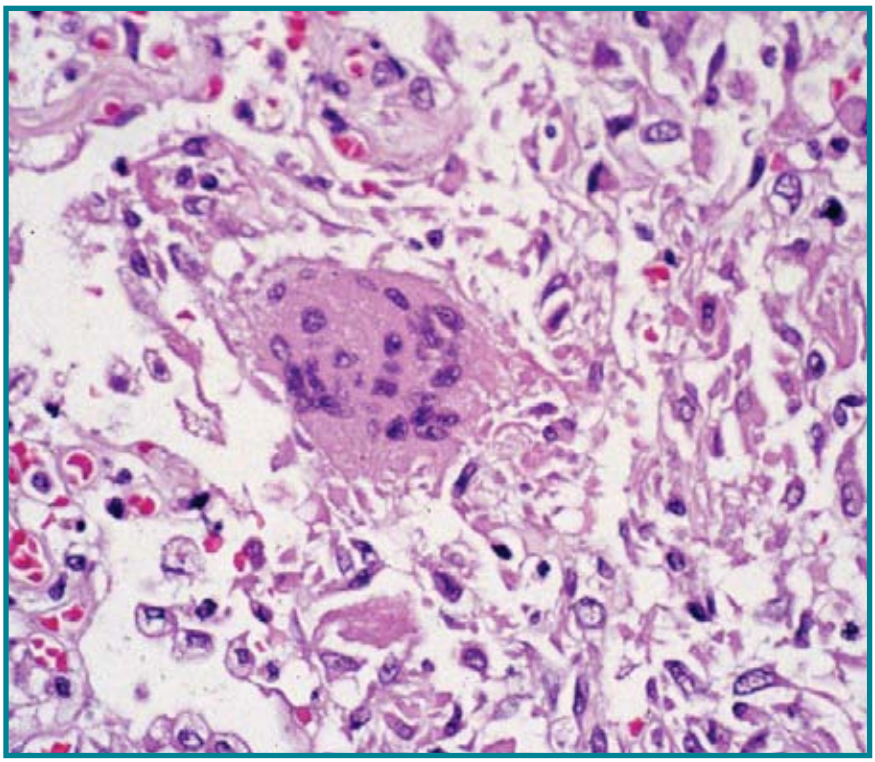
Canadian Journal of Respiratory Therapy *Revue canadienne de la thérapie respiratoire*

CJRT·RCTR

Spring 2004, Volume 40 (1)



SARS

Features

On Air

Forum 2004 Preliminary Program

Celebrating 40 Years of Inspiration

The journal for respiratory health professionals in Canada

La revue des professionnels de la santé respiratoire au Canada

Canadian Journal of Respiratory Therapy

Revue canadienne de la thérapie respiratoire

Official Journal of the CSRT
Revue officielle de la SCTR

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CSRT membership inquiries /
Questions concernant l'adhésion à la SCTR :
102 – 1785 Alta Vista Dr.,
Ottawa, Ontario, K1G 3Y6
1-800-267-3422
csrt@csrt.com
www.csrt.com

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The *CJRT* acknowledges the financial support of the Government of Canada, through the Publications Assistance Program (PAP), toward our mailing costs.

Cover Photo
Photo Credit
Dr. Sherif Zaki/CDC
This photomicrograph reveals lung tissue pathology due to SARS.

This image shows pathologic cytoarchitectural changes indicative of diffuse alveolar damage, as well as a multinucleated giant cell with no conspicuous viral inclusions.

Advertiser's Index

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Annual subscriptions are included in annual membership to the CSRT. Subscription rate for 2004 for other individuals and institutions within Canada is $44 and $44(US) for others outside Canada. All Canadian orders are subject to 7% GST / 15% HST as applicable. Requests for subscriptions and changes of address: Member Service Centre, CSRT, 102 - 1785 Alta Vista Dr., Ottawa ON K1G 3Y6.

L'abonnement annuel est compris dans la cotisation des membres de la SCTR. Le tarif annuel d'abonnement pour les non-membres et les établissements au Canada est de 44$ et de 44$ US à l'étranger. La TPS de 7% ou la TVH de 15% est ajoutée aux commandes canadiennes. Veuillez faire parvenir les demandes d'abonnement et les changements d'adresse à l'adresse suivante: Centre des services aux membres, SCTR, 102 - 1785 prom. Alta Vista, Ottawa ON K1G 3Y6.

About This Issue


Allan Shemanko

Welcome to our Spring issue of the *Canadian Journal of Respiratory Therapy!* Spring is right around the corner — finally! The days are getting longer and warmer which I really appreciate. This also means that we should be thinking about the next CSRT Annual Educational Forum in Toronto — you'll find the Preliminary Program for Forum 2004 along with the Forum Registration form inside. This promises to be a fantastic Forum!

In this issue, in the On Air section, we announce the Gerald Ashford Award winner and bid farewell to CoARTE Co-ordinator Patrica Haaland. You'll find information on our nominees for various positions on the CSRT Board of Directors. As well, an update from our new Executive Director and of course Industry and Scientific news of interest to all members.

Last, but certainly not least, it is also membership renewal time. There are great benefits to CSRT membership — many of them listed in this issue. Watch for your renewal package in the mail or check "Membership" on our website. Remember, the CSRT has a monthly debit plan! The CSRT also accepts VISA and Mastercard for those who prefer this form of payment.

Allan Shemanko, RRT
President, *CJRT*

On Air

In Memoriam

Tracy Davis (nee Cracknell), RRT, RRCP, RDCS, CAE
1959–2003
Oakville, ON

It is with deep sadness that we announce the passing of Tracy Davis, a dedicated respiratory therapist, following a brave and hopeful fight against the sudden onset of cancer.

Tracy graduated from the Respiratory Program at Algonquin College in Ottawa before moving to Toronto and working at both St. Joseph's Health Centre and Women's College Hospital. She moved back to Ottawa with her husband Eric Davis a former CRTO member and worked at Queensway Carlton and then more recently returned to the Toronto area and worked at Joseph Brant Hospital in Burlington and Halton Healthcare in Oakville and Milton.

Tracy always strived to reinvent herself in her career; in addition to being an RRT she later qualified as a Registered Diagnostic Cardiac Sonographer and a Certified Asthma Educator. Whether Tracy was working with neonates or with adult patients she demonstrated the utmost respect and compassion with her patients. As the charge therapist in the NICU at Women's College she mentored many of us "green" RTs and showed us how to handle those delicate neonates, perform radial stabs on the tiny wrists and at the same time be a good friend. Not only has the profession lost a wonderful therapist but patients have also lost a caring and dedicated health care professional.

Tracy will be sadly missed by all of her colleagues who had the good fortune and privilege to work with her over the years. She is survived by her husband Eric and their 2 daughters Daly, 15 years, Molly, 13 years and son Nick, 19 years. We offer our sincere condolences and sympathy to Tracy's extended family and all of her friends on their loss.

Mary Bayliss RRT, RRCP, CAE
Professional Practice Advisor
College of Respiratory Therapists of Ontario

I Can…

I can sit in the silence and listen carefully.

I can be in the dark and see everything.

I can run in the dirt and be clean.

I can whisper in a noisy room and be heard.

I can lay in my bed and be standing.

I can cry and be happy.

I can lay in my casket and be living.

I can sing and live with all my heart and be dead.

I can yell at you with anger and still love you.

I can say it's not okay and forgive you.

I can play in flowers and be sad.

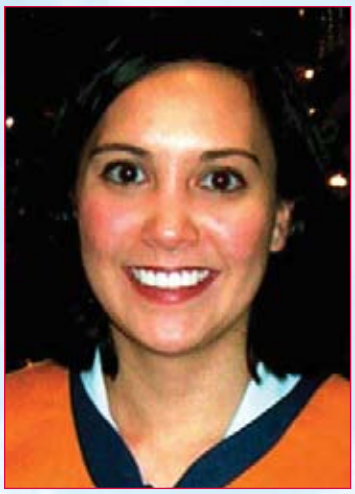
I can watch my end come and be hopeful.

I can watch you leave forever and know

I'll see you again.

Molly Davis
December 18, 2003

Congratulations to Jessica Belanger the 2003 Winner of The Gerald Ashford Memorial Award



Jessica Belanger of Campbellton, New Brunswick is the 2003 winner of The Gerald Ashford Memorial Scholarship Award.

Jessica was also co-valedictorian for the New Brunswick Community College in Saint John. In addition to winning the Gerald Ashford Memorial Award, Jessica also won an award for the Best Performance in Pulmonary Function Testing from Saint Joseph's Hospital Foundation.

The Gerald Ashford Scholarship is awarded annually, through the Canadian Respiratory Therapy Foundation, to the graduating student at New Brunswick Community College, Saint John who has written the best research paper. Jessica's paper, entitled "Preventing the Colonization of Pathogens: Reducing the Spread of Nosocomial Infections", will be featured in a future Journal.

The faculty of NBCCSJ and the CSRT commend Jessica on her outstanding efforts. She is now working as staff Respiratory Therapist at Saint John Regional Hospital, New Brunswick while she completes her Bachelor of Health Sciences Degree at the University of New Brunswick.

The Gerald Ashford Memorial Scholarship was established by the RT Department of South East Health Care Corporation, in New Brunswick. The award was established to honour the memory of Gerald Ashford who passed away in 1991

Donations to the fund may be forwarded to the Canadian Respiratory Therapy Foundation (CRTF), which manages the scholarship — 102-1785 Alta Vista Drive, Ottawa, ON, K1G 3Y6.

July Sitting of the CSRT National Exam

The deadline for registration of applications for the July 5, 2004 CSRT National Certification Exam is April 30, 2004.
Please check Certification on our website for details.

ON AIR NUGGETS

On Air

CSRT Membership Renewal Time

Check your mail for Membership renewal information. For your convenience, you have the option of using the CSRT Debit Plan to pay CSRT fees, as well as professional association membership and related fees. You can arrange to have monthly installments for your membership deducted directly from you bank account.

For CRTO and CARTA members who wish to take advantage of CSRT Membership, renewals must be received no later than February 15, 2004.

For more information please contact the CSRT office (1-800- 267-3422) or visit the Membership page on our website to download the Membership Renewal Form.

Membership renewals are due March 31, 2004

Patricia Haaland Retires

Patricia, who retires in March as Accreditation Consultant for CoARTE, has been instrumental in the development of our accreditation process, necessitated when the CMA terminated their relationship with the CSRT. She guided us from the drawing board to implementation and operationalizing what has become an accepted and respected accreditation process utilized by schools across Canada. It was only through Patricia's expertise, integrity and work ethic that CoARTE has gone from a concept on paper to the completion of five school visits.

On behalf of the CSRT, we thank Patricia for her invaluable contribution to our profession and to wish her a healthy and happy retirement.

Tracy Davis

The CSRT is saddened to hear of the untimely passing of Tracy Davis. Tracy was a member of the respiratory therapy community in Ontario and was well known and respected as a colleague and friend to many. Our condolences go out to her husband Eric Davis and their children. The CSRT would like to thank the RTSO for making a donation to the Canadian Respiratory Therapy Foundation in memory of Tracy.

Sputum Cup Competition

This year our Forum Social Committee is going to up the ante! The Sputum competition will be based on that home-grown Canadian board game — Trivial Pursuit. The categories will include:

History	Entertainment
Geography	Leisure
Science	People and Places

Have you got a question you would like to submit — however vaguely related to the respiratory therapy profession? Send it to us at CSRT@CSRT.com. Please supply the answer too! Help make Cup Competitors put on their thinking caps!

Survey Winner

Thank you to all our members who took the time to fill our the CSRT Membership Services Survey. We received concrete, positive feedback and will now will take some time to review the responses and comments. We expect the end result will be a more effective Head Office that offers the services and information that our membership is looking for. The winner of a free CSRT membership for one year is Kathy Walker of Ottawa.

The Canadian Society of Respiratory Therapists

CSRT Annual Educational Forum 2004

Photo: Tourism Toronto

Celebrating 40 Years of Inspiration!

Sheraton Centre
Toronto, Ontario
May 28–30, 2004

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Annual Educational Forum — Preliminary Program 2004

Friday May 28

Morning

7:30 – 9:30
Exhibitors Breakfast

9:30 – 10:00
Opening Remarks
The Past, The Present and
The Future of the CSRT

10:00 – 10:45
Professional Practice Issues

To Practice Professionally: What does it Mean?
Dr. David L. Streiner, Ph.D., C.Psych.
Professor, Department of Psychiatry,
University of Toronto

10:45 – 11:30
Clinical Practice Guidelines

More than the Individual Parts
Adèle Miles, Pastoral Care Consultant
St. Thomas Elgin General Hospital,
St. Thomas, ON

Mary van Soeren, PhD, Assistant Professor, Director of Nurse Practitioner Program
University of Toronto

Mike Keim, RRT/RRCP, Profession Practice Leader/Clinical Educator
St Joseph's Health Care,
London Ontario

11:30 – 13:00
Lunch Break and Exhibit s
Sheraton Hall

Afternoon — Concurrent Sessions

MODULE 1
COMMUNITY

13:00 – 14:30

Defining PAP Therapy Compliance: Research and Reality
Nicholas J. Macmillan, AS, RRT, FAARC

MODULE 2
DIAGNOSTICS/ SLEEP

13:00 – 14:30

MODULE 3
HOSPITAL / NUTRITION

13:00 – 14:30

13:00 – 13:30
Nutrition in the Septic Patient
Heidi Nixdorf, RD, CNSD
Clinical Dietician, Credit Valley Hospital,
Mississauga, Ontario

13:30 – 14:00
Challenges in Meeting the Nutritional Needs of Preterm Infant
Andrea Nash, RD
Perinatal Dietician, Sunnybrook and Women's College Health Science Centre, Toronto, Ontario

14:00 – 14:30
Respiratory Therapist as the Cardiac Arrest Team Leader
Myron Steinmann RRT/RRCP, Bed
Clinical Resource Therapist, London Health Science Centre, Victoria Campus, London, Ontario

14:30 – 15:00
BREAK

15:00 – 15:30
Non-invasive Ventilation Total Asthma Control

15:30 – 16:00
APRV Ventilation
Richard Kauc, RRT/RRCP
Staff Respiratory Therapist,
Credit Valley Hospital, Mississauga, Ontario

16:00 – 16:30
TBA

17:00 – 18:30
PRESIDENT'S RECEPTION AND AWARDS CEREMONY

Saturday May 29

MORNING

7:30 – 8:30
Exhibits
Sheraton Hall

8:00 – 9:00
Poster and Paper Presentations

9:00 – 9:30
Coffee Break

Please visit our website for updates to the Forum Program at www.csrt.com

Annual Educational Forum — Preliminary Program 2004

Saturday May 29

Morning — Concurrent Sessions

MODULE 1
EDUCATION: PATIENTS

9:30 – 11:30
Counselling for Behavioural Change
Andrea White-Markham, RRT/RRCP, CAE

Education at the Bedside
Paula Burns, RRT

RT To Go
Monique Ouellette, RRT
Anson General Hospital,
Iroquois Falls, Ontario

MODULE 2
MANAGEMENT/ LEADERSHIP
Gil Vergilio, RRT(A), MEd, Chair

09:30 – 09:35
Opening Comments

9:35 – 10:15
The Road to Evidence Based Practice: Research Opportunities for Respiratory Therapists

10:15 – 10:55
How to Construct a Business Case
John Andruschak, RRT, MHA

10:55 – 11:30
Winnipeg Regional Health Authority ABC Project
Neil Johnston, RRT
Profession Leader of Respiratory Therapy and Manager of Cardiology Technology Services at the Salvation Army Grace General Hospital, Winnipeg.

MODULE 3
ANAESTHESIA

9:30 – 11:30
The Role of Conscious Sedation
Dr. David Bevan and Dr. Rosa Braga-Mele

Advances in Malignant Hyperthermia
Dr. Julian Loke

New Scavenging Device Reduces Hospital Anaesthetic Emissions From Anaesthetic Gas Machines
Dushanka Filipovic

11:30 – 13:00
Lunch Break and Exhibits
Sheraton Hall

Afternoon — Concurrent Sessions

MODULE 1
EDUCATION: STUDENTS

13:30 – 15:30
Introduction and Overview
Paula Burns, RRT/RRCP, CAE, MAEd, , PhD (c)

13:45
Panel presentation What is Good clinical Teaching? The Student Perspective.
Participants will be clinical students from The Michener Institute's program

14:15
Innovations in Clinical Teaching
Robin Klages, RRT/RRCP
William Osler
Health Centre
Faculty, QEII Dalhousie School of Health Sciences

MODULE 2
MANAGEMENT/ LEADERSHIP

13:30 – 14:10
An Accreditation Program for Professional Practice
TBA — Representative of the Canadian Physiotherapy Association

14:10 – 1530
Forming a National "Special Interest Group" for Respiratory Therapy Leaders
Gilbert Vergilio, RRT(A), MEd

MODULE 3
ANAESTHESIA

13:30 – 15:30
Debate about Pros and Cons of the two top selling gas machines in Canada
Datex Ohmeda & Brathwaites Olivier

Celular Technology and the Dangers in the Health Care Environment
Dr. George Djiaini

15:30 – 17:30
Annual General Meeting

18:30
Fun Night

Sunday May 30

09:00 — 12:00
Infectious Disease: Changes to Practice

09:00 – 09:30
SARS introduction

09:30 – 10:00
SARS Guidelines

10:00 – 11:00
SARS Panel — Experiences in the Hospital
Respiratory Therapists will describe their department's experiences during the SARS outbreak.

Paula Cripps-McMartin, RRCP/RRT, CAE, CHT
Site Leader,
Respiratory Therapy
Toronto Western Hospital

Elizabeth Lalingo, RRT/RRCP
Co-ordinator,
Respiratory Therapy Services
Markham Stouffville Hospital

Bill Boyle, BSc, RRT/RRCP, CHT, MPa
Manager, Cardio Respiratory Neurology Services
North York General Hospital

11:00 – 11:45
Filter Panel
John Traill, RRT/RRCP
Clinical Instructor,
Respiratory Therapy
Mount Sinai Hospital,
Toronto, Ontario

Fundamentals of Filtration
Ron Thiessen, RRT
Research and Staff Development Coordinator
Respiratory Services Department,
Vancouver Hospital

CSRT Annual Educational Forum

Sheraton Centre, Toronto, Ontario
May 28–30, 2004

Highlights — Forum 2004

EXHIBITORS BREAKFAST
Join us for an Exhibitor Breakfast on Friday morning 7:30 to 9:30 am in the Sheraton Hall. Mingle with exhibitors over a morning coffee and continental breakfast. Have a look at some of the great exhibitor booths — you will find a full spectrum of suppliers, educators and manufacturers on hand, ready to discuss the most current information and technology on the market.

PRESIDENT'S RECEPTION
This reception gives RTs the opportunity to recognize award winners and network with others in the profession. It will be held May 28 from 17:30 to 19:30.

PATIENT EDUCATOR DINNER
This annual event, hosted by GlaxoSmithKline, has been standing-room only in the past. This year will be no different. RT Patient Educators are invited to attend this dinner meeting on May 27. While there is no charge for this dinner, space is limited. Seating is on a first-come basis. Please contact the CSRT National Office to reserve your place — csrt@csrt.com or 1-800-267-3422.

SPUTUM CUP
Gather up a team and test your knowledge! This year the competition will be based on the popular board game — Trivial Pursuit! Not only will teams of players from across the country will be vying for bragging rights over the ownership of the Sputum Cup, but also over who is most trivial!

FUN NIGHT
Always a popular event for RTs to get out and let their hair down. Reserve Saturday night, May 29, for an evening of fun and entertainment with fellow delegates.

ACCOMMODATIONS
The Sheraton Centre Toronto is the site for CSRT Forum 2004. Located in the heart of Toronto, at 123 Queen Street West, the Sheraton will host the Forum as well as provide accommodation at a preferred rate for Forum attendees.
1-800-325-3535
Or check the CSRT website for on-line reservations.

ANNIVERSARY GIFT
Registered delegates for Forum 2004 will receive a 40th Anniversary gift from the CSRT — a laser engraved pen in metallic blue with gold accents! A great, functional keepsake that serves as a thank you to our supporters and a reminder of 40 eventful years of CSRT service.

***Pre-registration deadline April 16, 2004**

■ **Full Registration — Members**	
*Pre-registration	290.00 ❒
After April 16, 2004	355.00 ❒
■ **Full Registration — Non-members**	
*Pre-registration	440.00 ❒
After April 16, 2004	500.00 ❒
■ **Full Registration — Student Members**	
*Pre-registration	155.00 ❒
After April 16, 2004	185.00 ❒
■ **Daily Registration** ❒ Fri. ❒ Sat. ❒ Sun.	
*Pre-registration-Members	150.00 ❒
*Pre-registration-Non-members	185.00 ❒
*Pre-registration-Student Members	70.00 ❒
After April 16, 2004 — Members	180.00 ❒
After April 16, 2004 — Non-members	215.00 ❒
After April 16, 2004 — Student Members	95.00 ❒
Social	50.00 ❒
Additional Exhibitor Representative	150.00 ❒

Full registration includes a Exhibitors Breakfast, all lectures and workshops, poster displays, exhibits, lunches, nutrition breaks, and the President's Reception and Awards Presentations. Tickets for Fun Night are not included.

GST is included in the total #119220010 RT

Refunds: Refunds are subject to a $50.00 administration fee.

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For more information please contact the CSRT at 1-800-267-3422 or (613) 731-3164 Fax: (613) 521-4314 E-mail: csrt@csrt.com

Message from the President

Jim Winnick

Well, it is that time of year again when our thoughts turn to warmer weather, more sunlight, what to plant in the garden and, of course, renewing our CSRT membership. Okay, maybe CSRT membership is not the first thing to come to mind as a sign of spring but it is extremely important to the profession that committed Respiratory Therapists, such as yourselves, continue to support the CSRT in the work that is done on your behalf.

At the risk of repeating what you have already seen in your membership renewal package — we have been through a turbulent year in the health sector in Canada from SARS, forest fires and the ever evolving new strains of influenza. RT's are continually on the front lines in these situations and continue to rise to the occasion with a high degree of expertise and ingenuity. This consistency of excellent service, over many years has earned the CSRT credential respect and recognition throughout Canada and internationally. The CRTO's recent decisions to endorse CoARTE as the accreditation tool of choice for the Ontario RT programs and to accept the CSRT exam, as produced by the CBRC, for CRTO registration are two significant examples of that recognition.

Unfortunately excellent work and commitment to quality patient care are not always enough to maintain the profile and presence of our profession in the many and varied arenas where decisions that can impact on our future are made. One of the main purposes of the CSRT is to advocate for Respiratory Therapy with federal and provincial bodies and to continually present ourselves as a dynamic and evolving profession committed to the highest quality standards. For example, our seat at the National Alliance table has ensured that the CSRT has had full representation on the development of the National Competency Profile and the Mutual Recognition Agreement. As another example, discussion with officials from the NBRC at the recent AARC Congress resulted in a mutual extension of our current reciprocity agreement for one year and set the groundwork for future discussions regarding reinstatement of full reciprocity.

In addition to these efforts the CSRT continues to provide financial support to CoARTE, our excellent and much envied accreditation process, and to the provision, in partnership with the CBRC, of our credentialing exam. The CSRT is also committed to providing as much in the way of value added benefits to our members as possible. This journal, the website, CSRT listserves, access to liability insurance, and the debit plan are some examples of those benefits. The recent survey on membership services is further evidence of our desire to listen to the membership and provide what you find important. The membership services focus group will be reviewing the results of that survey and formulating recommendations to the Board of Directors. Many thanks to the over 300 members who sent in their surveys.

Your CSRT Executive, Board of Directors, Head Office staff and a host of volunteers continue to put forward concerted efforts in providing the above and many other services to you, our members. It is, however, only through your continued membership that we will have the resources to continue this work and only through increased membership that we can implement new and improved services. I would like to offer my thanks to all of you who so faithfully support the CSRT with your membership renewals and to put forward a personal challenge for each of you to be an ambassador for the CSRT to your colleagues who are not members. Please share with them why you consider it important to support the national society. If each of you were able to persuade just one other RT to become a member we would double our membership and be in that much better a position to provide even more services to you, our members.

Once again, thank you for you ongoing support.

Jim Winnick, RRT
CSRT President

Executive Director's Report

Doug Maynard

I would like to thank all of the CSRT members that have called and offered their kind words of support and encouragement as I settle into my new position with the CSRT. The opportunity to contribute to one's chosen profession at this level does not present itself often and I plan to make the most of it. I would like to thank the CSRT Executive Council for giving me this opportunity.

There has been substantial change within the CSRT office and I would like to acknowledge the efforts of President, Jim Winnick in maintaining productivity in the office and for continuing to forward the goals and mission of the CSRT. This, of course, would not have been possible without the extraordinary efforts of the CSRT office staff, Sylvia Stiehl, Rita Hansen, Robin Ballance and Anne Dorion.

The CSRT continues to be an ever changing and evolving entity. In 2001, the CoARTE accreditation program was born. It has become an absolute success story despite the odds. Anyone associated with this program, respiratory therapist or not, should be extremely proud of what they have accomplished. It is with great regret that we accept Patricia Haaland's announcement that she will be retiring this spring. Without her incredible efforts, CoARTE would not have been possible. I am happy to announce that, because of Patricia's dedication to CoARTE, she has gone to great lengths to help us find a replacement. I am proud to welcome Michelle Kowlessar to the CSRT team as the Accreditation and Education Manager.

In staying with the theme of change, the CSRT will soon be looking for a dedicated volunteer to take on the leadership role with the *Canadian Journal of Respiratory Therapy*. Allan Shemanko, President of the *CJRT* has indicated that he would like to begin the search for his replacement. The corporate structure of the *CJRT* is changing so there will be no need for a President. The new position will be called Editor-in-Chief of the *Canadian Journal of Respiratory Therapy*. The *CJRT* continues to be considered one of the most valuable benefits of the CSRT membership. The individual who is chosen as Editor-in-Chief will have an incredible opportunity to make a significant and visible contribute to their profession.

The CSRT Annual Forum being held this spring in Toronto is well into the planning stages and the program is shaping up to be one of the best ever. Participation in this event is always a great opportunity for continuing education but it is also a great way to interact with RT's from across the country.

The CSRT has chosen Edmonton, Alberta to be the site of the 2005 CSRT Annual Forum and we are looking for a local Forum Coordinator and Forum Planning Committee. Anyone interested in participating in the planning of this event should contact the CSRT office. This is a great opportunity to not only contribute to your profession in a high profile, national event, but also to showcase your region, city, province and local research or achievements.

As you can see from this report there are a number of ways to participate in the CSRT. One of the benefits of CSRT membership is the opportunity to participate in the advancement of your chosen profession through CSRT sponsored events. There are currently many opportunities with high profile positions such as Editor-in-Chief of the *CJRT* and Forum Coordinator, but there are also many committee positions available as well. Many people are hesitant to inquire about these positions because they feel that they don't have the required experience. To that I would respond that there is only one way to get that experience and that is to go out and try one of these positions. As a volunteer your efforts will always be appreciated and your activities will always be supported by the CSRT head office team. I encourage every CSRT member to consider enhancing their professional portfolio by participating as a CSRT volunteer.

Again I would like to thank everyone that has helped me orient myself in my new position and I look forward to my future interactions with the membership.

Sincerely,

D Maynard

Douglas Maynard BSc, RRT, MBA
Executive Director, CSRT

CoARTE Update

Patricia Haaland, Consultant for CoARTE

The Council on Accreditation for Respiratory Therapy Education (CoARTE, pronounced CO-AR-TEE) is the national accrediting body for respiratory therapy educational programs.

Farewell

With retirement fast approaching, my thoughts turn to the conception, birth and evolution of the CoARTE accreditation program.

Conception

In May 2000, the CSRT members gave direction to the CSRT Board of Directors to develop their own accreditation program for respiratory therapy in Canada. To that end I was hired as a consultant, being known for my work coordinating the Canadian Medical Association's (CMA) conjoint accreditation program for ten health professions, including respiratory therapy, for a number of years.

Gestation

I began by seeking input from the CSRT members, educators in particular, at the 2000 Forum in Vancouver to find out what they wanted in their accreditation program. Next I mounted a national task force of respiratory therapists. We conducted extensive research on other health professions' accreditation programs: governance models, accreditation requirements and accreditation procedures. Throughout, the accrediting body for respiratory therapy in the USA, the Committee on Accreditation for Respiratory Care (CoARC), was most supportive and offered free use of all their accreditation documents.

I also consulted with ISO representatives in Canada; ISO is the International Organization for Standardization. After reviewing ISO 9000 documents we sought permission to base the CSRT's accreditation requirements on the ISO quality management principles. Through a contractual arrangement, we were allowed to include reproduced text from ISO documentation in the CSRT Accreditation Handbook.

As the developmental stage proceeded, we circulated draft documents to all the schools and regulatory bodies as well as to interested CSRT volunteers for review and comment.

In early December 2000, after a very intense six months of labour, I forwarded all accreditation documents to the CSRT Board of Directors for approval. The CSRT Accreditation Task Force was sunset and the Council on Accreditation for Respiratory Therapy Education (CoARTE) was formed. The Council was initially comprised of three CSRT members plus a physician, senior educational administrator and a public member.

Birth

January 1, 2001 was the magic day. We proudly announced the birth/implementation of CoARTE. All schools and regulatory bodies outside Ontario and Quebec came on board with the CoARTE national accreditation program.

Infancy

The accreditation program continued to evolve and thrive despite incredible obstacles.

I gave workshops for schools on how to apply for CoARTE accreditation and to volunteers wishing to serve as program reviewers. We started to build a roster of program reviewers comprised of respiratory therapists, physicians and senior educational administrators. Then, accreditation site visits began. To see the process come to fruition was indeed exhilarating for all of us: CoARTE members, program review teams, schools, the CSRT Board of Directors and other CSRT members.

Gradually, schools in Ontario and Quebec sought CoARTE approval. After objectively assessing accreditation programs, the College of Respiratory Therapists of Ontario (CRTO) elected not to renew its contract with the CMA. Instead, the CRTO signed a contract with the CSRT for CoARTE accreditation services. Shortly thereafter, all the Ontario schools attained CoARTE Approval Status and site visits have been scheduled. In Quebec, Vanier College has Approval Status and the site visit is scheduled for October 2004. The four French language schools are moving in the direction of seeking CoARTE Approval.

Weaning

I have administered the accreditation program for CoARTE from its inception. The program has reached a level of maturity; it is now well established, highly

CoARTE Update *continued*

regarded and financially sound. This gives me tremendous satisfaction and the confidence to pass on the responsibility of the Accreditation Secretariat to a CSRT staff person. I am optimistic that following my retirement at the end of March 2004, the accreditation program will continue to be well managed.

CSRT's Accreditation Manager

The CSRT has hired Michelle Kowlessar to fill the position. Most recently Michelle was the National Communications and Programmes Coordinator for the Canadian Breast Cancer Network. To promote a smooth transition for all stakeholders, Michelle will work under my guidance, gradually taking over various components of the position before assuming full responsibility on April 1, 2004.

Final words

Against great odds, the CSRT has succeeded in implementing its own accreditation program, a dream of many other national health professional associations. CSRT members can be very proud of this accomplishment and confident in knowing that CoARTE operates above the political level in the interest of patients and students. Respiratory therapists' support of their national professional organization made the development and implementation of the accreditation program possible.

The CSRT's accreditation program could not have survived without the dedication of highly professional and competent volunteers, too many to mention by name. My deepest gratitude goes to all the CSRT members, physicians, educational administrators and regulatory body representatives who have supported my endeavours.

CSRT Membership Renewal

It's membership renewal time! CSRT Members are reminded that yearly memberships are due by March 31, 2004. As the national organization, representing the interests of the respiratory therapy profession, the CSRT is pleased to continue to supply support, information, funding and direction to RTs in their many areas of health care. Please see the Membership section on our webite for details.

Take Advantage of Our Debit Plan!

CSRT Members have the option of using the CSRT Debit Plan to pay their CSRT fees, as well as their professional association membership and related fees. You can arrange to have monthly installments for your membership deducted directly from you bank account. Check your renewal form for this option.

Benefits of Membership to the CSRT

Liability Insurance

This comprehensive liability insurance is tailored to respiratory therapists. Managed by ENCON Insurance Managers, the policy is provided by insurance companies know for their vast experience in the medical field, as well as their long-term commitment to professional liability programs.

Errors and Omissions Liability Insurance

- Covers individual respiratory therapists for damages caused by error, omission or negligent act in the course of providing professional services as defined by the Registration Regulation of the Respiratory Therapy Act, 1991, (Ontario). The policy includes a sexual abuse rider that covers victim therapy and counseling up to $10,000 per victim.
- A Claims Only policy that covers you for any claim filed at the time the policy is in effect, no matter when the incident giving rise to the claim occurred. All active and inactive members of the profession are eligible for coverage.
- Insurance covers all costs incurred by the insurers to investigate, defend, settle, arbitrate or litigate a claim covered by this policy. These include costs and fees for hiring investigators, adjusters, experts, consultants, arbitrators, mediators and lawyers, as well as court and arbitration costs and expenses for arranging the attendance of witnesses.
- It includes $10,000 coverage for legal representation and advice in cases in which the insured has received a letter from the regulatory body, as a result of a complaint and a $1,500 coverage if a therapist is subpoenaed to appear as a witness in an incident relating to the practice of respiratory therapy.

Coverage Annual	**Premium**
$1 million	$65.00
$2 million	$78.00

Mortgage

Excellent mortgage rates are available through CSRT membership. Through an arrangement with HLC Group Mortgage Plan, the CSRT is pleased to introduce the Group Mortgage Plan with value added benefits available to ALL members, including discounted interest rates, flexible terms, increased consumer choice and over 300 product options. CIBC, First Line Mortgages, President's Choice (PCF), MCAP and National Bank are just some of the lending institutions in this plan. HLC is Canada's leading provider of mortgage benefit programs with over 300 participating corporations and associations.

Benefits include:

- Guaranteed discounted interest rates without negotiation
- fully open mortgages below prime
- Up to 5% cash back option for first time home buyers to help with unforeseen expenses (some conditions apply)
- Choice of over 30 lenders
- Choice of over 100 mortgage products

Total convenience, same day mortgage pre-approval:

- Appraisal fees paid
- Home warranty protection
- Superior, prepayment privileges and flexibility to pay your mortgage off faster.

This program is exclusively available through a bilingual Call Centre open from Monday to Friday 8:00 am to 8:00 pm EST. Employees can obtain information and apply for a mortgage through via email, or fax. A mortgage specialists is on hand to provide detailed information. Toll Free Number 1-800-663-4819 or www.groupmortgages.com/csrt or email and inquiry to info@groupmortgages.com.

Awards

The CSRT offers a number of awards and fellowships. Please check for details on our website under Foundation.

- Education Awards for Advanced Respiratory Practice
- Research Fellowship
- CSRT Research Award
- Robert Merry Memorial Award
- Summit Award for Respiratory Excellence

CALENDAR OF EVENTS

March 7 – 11, 2004
3rd World Assembly on Tobacco Counters Health
New Delhi, India
http://www.watch-2000.org/

March 7 – 10, 2004
ACC Annual Scientific Session 2004
New Orleans, Louisiana
http://www.acc.org/2004ann_meeting/home/home.htm

March 14, 2004
Society of Cardiovascular Anesthesiologists 9th Annual Cardiopulmonary Bypass Meeting
Snowmass, Colorado
www.scahq.org

March 19, 2004
60th Annual Meeting of the American Academy of Allergy, Asthma and Immunology
San Francisco California
www.aaaai.org

April 3, 2004
Toronto Anesthesia Symposium 2004
Toronto, Ontario
Julie.Nigro@uhn.on.ca

April 17 – 23, 2004
13th World Congress of Anaesthesiologists
Paris, France
http://www.wca2004.com

April 22 – 24, 2004
4th Annual FOCUS Conference
Baltimore, Maryland
www.foocus.com

April 25 – 29, 2004
Canadian Association of Emergency Physicians
Montreal, Quebec
http://www.caep.ca/

April 25 – 28, 2004
84th Annual Meeting of the American Association for Thoracic Surgery
Ontario Canada
aats@prri.com

May 1 – 2, 2004
If You Can't Breathe, You Can't Function Lecture and Lab
Calgary, Alberta
http://www3.telus.net/rehabforthefuture/

May 6 – 9, 2004
National Research Forum For Young Investigators in Circulatory and Respiratory Health
Winnipeg, Manitoba
www.yiforum.ca

May 21 – 26, 2004
100th International Conference - American Thoracic Society
Orlando, Florida
http://www.thoracic.org/

May 21 – 25, 2004
Third All Africa Anaesthesia Congress
Tunis, Tunisia
http://www.staar-tunisie.net

May 27 – 30, 2004
CSRT Annual Educational Forum
Toronto, Ontario
www.csrt.com

June 2, 2004
6th International Symposium on Memory and Awareness in Anaesthesia
Hull UK
www.maa6.com
email: B.J.Leak@hull.ac.uk

June 5 – 8, 2004
European Society of Anaesthesiologists - Euroanaesthesia 2004
Lisbon, Portugal
www.euroanesthesia.org

June 18 – 22, 2004
Canadian Anaesthesiologists' Society 61st Annual Meeting
Quebec City, Quebec
www.cas.ca

June 19, 2004
German Congress of Anaesthesiology
Nuernberg, Germany
http://www.mcn-nuernberg.de

September 4 – 8, 2004
14th European Respiratory Society Annual Congress
Glasgow, Scotland
info@ersnet.org

September 15 – 18, 2004
7th Asia Pacific Conference on Tobacco or Health
Gyeongju, Republic of Korea
http://www.apact2004.org/

CSRT Board of Directors Nominees

Nominee — CSRT President-Elect
Sue Jones, RRT RPSGT

I am honored to have the opportunity to put my name up for nomination for President-Elect of the CSRT. I feel volunteering in organizations such as the CSRT is key to the success of our profession.

Having been a respiratory therapist for the past 20 years, and being in the middle of my career, I would like to become more formally involved in the CSRT as part of the board.

My past is littered with only three major employers. Most recently I have been employed with Royal Victoria Hospital in Barrie. In October 1986, I became a staff respiratory therapist. After four and a half years I took the position as the charge respiratory therapist. Prior to this I was employed at Women's College Hospital, Toronto from January 1984 to September 1986 working primarily in the NICU. My first position after graduation in 1983 was with York County (now known as Southlake Regional Hospital) in Newmarket.

I graduated from the only 3-year program at the time, at Algonquin College, in Ottawa with only 11 other classmates. Although my career displays stability, which may portray someone who can be stagnant, this is far from the truth as evidenced by my tenure with the RTSO during the negotiations with the CRTO. I am always interested in a challenge or making changes to better our profession. I strive in my position at work to raise the profile of the respiratory therapist whenever the opportunity presents itself. As a result I have become skilled in diplomacy and negotiation. I am a very good listener, but can make decisions as needed.

I have experience in organizing conferences, being a speaker on several occasions. I am a BCLS instructor (1991), NRP Instructor/Trainer (1991), and the co-ordinator for the NRP program here at RVH, Barrie. I am the Clinical Co-ordinator for the students in 3rd year from North Bay.

I am confident that I can provide quality leadership while learning from the other members of the board. I hope you will provide me with this opportunity in May at the AGM.

Nominee — Director of Professional Advocacy
Wrae Hill BSc RRT

After training as a Respiratory Therapist in Toronto I gained clinical experience in neonatal, pediatric and adult critical care in British Columbia and Saudi Arabia until 1998. My work in professional advocacy began early in my career and has intensified through my work as Clinical Educator and Department Head.

Throughout my career, wherever it has taken me and my family, I have taken my responsibility of active participation in my National Professional Association seriously — as a member and contributor. Having held Senior RRT leadership positions in Riyadh, Toronto and now in Edmonton, I am aware more than ever of the need for clarity of direction and focused advocacy for our changing profession. This must happen at both the Provincial and National levels. We need to move forward with the complex task of re-inventing the CSRT within the "new normal" of a profession characterized by nationally linked, provincial and territorial RRT self regulation.

Having international experience, I know that the Canadian RRT credential is the "gold standard" among our peers. We must further develop this important credential by working together. The CSRT, National Alliance of Respiratory Therapy Regulatory Bodies Educators, RRT Administrators, RRT community service providers, RT equipment suppliers and frontline staff RRTs are all essential to developing an excellent competency based exam process. While we get our regulatory house in order, we must build a nationally unified and simple strategy to advocate for the interests of RRTs and our patients, at all levels of government.

In the last year, the selfless care of patients by frontline RRTs during SARS, forest fires and other recent challenges, have brought RRTs into a long overdue spotlight. Still many of our patients and the public are unaware of the level and complexity of care provided them by RRTs. As the CSRT Director of Professional Advocacy I would work hard to change that.

CSRT Board of Directors Nominees *continued*

Nominee — CSRT Director of Education and Curriculum Standards
Ray Hubble, RRT MMEd.

Fifteen years, 3 provinces and 2 coasts. Perhaps qualifications better suited for a middle-aged hitchhiker than a prospective member of the CSRT Board of Directors.

My coast to coast career as a Respiratory Therapist, educator and volunteer has given me a desire to constantly challenge the norm, improve educational standards and always look for ways to enhance patient care.

I present myself as a nominee for the position of Director of Education and Curriculum Standards with 12-plus years of experience as a clinical educator, 7 years of experience with the CSRT Education Committee and my current role as an executive member of our national accreditation body, CoARTE.

I hold a Master's of Medical Education degree from the University of Dundee's (UK) School of Medicine and continue to teach in the class and at the bedside on a daily basis at the New Brunswick Community College, Saint John, New Brunswick.

As Respiratory Therapy evolves, there are both national needs and jurisdictional considerations for regulatory practices in many provinces.

I am confident that my experiences and my background will allow me to work with all concerned parties to balance the needs of our profession while respecting regulatory needs where they exist.

Nominee — Director of Membership Services
Colya Kaminiarz, RRT

I am excited to be nominated for the position of Director of Membership Services as the CSRT makes its transition to a new board structure.

I became involved with the CSRT in 2000 with the creation of the CSRT Anesthesia Assistant Special interest group. This group is working towards the development of a national standard for anesthesia assistants. I was elected as a CSRT Director-at-Large in 2002. My time working with, and as a member of, the CSRT board has allowed me to develop an understanding of how the CSRT functions.

Our profession has faced various struggles over the past few years. Despite the challenges, it continues to be very motivating to see RTs from every province working hard to address issues facing our profession. On a provincial, national and international level, RTs are tackling issues, large and small, with energy, innovation and perseverance.

When I initially read the position summary, and responsibilities of Director of Membership Services, I was a little daunted by its scope. There is no doubt in my mind that the road ahead will not be free of bumps, but I will make it my aim to maximize the communication we have with our membership, and at all times keep an open mind for suggestions on how we ensure the CSRT is responsive to our professions needs.

I thank you for your support, and only leave you with one request. If there is something that you think can make our profession stronger, or make the CSRT more relevant to yourself, don't hesitate to get in touch!

CSRT Board of Directors Nominees *continued*

Nominee — Director of National and Provincial Relations
Scott LeMessurier

I received my education and trained in Ottawa at Algonquin College. I graduated and registered with the CSRT in 1980. I have been a member in good standing since and am a long-standing advocate for CSRT.

I initiated a new department in Grand Falls-Windsor Newfoundland in 1981, which has grown steadily. I now manage a Cardio-Respiratory Department, including Respiratory Services, Non-Invasive Cardiology and Diagnostic Neurophysiology. Some of my involvements for Respiratory Therapy include;

- First board position as Director-at-Large 1990–1992.
- President NLART 1996–1998, Member CSRT Board.
- Involved in all occupational profile reviews.
- Chairperson, Provincial MIS committees for Respiratory Therapy and Electrodiagnosis.
- Chairperson, Advisory committee for Respiratory Therapy program, College of the North Atlantic.

I believe that the national fabric and strength of the CSRT is important, including entry to practice standards and mobility nationally and internationally.

Nominee — CSRT Director of Human Resources
Cliff Seville, RRT

Since graduating as a Respiratory Therapist from the Northern Alberta Institute of Technology in 1978, I have worked in Edmonton. I began at the Royal Alexandra Hospital in NICU, then on to Misericordia Hospital and most recently with the Caritas Health Group. My clinical career progressed from clinician to supervisor, to clinical instructor and co-ordinator. I sat on executive council for HSAA. My experience and skills have helped equip me for leadership roles. I am currently manager of Therapeutic Programs and Services for the Caritas Health Group. I am now responsible for respiratory care, physical therapy, occupational therapy, speech/language pathology, and audiology.

My strengths lie in designing and implementing innovative programs to meet changing needs in the patient community, and developing strong cross-functional teams. I have been instrumental in starting specialized programs, including the hyperbaric oxygen unit, wound care program, asthma care, respiratory sleep diagnostics, and several rehabilitation programs.

I have a strong presence in the health care community. I am frequently invited to speak at meetings of health professionals from various disciplines. I have served on the CSRT strategic planning task force and the Canadian board for respiratory care. I have strong interpersonal and labour relations skills as evidenced by being the national employer representative during the federal occupational analysis of respiratory therapy. I am also a member of the Caritas research steering committee, sit on the College of Physicians and Surgeons advisory committee for pulmonary function labs and am a member of the PHAA (Provincial Health Authorities Alberta) professional\technical advisory committee. My wife Janis is a Respiratory Therapist and daughter Chrysten is currently taking Respiratory at NAIT.

I am currently the chairperson of the NAIT advisory committee. My interest in medical publication is evidenced by a 6 year tenure as co-editor and then editor-in-chief of *CJRT* (*The Canadian Journal of Respiratory Therapy*), and I have published more than 35 articles and editorials.

Abstracts

Early Clinical Predictors of Severe Acute Respiratory Syndrome in the Emergency Department

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ABSTRACT

Objectives: To assess the association of diagnostic predictors available in the emergency department (ED) with the outcome diagnosis of severe acute respiratory syndrome (SARS).

Methods: This retrospective cohort study describes all patients from the Amoy Garden complex who presented to an ED SARS screening clinic during a 2-month outbreak. Clinical and diagnostic predictors were recorded, along with ED diagnoses. Final diagnoses were established independently based on diagnostic tests performed after the ED visit. Associations of key predictors with the final diagnosis of SARS were described.

Results: Of 821 patients, 205 had confirmed SARS, 35 undetermined SARS and 581 non-SARS. Multivariable logistic regression showed that the strongest predictors of SARS were abnormal chest x-ray (odds ratio [OR] = 17.4), subjective fever (OR = 9.7), temperature >38°C (OR = 6.4), myalgias (OR = 5.5), chills and rigors (OR = 4.0) and contact exposure (OR = 2.6). In a subset of 176 patients who had a complete blood cell count performed, the strongest predictors were temperature >=38°C (OR = 15.5), lymphocyte count <1000 (OR = 9.3) and abnormal chest x-ray (OR = 5.7). Diarrhea was a powerful negative predictor (OR = 0.03) of SARS.

Conclusions: Two components of the World Health Organization case definition — fever and contact exposure — are helpful for ED decision-making, but respiratory symptoms do not discriminate well between SARS and non-SARS. Emergency physicians should consider the presence of diarrhea, chest x-ray findings, the absolute lymphocyte count and the platelet count as significant modifiers of disease likelihood. Prospective validation of these findings in other clinical settings is desirable

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Absolute Association of Coronavirus in Lung Tissue from Fatal Cases of Severe Acute Respiratory Syndrome

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**Contributed equally to this manuscript.*

Abstract

Efforts to contain SARS have been limited by the lack of a standardized, sensitive and specific test for SARS-associated Coronavirus (CoV). In this study we used a standardized RT-PCR assay (Artus) to detect SARS-CoV in lung samples obtained from well-characterized patients who died from SARS compared to those who died from other reasons. SARS-CoV was detected in all 22 post-mortem lung tissues (to 109 viral copies/g) from 11 patients with probable SARS but was not detected in any of the 23 lung control samples (sample analysis was blinded). The sensitivity and specificity (95% CI) was 100% (84.6%–100%) and 100% (85.1%–100%), respectively. Viral loads were significantly associated with a shorter course of illness but not with the use of ribavirin or steroids. CoV was consistently identified in the lungs of all patients who died from SARS but not in controls supporting a primary role for CoV in fatal outcomes.

Coronavirus in Lung Tissue

From its origins in November 2002 in Guangdong province, China, severe acute respiratory syndrome (SARS) has become an emerging infectious disease that has spread to numerous regions of the world including Hong Kong, Vietnam, Singapore, Taiwan, and Canada.[1] Although there remains some controversy over the etiology of SARS, a newly described virus known as the SARS-associated Coronavirus (SARS-CoV) has been declared by the World Health Organization as the cause of SARS.[2] This has led to a rapid proliferation of a number of different in-house laboratory tests aimed at detecting either SARS-CoV-specific antibodies or SARS-CoV nucleic acid in clinical specimens. The Centers for Disease Control and Prevention definition for a confirmed case of SARS includes the results of these laboratory tests.[3] However, due to the numerous different assays being used and the lack of standardization, it has been difficult to compare the results reported from different centers. As well, the inability of these non-standardized tests to detect SARS-CoV in all cases has led to speculation that there may be other agents associated with SARS. Some have suggested that in patients who progress to respiratory failure and ultimately death, this may not be associated with uncontrolled viral replication, but rather may be the result of an immunopathological process.[4] In a recent report of 6 fatal cases of SARS, SARS-CoV was detected by reverse transcriptase polymerase chain reaction (RT-PCR) in post-mortem lung tissue in only 4 patients.[5]

The purpose of this study was to use a standardized, commercially available RT-PCR assay to test for the presence of SARS-CoV RNA in lung tissue obtained at autopsy from well-characterized patients with SARS who died during the outbreak

in Canada, compared to lung samples obtained at autopsy from patients without SARS who died during the outbreak and lung samples from patients during a period predating the outbreak.

Methods

Patients

All patients who met the current World Health Organization case definition of probable SARS and who underwent a post-mortem examination in Canada during the March to April 2003 outbreak were included in this study. Clinical details were extracted retrospectively using hospital records. Clinical descriptions of some of these cases have been published separately.[6,7] As of May 14, 2003, there were a total of 24 deaths due to SARS all occurring in Toronto, Canada. Of these, autopsies were performed on 11 patients. Ante and post-mortem examination for routine bacterial and viral respiratory pathogens from these 11 patients, as described elsewhere, was negative.[6]

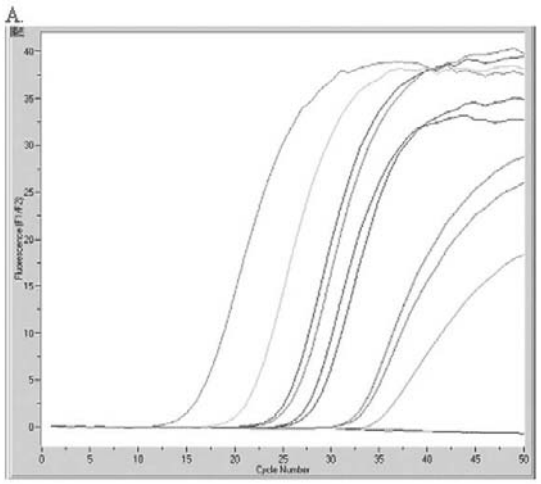
Lung Tissue Samples

A total of 22 discrete post-mortem lung samples collected from these 11 patients were included in this analysis. An additional 13 post-mortem lung samples from 7 patients who died during the SARS outbreak but whose deaths were attributed to other causes were also included. The attributed cause of death in these patients was as follows: 46 y/o female — Invasive Group A streptococcal infection; 93 y/o male — Congestive Heart Failure; 37 y/o male — Sudden death Cardiovascular disease; 74 y/o male — Amiodorone pulmonary toxicity; 78 y/o female — dementia and aspiration pneumonia; 47 y/o female — diabetes and congestive heart failure; and 81 y/o male — bladder cancer and aspiration pneumonia. As well, 10 lung samples from 10 different patients (4 females and 6 males; age range 54 to 75 years) with lung cancer collected in 1998, generously provided by Dr. Brendan Mullen, Department of Laboratory Medicine and Pathology, Mount Sinai Hospital, were also included as negative controls. All samples collected at the time of autopsy were snap frozen in a mixture of absolute ethanol and dry ice and subsequently stored at -70°C until tested. The samples were coded and then processed, subjected to RT-PCR analysis and interpreted before the identity of the samples was divulged. This study was approved by the research ethics boards at Mount Sinai Hospital and the University Health Network.

RT-PCR

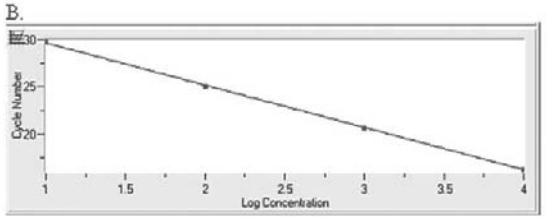
Lung tissue samples were thawed and immediately homogenized in lysis buffer (Qiagen, Mississauga, Canada) using disposable tissue grinders (Kendall Precision™, Mansfield, USA). The homogenate was passed through QIA shredder columns (Qiagen) prior to RNA isolation using the RNeasy Mini Kit (Qiagen). The sample was eluted in 30^{l} of RNAse free water. The RT-PCR was carried out using the RealArt™ HPA-Coronavirus LC RT Reagents Assay (Artus GmbH, Hamburg, Germany) using a Lightcycler real-time platform (Roche Diagnostics, Laval, Canada). The HPA-Coronavirus master Mix contains reagents and enzymes for the specific amplification of an 80bp region of the SARS-CoV polymerase gene from 5^{l} of RNA using the primer pairs published by the Bernhard-Nocht Institute (Hamburg, Germany) as posted on the World Health Organization website at http://www.who.int/csr/sars/primers/en/. Viral load was calculated from a standard curve based on four external positive controls (quantification standards) included in the RealArt™ HPA-Coronavirus LC RT Reagents Assay kit (Figure 1A and B). The standards were treated as previously purified samples and the same 5^{l} volume was added per capillary. A standard preparation of SARS-CoV isolated from cell culture supernatants of VeroE^{6} cells, generously provided by Dr. Doerr from the University of Frankfurt, Germany and Dr. Matthias Niedrig, Robert Koch-Institute, Berlin, Germany, was used as a calibrator in each run. In addition, the kit contains a second heterologous amplification system (i.e. an internal control) to identify either PCR inhibition exclusively, if added to the extracted RNA, or RNA isolation quality as well as PCR inhibition, if added during the RNA isolation procedure (Figure 1C).

Figure 1 A



Although the assay insert states that the primers and probes used in the assay were checked for possible homology to other pathogens by means of sequence comparison, 25 randomly chosen amplicons from our sample pool were independently sequenced to confirm SARS CoV specific amplification and detection.

Figure 1 B



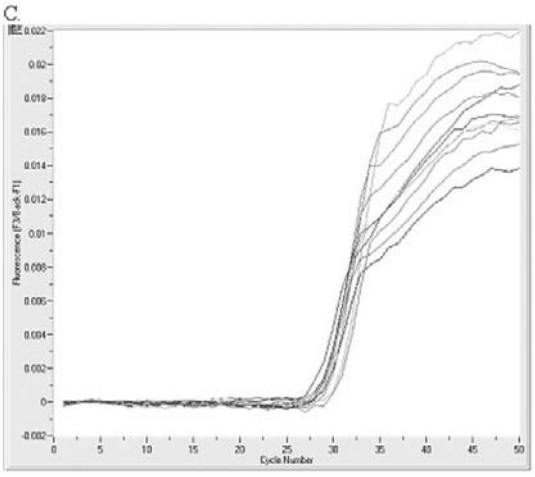
Univariate Analysis
Univariate analysis comparing potential predictors of viral load (duration of illness, the use of ribavirin, the use of steroids) was completed using *Fisher's Exact Test*. Two-sided p values 0.05 were considered significant.

Results

The clinical description and RT-PCR results for the 11 patients with probable SARS from whom post-mortem lung tissue samples were examined in this study are summarized in Table 1 (p. 26).

The mean age of the 11 patients was 70 years (range 43–99). Six of the 11 patients were male. All but one of the 11 patients had underlying co-morbidities, the most common of which was diabetes mellitus in six patients. The mean duration of illness was 20 days (range 8–32). Seven patients had been intubated and mechanically ventilated prior to death. Three patients had requested not to be intubated (information on ventilation was not available for one patient). Ten of the eleven patients were treated with ribavirin. Six of the eleven patients were treated with steroids.

Figure 1 C



SARS-CoV was detected in all 22 post-mortem lung tissue samples collected from all 11 patients who died with a diagnosis of probable SARS. All thirteen post-mortem lung samples from the 7 non-SARS fatalities that occurred during the SARS outbreak were negative for SARS-CoV, as were all 10 lung tissue samples collected from patients with lung cancer 5 years prior to the outbreak (Table 2). The corresponding sensitivity and specificity of the RealArt HPA-Coronavirus LC RT Reagent assay are both 100% (95% Confidence Interval for sensitivity: 84.6%–100% and 95% Confidence Interval for specificity: 85.1%–100%) for the detection of SARS-CoV.

Table 2: Univariate analysis assessing predictors of high viral loads in post-mortem lung tissue.

Predictor	Viral Load $\geq 10^6$ copies/g lung tissue	Viral Load $< 10^6$ copies/g lung tissue	Fisher's Exact Test
Short duration of illness (≤ 21 days)	5/5	0/6	p=0.002
Use of ribavirin	4/5	6/6	p=0.45
Use of steroids	1/5	5/6	p=0.08

The SARS-CoV viral load in post-mortem lung tissue ranged from 2.7 x 104 copies/g tissue to 3.8 x 109 copies/g tissue. Higher viral loads (106 copies/g tissue) were significantly associated with patients who had a shorter duration of illness (21 days) (p = 0.002, *Fisher's Exact Test*). The use of ribavirin or steroids was not significantly associated with viral load levels (Table 2).

Twenty-five randomly selected amplicons from the sample pool were sequenced to assess specificity and possible cross-reactivity to other pathogens. A BLASTN search performed against the SARS-CoV genomes in GenBank, EMBL, DDBJ and PDB on the NCBI website, indicated that all amplicon samples contained SARS CoV polmerase gene sequence.

Discussion:

Using a standardized RT-PCR assay, SARS-CoV has been unequivocally identified in the lung tissue of all patients who died with probable SARS but not in any of the controls. These observations support a primary role for this virus in patients with SARS who have fatal outcomes and provide additional and strong evidence to fulfill *Koch's* postulates regarding SARS-CoV as the etiology of SARS.[8] SARS-CoV was found in multiple different samples of lung in the same patient suggesting that there is widespread dissemination of the virus throughout the lung at the time of death. Previous studies suggested that progression of disease to respiratory failure may be primarily mediated by host immune response rather than viral replication.[4] Although the presence of viral RNA in lung tissue does not necessarily indicate replicating virus, the presence of virus in multiple lung lobes, often in high copy number, at the time of death suggest that the SARS CoV may also be contributing to progression of disease. The fact that higher viral loads were significantly associated with patients with a shorter duration from onset of illness to death supports the role of viral replication as a contributor to death. Ten of the 11 patients had received therapy with ribavirin and six patients were treated with steroids. The failure to eradicate SARS-CoV despite ribavirin therapy, and the lack of association between the use of ribavirin and SARS-CoV viral load is consistent with in vitro data showing that ribavirin has no activity against this agent.[9]

Global efforts to contain SARS have been severely impeded by the lack of a standardized, sensitive and specific diagnostic test for SARS-CoV. Different diagnostic strategies including culture, serologic assays, and molecular detection methods have been described but each of these tests has limitations. In-house RT-PCR assays have been associated with sensitivities as low as 50% in patients with SARS,[10] raising uncertainty as to the role of CoV versus co-pathogens in mediating severe or fatal SARS. By contrast, the sensitivity and specificity of the RealArt HPA-Coronavirus RT-PCR assay for the detection of CoV in lung tissue appears to be excellent. In addition, with the real-time Lightcycler system, the assay generates quantitative results within one hour, which is much shorter than traditional PCR reactions.

It is important to note that the type of specimen tested, the timing of sample collection, (i.e. acute versus convalescent phase) the method of specimen collection, as well as the method of sample preservation may have a significant impact on the results obtained from a diagnostic test. The lower sensitivity of SARS CoV detection reported by *Peiris et al*[10] may be a consequence of these confounding factors. Our study design examining lung biopsies from clearly defined patient populations overcame confounding issues such as sampling technique, non-specific case definitions, or possible undocumented exposure to SARS. Given the

Table 1: Clincial description and SARS-Co V RT-PCR results for 11 patients who died with probable SARS.

Sex/Age	Co-morbidities	Illness and Treatment Duration (days)				Post-mortem lung tissue description	RealArt HPA Coronavirus RT-PCR	
		Illness	Ventilation	Ribavirin	Steroids		Results	Copies of CoV/ gram tissue
M/43	Type II DM, HTN	15	4	0	0	RUL	Positive	1.5×10^{8}
						RML (#1)	Positive	5.4×10^{7}
						RML (#2)	Positive	2.8×10^{7}
						RML (#3)	Positive	7.4×10^{6}
						RML (#4)	Positive	6.4×10^{8}
M/76	Type II DM, CAD, HTN	11	4	6 (started on day 6 of illness)	0	Lung	Positive	3.8×10^{9}
F/78	Type II DM, CAD, Hypercholesterolemia, chronic obstructive	8	5	>=5 (started on day 4	0	RT Lung	Positive	1.0×10^{9}
						LUL	Positive	9.4×10^{7}

predominance of respiratory symptoms in patients with SARS, lung samples have perhaps the highest viral titers of all specimen types, yet in non-fatal cases, obtaining routine lung biopsies is not practical. Other respiratory tract specimens may be satisfactory substitutes to biopsies but further studies examining the prevalence of SARS-CoV in these other specimen types and in a larger population are needed. With the use of standardized commercially available assays, comparison of results from different centers may be facilitated.

Contributors

Tony Mazzulli, Gabriella A. Farcas, Susan M. Poutanen, Barbara M. Willey, Donald E. Low, Jagdish Butany, Sylvia L. Asa, and Kevin C. Kain jointly conceived and designed the study, and wrote the report. Gabriella A. Farcas performed the majority of the RT-PCR assays.

Conflict of Interest Statement

None of the authors has a conflict of interest in relationship to this study.

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Table 1 *continued*: Clincial description and SARS-Co V RT-PCR results for 11 patients who died with probable SARS.

	pulmonary disease			of illness)				
M/62	Rectal cancer; HTN, hypercholesterolemia	8	N/A	>=5 (started on day 4 of illness)	0	LT Lung	Positive	5.3×10^7
F/73	HTN, hypercholesterolemia	28	DNI	14 (started on day 5 of illness)	12 (stated on day 14 of illness)	LT lung RT Lung	Positive Positive	3.0×10^4 3.6×10^5
F/99	Osteoarthritis	26	DNI	13 (started on day 1 of illness)	0	Lung	Positive	5.0×10^4
M/63	Hypercholesterolemia, cerebral vascular disease	20	12	16 (started on day 4 of illness)	16 (started on day 6 of illness)	RUL Lung LLL	Positive Positive	3.2×10^6 2.5×10^7
F/78	Type II DM, HTN,	24	18	10	18	LT Lung	Positive	4.1×10^5

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Table 1 *continued*: Clincial description and SARS-Co V RT-PCR results for 11 patients who died with probable SARS.

	hypercholesterolemia			(started on day 3 of illness)	(started on day 5 of illness)	RUL	Positive	$4.9x10^5$
M/44		29	18	18 (started on day 8 of illness)	17 (started on day 12 of illness)	RT Lung LT Lung	Positive Positive	7.6×10^4 4.1×10^4
M/77	Type II DM, HTN, hypercholesterolemia	>=18	>=1	>=1 (started on day 10 of illness)	>=7 (started on day 10 of illness)	LLL LUL	Positive Positive	5.6×10^5 5.7×10^5
F/79	Type II DM, HTN, hypercholesterolemia	32	DNI	11 (started on day 2 of illness)	>=4 (started on day 12 of illness)	LT Lung Lung	Positive Positive	2.7×10^4 2.1×10^5

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