banff National Parks.



West Edmonton Mall

### CSRT Forum 2005 — Call for Abstracts

The 2005 CSRT Annual Educational Forum, "Compassion in Action" will be held in Edmonton, Alberta. The Forum provides opportunity for respiratory therapists to network with colleagues, engage in professional development, share experiences and enhance the practice of respiratory therapy in Canada. To that end, the Planning Committee invites the submission of abstracts for poster presentations at Forum 2005.

Abstracts may pertain to any area of respiratory therapy including clinical practice, program development, research investigation, evaluation, and respiratory healthcare delivery. Abstracts of no more than 250 words must be submitted according to the attached guidelines and will be reviewed by a Panel using a blind peer review mechanism. Check the CSRT website for details.

A chance to win free registration for Forum 2006 will be given in each of the following categories:

- Best Poster
- Best Student Poster



Edmonton at Dusk  
Photo: Edmonton Tourism/Economic Development Corporation

## ON AIR NUGGETS

### Fanshawe's New Program Coordinator

After five years, Dennis Hunter has stepped down from the position of Program Coordinator at Fanshawe College in London, Ontario. He will pursue new academic projects and enjoy more teaching time. He is replaced by Sandy Annett as of September 1, 2005. Thank you for all your hard work and dedication, Dennis and welcome aboard Sandy!

### RT Week October 3 – 9, 2004

How are you promoting RT Week? Please send us a paragraph on how you showcased the work of RTs in your area. Share your experiences with others to help profile our profession. Photos are welcome too! [cjrt@csrt.com](mailto:cjrt@csrt.com).

### RTSNS 40th Anniversary

The RTSNS hosts its 40th Anniversary Educational Conference and Celebration **October 22-23, 2004 in Halifax.**

The conference will include sessions on topics ranging from anesthesia, sleep studies, home care, neonatal/pediatric and adult respiratory care. A social night to celebrate is also planned.

For more information: [www.rtsns.com](http://www.rtsns.com)

### Exam Application Deadline

The deadline for application to write the January 2005 CSRT National Exam, is November 15, 2004. This exam will be written January 10, 2005. Check the CSRT website under RRT Credential for details.

### On-Line Discussion Groups Are Back

The CSRT is re-introducing on-line Discussion Forums on the CSRT website. Our email-based discussion forums are similar to the service formerly known as the Listserv.

Log on and see what your peers are discussing. Areas currently available include Anesthesia, Managers, Patient Educators, Professional Practice and Students.

Tap into this great communications tool. It's free and gives you an opportunity keep current on issues in your area of practice.

Share and opinion.  
Ask a question.

Sign up by choosing your area of interest — you can find it on the website under Forums.

### Congratulations Terry

Terry Boone, recipient of a CSRT Honorary Lifetime Membership, recently received his certificate from CSRT Past-President, Daniel Paré. Terry was unable to attend the Educational Forum in Toronto in May 2004. He was presented with his certificate in Saint John, New Brunswick. The CSRT Honorary Lifetime Membership recognizes members who have made significant contribution to the Society.

## Message from the President

"Keep interested in your own career, however humble;  
it is a real possession in the changing fortunes of time."

— Max Ehrman, *Desiderata*



Brent Kitchen

In the last *CJRT* I wrote about what I consider to be the changing role of the CSRT. Because the profession has become self-regulated (licensed) in some provinces and will eventually be self-regulated in all provinces, the need for the CSRT to provide its credentialling services to most RTs is diminishing. Right now, approximately 80% of the RTs practicing in Canada come under the jurisdiction of a licensing body (AB, MAN, ON and QC). It's clear that the CSRT must continue to become an organization that focuses on providing services and benefits to its members as well as representing the interests of RTs, rather than focusing primarily on credentialling issues. To offer more benefits and to have a stronger voice the CSRT needs to be an organization that finds ways to include all Respiratory Therapists as equal members in our Society. As individuals we also need to be involved in our provincial colleges and associations to ensure that our interests are being represented in discussions on regulation.

Recently the CSRT Long-range Planning Committee developed a strategic direction for our organization. Its key points are:

"The CSRT shall serve its members by:

1. Maintaining the viability of the national society in order to effectively represent the profession.
2. Enhancing member benefits.
3. Supporting respiratory therapy education and clinical standards.
4. Promoting development of the respiratory therapy profession."

This strategic direction was broken down to more specific goals. The new CSRT Board of Directors is now focused on reaching these specific goals. To facilitate this, the new CSRT Board has been restructured. Each Director is now elected by the entire membership

rather than most of the Board being automatically composed of the Presidents of each provincial association. Each Director now represents all CSRT members across Canada and can focus their attention on CSRT issues.

The new Board had its first meeting in Toronto during the CSRT Education Forum. Each Director now has a specific job description. The Board took all of the specific goals of the CSRT and assigned each one to a specific Director. Each Director now has a list of specific goals to accomplish. Every Board member is now creating a workplan to outline how the CSRT will reach these goals. In November the Board will meet again to review the workplan created by each Director. The Board will determine the top priorities and will begin to implement these plans. This is how we will get things done and I believe how members will begin to see significant changes in how they and the profession benefit from the CSRT.

Other exciting changes are happening in the CSRT head office. Our new Executive Director has changed how budgets are created, how expenses and revenues are tracked as well as what specific projects cost or benefit the CSRT. This is an important tool to tell us how we can improve as an organization. Within the next few months, the CSRT will be investing in a new database system to offer services such as on-line registration, to track the movement of our members better and to give us important demographic information that will allow us to improve how we serve our members.

Have you seen the new CSRT website ([www.csrt.com](http://www.csrt.com)) that was launched last month? Have you seen the fantastic list of presenters for the 2005 CSRT Education Forum in Edmonton that is already available. The new listserves, now called Discussion Forums and our new CSRT Standards of Practice are also on the site. The BOD is also reviewing proposals to improve how we

*Continued on page 10*

## Message from the President continued from page 9

market our profession as part of an overall plan to improve awareness. Changes are taking place because we are now better organized to serve our members and more focused on what members want.

To carry out these changes we need your support. The more volunteers and the more resources (ie. members) we have the sooner we can reach the goals RTs in Canada have. More respect, more autonomy, better public awareness, a stronger national voice for the profession, reciprocity in and outside of Canada as well as an improved ability to care for our patients through education and awareness. No time to volunteer? Work one day a year for your profession. For most of us one day of work will pay for your annual CSRT member

ship dues and that is the least you can do for your profession. As professionals, we need to care for our profession too. The CSRT is working hard to serve you and to speak for you wherever the voice of RTs needs to be heard. Even with new a new focus, restructuring, comprehensive plans and new tools, the CSRT can't reach our goals without your support.



Brent Kitchen, RRT  
President, CSRT

### Message du président

« Aime ton travail, aussi humble soit-il, car c'est un bien réel dans un monde incertain. » — Max Ehrman, *Desiderata*

Dans la dernière édition de la *RCTR* j'ai parlé de ce que considère être le nouveau rôle de la Société canadienne des thérapeutes respiratoires. Comme notre profession est devenue autorégulée (brevétée) dans certaines provinces et qu'elle sera tôt ou tard autorégulée dans l'ensemble des provinces, il devient moins nécessaire pour la SCTR de fournir ses services d'accréditation à la plupart des thérapeutes respiratoires. À l'heure actuelle, environ 80% des TR pratiquant au Canada relèvent de la compétence d'un organisme de réglementation (en Alberta, au Manitoba, en Ontario et au Québec). Il est clair que la SCTR doit continuer à être une organisation qui met l'accent sur les services et les avantages livrés à ses membres, en plus de représenter les intérêts des TR, plutôt que de s'en tenir surtout à des questions de reconnaissance professionnelle. Pour offrir plus d'avantages et disposer d'une voix plus forte, notre Société doit devenir le genre d'organisation qui multiplie les façons de rassembler sur un pied d'égalité l'ensemble des thérapeutes respiratoires. Nous devons également, à titre individuel, nous impliquer dans nos associations et collèges provinciaux pour veiller à ce que nos intérêts soient représentés dans les échanges concernant la réglementation de la profession.

Le comité de planification à long terme de la SCTR a récemment adopté une orientation stratégique pour notre organisation. En voici les principaux éléments:

- La SCTR servira ses membres par les activités suivantes:
  1. Maintenir la viabilité de l'organisation nationale afin de représenter efficacement la profession.
  2. Bonifier les avantages livrés aux membres.

3. Appuyer l'enseignement et les normes cliniques de la thérapie respiratoire.
4. Promouvoir les progrès de la profession de thérapeute respiratoire.

Cette orientation stratégique comprenait des objectifs plus spécifiques, que le nouveau Conseil d'administration de la SCTR s'occupe présentement à réaliser. Nous avons procédé pour ce faire à une restructuration du nouveau C.A. de la SCTR. Chaque administrateur est maintenant élu par l'ensemble de notre effectif, plutôt que d'avoir un Conseil presque automatiquement composé des présidents de chaque association provinciale. Chaque administrateur représente maintenant les membres de la SCTR de tout le Canada et peut consacrer son attention aux enjeux de la SCTR dans son ensemble.

Le nouveau C.A. a tenu sa première réunion à Toronto, durant le Forum sur l'éducation de la SCTR. Chaque administrateur possède maintenant sa propre description de tâches. Le C.A. leur a assigné individuellement chacun des objectifs spécifiques de la SCTR. Chaque administrateur a donc maintenant une liste d'objectifs particuliers à réaliser et s'occupe présentement à créer un plan de travail décrivant une façon pour la Société de réaliser ces objectifs. Le C.A. se réunira de nouveau en novembre pour étudier les plans de travail créés par chacun de ses membres. Il assignera des priorités et entreprendra la mise en œuvre de ces plans. Voilà comment nous allons faire les choses et comment nos membres vont, à mon avis, commencer à voir d'importants progrès dans les avantages qu'apporte la SCTR aux TR et à leur profession.

Le bureau central de la Société connaît également des changements stimulants. Notre nouveau directeur général a changé notre façon de préparer les budgets et de consigner nos dépenses, nos recettes et ce que chaque projet particulier

*Suite à la page 31*

## National Neonatal Resuscitation Meeting

### Kathy Johnson, RRT

The National Neonatal Resuscitation Program (NRP) Committee meeting was held in Montreal on June 15, 2004. Robert Martell, the CSRT representative to this committee, was in Shanghai at the time, as a member of the International Neonatal Training Program. Kathy Johnston attended the NRP meeting in his seat.

The structure of this committee will be changed in the future due to changes in governance and management structure at the level of the Heart and Stroke Foundation of Canada. The membership of this committee will not change, reflecting the importance of a multidisciplinary committee committed to the issues surrounding neonatal resuscitation.

The committee discussed the myriad of neonatal resuscitation issues currently being analyzed by the International Liaison Committee on Resuscitation (ILCOR). The ILCOR Consensus on Science Statement will be published in December 2005. The new American Academy of Pediatrics (AAP)/American Heart Association (AHA) neonatal resuscitation guidelines will follow in January 2006. The revised *Textbook of Neonatal Resuscitation*, 5th edition will be available in the spring of 2006.

The issues being discussed reflect the current questions and controversies in neonatal resuscitation. They include intra-partum and post-partum management as well as the strategies we use to instruct providers in NRP. These issues include, but are not limited to the following:

- Use of 100% O<sub>2</sub> in neonatal resuscitation
- Use of CO<sub>2</sub> detectors to confirm ETT placement
- Role of CPAP in the delivery room management of the neonate
- Initial ventilation of the neonate in the delivery room
- Strategies to avoid temperature instability
- Management of meconium including the role of amnioinfusion and intrapartum suctioning
- Role of Naloxone
- Validation of the current evaluation process for NRP providers

More information regarding these discussions is available on the NRP page of the AAP web site. URL is <http://www.aap.org/nrp/nrpmain.html>

There is much activity in NRP in all provinces and there is always a need for more NRP Instructors and Instructor Trainers. The number of Respiratory Therapists who are participating in these programs is high and our knowledge and expertise is valued. We are recognized by the National NRP Committee as an integral part of the delivery room management of the neonate and also as potential educators within the NRP training programs.

*Kathy Johnston is an RRT, with the Educator, Respiratory Therapy Department IWK Health Center, in Halifax, NS. Kathy represented the CSRT on the Neonatal Resuscitation Program (NRP) Committee.*

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### Welcome continued from page 4

The CSRT continues to expand the services that it is providing to its members. We continue to enhance our web-based services and have added subscription based on-line discussion forums to the new website. We encourage all members to continue to provide us with input on and content for the new website.

Also in this issue you will find an updated CSRT Standards of Practice, current information on the CSRT Forum 2005 to be held in Edmonton, AB, an update on the situation of Nitric Oxide in Canada, a report from the new Student Special Interest Group and much more.

Finally, I would like to direct your attention to the Call for Nominations that you will also find in this issue. The CSRT is looking for nominations for the positions of President-elect and Treasurer. Taking a position on the CSRT Board of Directors is a fantastic way to learn about your profession, and it will also provide you with the invaluable opportunity to make a positive change in the working lives of all RT's. If you are interested in your profession, please consider running for one of these positions.



Douglas Maynard BSc, RRT, MBA  
Executive Director CSRT

## New Standards of Practice Approved

The CSRT is very pleased to announce that the Board of Directors has recently approved a new CSRT Standards of Practice Document.

Two of the goals of the CSRT are to support national standards for Respiratory Therapy and to foster the development of the profession in Canada and internationally. With these goals in mind, the CSRT has recently completely updated the CSRT Standards of Practice.

The purpose of these Standards of Practice is to establish and define a set of guidelines, which will guide and direct all members of the CSRT as each pursues his or her profession. It is incumbent upon all members to provide their services in a manner that instills a strong sense of trust and confidence between themselves and their employers, patients, clients, peers and all mem-

bers of the general public. Creating and abiding by a Standards of Practice document is one of the elements that demonstrates that Respiratory Therapists are no longer technicians but are, in fact, true professionals.

Information regarding Standards of Practice for Respiratory Therapists is often requested by individual RTs, governments, employers and other professions. The CSRT's ability to provide this information on behalf of its members is paramount as the CSRT continues to market the abilities of RTs and support the profession in Canada and around the world.

A special thank you goes to Sandra Biesheuvel, CSRT Director of Human Resources, for leading us in this project.

### CSRT Call for Nominations



The CSRT requires nominations for the two (2) positions for the 2005 elections. Don't miss this chance to make a difference in your profession.

The two positions that will be vacant are:

#### 1. President-Elect

(becoming President and Past-President)

The position of President-Elect is a three-year term (one year for each term covered as President-Elect, President and Past-President).

#### 2. Treasurer

The position of Treasurer will have a 2-year term.

The job descriptions and nomination forms for these two positions are available on the CSRT website [www.csrt.com](http://www.csrt.com) or can be obtained by contacting the CSRT head office at 1-800-267-3422.

Each nominee must be a Registered Member of the Society. Individuals may be nominated by forwarding the nomination papers, duly signed by five (5) Registered members in good standing, to the Executive Director of the Society.

Original signatures must be on the nomination forms sent to the CSRT Head office.

Send completed forms with original signatures to:

Executive Director, CSRT  
Suite 102-1785 Alta Vista Drive  
Ottawa ON K1G 3Y6

**Deadline for Nominations is  
December 1, 2004**

## CSRT Standards of Practice

### 1. Specialized Body of Knowledge

Respiratory Therapists possess a specialized body of knowledge, and base the performance of their duties on Respiratory Therapy theory and practice.

Respiratory Therapists are essential members of the healthcare team, and assume a variety of roles in different areas of practice, such as clinical, education, health promotion, management, research, administration, and consulting.

Respiratory Therapists practice independently, interdependently, and collaboratively, and may practice within legislated professional regulations.

### 2. Safe Practice and Application of Knowledge and Technology

Respiratory Therapists safely and effectively apply their skills, knowledge, and judgment based on the needs of their patients.

Respiratory Therapists are committed to quality outcomes, and intervene so as to contribute to the best possible outcomes for their patients.

Respiratory Therapists who are involved with technical procedures must do so in accordance with any regional, provincial, or manufacturer standards or recommendations. These procedures must incorporate best practice standards, and should be research based.

Respiratory Therapists, in consultation with peers, relevant others, equipment manuals, and CSA guidelines select, operate and maintain equipment to provide safe, effective care.

Respiratory Therapists ensure that all equipment is appropriately cleaned, disinfected or sterilized, and is properly maintained and calibrated by trained personnel.

Respiratory Therapists will notify and discuss with the physician if he or she feels the ordered

therapy/diagnostic procedure is inappropriate for the patient's condition. The Respiratory Therapist may refuse to perform such therapy/diagnostic procedure if they feel that it is detrimental to the patient. Such refusal must be made clear to the physician and documented.

### 3. Communication and Collaboration

Respiratory Therapists shall understand the objective of the ordered therapy/diagnostic procedure and clarify with the physician if necessary.

Respiratory Therapists will inform the patient of the therapy/diagnostic procedure that will be performed, respecting the personal and legal rights of the patient including the right to informed consent and refusal of treatment.

Respiratory Therapists will maintain effective communication with members of the healthcare team regarding the patient's status and progress.

Respiratory Therapists will institute immediate supportive measures and notify relevant members of the healthcare team in the event of deterioration of the patient's condition.

Respiratory Therapists will document all information relevant to the provision of care as per organizational policies and procedures.

### 4. Assessment

Respiratory Therapists will determine the initial clinical status of the patient, and ensure the ordered therapy/diagnostic procedure is consistent and correct for the patient's condition.

Respiratory Therapists will collect data from the patient, family, members of the healthcare team, health records and reference material to identify the patient's level of function and relevant risks affecting and factors contributing to the patient's health.

## CSRT Standards of Practice

### 5. Planning

Respiratory Therapists will develop and implement the plan of care in collaboration with members of the healthcare team.

Respiratory Therapists use evidence-based knowledge in selecting strategies and interventions.

Respiratory Therapists select strategies and interventions according to their effectiveness, efficiency and suitability in relation to the goals of the plan, and ensure that the goals of the plan are appropriate for each patient.

Respiratory Therapists will maintain, modify, or discontinue the plan in consultation with members of the healthcare team.

### 6. Evaluation

Respiratory Therapists will evaluate the effectiveness of strategies and interventions by comparing actual outcomes to anticipated outcomes.

Respiratory Therapists will use the results of the evaluation to improve policies and procedures in Respiratory Therapy practice related to patient care.

Respiratory Therapists will evaluate his/her performance of individual procedures and overall practice.

### 7. Professional Accountability and Responsibility

Respiratory Therapists are accountable for meeting the ethical and legal requirements of the profession of Respiratory Therapy.

Respiratory Therapists shall follow sound scientific procedures and promote ethical behaviour in practice and in research.

Respiratory Therapists shall demonstrate behaviour that reflects integrity, compassion, supports

objectivity, and fosters trust in the profession and its professionals.

Respiratory Therapists shall report unsafe practice or professional misconduct of a peer or other healthcare worker to appropriate authorities.

Respiratory Therapists will provide care without discrimination on any basis, with respect for the rights and dignity of all individuals.

Respiratory Therapists shall refrain from indiscriminate and unnecessary use of resources, both economic and natural, in their practice of the profession.

Respiratory Therapists promote disease prevention and wellness.

Respiratory Therapists promote the growth of the profession, and present a positive image of Respiratory Therapy to the community.

### 8. Continuing Education and Competence

Respiratory Therapists are committed to life-long learning to upgrade their knowledge and skills in order to keep their practice current.

Respiratory Therapists shall assume responsibility for maintaining competence in their practice of Respiratory Therapy, and seek opportunities for professional growth.

Respiratory Therapists shall acknowledge limitations in their knowledge, skills, or judgment, and function within those limitations.

Respiratory Therapists strive for excellence in the profession by participating in, and promoting the use of self-assessment tools and feedback from appropriate others to determine and improve their knowledge, skills, and judgment.

**Important Message****Implementation of the Mutual Recognition Agreement**

This is an important message from the CSRT President and Board of Directors regarding the CSRT and the full implementation of the Mutual Recognition Agreement (MRA). Please read the following information, as you will be asked to participate in person or by proxy at a Special Meeting of the CSRT membership for the purpose of resolving this issue. You will receive or may have already received more information on this meeting by mail.

The following information is intended to provide you with some of the history and major points of discussion regarding this issue. We encourage you to discuss this issue with your colleagues, to check the CSRT website and to contact the CSRT Head Office if you have any questions or input regarding this issue. At the 2004 AGM the CSRT asked for a bylaw change to enable the Society to address issues like this through special mail-out ballots. Although members voted to accept the mail-out ballot bylaw change, Industry Canada rejected it. So, in order to have this MRA implementation issue addressed and in-keeping with the intent to have all members participate in this important decision, the CSRT will have a special meeting and a mail-out of proxies, as allowed for under CSRT bylaw, rather than ballots.

**History**

In 1994 governments within Canada signed the Agreement on Internal Trade (AIT). The AIT includes a chapter on the movement of workers called the Labour Mobility Chapter. The objective of the Labour Mobility Chapter is to enable workers qualified for an occupation in one part of Canada to have access to employment in that occupation everywhere in Canada.

Article 708 of the Labour Mobility Chapter instructs Parties "to mutually recognize the occupational qualifications required of workers of any other Party" and to "reconcile differences in occupational standards." Also under the chapter, Parties agree to assess occupations and when they are very similar, Parties must agree to recognize the qualifications of workers from other jurisdictions without requiring additional testing, assessment or training. If there is insufficient information to make that determination, Parties agree to participate in an occupational analysis. The analysis should determine whether or not there is sufficient commonality to allow for mutual recognition of qualifications. The intent is to have a full inter-provincial reciprocity agreement for each occupation within Canada.

The CSRT and RT regulatory bodies (The Labour Mobility Consortium for Respiratory Therapy) have met to find a way to recognize each other's certification processes because provincial governments demand it. After reviewing the practice of RTs in all of the provinces, the group concluded that there was a level of commonality of greater than 90% among practicing RTs across Canada. The group decided that RTs in Canada are similar enough that we can recognize each other's licensing/certification processes and we can work towards bridging differences.

What does this mean for Respiratory Therapy? Provinces must comply with AIT. The bodies that license, credential or register workers in each province must therefore comply as well. CARTA, MARRT, CRTO and OPIQ license RTs in their provinces. Jurisdictions without self-regulation, in general, use the CSRT RRT credential as a means of credentialing RTs. To comply with AIT these groups must find a way to either accommodate each other's licenses/credentials or attempt to harmonize their processes.

*Important Message — continued***Implementation of the Mutual Recognition Agreement**

In 2002 the regulators and the CSRT signed a Mutual Recognition Agreement (MRA), which is essentially an inter-provincial reciprocity agreement between each of the regulatory bodies and the CSRT. The agreement stipulates that the Parties agree to develop a common competency profile (a list of what RTs need to be competent in to work as a RT across Canada) as a step toward harmonizing our process. After surveying RTs in each province in Canada in 2003, a National Competency Profile (NCP) for Respiratory Therapy was developed. All regulatory bodies and the CSRT have agreed to begin using this new standard to accredit our educational institutions and to create entry-to-practice exams. What this means is that every school, in every province in the country will be teaching to, and will be accredited to the same standard.

**What does this mean for the profession?**

The NCP was developed based on three individual occupational profiles that were all considered to be greater than 90% congruent. The College and Association of Respiratory Therapists of Alberta commissioned an independent study to compare the new NCP with the current CSRT Occupational Profile. This analysis found the two profiles to be greater than 90% similar. This means that changes in the way we currently teach and assess individuals entering the practice of respiratory therapy will most likely be small. This also means that any future changes made to the National Competency Profile and therefore to the entry level competencies of the profession will be made by, and adopted by every jurisdiction in the country. We will begin to move forward as one profession instead of the different factions that we currently operate in.

The CSRT signed the MRA. The MRA stipulates that, because the practice of RTs is so similar across Canada all signatories to the agreement will accept each other's licenses and/or credential. This means that if an RT holds unrestricted RRT status in one jurisdiction, the individual will be granted a license or credential to work in any of the other jurisdictions as long as they have been working for at least 6 months and have participated in a recognized continuing education program. The CSRT, because of its bylaws, is not yet fully implementing this agreement. If we do not implement this agreement, and are no longer a member of the National Alliance we will no longer be able to participate in determining the entry to practice standards in Canada. The CSRT could possibly have influence as an observer but we would drastically decrease our effectiveness in advocating for national standards for our profession.

We want to make it clear that not participating in the MRA does not mean that RTs won't be able to move between jurisdictions. What it does mean is that individuals with the CSRT RRT credential that want to move into a regulated jurisdiction may have to go through an accommodation mechanism (ie, an exam) established by that jurisdiction. RTs in the non-regulated provinces would not have reciprocity with the regulated provinces in Canada.

**The future for the CSRT and the profession**

Most CSRT members will want to know what the down side is. One argument that has been put forward is that this will potentially dilute the CSRT credential and lower the standards. We will be granting the CSRT RRT credential to individuals that may have gone through a different

**Important Message — continued****Implementation of the Mutual Recognition Agreement**

process than current CSRT members. The CSRT's response to this concern is that in Canada, all schools will be accredited by the CSRT's CoARTE accreditation process. All graduates will be from programs that have met the same standard. The only factor that remains a variable is which entry to practice exams are accepted. With all entry to practice exams now being based on the same profile we feel that the high level of commonality that currently exists will only increase.

The CSRT requested information from individuals that had voiced opposition to this bylaw change, however we had not received any information by the time this issue of the CJRT went to print. We would still like to hear from individuals that may oppose this change and we encourage you to contact the CSRT Head Office.

Therefore, the CSRT Board of Directors is going to be asking for approval to revise our bylaws to grant the CSRT RRT credential to those already licensed and working in the regulated provinces as per the MRA that we have agreed to. To be included in the MRA and to qualify for the CSRT credential, RTs must work the equivalent of 6 months of full-time and maintain a professional portfolio in the province they are licensed in before they are eligible. A copy of the MRA can be found on the CSRT website. Each of the regulatory bodies now accepts RTs with the CSRT RRT credential and grants them a license. The CSRT needs to reciprocate. If we do not, we cannot expect the regulatory bodies to continue to accept CSRT credentialled RTs without additional testing and assessment. Without this bylaw change not all RTs will have free movement as professionals in Canada. This change is particularly important to those RTs working in the non-regulated provinces. Without the CSRT being a signatory to the Mutual Recognition Agreement on their behalf, there is no way for these RTs to

freely move to regulated provinces without expecting to undergo assessment and testing. With the diversity in the profession, with differences in practice across Canada and differences that often exist in cities and even RT departments, RTs in Canada are not all exactly the same. The CSRT negotiated and signed the MRA. The survey that created the National Competency Profile and the analysis which compared the new NCP to the CSRT Occupational Profile are two of the very few objective reviews of RT practice in all of Canada. They prove that our practice is more than 90% the same. We as RTs have differences, but we are similar enough to accept each other's credentials. If we want unrestricted inter-provincial mobility for all RTs in Canada and if we want the CSRT to grow and be able to advocate for RTs when it comes to advancing practice standards we need to make this bylaw change.

CSRT Board of Directors  
August 23, 2004

**COPD the standard of care**

The 4th National Canadian COPD Alliance Conference will take place in **Montréal, November 26–28, 2004.**



This conference targets family physicians, respirologists, respiratory therapists, physical therapists, nurses, dietitians, pharmacists and social workers.

For detailed information:  
[www.lung.ca/CCA/conference](http://www.lung.ca/CCA/conference)



## CSRT Student Special Interest Group

Jason Nickerson, Chairperson, CSRT Students Special Interest Group

Another summer has come and gone, and with the beginning of fall comes another new class of Respiratory Therapy students. It is my pleasure to welcome this year's class to the world of Respiratory Therapy. As we prepare for another year of lectures, clinical rotations and all of the other wonderful things that come with being a Respiratory Therapy student, we must take some time to step back and enjoy it all, to soak it all in.

This edition of the Journal features an article submitted by a Dalhousie University student who discusses her experiences on clinical rotations at different hospitals from the East Coast to the West. It is certainly a relevant topic as students prepare to undertake clinical rotations throughout this year, and as hospitals prepare to welcome us and to show us clinical aspects of Respiratory Therapy.

I would also like to take this opportunity to announce the appointment of a Co-Chairperson to the Group, Melissa McPherson-Brown of Fanshawe College. Melissa is entering her 3rd year in Respiratory Therapy and will play an integral role in the development and maintenance of the Group.

We are looking for original student submissions for upcoming editions of the *JRT*. This can include literature reviews, patient case presentations, or other forms of research conducted by, or in part by, students. Furthermore, we have set up an on-line e-mail Forum for students, educators and others involved in aspects of Respiratory Therapy Education to share ideas and

opportunities. Be sure to log on to our website and get involved. Encourage others to do the same.

Have a great upcoming school year, and I look forward to hearing from you all with some fresh, new ideas.

**The CSRT wishes to acknowledge the on-going support of our Corporate Members. Sponsorship by our Corporate Members helps the CSRT maintain the current standards of excellence in the profession. Thank you!**

### CSRT Corporate Members 2004 – 2005

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VitalAire Canada Incorporated

## A Student's Journey; Benefits of Training in Two Distant Hospital Systems

J. Marie Matheson, RRT

### Are we ever really done?

This is one question I don't need to ponder. My answer is No. This spring I completed the Diploma portion of the Respiratory Therapy Program at Dalhousie University, allowing me to enter the profession as a working RT. Still, I am far from done. I will return to Dalhousie for another year to obtain a Bachelor of Health Science Degree. In the blink of an eye, three years have passed. It seems like only a short time ago, I was trying to remember if it was the big "A" that stood for alveolar.

My patient professors had explained the fundamentals of Respiratory Therapy. They provided us with the knowledge to think for ourselves. Still, no matter how much I studied, or how many equations that I could rhyme, the best way for me to learn is by doing. One of the best chances to learn by doing is during clinical rotations.

Throughout my program, I had three full time clinical rotations that occurred at the end of each year. Rotations allow students to stay in Halifax at the Queen Elizabeth II Health Science Center or to travel to an external site. The professors believe that the external rotations are of such importance that everyone is required to do at least one. I have done two, and in spite of the financial load to travel to another center, I recommend the experience.

My last clinical rotation was extremely advantageous because it was so close to when I would be stepping into the profession myself. On April 30 I journeyed from Halifax, Nova Scotia to Edmonton, Alberta. As I traveled I nervously anticipated what the next few months would be like. Would the technology in Alberta be so different that I would appear inept? I had to trust that my education would allow me to adapt in my new situations. Arriving at the University of Alberta Hospital, my eyes widened. Was I at the hospital or a huge mall? Had it not been for the man toting an IV pole, I might have asked to be sure. I had not yet experienced such a large hospital, which employs more than a 100 RTs. The first day provided my introduction to different

technology. The familiar 7200's I had been using were not to be found. Instead, I was introduced to the Evita's. It was not long before I came to understand and use the different types of ventilators and BiPAP machines in the supply room. This ability is certainly due in a large part to Clive. When I said that I had never used an Evita before, he grabbed the test lung and said "Go ahead then." He fielded my many questions as I made my way through screens of modes and alarms. Eventually we worked through a variety of equipment. Once I had hurried the technology differences, I began to realize that eventually it all came back to basic fundamentals. With a manual and some helpful advice, new technologies are not intimidating. Just don't ask me to fix them!

I have had the chance to work with many great RTs. There is one that I will attempt to model my own preceptoring skills after. A personable, energetic RT named Paul whom I spent the majority of time with while in the Emergency Department at the University of Alberta Hospital. His method of quizzing, coupled with positive comments is a technique that I learned when I was becoming a swimming instructor. It was called the sandwich technique. Tell the learner something positive, then give a constructive criticism, then follow with another positive comment. No matter if you are 4 or 24, this encourages improvements and reinforces strengths.

Overall the adventure from East to West was of fantastic benefit to me. The opportunity to immerse myself in an area very different from the one in which I had trained, showed me new ideas, technologies, equipment and some new tricks. Across the country much is similar, although the technology or terminology used may differ slightly. The fundamental principals remain.

All RTs must know similar essential information, however I strongly believe there is considerably more that we can learn from each other. The RTs at the QEII HSC have taught me a wealth of knowledge. Yet by traveling far outside my area I gained the opportunity to learn from many other excellent RTs as well.

*Continued on page 30*





### Medigas Award Winners

The CSRT and Medigas, congratulate the respiratory therapy team from Acadie-Bathurst Health Authority. They are the recipients of this year's Medigas Award. The all-volunteer team consists of 25 respiratory therapists from 4 sites across northern New Brunswick. Team members have with between one and twenty years experience.

Their focus has been on building awareness of respiratory issues in schools, industries, pharmacies, nursing homes and family physician's office. They have created a very successful smoking cessation program. The team has taken part in a variety of special events including the Canada Games in Bathurst in 2003; Lung Run with the New Brunswick Lung Association; Respiratory Therapy Week activities; Smog Alerts and participated at conferences on various RT topics.

This team has been actively involved in the only francophone summer camp dedicated to children with asthma, outside of Québec. This asthma camp has been operational since 1994 and has room for 24 children between 9 and 12. They have made a great difference in their community!

The Acadie-Bathurst team effort shows a long-term commitment that goes beyond the regular job. The team was awarded the Medigas Award at the CSRT Annual Educational Forum held in Toronto in May, 2004.

Medigas, A Praxair Health Care Company, that employs respiratory therapists, wished to acknowledge the contribution of respiratory therapists as members of the Health Care Team. Medigas and the Canadian Respiratory Therapy



Daniel Paré, Chairman of the Canadian Respiratory Therapy Foundation and Jan Taylor of Medigas announced the first winners of the Medigas Award at the CSRT Educational Forum in Toronto in May.

Foundation have worked together in developed the Medigas award. This award is to be presented to a Department or Group of Respiratory Therapists who, through their efforts, promote the profession of Respiratory Therapy. The Medigas award is a \$2,500 education grant. The award is open to Respiratory Therapists who are active in any facet of the profession. Criteria and an application form for this award can be found on the CSRT website under Foundation.



## CSRT Awards Deadlines

Applications are now being accepted for the **Summit Technologies Award in Respiratory Excellence**. This award focuses on the areas of respiratory care involving direct patient care, education or research. The deadline for applications is December 15, 2004.

Other award deadlines are also coming up — **The Robert Merry Memorial Award** is January 31, 2005; **The AstraZeneca Award of Excellence in Asthma Education** is due March 31, 2005 and the **Education Award for Advanced Respiratory Practice** is February 1, 2005.

Please check the Foundations section of the CSRT website for eligibility details on all these awards.

## CALENDAR OF EVENTS

<p>October 5 – 9, 2004 <b>17th Congress of the European Sleep Research Society</b> Prague, Czech Republic info@conference.cz</p>	<p>October 23 – 27, 2004 <b>Canadian Cardiovascular Congress 2004</b> Calgary, Alberta http://www.ccs.ca/</p>
<p>October 7, 2004 <b>15th Annual Meeting of the European Society for Computing and Technology in Anesthesia and Intensive Care</b> Toulouse, France ingo.mansolek@hcmib.org</p>	<p>October 23 – 28, 2004 <b>CHEST 2004 – AACPs 70th Annual International Scientific Assembly and the Clinical World Congress on Diseases of the Chest</b> Seattle, Washington registration@chestnet.org</p>
<p>October 10 – 13, 2004 <b>17th Annual Congress of the European Society of Intensive Care Medicine</b> Berlin, Germany www.esicm.org</p>	<p>October 23 – 27, 2004 <b>Canadian Cardiovascular Congress</b> Calgary, Alberta http://www.ccs.ca/</p>
<p>October 14 – 17, 2004 <b>14th World Congress of the International Society of Cardio-Thoracic Surgeons</b> Beijing, China cstcs@cstcv.com</p>	<p>October 23 – 26, 2004 <b>American Society of Anesthesiologists Annual Meeting</b> Las Vegas, Nevada http://www.asahq.org/</p>
<p>October 18 – 19, 2004 <b>The 16th Annual Edmonton Palliative Care Conference</b> Calgary, Alberta www.palliative.org</p>	<p>October 24 – 26, 2004 <b>14th Annual Canadian Home Care Association Conference</b> Halifax, Nova Scotia http://www.cdnhomecare.on.ca/</p>
<p>October 21 – 24, 2004 <b>Canadian Society of Allergy and Clinical Immunology 2004 Annual Scientific Meeting</b> Ottawa, Ontario http://csaci.medical.org/</p>	<p>November 15 – 17, 2004 <b>Ontario Hospital Association HealthAchieve2004</b> Toronto, Ontario http://www.oha.com/oha/ohawm.nsf?OpenDatabase</p>
<p>October 22 – 23, 2004 <b>RTSNS Fall Conference</b> Halifax, Nova Scotia www.rtsns.com</p>	<p>November 26 – 28, 2004 <b>Canadian COPD Alliance — Raising the Standard of Care</b> Montréal, Québec www.lung.ca/CCA/conference</p>
<p>October 22, 2004 <b>17th annual Meeting of American Society of Critical Care Anesthesiologists</b> Las Vegas, Nevada ASCCA@ASAhq.org</p>	<p>December 4 – 7, 2004 <b>50th International Respiratory Congress</b> <b>American Association for Respiratory Care</b> New Orleans, Louisiana http://www.aarc.org/</p>

## Abstracts

### Evidence-Based Clinical Practice Guideline for the Prevention of Ventilator-Associated Pneumonia

Peter Dodek, MD, MHS; Sean Keenan, MD, MSc(Epid); Deborah Cook, MD, MSc(Epid); Daren Heyland, MD, MSc(Epid); Michael Jacka, MD, MSc; Lori Hand, RRT; John Muscedere, MD; Debra Foster, RN; Nav Mehta, MD; Richard Hall, MD; and Christian Brun-Buisson, MD, for the Canadian Critical Care Trials Group and the Canadian Critical Care Society

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**Background:** Ventilator-associated pneumonia (VAP) is an important patient safety issue in critically ill patients.

**Purpose:** To develop an evidence-based guideline for the prevention of VAP.

**Data Sources:** MEDLINE, EMBASE, and the Cochrane Database of Systematic Reviews.

**Study Selection:** The authors systematically searched for relevant randomized, controlled trials and systematic reviews that involved mechanically ventilated adults and were published before 1 April 2003.

**Data Extraction:** Physical, positional, and pharmacologic interventions that may influence the development of VAP were considered. Independently and in duplicate, the authors scored the validity of trials; the effect size and confidence intervals; the homogeneity of results; and safety, feasibility, and economic issues.

**Data Synthesis:** Recommended: The orotracheal route of intubation, changes of ventilator circuits only for each new patient and if the circuits are soiled, use of closed endotracheal suction systems that are changed for each new patient and as clinically indicated, heat and moisture exchangers in the absence of contraindications, weekly changes of heat and moisture exchangers, and semi-recumbent positioning in the absence of contraindications. Consider subglottic secretion drainage and kinetic beds. Not recommended: Sucralfate to prevent VAP in patients at high risk for gastrointestinal bleeding and topical antibiotics to prevent VAP. Because of insufficient or conflicting evidence, no recommendations were made about systematically searching for maxillary sinusitis, chest physiotherapy, the timing of tracheostomy, prone positioning, prophylactic intravenous antibiotics, or intravenous plus topical antibiotics.

**Limitations:** No formal economic analysis was performed, and patient perspectives were not considered.

**Conclusion:** If effectively implemented, this guideline may decrease the morbidity, mortality, and costs of VAP in mechanically ventilated patients.

### Inspiratory Muscle Training Improves Lung Function and Exercise Capacity in Adults With Cystic Fibrosis\*

Stephanie Enright, PhD, MPhil, MSc; Ken Chatham, MSc; Aina A. Ionescu, MD; Viswanath B. Unnithan, PhD, MSc and Dennis J. Shale, MD

\* From the School of Health Care Professions (Dr. Enright), University of Salford, Manchester, UK; Llandough Hospital NHS Trust (Mr. Chatham, and Drs. Ionescu and Shale), Cardiff, Wales, UK; and Exercise Science Department (Dr. Unnithan), Syracuse University, Syracuse, NY.

**Correspondence to:** Stephanie Enright, PhD, MPhil, MSc, School of Health Care Professions, University of Salford, Manchester, M6 6PU, UK, e-mail: s.enright@salford.ac.uk

**Study objectives:** To investigate the effects of high-intensity inspiratory muscle training (IMT) on inspiratory muscle function (IMF), diaphragm thickness, lung function, physical work capacity (PWC), and psychosocial status in patients with cystic fibrosis (CF).

**Design:** Twenty-nine adult patients with CF were randomly assigned to three groups. Two groups were required to complete an 8-week program of IMT in which the training intensity was set at either 80% of maximal effort (group 1; 9 patients) or 20% of maximal effort (group 2; 10 patients).

A third group of patients did not participate in any form of training and acted as a control group (group 3; 10 patients).

**Interventions:** In all patients, baseline and postintervention measures of IMF were determined by maximal inspiratory pressure (P<sub>imax</sub>) and sustained P<sub>imax</sub> (SP<sub>imax</sub>); pulmonary function, body composition, and physical activity status were also determined. In addition, diaphragm thickness was measured at functional residual capacity (FRC) and total lung capacity (TLC) [TDIcont], and the diaphragm thickening ratio (TR) was calculated (TR = thickness during P<sub>imax</sub> at FRC/mean thickness at FRC). Subjects also completed an incremental cycle ergometer test to exhaustion and two symptom-related questionnaires, prior to and following training.

**Results:** Following training, significant increases in P<sub>imax</sub> and SP<sub>imax</sub> ( $p < 0.05$ ), TDIcont ( $p < 0.05$ ), TR ( $p < 0.05$ ), vital capacity ( $p < 0.05$ ), TLC ( $p < 0.05$ ), and PWC ( $p < 0.05$ ) were identified, and decreases in anxiety scores ( $p < 0.05$ ) and depression scores ( $p < 0.01$ ) were noted in group 1 patients compared to group 3 patients. Group 2 patients significantly improved P<sub>imax</sub> and SP<sub>imax</sub> (both  $p < 0.05$ ) only with respect to group 3 patients. No significant differences were observed in group 3 patients.

**Conclusion:** An 8-week program of high-intensity IMT resulted in significant benefits for CF patients, which included increased IMF and thickness of the diaphragm (during contraction), improved lung volumes, increased PWC, and improved psychosocial status.

**Key Words:** diaphragm thickness • exercise tolerance • lung volumes • respiratory muscle training

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<http://www.chestjournal.org/cgi/content/abstract/126/2/405>

## Inter-Observer Reliability of Alveolar Dead Space Measurements in Suspected Pulmonary Embolism

Marc A. Rodger MD\*, Gwynne Jones MD\*, Helene Djunaedi RRT, Christopher N. Bredeson MD\* and Philip S. Wells MD\*. \*From the Department of Medicine, University of Ottawa, Ottawa, Ontario, Canada; From the Department of Respiratory Therapy, Ottawa Hospital — General Campus, Ottawa, Ontario, Canada; Study conducted at the Ottawa Hospital — General Campus

### Abstract

**Objective:** Less than 35% of patients suspected of having pulmonary embolism (PE) actually have PE. Safe bedside methods to exclude PE could save health care resources and improve access to diagnostic testing for suspected PE. Recently, interest has been generated in using alveolar dead space measurements to exclude PE at the bedside. Prior to widespread adoption of alveolar dead space measurement in patients with suspected PE the reproducibility of these measurements must be demonstrated. We sought to determine the inter-observer reliability of three previously published techniques of alveolar dead space fraction measurement.

**Design:** Prospective cohort study.

**Setting:** Tertiary care center in Ottawa, Ontario, Canada

**Patients:** Consecutive inpatients, outpatients or emergency room patients with suspected PE referred to Nuclear Medicine or Radiology for investigation of suspected PE.

**Interventions:** All study patients had alveolar dead space measurement performed by three techniques by two different respiratory therapists blinded to each other's results and outcome (PE or No PE).

### Main Results:

The steady state end tidal alveolar dead space fraction measurement had a Kappa of 1.00 indicating excellent inter-observer agreement. The alveolar plateau dead space fraction measurement and the end expired alveolar dead space fraction measurements had Kappa scores less than 0.5 indicating poor inter-observer agreement.

**Conclusions:** Alveolar plateau and end expired alveolar dead space fraction measurements have poor reproducibility. Steady state end tidal alveolar dead space fraction measurement is a simple reproducible bedside test.

**Keywords:** Pulmonary embolism, alveolar dead space, Kappa, diagnosis and reproducibility.

### Abbreviations:

PE – Pulmonary Embolism

V/Q scan – Ventilation Perfusion scan

RT – Respiratory Therapist

ADSF – Alveolar Dead Space Fraction

PaCO<sub>2</sub> – Concentration of carbon dioxide in arterial blood

PETCO<sub>2</sub> – End tidal carbon dioxide

PEPCO<sub>2</sub> – Plateau expired carbon dioxide

PEECO<sub>2</sub> – End expired carbon dioxide

### Introduction

Pulmonary Embolism (PE) is a common, lethal and treatable condition that is only present in a minority of those investigated with suspected PE.<sup>1-3</sup> PE is responsible for 5–10% of all in-hospital deaths.<sup>3,5</sup> However, less than 35% of patients suspected of having PE actually have PE.<sup>6-8</sup> Without a simple and reliable way of excluding PE at the bedside, many patients without PE must be hospitalised and anticoagulated while awaiting confirmatory testing with either ventilation-perfusion (V/Q) scans, pulmonary angiograms or non-invasive leg studies.

Physiologic dead space ventilation represents ventilation of those parts of the lung not involved in gas exchange. Physiologic dead space has two components: anatomical dead space and alveolar dead space. Anatomical dead space represents ventilation of the airways, which are minimally involved in gas exchange. Alveolar dead space represents ventilation of those alveoli that are not involved in gas exchange i.e. alveoli that are not or poorly perfused. Many authors have demonstrated that measures of physiologic and alveolar dead space increase in pulmonary embolism.<sup>9,10</sup>

Investigations to date have not, however, been able to demonstrate and validate a technique of

alveolar dead space measurement that is near 100% sensitive for pulmonary embolism.<sup>2,15</sup> This has limited the acceptance of this potential diagnostic tool in the management of patients with suspected PE. Recently, interest has been rekindled in using these measures in combination with other sensitive bedside tests (namely D-Dimer measurement) to exclude pulmonary embolism at the bedside. Kline used arterial to end-tidal CO<sub>2</sub> differences (PETCO<sub>2</sub>) to measure alveolar dead space fraction (AVDSF) in a study of 170 ambulatory patients suspected of PE. This method of measuring the alveolar dead space fraction was 88% sensitive (95% confidence interval of 70–98%) and had a negative predictive value over 97% (92–99%).<sup>15</sup> Kline further showed that the combination of a negative latex D-Dimer and an end-tidal alveolar dead space fraction of less than 0.2 had a negative predictive value of 100% (95% confidence interval of 96 to 100%).<sup>15</sup> We recently described a technique of steady state end-tidal alveolar dead space fraction measurement that, in combination with D-Dimer, appears useful in excluding pulmonary embolism at the bedside.<sup>16</sup> A steady state end-tidal alveolar dead space fraction less than 0.15 excluded PE with a sensitivity of 79.5% (95% confidence interval of 63.5–90.7%), a negative predictive value of 90.7% (95% confidence interval of 82.5–95.9%) and a specificity of 70.3%. The combination of a negative D-Dimer and a steady state end-tidal alveolar dead space fraction less than 0.15 excluded PE with a sensitivity of 97.8% (95% confidence interval of 88.5–99.9%), a negative predictive value of 98.0% (95% confidence interval of 89.4–99.9%) and a specificity of 38.0%.

However, prior to widespread adoption of this potentially useful diagnostic test the inter-observer reliability of alveolar dead space fraction measurements must be demonstrated and reported. Here we report on the reproducibility of the previously published methods of estimating alveolar dead space in patients with suspected PE namely, steady state end-tidal alveolar dead space fraction measurements, alveolar plateau dead space fraction measurements and end-expired alveolar dead space fraction measurements.

## Methods

### Inclusion Criteria

Consecutive patients referred for V/Q scanning at the Ottawa General Hospital who were suspected of having pulmonary embolism were approached for consent to participate in the study between April 1998 to August 1998.

### Exclusion Criteria

Patients were excluded from the study if they:

1. were less than 18 years of age,
2. were unable to give informed consent,
3. had a contraindication to pulmonary angiography,
4. were ventilated or
5. were in the final stages of terminal disease.

### Alveolar Dead Space Measurements

Consenting study participants, between April 1 1998 to August 15 1998, had two respiratory therapists independently and blindly perform alveolar dead space fraction measurement by three techniques: 1. steady state end-tidal alveolar dead space fraction measurement; 2. the alveolar plateau dead space fraction measurement; and 3. end-expired alveolar dead space fraction measurement. Each patient had two separate respiratory therapists perform alveolar dead space fraction measurements using the three techniques. The results of the alveolar dead space measurements obtained by one respiratory therapist were not provided to the second respiratory therapists. The respiratory therapists were also unaware of the outcome of investigations for suspected pulmonary embolism, physician assessments and the D-Dimer results.

These methods were taught in a two-hour training session to the approximately 40 respiratory therapists in our institution. The sitting patient breathed through an airway adapter attached to a mouthpiece. The airway adapter had a mainstream CO<sub>2</sub> and volume sensor (CapnoSTAT and COSMO+ by Novamatrix Medical Systems Inc. New Haven, Connecticut, USA). This device measures breath by breath volume with an accuracy of +/- 50ml and CO<sub>2</sub> with an accuracy of 2 mmHg. The calibration of the device was

confirmed prior to each use with a known gas (4% CO<sub>2</sub>). Once the patient had stabilised (respiratory rate +/- 2 breaths per minute over 2 minutes) the RT recorded this as the stable respiratory rate. With the patient breathing at the stable respiratory rate, the end tidal CO<sub>2</sub> was recorded if it was stable (+/- 1 mmHg over 2 minutes) (PETCO<sub>2</sub>). Arterial blood gas was then obtained by a single arterial blood gas puncture but only if the patient was breathing at the stable respiratory rate and the stable end tidal PCO<sub>2</sub> (PETCO<sub>2</sub>). The alveolar plateau pCO<sub>2</sub> (PEPCO<sub>2</sub>) was measured as follows: If a plateau was seen on Phase III of the expired breath capnogram during tidal breaths we recorded this as the plateau pCO<sub>2</sub> (PEPCO<sub>2</sub>). If a plateau was not seen during regular tidal breaths we asked patients to deeply expire. Patients were coached to expire as deep as possible at the end of a normal tidal inspiration. We recorded the plateau CO<sub>2</sub> value during the deep expired breath as the plateau pCO<sub>2</sub> (PEPCO<sub>2</sub>). Finally, we recorded the end expired pCO<sub>2</sub> on the deep expired breath as the end expired pCO<sub>2</sub> (PEECO<sub>2</sub>).

The respiratory therapist calculated the steady state end tidal alveolar dead space fraction as follows:

$$\text{Steady State End tidal AVDS Fraction} = \frac{\text{PaCO}_2 - \text{PETCO}_2}{\text{PaCO}_2}$$

PaCO<sub>2</sub> = Concentration of arterial carbon dioxide in arterial blood with the patient breathing at the stable respiratory rate and stable end-tidal CO<sub>2</sub>.  
PETCO<sub>2</sub> = Stable end tidal PCO<sub>2</sub>

The respiratory therapist calculated the alveolar plateau dead space fraction as follows:

$$\text{Steady State End tidal AVDS Fraction} = \frac{\text{PaCO}_2 - \text{PEPCO}_2}{\text{PaCO}_2}$$

PaCO<sub>2</sub> = Concentration of arterial carbon dioxide in arterial blood with the patient breathing at the stable respiratory rate and stable end-tidal CO<sub>2</sub>.

PEPCO<sub>2</sub> = Alveolar plateau PCO<sub>2</sub>

The respiratory therapist calculated the end expired alveolar dead space fraction as follows:  
End Expired AVDS Fraction =

$$\frac{\text{PaCO}_2 - \text{PEECO}_2}{\text{PaCO}_2}$$

PaCO<sub>2</sub> = Concentration of arterial carbon dioxide in arterial blood with the patient breathing at the stable respiratory rate and stable end-tidal CO<sub>2</sub>

PEECO<sub>2</sub> = End expired PCO<sub>2</sub>

### Data Analysis

The inter-observer reliability of each method of alveolar dead space measurement was determined by calculating a two rater unweighted Kappa statistic. Kappa (K) is defined as:

$$K = \frac{Po - Pe}{1 - Pe}$$

where Po is the actual probability of agreement and Pe is the expected agreement by chance.<sup>17</sup>

A kappa score above 0.8 is considered excellent reliability, a kappa score above 0.6 is considered good reliability and a kappa score below 0.4 is considered poor reliability.<sup>17</sup> Exact binomial ninety-five percent confidence intervals were calculated for each kappa.

Pearson correlation coefficients were also calculated to compare the correlation of the PETCO<sub>2</sub>, PEPCO<sub>2</sub>, PEECO<sub>2</sub> and the volume of expired breaths measured by the two different respiratory therapists.

### Results

Fifty-eight patients were approached to participate. Forty-eight completed a single RT assessment and 33 completed two RT assessments. All of these 33 patients were able to undergo two steady state end tidal alveolar dead space measurements however three of these patients did not complete a deep expired breath. Twenty-three respiratory therapists performed the 129 assessments that are the subject of this analysis.

Steady state end tidal alveolar dead space measurements had excellent reproducibility

(see Tables I and IV). The two components of this measurement individually also had excellent reproducibility: 1) PETCO<sub>2</sub> measurements had a Pearson correlation coefficient of 0.839; and PaCO<sub>2</sub> measurements had a Pearson correlation coefficient of 0.919.

Alveolar plateau dead space measurements had poor reproducibility (see Tables II and IV.) PEECO<sub>2</sub> measurements by the independent observers were moderately correlated with a Pearson correlation coefficient of 0.668.

End expired alveolar dead space measurements had poor reproducibility (see Tables III and IV). PEECO<sub>2</sub> measurements by the independent observers were poorly correlated with a Pearson correlation coefficient of 0.136. The volumes of the deep expired breaths upon which the PEECO<sub>2</sub> measurements were based were also poorly correlated with a Pearson correlation coefficient of 0.136.

**Discussion**

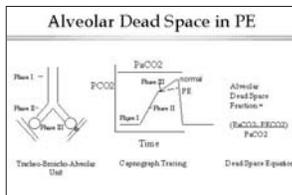
Pulmonary embolism is a common, lethal yet treatable disease. The diagnostic management of suspected pulmonary embolism is limited by the lack of specificity of ventilation perfusion scanning.<sup>6</sup> Safe and reliable bedside methods to exclude PE are desirable. We and others have demonstrated that alveolar dead space measurements in combination with D-Dimer are potentially safe bedside tests to exclude PE.<sup>15,16</sup> However, prior to widespread adoption of these techniques the inter-observer reliability of these techniques of alveolar dead space measurement must be demonstrated. In this paper we have shown that steady-state end-tidal alveolar dead space measurement is reproducible but alveolar plateau and end expired techniques of alveolar dead space measurement are not reproducible.

Dead space ventilation represents ventilation of those parts of the lung not involved in gas exchange. Gas is exchanged in the alveoli (Alveoli are represented in Figure 1 as the circles in the Tracheo-Broncho-Alveolar unit).

from the blood vessels to the alveoli (blood vessels represented in Figure 1 as double lines interfacing with the alveoli). Physiologic dead space has two components: anatomical dead space and alveolar dead space. Anatomical dead space is ventilation of the airways. The airways conduct air to the alveoli and are minimally involved in gas exchange. Alveolar dead space represents ventilation of those alveoli that are not involved in gas exchange i.e. alveoli that are not perfused.

Robin first published the concept of using the end tidal CO<sub>2</sub> to arterial CO<sub>2</sub> difference in the diagnosis of pulmonary embolism in the *New England Journal of Medicine* in 1959.<sup>9</sup> He suggested that an estimate of alveolar dead space could be derived from an expired breath capnogram. An expired breath capnogram tracing is shown in Figure 1. This tracing demonstrates a carbon dioxide concentration versus time curve for an expired breath. Phase I of the curve is thought to represent the emptying of large airways. These large airways aren't involved in gas exchange and hence have the same carbon dioxide concentration as inspired air (i.e. negligible). Phase II represents emptying of a mixture of airways and alveoli and hence has an increasing amount of carbon dioxide. Phase III represents emptying of alveoli (shown as a solid line in

**Figure 1 — Dead Space**



Schematic of Tracheo-Broncho-Alveolar lung unit, a capnograph (CO<sub>2</sub> vs Time) tracing of a normal tidal breath and the Alveolar Dead Space Fraction equation.

normal patients on the capnograph tracing in Figure 1). Alveoli that are involved in gas exchange have high carbon dioxide concentrations. The increased contribution of dead space alveoli to expired alveolar gas in pulmonary embolism patients results in a diminished slope of Phase III (phase III in pulmonary embolism patients is marked with dashed line in Figure 1). An estimate of alveolar dead space can be expressed in the form of an equation, the alveolar dead space fraction, as shown in Figure 1.  $PaCO_2$  represents the arterial blood  $CO_2$  concentration that is obtained routinely at the bedside by arterial blood gas sampling.  $PECO_2$  is the expired breath  $CO_2$  concentration obtained from a capnograph tracing.  $PECO_2$  can be obtained from one of many points in Phase III. These points include: 1) the end of Phase III of normal tidal breaths i.e. the end tidal  $CO_2$  concentration ( $PEtCO_2$ ),<sup>9,10,18</sup> the alveolar plateau  $CO_2$  concentration ( $PEPCO_2$ )<sup>15,19</sup> or at the end of a deep expired breath ( $PEECO_2$ ).<sup>10,20</sup>

Alveolar dead space fraction may increase in disease states other than pulmonary embolism including obstructive lung disease and other pulmonary vascular conditions.<sup>11,12</sup> Physiologic factors may influence alveolar dead space including posture, lung volume and ventilatory pattern.<sup>11,13</sup> Previous authors have suggested that alveolar dead space fraction should only be measured under steady state conditions (i.e. in a patient with a stable respiratory rate and end tidal carbon dioxide).<sup>11</sup> The data presented here support these assertions.

The plateau and end expired method of alveolar dead space fraction measurement had poor reproducibility. This seems to result from the need for at least some patients to deeply expire for both techniques. Deep expiration is both patient effort dependent and patient comprehension dependent and as we demonstrated the volumes of deep expired breaths are poorly reproducible between measurements. Inconsistent deep expired breaths resulted in variable  $PEPCO_2$  measurements and  $PEECO_2$  measurements which in turn contributed to poorly reproducible alveolar dead space measurements. In addition, the

**Table I — Inter-observer reliability of steady state end tidal alveolar dead space fraction measurements**

Observer #2	Observer # 1	
	Steady state end tidal AVDS fraction* <0.2	Steady state end tidal AVDS fraction* >0.2
Steady state end tidal AVDS fraction* <0.2	29	0
Steady state end tidal AVDS fraction* >0.2	0	4

**Table II — Inter-observer reliability of alveolar plateau dead space fraction measurement**

Observer #2	Observer # 1	
	Plateau AVDS fraction* <0.1	Plateau AVDS fraction* >0.1
Plateau AVDS fraction* <0.1	21	7
Plateau AVDS fraction* >0.1	1	1

plateau method requires a respiratory therapists' interpretation of a plateau on a capnograph tracing further introducing inter-observer variation in this method of alveolar dead space fraction measurement. These factors likely contribute to the poor reproducibility we observed with the plateau and end expired methods. This study calls into question the generalisability of methods of alveolar dead space measurement that rely on plateau or end expired  $PCO_2$  measurement.

The steady state end tidal alveolar dead space measurement does not require any alteration in a

**Table III — Inter-observer reliability of end expired alveolar dead space fraction measurement**

Observer #2	Observer # 1	
	End expired AVDS fraction* <0.1	End expired AVDS fraction* >0.1
End expired AVDS fraction* <0.1	24	3
End expired AVDS fraction* >0.1	3	0

**Table IV — Inter-observer reliability of alveolar dead space measurements**

Predictor	Kappa	Lower 95% CI	Upper 95% CI
AVDSf <0.2 – Steady state end tidal AVDS fraction measurement method	1.000	1.000	1.000
AVDSf <0.1 – Plateau AVDS fraction measurement method	0.104	-0.238	0.421
AVDSf <0.1 – End Expired AVDS fraction measurement method	-0.111	-0.199	-0.023

patient's breathing pattern or a respiratory therapist's interpretation of what constitutes a plateau. As shown in this study, steady state end tidal alveolar dead space measurement had excellent reproducibility (see Table I and IV). If care is taken to ensure that alveolar dead space measurements are conducted on a sitting patient with stable respiratory rate and stable end tidal carbon dioxide, good inter-observer reliability and reproducibility is achievable. However, further validation of the reproducibility of steady state end

tidal alveolar dead space measurement in other clinical settings (e.g. primary or secondary care settings) and other centers will be required.

In conclusion, plateau and end expired alveolar dead space fraction measurements appears to have poor inter-observer reliability. Steady state end tidal alveolar dead space measurements appear to have excellent inter-observer reliability in patients with suspected pulmonary embolism. Further development of alveolar dead space measurements as a diagnostic tool for suspected PE should focus on steady state end tidal alveolar dead space measurements.

**Acknowledgements**

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Running title: *Inter-observer reliability of alveolar space measurements*

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**A Student's Journey;** *continued from page 19*

I have heard the saying, "Students must string their own pearls," by taking from each preceptor a gem or two. I would like to thank my many preceptors from both east and west for the wonderful pearls of wisdom they have given me. I know that I will continue to add to my string from co-workers and hope that I will bestow some gems to others.

It is because we work in a field of innovation that a practical education is required to prepare future RTs for situations that do yet exist. As each situation will continue to be different, we will draw on our experience to make decisions, and although our experience will grow, there will always be new challenges.

Which is why we are never really done.

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The "Glossaire canadien sur la prestation sécuritaire des soins et services au patient" is now available on-line. This Glossary was an initiative of Le Centre hospitalier de l'Université de Montréal (CHUM), in partnership with the Royal College of Physicians and Surgeons of Canada and is sponsored by Health Canada. It was created to meet the needs of Francophone managers, clinicians, researchers and patients.

Since 2000, Canadian national and provincial health organizations have consulted each other on issues related to patient safety within health and social services. They identified a need for a glossary on patient safety terms. Terms in the Glossary were identified from recognized resources and research in patient safety. Dictionaries, glossaries and a wide range of other health care reference resources from Australia, Canada, the United Kingdom and the U.S. formed the core resource of the development process.

With at least 372 terms, the Glossary was developed in accordance with the values and objectives shared by the authors of the English edition and by the Canadian Patient Safety Institute (CPSI). The 223-page pdf glossary can be downloaded from the Le Centre hospitalier de l'Université de Montréal website at: <http://www.chumontreal.qc.ca/pages/publications.htm>

**Message du président — suite de la page 10**

coûte ou apporte à la SCTR, il s'agit d'un outil primordial pour apprendre la façon d'améliorer notre organisation. D'ici quelques mois, la SCTR investira dans un nouveau système de base de données afin d'offrir des services comme l'adhésion en ligne, de mieux repérer les mouvements de notre effectif et de nous fournir d'importantes données démographiques qui nous aideront à mieux servir nos membres.

Avez-vous vu le nouveau site Web de la SCTR ([www.csr.com](http://www.csr.com)), inauguré le mois dernier? Avez-vous remarqué, toujours sur notre site, le fantastique répertoire des spécialistes qui prendront la parole au Forum sur l'éducation 2005 de la SCTR, à Edmonton? Surveillez nos nouvelles listes de discussion et nos nouvelles Normes de pratique de la SCTR. Notre C.A. se penche également sur des propositions visant à améliorer la façon dont nous faisons valoir notre profession, dans le cadre d'un programme général de meilleure sensibilisation. Ces changements ont lieu parce que nous sommes maintenant mieux organisés pour servir nos membres et mieux informés de leurs souhaits

Dependant, la mise en œuvre de ces avancées requiert votre soutien. Plus nous disposerons de bénévoles et de ressources (c.-à-d. de membres), plus nous atteindrons rapidement les objectifs des TR au pays : plus de respect, plus d'autonomie, une meilleure sensibilisation du public, une voix plus forte pour la profession à l'échelon national, des mécanismes de réproché tant au pays qu'au-delà de ses frontières et une capacité accrue de servir notre clientèle grâce à l'éducation et à la sensibilisation. Pas le temps de vous porter volontaire? Consacrez une journée par an à votre profession. Pour la plupart d'entre nous, une journée de travail suffit à payer votre cotisation annuelle de la SCTR, c'est bien le moins que vous pouvez faire pour votre métier. Notre conscience professionnelle doit également s'appliquer à notre profession. La SCTR travaille fort pour vous servir et pour parler en votre nom partout où la voix des TR doit être entendue. Mais même avec sa nouvelle orientation, une restructuration, des plans de travail détaillés et de nouveaux instruments, la SCTR ne saurait atteindre ses objectifs sans votre appui.

Brent Kitchen, TRA  
Président de la SCTR

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