CCCTG

Canadian Critical Care Trials Group /
Groupe canadien de recherche en soins intensifs

STRATEGIC PLAN 2013–2018 / PLAN STRATÉGIQUE 2013–2018

Collaborating for Impact / Une collaboration d'impact

Leading Science, Saving Lives / L'excellence en science pour sauver des vies

Final draft May 10, 2013

Prepared by Axler & Associates

Revised and approved by the CCCTG Executive Committee

Contents

Message from the Chair

On behalf of the Canadian Critical Care Trials Group (CCCTG) Strategic Planning Committee, I am delighted to share the organization's new five-year Strategic Plan, Collaborating for Impact: Leading Science, Saving Lives. The plan is both comprehensive and ambitious in its aspirations. In forging this plan, we hope to engage every member of the CCCTG in a collaborative effort to further enhance the CCCTG's impact in Canada and around the world.

This Strategic Plan builds on the CCCTG's 23 years of excellence and growth as the world's most successful investigator-led critical care research network. It compels us to improve or strengthen our existing activities and to pursue new directions in areas such as national critical care observational studies, formalized partnerships with institutions, and engagement of patients, citizens and decision-makers in our research.

We undertake this planning process at a time when the environment is changing rapidly. Clinical research networks are growing in number across Canada and around the world. Increasing accountabilities are adding to the complexity of administering and supporting these networks. A heightened focus on knowledge translation is driving more collaboration with patients, decision-makers and others. Funding constraints are pushing groups to explore more innovative approaches to obtaining research support.

The CCCTG Strategic Plan faces these challenges with a renewed vision and mission, guided by a defined roadmap of strategies, goals and actions. Over the next few years, we will build nationwide research infrastructure, improve research processes, secure core funds, develop mentorship and educational programs, and strengthen our partnerships.

Implementing this plan will require engaged leadership across the CCCTG, the support of partners with a shared vision and the resources to put in place a much improved infrastructure. This Strategic Plan has taken shape through the hard work and wisdom of the Strategic Planning Committee and its working groups, and the thoughtful contributions of members who responded to surveys or

Strategic Planning Committee

Paul Hebert (chair)
Karen Burns, Toronto
Elaine Caon, Toronto
Karen Choong, London
Deborah Cook, Hamilton
Brian Cuthbertson, Toronto
Denise Foster, Vancouver
Rob Fowler, Toronto
Elaine Gilfoyle, Calgary
Rick Hall, Halifax
Margaret Herridge, Toronto
Daren Heyland, Kingson
James Hutchinson, Toronto
Jacques Lacroix, Montreal
François Lamontagne, Sherbrooke
John Marshall, Toronto
Lauralyn McIntyre, Ottawa
Maureen Meade, Hamilton
John Muscedere, Kingston
Andrew Seely, Ottawa
Tasnim Sinuff, Toronto
Marisa Tucci, Montreal
Alexis Turgeon, Quebec
Ryan Zarychanski, Winnipeg

attended our planning retreat in January 2013. A special thanks to our strategy consultants, Helena Axler and Susan Tremblay, for their expertise and to Elaine Caon for her administrative support throughout the process.

It is an honour to serve as Chair of the Canadian Critical Care Trials Group. I look forward to working with you as we pursue our shared vision.

—Paul Hebert, Chair, Canadian Critical Care Trials Group (CCCTG)

Message du Président

Au nom du Comité de planification stratégique du Groupe canadien de recherche en soins intensifs (CCCTG), c'est avec fierté que je vous présente le nouveau plan stratégique quinquennal de notre regroupement : Une collaboration d'impact – L'excellence en science pour sauver des vies. Il s'agit d'un programme à la fois exhaustif et de grande envergure. En élaborant ce plan, nous espérons impliquer chacun des membres du CCCTG dans un effort concerté visant à rehausser l'impact du CCCTG au Canada et dans le monde.

Le plan stratégique s'appuie sur 23 années d'excellence et de croissance ayant fait du CCCTG le groupe de recherche en soins intensifs le plus prolifique et reconnu à travers le monde. Cela nous porte à améliorer ou à consolider nos activités en cours et à nous orienter vers de nouveaux horizons dans des domaines tels que des études observationnelles d'envergure nationale en soins intensifs, des partenariats formels avec des établissements et l'implication dans nos recherches de patients, de citoyens et de décideurs.

Nous entreprenons ce processus de planification au moment où le milieu de la recherche évolue rapidement. Les réseaux de recherche clinique se multiplient partout au Canada et dans le monde. Le devoir d'imputabilité ajoute à la complexité de la gestion et du soutien de ces réseaux. L'importance grandissante mise sur le transfert des connaissances mène à une meilleure collaboration avec patients, décideurs et autres intervenants. Les contraintes de financement poussent les groupes à innover dans leur approche pour obtenir le soutien nécessaire à la recherche.

C'est avec une vision et une mission renouvelées que le plan stratégique du CCCTG envisage ces défis grâce à une feuille de route bien définie de stratégies, d'objectifs et d'actions. Au cours des prochaines années, nous établirons une infrastructure de recherche à l'échelle du pays, faciliterons l'organisation de la recherche, obtiendrons du financement, développerons des programmes de mentorat et de formation et renforcerons nos partenariats.

Comité de planification stratégique

Paul Hebert (Président)
Karen Burns, Toronto
Elaine Caon, Toronto
Karen Choong, London
Deborah Cook, Hamilton
Brian Cuthbertson, Toronto
Denise Foster, Vancouver
Rob Fowler, Toronto
Elaine Gilfoyle, Calgary
Rick Hall, Halifax
Margaret Herridge, Toronto
Daren Heyland, Kingson
James Hutchinson, Toronto
Jacques Lacroix, Montréal
François Lamontagne, Sherbrooke
John Marshall, Toronto
Lauralyn McIntyre, Ottawa
Maureen Meade, Hamilton
John Muscedere, Kingston
Andrew Seely, Ottawa
Tasnim Sinuff, Toronto
Marisa Tucci, Montréal
Alexis Turgeon, Québec
Ryan Zarychanski, Winnipeg

La mise en œuvre de ce plan requerra un leadership impliqué sur tous les plans CCCTG, l'appui de partenaires partageant la même vision ainsi que des ressources pour mettre en place une infrastructure grandement améliorée. Ce plan stratégique a pris forme grâce au travail ardu du Comité de planification stratégique et de ses groupes de travail, ainsi qu'à la collaboration de ses membres qui ont répondu aux différentes requêtes du groupe et qui ont participé à notre lac-à-l'épaule de janvier 2013. Nous remercions particulièrement nos consultantes en planification stratégique, Mesdames Helena Axler et Susan Tremblay pour leur expertise ainsi que Madame Elaine Caon pour son soutien administratif tout au long du processus.

C'est pour moi un honneur d'être à la direction du Groupe canadien de recherche en soins intensifs. Il me tarde de collaborer avec vous en poursuivant notre vision commune.

—Paul Hebert, Président, Groupe canadien de recherche en soins intensifs (CCCTG)

Executive Summary

Who is the Canadian Critical Care Trials Group (CCCTG)?

The CCCTG is an open-membership group of approximately 350 Canadian critical care professionals from 60 intensive care units. Collectively, we promote and assist in the implementation of investigator-initiated, patient-focused, multicentre research. Through our research programs, each led by experienced scientists, we have studied how best to support critically ill patients, by evaluating a wide variety of treatments, such as early resuscitation, blood transfusions, powerful blood pressure supporting drugs called vasopressors, mechanical ventilation and nutrition. We have also studied specific patient groups, such as children in need of life-sustaining treatments and patients with brain injury. Finally, we have studied techniques to keep our patients safe or to prevent their medical condition from getting worse, for example, by studying prevention of pneumonia during ventilation therapy and prevention of blood clot formation. Through the CCCTG's translational biology research group, we also collaborate with scientists who understand the immune system and the processes of inflammation and infection, as well as various mechanisms of injury. These collaborators have helped us to understand why critically ill patients become sick, why their condition worsens and how various treatments work. During the period of our new Strategic Plan, we hope to further develop patient-centred research as part of our contribution to society at large.

Paul Hebert, Deborah Cook and John Marshall, current, past and immediate past chairs of the CCCTG at the Spring meeting of the CCCTG

What successes has the CCCTG achieved?

As the world's most successful critical care research network, we are "research ready" and poised to continue our record of practice-changing investigations. Indeed, CCCTG members have recently published 2 major trials in the *New England Journal of Medicine* (Ferguson, Meade et al., 2013, and Heyland et al., 2013), which can be added to 13 previous publications in this journal and more than 130 articles in other major journals. Since the CCCTG was established, more than 20 years ago, we have secured a total of more than $60 million in peer-reviewed grants, including $30 million in Canadian Institutes of Health Research project-specific funds in the last 5 years alone. Our research contributions will continue to change the practice of critical care around the world.

What challenges does the CCCTG face?

Despite a long history of success, the CCCTG has always relied on individual grants, with no core infrastructure for multicentre research and evaluation. We have several regional information technology platforms needing coordination and funding to allow their evolution into a national infrastructure. Similarly, we have many regional pilot programs awaiting large-scale evaluation and implementation. We lack the means to systematically evaluate or benchmark the quality of services delivered across Canadian intensive care units. Likewise, we have no formal means to engage patients and decision-makers. We therefore believe it is imperative to capitalize on major project-specific public investments to ensure that their results have a greater and more immediate impact.

Why initiate a formal planning process?

In addition to being a response to these challenges, the planning process was initiated as part of the CCCTG's leadership transition cycle. We had also noted changes to the external environment, including an appropriately heightened emphasis on public accountability. Finally, and more importantly, we wished to be prepared for a number of key opportunities that will arise in the coming 24 to 36 months. Therefore, it was imperative and timely to reflect on past successes and to plan future directions.

What is the CCCTG's plan?

The Strategic Planning Committee have agreed to implement the following strategies (see also the table summarizing strategic directions and goals, below):

- Build national platforms to capture consistent minimum patient data from all centres, strengthen working relationships with methods centres, and adopt common standards for running all projects and programs.
- Improve processes and support mechanisms for project development and peer review, including triennial in-person meeting format.
- Secure funds for core network resources to support research coordination, common data platforms, and programs.
- Strengthen centre-specific data monitoring and research accountability processes.
- Strengthen communications and data-sharing tools.
- Develop mentorship and educational programs for faculty, research coordinators, and trainees.
- Strengthen partnerships with local institutions and with provincial and national governments and agencies.
- Develop strategies to better engage our stakeholders, including patients and decision-makers.

What are the next steps?

The first action in implementing this Strategic Plan will be to hire an executive director. We will then identify the other resources required to implement the plan. We will then undertake to develop common procedures for minimum data collection, create an organizing scientific framework, identify and respond to opportunities, and initiate a communication and engagement strategy.

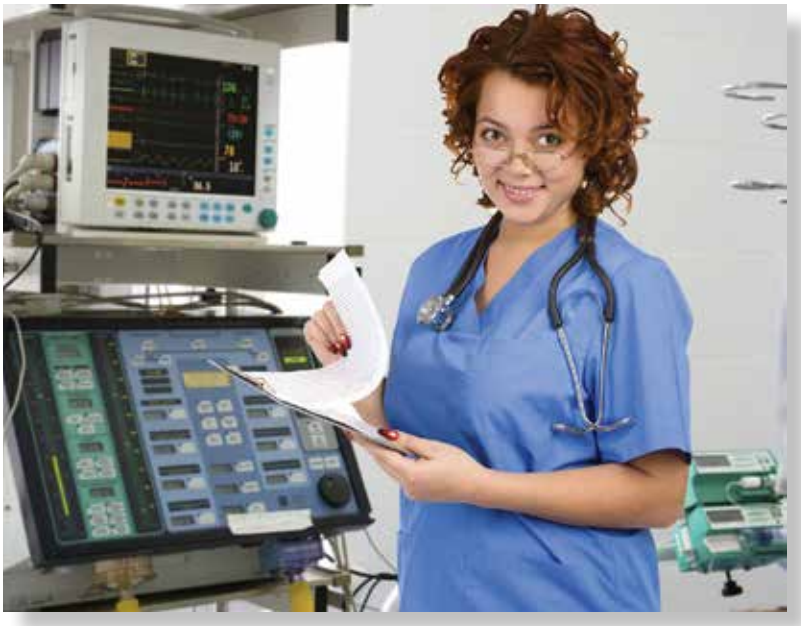
Strategic Plan of the Canadian Critical Care Trials Group (CCCTG): Summary of Strategic Directions and Goals, 2013–2018

Strategic Direction	Goals	
Research	1-1	Develop an organizing scientific framework to strengthen and better profile CCCTG research themes, methodologies and platforms.
	1-2	Position the CCCTG for greater success in obtaining SPOR (Strategy for Patient-Oriented Research) Network funding and other grant awards.
	1-3	Explore new directions within existing themes, and use new partnerships to extend research initiatives into broader fields.
	1-4	Select appropriate metrics to quantify the impact of CCCTG research.
Operations and Infrastructure	2-1	Strengthen the scientific meetings of the CCCTG for optimal peer review and member engagement.
	2-2	Improve productivity and accountabilities to increase patient enrolment in trials.
	2-3	Establish central network resources.
	2-4	Enhance internal communications and sharing of research tools.
Education and Mentorship	3-1	Revise educational programs and curricula, targeting trainees who have research training and are exploring academic or research careers.
	3-2	Develop integrated educational programs for faculty, research coordinators and trainees.
	3-3	Formalize CCCTG mentorship, and track mentorship activities.
Partnerships and Engagement	4-1	Develop strategic partnerships with institutional, provincial and national organizations to identify research priorities and enhance the impact of CCCTG research.
	4-2	Foster international partnerships and collaborations in critical care research.
	4-3	Advance a stakeholder engagement strategy to include patients and their families, citizens, and policy- and decision-makers.
Enabling and Supporting Strategies (Funding and Sustainability, Communications, Governance)	5-1	Identify and implement targeted revenue strategies to increase annual revenues to $5 million per year.
	5-2	Enhance the CCCTG's interface with the public and other external audiences, building on a shared vision of improved care for critically ill patients.
	5-3	Renew CCCTG governance, organizational structure and decision-making processes to enable achievement of the new strategic vision and directions.

Synthèse

Qu'est-ce que le Groupe canadien de recherche en soins intensifs (CCCTG)?

Le CCCTG est un groupe réunissant environ 350 professionnels en soins intensifs provenant de 60 unités de soins intensifs au Canada et dont l'adhésion est ouvert à tous. Collectivement, nous promouvons et aidons à la mise en place de projets de recherche multicentriques initiées par les chercheurs et axées sur les besoins des patients. Les programmes de recherche menés par nos chercheurs chevronnés ont permis d'étudier les meilleures façons de prendre soin de patients gravement malades en évaluant un large éventail de traitements notamment la réanimation précoce, les transfusions sanguines, les vasopresseurs (puissants médicaments pour le maintien de la pression sanguine), la ventilation mécanique et la nutrition. Nos travaux ont également porté sur des groupes spécifiques de patients tels que les enfants nécessitant des traitements de maintien des fonctions vitales ou encore les patients présentant des lésions cérébrales. Finalement, nous avons étudié certaines techniques visant à protéger nos patients ou à éviter la détérioration de leur condition. Notamment, nous avons étudié les façons de prévenir les pneumonies acquises sur respirateur artificiel ou encore la formation de caillots sanguins. Grâce au groupe de recherche en biologie translationnelle du CCCTG, nous collaborons avec des chercheurs s'intéressant au fonctionnement du système immunitaire et aux processus d'inflammation et d'infection, ainsi que divers autres mécanismes lésionnels. Ces collaborations nous ont aidé à comprendre pourquoi les patients gravement malades deviennent malades, pourquoi leur condition se détériore et comment fonctionnent les divers traitements. Avec l'application de notre nouveau plan stratégique, nous espérons pousser davantage la recherche axée sur les besoins des patients et contribuer davantage au bien-être de notre société.



Quels ont été les succès du CCCTG?

En tant que réseau de recherche en soins intensifs le plus reconnu à travers le monde, nous désirons maintenir notre long historique visant l'amélioration de la pratique médicale. Notamment, les membres du CCCTG ont récemment publié deux études cliniques d'envergure dans le *New England Journal of Medicine* (Ferguson, Meade et coll., 2013 et Heyland et coll., 2013) qui s'ajoutent aux 13 publications antérieures dans cette revue prestigieuse ainsi qu'à plus de 130 articles dans d'autres revues scientifiques prestigieuses. Depuis la création du CCCTG, il y a plus de 20 ans, nous avons obtenu plus de 60 millions de dollars en subventions pour la recherche auprès d'organismes subventionnaires, incluant 30 millions de dollars auprès des Instituts de Recherche en Santé du Canada (IRSC) au cours des 5 dernières années seulement. Nos travaux de recherche continueront à transformer la pratique de la médecine des soins intensifs à travers le monde.

Quels défis attendent le CCCTG?

En dépit d'une longue histoire remplie de succès, le CCCTG a toujours compté sur des subventions individuelles obtenues par nos membres, sans infrastructure centrale pour favoriser la réalisation d'études multicentriques. Nous avons plusieurs plateformes régionales de technologies de l'information qui nécessitent coordination et financement pour leur permettre d'évoluer vers une infrastructure nationale plus efficace. De plus, nous avons plusieurs projets pilotes régionaux en attente d'implantation à large échelle. Actuellement, nous n'avons pas les moyens d'évaluer systématiquement ou de comparer la qualité des soins offerts dans les unités de soins intensifs à travers le Canada. Nous ne disposons pas non plus de moyens efficaces pour impliquer davantage les patients et les décideurs dans nos différents projets. Par conséquent, nous pensons qu'il est impératif de tirer profit d'importants investissements publics orientés vers des projets spécifiques pour nous assurer que les résultats de nos travaux aient un impact plus important et plus immédiat.

Pourquoi s'engager dans un processus formel de planification?

En plus de constituer une réponse aux défis énoncés, le processus de planification stratégique a été amorcé dans le contexte d'un nouveau cycle de transition du leadership au sein du CCCTG. Nous avions également observé des changements de l'environnement de recherche, notamment l'emphase importante mise sur la responsabilisation publique. Enfin, et plus important encore, nous voulions nous préparer aux diverses opportunités au cours des 24 à 36 prochains mois. Par conséquent, il était essentiel et opportun de se pencher sur nos réussites passées et de planifier nos orientations futures.

Quel est le plan du CCCTG?

Le Comité de planification stratégique a décidé de mettre en œuvre les stratégies suivantes (voir également le résumé des orientations stratégiques et des objectifs dans le tableau ci-dessous) :

- Bâtir des plateformes nationales pour colliger des données de base de façon uniforme dans tous les centres, et consolider les relations de travail avec les centres de méthodologie en recherche clinique et adopter des règles communes pour la réalisation de tous les projets et programmes.
- Améliorer les processus et les mécanismes de soutien pour le développement de projets et l'évaluation par les pairs, incluant les rencontres triennales.
- Obtenir des fonds pour des ressources de base du réseau pour soutenir la coordination des projets, les plateformes de données communes et les programmes.
- Améliorer les processus de monitorage des données dans les centres, et les processus de prise en charge et responsabilités des projets en cours.
- Améliorer les outils de communication et de partage des données.
- Développer des programmes de mentorat et de formation pour les chercheurs, les coordonnateurs de recherche et les étudiants.
- Consolider les partenariats avec les institutions locales et avec les différents paliers de gouvernement et organismes provinciaux et nationaux.
- Élaborer des stratégies pour mieux impliquer tous les intervenants incluant les patients et les décideurs.

Quelles sont les étapes suivantes?

La mise en œuvre de ce plan stratégique débutera par l'embauche d'un directeur exécutif. Nous allons ensuite identifier les autres ressources nécessaires pour mettre ce plan en oeuvre. Puis, nous procéderons à l'élaboration de procédures communes pour la collecte des données de base, élaborerons un cadre d'organisation scientifique, identifierons les opportunités disponibles, y répondrons et, finalement, nous établirons une stratégie de communication, de participation et d'engagement.

Plan stratégique du Groupe canadien de recherche en soins intensifs (CCCTG) : résumé des orientations stratégiques et des objectifs 2013–2018

Orientations stratégiques	Objectifs	
Recherche	1-1	Élaborer un cadre structurel scientifique pour renforcer et mieux définir les thèmes de recherche du CCCTG, les méthodologies et les plateformes.
	1-2	Placer le CCCTG en meilleure position pour l'obtention d'une subvention de réseau de la SRAP (stratégie de recherche axée sur le patient) ainsi que d'autres subventions.
	1-3	Explorer de nouvelles avenues parmi les thèmes existants et former de nouveaux partenariats pour élargir les domaines de recherche.
	1-4	Choisir les paramètres appropriés permettant de quantifier l'impact des recherches du CCCTG.
Opérations et Infrastructure	2-1	Renforcer les réunions scientifiques du CCCTG pour optimiser notre processus d'évaluation par les pairs et la participation des membres.
	2-2	Améliorer la productivité et la reddition des équipes et des membres et ainsi augmenter le recrutement de patients dans les études.
	2-3	Mettre en place des ressources centrales.
	2-4	Améliorer la communication interne et le partage des outils de recherche.
Formation et mentorat	3-1	Réviser les programmes de formation et les cursus en ciblant les étudiants qui ont une formation en recherche et en sont à explorer une carrière universitaire ou de recherche.
	3-2	Élaborer des programmes éducatifs intégrés pour le corps professoral, les coordonnateurs de recherche et les étudiants.
	3-3	Établir un processus de mentorat au sein du CCCTG et en suivre les activités de mentorat.
Partenariats et engagement	4-1	Développer des partenariats stratégiques avec des organismes institutionnels, provinciaux et nationaux afin de définir les priorités de recherche et d'améliorer l'impact des travaux de recherches du CCCTG.
	4-2	Favoriser les partenariats et les collaborations internationales de recherche en soins intensifs.
	4-3	Proposer une stratégie de participation des parties prenantes afin d'inclure les patients, leurs familles, les citoyens ainsi que les responsables de l'élaboration de politiques et les décideurs.
Stratégies d'habilitation et de soutien (financement et durabilité, communications, gouvernance)	5-1	Identifier et mettre en œuvre des stratégies de financement ciblées pour accroître nos revenus annuels à 5 millions de dollars.
	5-2	Améliorer la communication du CCCTG avec le public et autres auditoires externes en s'appuyant sur une vision partagée de l'amélioration des soins aux patients gravement malades.
	5-3	Réévaluer les processus de gouvernance, de structure organisationnelle et de décision du CCCTG afin de favoriser la réalisation de ces nouvelles visions et orientations stratégiques.

Introduction

The Canadian Critical Care Trials Group has enjoyed remarkable success in producing research of value and impact for critical care practice. One of the most important factors contributing to their success has been a genuine ethos of collegiality—how the group instils a welcoming and nurturing environment for any and all ideas for research.

—John Marshall, former chair, CCCTG

Each year, more than 150,000 Canadians are admitted to an intensive care unit (ICU) with a life-threatening condition such as severe traumatic injury, sepsis or acute lung injury, and this number will only increase in the coming years.[1] The critical care that these patients receive is effective. For example, more than 70% of patients who receive mechanical ventilation survive.[2] The mortality rates for adults with severe multiple traumas,[3,4] life-threatening infections or lung failure have decreased by more than 50% in the past three decades. From 1980 to 2010, the mortality rate in Canadian pediatric ICUs has dropped even more, from 36% to 3.6%.[5] However, critical care is also expensive, accounting for $6 billion (16% of total hospital expenditures) in Canada or 0.5% of GDP in 2004, the latest year for which comprehensive data are available.[6,7]

The Canadian Critical Care Trials Group (CCCTG; www.ccctg.ca) was founded in 1989 "to improve the care of critically ill patients through investigator-initiated research and to provide a national forum for continuing education about research methods." As the world's most successful critical care research network, the CCCTG is "research ready" and poised to continue its record of practice-changing investigations. Indeed, CCCTG members have recently published 2 major trials in the *New England Journal of Medicine*,[8,9] which can be added to 13 previous publications in this journal[10-23] and more than 130 articles in other major journals. Over the lifetime of the network, we have secured more than $60 million in peer-reviewed grants, including $30 million of Canadian Institutes of Health Research (CIHR) project-specific funds in the past 5 years. Through more than 50 ongoing multicentre initiatives, our research ranges from investigations of how best

Changing practice: A "bloody" anecdote

The question: *How much blood should critically ill adults and children receive by transfusion?*

The findings: *In two large trials, one in adults and the other in children, CCCTG researchers found that giving less blood was associated with comparable rates of death and organ failure and fewer complications.*

The impact of the research: *Surveys of physicians in Canada, the United States and the United Kingdom have shown that transfusion practices have changed since publication of these studies. Lower blood transfusion triggers have been incorporated into guidelines and quality indicators worldwide. More restrictive approaches to transfusion practice have become the norm in anesthesiology and the general practice of medicine beyond the ICU (10).*

to care for dying patients and how best to support severely injured vital organs (heart, lung and kidneys) to studies of how to care for children with severe brain injury. These contributions and many more have already changed the practice of critical care around the world and will continue to do so in the decades to come.

Despite a long history of success, the CCCTG has always relied on individual grants, with no core infrastructure for multicentre research and evaluation. We have several regional information technology platforms needing coordination and funding to allow their evolution into a national infrastructure. Similarly, we have many regional pilot programs await large-scale evaluation and implementation. We lack the means to systematically evaluate or benchmark the quality of services delivered across Canadian ICUs. Likewise, we have no formal means to engage patients and decision-makers. We in the CCCTG therefore believe it is imperative to capitalize on major project-specific public investments to ensure that their results have a greater and more immediate impact.

The Context for Planning

The CCCTG has recently undergone a leadership transition, with Dr. Paul Hebert becoming its new Chair, following eight years of leadership by Dr. John Marshall. To meet future challenges, to ensure sustainability and, most importantly, to respond to key opportunities in the coming 24 to 36 months, we believe that a re-engineering process and new strategic imperatives are essential. It is therefore timely to reflect on the CCCTG's past successes and to plan its future directions.

In 2005, the CCCTG undertook a planning and renewal exercise that aimed to identify threats to its continued success and solutions to ensure continued growth. That exercise resulted in a vision and mission statement, a more structured approach to scientific presentations, enhanced mentoring of junior investigators, a detailed internal peer review system, increased membership and success at major granting councils. Since then, the CCCTG has continued to expand, largely through the commitment and collective generosity of its members. At the same time, a number of changes and trends in the health care environment have occurred to influence and shape the organization's planning for the future. The continuingly changing research environment, the uncertain economic climate and the increasing importance of international collaborations have reinforced the need for adaptability and nimbleness in order to succeed as an international leader in critical care research in the years ahead.

Within this context, the CCCTG embarked on another strategic planning process in November 2012, with the aim of developing a robust roadmap and well-defined priorities to guide its efforts over the next five years. The recent call for expressions of interest in an upcoming CIHR Strategy for Patient-Oriented Research (SPOR) initiative (described in more detail below), which will provide input on research network capacity in Canada, added urgency to the planning process.

CCCTG 1989–2012 highlights

Membership

- *Growth to 350 members*

Research and Publications

- *More than 50 current research programs*
- *137 peer-reviewed publications (including 15 in the* New England Journal of Medicine*)*

Funding

- *$60 million in peer-reviewed grants, including $30 million project-specific CIHR grants in past 5 years*

Knowledge Translation

- *Formed aCKTion Net, a critical care knowledge translation network*
- *Performed scoping review of knowledge translation in the ICU (KRITICAL), funded by CIHR*
- *Developed and implemented clinical practice guidelines in critical care:*
  - *Non-invasive ventilation*
  - *Ventilator-associated pneumonia*
  - *Stress ulcer prophylaxis in intensive care*
- *Spearheaded international H1N1-related research initiatives*
- *Led formation of INFACT as an umbrella group representing investigator-led research groups around the world*

Changing clinical research environment

Clinical research networks in critical care and other disciplines are growing in number across Canada and around the world. These networks are competing with the CCCTG for limited peer-reviewed funding and are undertaking research in areas where the CCCTG has traditionally dominated. Many of these networks have already secured network funds to build research capacity for patient-oriented research and knowledge translation while also seeking resources and supports for sustainability. The CIHR and many others will be making significant investments in patient-oriented research and knowledge translation networks. One of the CIHR's signature initiatives is the Strategy for Patient-Oriented Research (SPOR). This strategy includes the development of networks designed to have major impacts on health and health care through the implementation of large-scale studies based on research-ready pilot studies. It also includes finding ways to better disseminate and make use of existing evidence. The CIHR intends that these networks will incorporate the perspectives of all stakeholders (patients, clinicians and decision-makers) in research and knowledge translation activities leading to the integration of evidence into clinical practice.

Deborah Cook enjoying some comic relief during one of the presentations

The performance of clinical research has become more burdensome from an administrative perspective, with more rules put in place by Health Canada and the US Food and Drug Administration, more auditing and higher expectations of public accountability, the advent of detailed inter-institutional and contracts with industry partners, greater concerns and regulations relating to privacy, and complex and fragmented ethics reviews. All of these changes are drastically increasing the resources required to conduct and oversee research projects.

Increasing focus on knowledge translation and impact

A growing emphasis on translating research findings to clinical practice has resulted in greater collaboration with knowledge users and novel strategies to increase uptake. The critical care community has recognized the importance of knowledge translation.

Under the leadership of Dr. John Muscedere, the CCCTG formed and secured CIHR funds for acKTion Net, the Canadian Critical Care Knowledge Translation Network.

Changing health policy environment

Following expiration of the 2004–2014 Health Accord and disengagement of the federal government from health-related matters, the provincial governments formed the Council of the Federation to tackle health concerns. Through this joint effort, the Council has identified performance, the provision of evidence-informed health care and the improvement of health through implementation of best practices as priorities. As a consequence of these changes, it appears that the federal government will be investing in patient-oriented research through CIHR, while the provinces will be looking for willing partners to take on nationwide challenges.

Changing funding environment

Canada's health research community is growing, with more and more high-calibre researchers competing for declining research funding. This competition is reducing the success rate for grant applications. Innovative approaches to research funding must be explored.

The Planning Process

The following Strategic Plan reflects key strategies, goals and priorities developed over a broad consultative process. The Strategic Planning Committee began by hiring external consultants, Axler and Associates. We then undertook a series of briefing sessions with the consultants. We also provided them with past strategic plans, CIHR documents and past CCCTG network grant applications. To fulfill our commitment to engage a large number of members through the eight-month planning process, we first formed a Strategic Planning Committee, decided on broad objectives and agreed on the planning process. To initiate the process, we completed a brief SWOT analysis (strengths, weaknesses, opportunities and threats) and outlined the broad strokes of the plan. Subsequent consultations included detailed interviews with 29 individuals, including members of the CCCTG and influential critical care physicians from Canada and other countries, as well as other stakeholders. We then formulated a more detailed SWOT analysis, incorporating information from other documents.

Armed with this information, we formed a series of six working groups to tackle the following areas of interest: research strategy, infrastructure and operations, governance, communication and partnerships, education and mentorship, funding and sustainability. Each working group established a work plan based on broad objectives defined by the Steering Committee. More specifically, the working groups were asked to identify major issues, propose solutions, and pick two or three priorities. Each group was also asked to prepare a short presentation for a planning retreat, which was held on January 28, 2013. At the retreat, Dr. Tom Noseworthy made an opening presentation to set the stage, and the working groups presented their reports. On the basis of these reports and discussions among the 60 CCCTG members present, a revised mission, vision and values proposition was formulated, and key priorities emanating from the retreat were defined. Follow-up after the retreat included two 2-hour meetings of the Strategic Planning Committee to refine the recommendations and put together a 12-month plan covering the first year of implementation. This document synthesizes many hours of work by a wide range of CCCTG members.

Renewing CCCTG Vision, Mission and Values

Nurturing the care of our sickest patients, one person, one idea, one trial at a time.
—Retreat participant (January 2013)

The CCCTG is guided by renewed vision, mission and values.

Vision: Together, advancing the care of our sickest patients through excellent research.

Mission: We are a diverse group of researchers and practitioners committed to improving the lives and care of critically ill patients by conducting relevant research in response to health care needs. To fulfill our mandate, we

- foster and conduct excellent, innovative research with high clinical impact
- translate research knowledge into practice and policy
- provide international leadership and collaboration in critical care research
- mentor current investigators and the next generation of leaders in critical care research

Values:

- *Excellence:* We strive to develop and conduct rigorous research of the highest quality.
- *Patient-centred focus:* We aim to engage patients and their families to enhance the relevance and impact of our research.
- *Integrity:* We place integrity at the core of our research and relationships.
- *Innovation:* We promote critical inquiry and support implementable ideas that provide value and evidence to advance critical care.
- *Collaboration:* We promote a respectful and collegial environment that fosters constructive and supportive relationships for researchers across the health professions and throughout their scientific careers.

Strategic Directions and Goals

This plan outlines four strategic directions and three key enabling and supporting strategies, described in more detail in the sections that follow.

Strategy Map

Vision

Together, advancing the care of our sickest patients through excellent research

Mission

We are a diverse group of researchers and practitioners committed to improving the lives and care of critically ill patients by conducting relevant research in response to health care needs. To fulfill our mandate, we

- foster and conduct excellent, innovative research with high clinical impact
- translate research knowledge into practice and policy
- provide international leadership and collaboration in critical care research
- mentor current investigators and the next generation of leaders in critical care

Strategic Directions

Research
Optimize research success and encourage new programs of research

Operations and Infrastructure
Strengthen the CCCTG's peer review, operational processes and central resources

Education and Mentorship
Nurture and support aspiring investigators and future leaders in critical care research

Partnerships and Engagement
Foster partnerships and stakeholder engagement to enhance the CCCTG's research and impact on health outcomes

Enabling and Supporting Strategies

Funding and Sustainability
Communications
Governance

Strategic Direction 1: Research

Optimize Research Success and Encourage New Programs of Research

The CCCTG takes pride in the depth and scope of its many research programs. Its 350 members are collectively engaged in more than 50 major clinical research programs.

The success of CCCTG research is built on four key principles:

1. Research foci reflect the day-to-day concerns of practising clinicians and address current knowledge gaps.
2. The scope of investigations is broad and problem-based.
3. Investigator-initiated research is the foundation of CCCTG activities and is highly valued by all members. Investigator-initiated studies are patient-centred and free from commercial influence.
4. The CCCTG takes a programmatic approach to research, asking many questions and using optimal research designs to address them, thereby providing a comprehensive view of each area of practice. Research programs incorporate systematic reviews of the pre-clinical and clinical literature, surveys and observational studies of practice patterns, consensus-building processes to standardize definitions and metrics, pilot studies to evaluate feasibility, rigorous randomized controlled trials (RCTs), and post-trial knowledge translation and exchange studies.

> *"Investigators bring their research ideas to the CCCTG with two main goals: (1) critical appraisal and guidance in improving the quality and success of the research project; and (2) collaboration—seeking partners and participants for multi-component and multi-centre research initiatives."*
>
> *—Retreat participant (January 2013)*

Arguably, the greatest value of the CCCTG lies in its role of providing broad constructive input in research design and in building and supporting the collaborations required to complete the research. We assist in building partnerships and capitalizing on outside opportunities. Indeed, we recognize that significant critical care research conducted outside of the CCCTG complements and even enhances our own programs. Such studies may include health services research, local or regionally focused projects, and industry-driven studies.

Changing practice: A "sweet" success

The question: *Should aggressive, labour-intensive control of blood sugars be widely adopted for critically ill patients? A series of small, single-centre studies have suggested that aggressive control of blood sugars with intravenous insulin therapy could save the lives of some patients with life-threatening illnesses, but it was not clear whether the extra costs and the potential increases in hypoglycemic episodes could be justified.*

The findings: *In a major large-scale evaluation with our Australian colleagues, we documented an increase in complications without any life-saving benefits.*

The impact of the research: *In Canada and elsewhere, the previously widely adopted practice of strict blood glucose control, an expensive ICU treatment, has now been halted. This study is an excellent example of international collaboration for large-scale studies (13).*

In planning for the next five years, a number of critical factors must be considered:

- Strategies to engage patients and their families as key stakeholders in research and knowledge translation
- New strategic investment initiatives, such as the Strategy for Patient-Oriented Research (SPOR) Networks
- Opportunities for partnerships with other networks
- The building and fostering of new areas for research (e.g., quality of care, knowledge translation and exchange)
- Promotion of collaborations across disciplines and professions

Goals to Advance Research

The following four goals are proposed to strengthen research success and encourage new programs of research.

1-1 Develop an organizing framework to strengthen and better profile CCCTG research themes, methodologies and platforms.

There is broad support for organizing or clustering CCCTG research activities into thematic areas. Such clustering would, in particular, be beneficial to external stakeholders and funders in terms of their understanding of the range and depth of research activity across multiple themes or categories. Groupings by methodology might also be explored to profile the CCCTG's deep expertise in a range of methodologies.

The goals of clustering the CCCTG's research work include improving communication to external groups, increasing collaboration among members within a theme, reducing overlap between and redundancy of similar trials, and identifying new opportunities for future research.

1-2 Position the CCCTG for greater success in obtaining SPOR Network and other infrastructure awards

With CIHR's recent call for expressions of interest in SPOR Network grants, the timing is ideal for the CCCTG to prepare a grant application. In fact, as a long-standing collaborative alliance that addresses patient-oriented research through interdisciplinary and interprofessional approaches, the CCCTG is extremely well positioned for a SPOR Network

application. In particular, it has a well-developed knowledge translation program, known as ACKTion Net, which was recently awarded a major three-year CIHR grant.

The SPOR Network grants will focus on the following activities:[1]

- developing, validating and implementing interventions that change a significant aspect of practice
- accelerating the evaluation of the clinical utility of new discoveries and analyzing their comparative effectiveness (in terms of both clinical benefit and cost) relative to existing practices
- accelerating transition of affordable innovations to the marketplace
- evaluating health outcomes to demonstrate impact
- accelerating translation of best practices and clinical applications into practice and policy

In preparing for the grant application, the CCCTG must expand its partnerships with organizations that have shared goals, in particular those that can bring matching funds to the proposal. Success in securing a SPOR Network grant will allow the establishment of core infrastructure, universal databases, site infrastructure, and enhanced training and mentoring opportunities, all of which are critical elements to support successful research and researchers. Partnered funds and programs from a successful SPOR initiative are expected to catalyze transformation of the CCCTG from an investigator-led research network to one that engages multiple stakeholders, including patients and decision-makers. Preparing for a SPOR Network grant will be the top priority for the first year of the Strategic Plan.

Over the mid to longer term, the CCCTG will seek opportunities with Tech Value Net, the CIHR Institute of Circulatory and Respiratory Health, and other networks and granting agencies.

Possible research theme clusters

The following are examples of possible theme clusters and should not be considered a final framework.

- *Acute lung injury*
- *Infection and immunity*
- *Recovery, rehabilitation and Post-ICU care*
- *Resuscitation*
- *Renal injury*
- *Transfusion*
- *Sedation and delirium*
- *Traumatic brain injury*
- *Nutrition*
- *End-of-life care*
- *Prevention of venous thromboembolism*
- *Knowledge translation*
- *Research processes (e.g., consent)*

Possible methodology ctlusters

- *Qualitative studies: interviews and mixed-methods studies*
- *Knowledge synthesis and systematic reviews*
- *Observational studies: surveys, case series, cohort studies*
- *Interventional studies: before-and-after, time-series, patient- and cluster-based RCTs*
- *Knowledge translation*
- *Health services science and research*
- *Basic science*
- *Translational science*

The CCCTG has had some early success in its translational research through its close relationship with the Canadian Critical Care Translational Biology Group (CCCTBG). There are many opportunities for future collaborations to develop new hypotheses, to take advantage of biobanking platforms and to track specimens from human tissue samples. One strength of this collaboration is the opportunity to use clinical studies as platforms for biologic research. A goal for the future is to provide greater communication

1. Canada's Strategy for Patient-Oriented Research; Investment Framework for Patient-Oriented Research and Knowledge Translation Networks

between and integration of the CCCTG and the CCCTBG, with the latter having the potential to contribute to a greater number of CCCTG research programs. There may also be opportunities to strengthen the TBGCCCTG partnership through application for team grants or smaller network grants.

Changing practice—Finding out what happens to patients

The question: *What are some of the major health consequences of receiving ventilation therapy for long periods?*

The findings: *In a study of 109 survivors of prolonged mechanical ventilation, we documented significant emotional and physical impairment at 1 year and 5 years following the acute illness.*

The impact of the research: *These results remind health care professionals of the long-term consequences of life-threatening illnesses and their treatment; in particular, that post-ICU follow-up may be required (12,18).*

1-3 Explore new directions within existing themes, and use new partnerships to extend research initiatives into broader fields

The CCCTG's research extends across broad clinical areas relevant to patient care. Although all of the CCCTG's studies address issues and priorities of practising critical care clinicians, it is important to stay attuned to new areas of inquiry that may contribute to improving the lives and care of critically ill adults and children. The CCCTG is well positioned to build on extensive collaborations across Canada among researchers and the ICU collaborative. Quality of care is a major thrust of practice communities and provincial governments and presents a significant opportunity for research. A nationwide quality research initiative might aim to

- evaluate the degree to which critically ill patients receive safe, effective, timely and patient-centred care
- assess whether the delivery of high-quality care is efficient, sustainable and equitable
- work with the community to plan and perform research in areas of great burden where evidence is limited
- The CCCTG could consider opening discussions on the merits and opportunities of a quality-related research agenda, exploring seed funding for initial work and encouraging investigators to pursue ideas in this realm.

1-4 Select appropriate metrics to quantify the impact of CCCTG research

The CCCTG has a long track record of high-impact research that has dramatically improved the care of vulnerable patients with life-threatening illnesses. Areas of impact have included practice changes in blood transfusion, mechanical ventilation, cooling for traumatic brain injury and blood sugar control. However, the CCCTG has not specifically quantified the impact of its research. This is an area that should be addressed, and the CCCTG should have better metrics to do so.

How will we know that we have achieved our research and research strategy goals?

- Production of a functional framework of key research themes and methodologies
- Greater clarity about the nature of CCCTG research for prospective funders
- Decreased overlap and redundancy among trials
- Secure network grants, awards and funding dollars for research and infrastructure
- Increased number of large multicentre research projects and collaborations
- Enhanced research output and publication in high-impact journals

Strategic Direction 2: Operations and Infrastructure

Strengthen the CCCTG's peer review, operational processes and central resources

Both the CCCTG membership and the number of research programs under way have grown tremendously over the past 20 years. Many more members are seeking critical review and input at CCCTG's scientific meetings, numerous research programs are active across critical care sites, and the conduct of multiple studies within overlapping populations are presenting challenges to patient enrolment. Given its size and level of productivity, the CCCTG has surprisingly limited central infrastructure and administrative and management support.

The continuing growth of the CCCTG calls for operational changes to enhance the organization's activities, particularly its scientific meetings, but also the supports and central infrastructure that are essential to coordinating and supporting large-scale research activities.

Goals to Advance Operations and Infrastructure

The following four goals are proposed to enhance the operations and infrastructure of the CCCTG.

2-1 Strengthen the scientific meetings of the CCCTG for optimal peer review and member engagement.

The growing numbers of research projects and investigators seeking peer review and collaboration have strained the capacity to provide adequate time for constructive discussion and feedback at the CCCTG's scientific meetings. As a result, overall meeting effectiveness and member engagement have suffered. There is broad agreement on the need for (1) clarity about the peer review mechanisms for research programs at various stages of a project's life cycle (see Figure 1) and (2) new approaches to the organization of the scientific meetings to deal with an increasingly complex agenda and to meet the goals of critical appraisal and constructive input. Revisiting the goals of these scientific meetings may be helpful in considering new structures and processes.

Guiding principles

Several guiding principles have been emphasized by CCCTG members with respect to changing the structure and format of scientific meetings:

- *Ensuring opportunities for investigators to receive input from broad and diverse perspectives*
- *Ensuring equal opportunity to present at scientific meetings*
- *Ensuring transparency of proposed changes for scientific meetings*
- *Encouraging testing and evaluation of new meeting approaches*
- *Protecting scheduled leisure and recreation time*
- *Ensuring responsiveness to member interests and perspectivest*

The following are among suggestions for improving peer review and the structure of the scientific meetings that have been put forward:

- Two-tier programming: shorter presentations for new ideas and longer presentations for more fully developed research proposals
- Formalized criteria and guidelines for presentations
- Vetting of requests for presentations of new ideas, to ensure readiness and linkage to guidance or mentorship
- Formalized criteria for the CCCTG's adoption of research proposals and for investigators' commitments to collaborate in patient recruitment
- More formal process for deciding if a proposal is ready for grant submission (similar to that used by the Pediatric Acute Lung Injury and Sepsis Investigators Network)
- Process for formal feedback to investigators on their CCCTG presentations
- Discussion of ongoing CCCTG studies to facilitate the success of and colleagues' commitment to patient recruitment
- Process for formal review of existing research proposals before and during CCCTG meetings
- Development of alternative peer review mechanisms for investigators who require support or feedback but do not yet meet criteria to present at a CCCTG scientific meeting

CCCTG members value highly the peer review processes, the support and guidance of other investigators, and the collegial and welcoming spirit of the scientific meetings.

Figure 1: Key elements of ICU Rsearch Programs

Phase I

- Systematic review of treatments
- Examination of practice variation
- Etiology of disease
- Incidence, risks and burden of problem
- Association between risks and outcomes
- Defining outcomes

Phase II

- National Practice Survey
- Surveying patients
- Pilot and feasibility studies
- Systematic review of existing guidelines

Phase III

- Large RCT

Phase IV

KT Strategy that includes measuring implementation into practice (overall risks, benefits and costs)

- Economic evaluation
- Practice guidelines
- Large practice-based cluster trial

The growth of CCCTG membership and associated research activity signals the need for better processes to deal with more complex scientific agendas while maintaining or improving the current peer review process and optimizing the use of time and expertise at scientific meetings.

2-2 Improve productivity and accountabilities to increase patient enrolment in trials

One of the biggest challenges for large multicentre trials is timely and efficient enrolment of patients to meet target participant numbers within the expected timeframe for trial completion. The simultaneous conduct of multiple trials places even greater pressures on the relatively limited number of clinical recruiting sites and research personnel at those sites. It will be important for the CCCTG to ensure that it can provide the necessary support to clinical sites and implement better monitoring and accountability mechanisms related to patient enrolment.

Opportunities must also be explored to expand the number of centres that recruit patients, in particular by reaching out to other academic and community hospital sites for engagement in research studies and recruitment of patients.

2-3 Establish central network resources

The CCCTG's commitment to high-quality research must be supported by quality assurance

and quality assessment tools, standard operating procedures, training of research coordinators and research staff, improvement of source verification processes, audit readiness, and other quality initiatives.

The CCCTG has long discussed the need for standardized network resources that would be useful for many projects, including template contracts, standardized case report forms, common definitions and standardized operating procedures. Efforts to standardize definitions and data collection for items such as DOB, MODS, SOFA, PELOD, APACHE II, PRISM-III, comorbidities and adverse events should be fast-tracked. Standard definitions and data elements are foundational to national data collection and minimum data sets.

> *"Our number one priority is to secure sustainable funding for core resources that can be shared across all investigators – standardized templates and tools, data management and data platforms, project management, supports for new sites, and other services."*
>
> *—Paul Hébert, Chair, CCCTG*

Planning for nationwide minimum data collection for all patients admitted to an ICU will allow for future pan-Canadian quality improvement initiatives and is therefore a priority focus of the CCCTG. The development of national platforms would provide strong support for all investigators in terms of data management and methods centres, national data collection and minimum data sets, national audits, biobanks and other infrastructure. The potential for electronic data capture by systems like Clinical DataFax Systems and REDCap (Research Electronic Data Capture) might be explored. It has been suggested that existing databases from completed trials may be of interest to other investigators and that an inventory of databases is required.

Concerns related to the slow speed and complexity of gaining approval for clinical trials suggest that attention be paid to improving processes for ethics approvals and standardizing consent processes, particularly for large multicentre trials. Connecting with the Canadian Association of Research Ethics Boards may be a first step in this regard.

Core infrastructure and central resources represent a high priority for the CCCTG. Ideally, new sustainable funding sources would support a central infrastructure to coordinate the development of standardized resources for investigators, support new national platforms, administer member services, track research activity and publications, facilitate communications and engage with new sites. Opportunities for shared infrastructure may be explored with potential partners, such as Tech Value Net.

2-4 Enhance internal communications and sharing of tools

The CCCTG, as a volunteer member organization, must continually strive to facilitate communications across the organization and to support the research work of its members. A number of initiatives are under way and in development to enhance communications and online supports for members. The following are some examples:

- Website and online tools to facilitate collaborative work within the CCCTG: project-specific document sharing, posting of generic standardized documents (e.g., case report forms, screening forms, research ethics board applications, template protocols)
- Databases for tracking membership, expertise, research programs, publications
- Web-based tools to support fee payments
- Web-based tools to facilitate peer review processes, allowing for uploading of grant applications, manuscripts and reviews (with controlled access)
- Automated email and mail tools for groups
- Supports for web-based tutorials (to facilitate training of peers, research coordinators, trainees) and virtual meetings

Future initiatives may include news feeds, Twitter accounts and other social media for internal communications and collaborations.

How will we know that we have achieved our operations and infrastructure goals?

- Increased number of members receiving high-quality constructive feedback on their research programs
- Increased satisfaction and higher scores on evaluations of CCCTG scientific meetings
- Shorter project completion times
- Increased number of patients enrolled per site (through greater recruitment efficiency) and increased number of sites involved in CCCTG activities
- Improved efficiencies in developing and executing research protocols through access to standardized templates, data platforms and other common supports
- Development of a national platform for patient-level data collection, describing patients, the care provided, outcomes, quality of care, impact of the work
- Higher success rate of projects supported by the CCCTG (i.e., richer discussions and feedback for active projects; increased number of research grants and greater dollar amounts)
- Increased use of online tools, tutorials and meetings

Strategic Direction 3: Education and Mentorship

Nurture and support aspiring investigators and future leaders in critical care research

The CCCTG has long been committed to developing and mentoring the future generation of critical care scientists for successful research careers. We hope to build lasting mentorship and education programs.

In the coming years, we will develop education days for research fellows, monthly webinars, research electives and career planning. We will also encourage research fellows to present at the CCCTG scientific meetings.

A recent survey of critical care trainees indicated strong support for the establishment of a Canadian critical care trainees network that would focus on supporting trainees in their career development. A significant opportunity exists for the CCCTG to collaborate with and support the goals of such a network.

In fall 2012, the CCCTG Education Committee launched a survey of critical care fellows, program directors, CCCTG research coordinators, new faculty (with less than five years' experience) and the CCCTG membership to examine the needs for critical care research education in Canada. The limited response to date points to three main findings:

- Possible differences of opinion as to whether fellows are trained well enough in the workings of research
- Evidence that other sources of research education are available within academic programs
- Perception of CCCTG's primary role as mentorship and protocol evaluation

The CCCTG also hosts an annual workshop for critical care research coordinators, where

members of the Canadian Critical Care Research Coordinators Group gain knowledge about all aspects of research, participate in working groups to develop shared resources, engage in studies led by research coordinators and network with their colleagues from across the country.

The Strategic Planning Committee undertook an environmental scan of established research networks in Canada and the United States to develop an understanding of the scope of education and mentorship in critical care. Information from interviews with representatives of 13 research networks confirmed that the CCCTG's strengths with respect to education and mentoring (especially opportunities for collaboration and networking at in-person meetings) as well as its challenges in this area (competition for time and stable funding) are shared by other networks. The environmental scan pointed to the need for clarity as to who constitutes the learner population in critical care research, as well as what unique educational offerings could be provided by the CCCTG.

Changing practice – stopping the clot!

The question: *What are the best treatments to prevent blood clots in the legs and lungs?*

The findings: *We recently undertook a large international study to compare a new, more expensive blood thinner, enoxaparin, with a much cheaper drug called heparin. We found that the more expensive treatment prevented more dangerous clot formation without causing any life-threatening bleeding. The results of this large randomized trial were published in the prestigious* New England Journal of Medicine.

The impact of the research: *Enoxaparin is now being recommended in many guidelines and protocols around the world (11).*

Goals to Advance Education and Mentorship

The following three goals are proposed to strengthen education and mentoring as a key mandate of the CCCTG.

3-1 Revise educational programs and curricula targeting trainees who have research training and are exploring academic or research careers.

There is agreement that the CCCTG cannot provide the basics of research education. Rather, we must focus its efforts on learners who already have some fundamental training in this area and are exploring the possibility of an academic or research career. Models such as ACADEMT at McMaster University could be considered, whereby monthly meetings are held (in person or via the Internet) to discuss career development, research development or research projects. The value of including graduate science students along with clinical trainees has been highlighted. The importance of travel stipends for in-person meetings has also been acknowledged. The opportunity for regional coordination of educational sessions should also be explored and leveraged where possible.

Limited attendance at the annual Fellows Day suggests the need for greater outreach to program directors and trainees to ensure that the curriculum is relevant and that

the appropriate supports (e.g., travel stipends) are available. Ideally, the Fellows Day will become a highly sought-after program offering significant support to prospective attendees.

The curricular content of the CCCTG's educational offerings should focus on topics not already offered in local fellowship or graduate programs. The survey of critical care fellows that is currently under way will provide further information about their educational needs and interests.

Future educational offerings may include online instructional sessions, webinars and other forums (e.g., Trials Group School) to supplement in-person events.

3-2 Develop integrated educational programs for faculty, research coordinators and trainees

A significant opportunity exists for the CCCTG to build on its interdisciplinary, collaborative and integrative culture by developing integrated educational programs such as workshops for faculty, coordinators and trainees, especially in new scientific areas (e.g., quality of care).

One of our scientific sessions of the spring 2013 meeting

3-3 Formalize CCCTG mentorship, and track mentorship activities

The CCCTG plays a significant role in the mentorship of new investigators. Mentorship activities are often highly targeted in relation to particular research methodologies, processes, areas or topics that may not be sufficiently covered by local or regional supervisors or mentors. This mentorship is highly valuable to investigators' success. Documentation or tracking of mentoring activities would be beneficial to future applications for training grants, network grants and other types of funding for which training and mentorship are critical. The development of documentation and tracking processes is therefore a high priority.

Future considerations in this area include a database of mentors, online mentoring sessions and mentor recognition.

How will we know that we have achieved our education and mentoring goals?

- Increased educational offerings for targeted learners
- Increased numbers of basic and clinical learners accessing educational offerings
- Increased attendance at Fellows Day
- Availability of new integrated educational programs engaging faculty, coordinators and trainees
- Increased numbers of posters, presentations, grant applications and manuscripts prepared by learners
- Enhanced documentation and tracking of mentorship activity within the CCCTG
- Increased numbers of awards obtained by fellows and young investigators

Strategic Direction 4: Partnerships and Engagement

Foster partnerships and stakeholder engagement to enhance the CCCTG's research and impact on critical care

The CCCTG has considerable experience in collaborations, both nationally and internationally, and many of these efforts have involved shared research programs. The CCCTG is now looking to explore more formal partnerships that will assist in advancing its research agenda, in obtaining resources for infrastructure support and in increasing the impact of its research. Potential partners include academic and community institutions, as well as agencies and governments at both the provincial and national level. In considering its partnerships, whether new or established, the CCCTG acknowledges the potential for both risks and advantages.

An advantageous partnership for the CCCTG may be described as one in which the CCCTG achieve its objectives while remaining true to its own values and promoting its own sustainability. From the CCCTG's perspective, a net benefit is likely to result when one or more of the potential advantages outweigh the potential risks.

Potential Advantages

- Improves funding or access to other resources
- Improves the CCCTG "brand"
- Increases and/or fosters research opportunities
- Improves efficiency in achieving CCCTG research goals
- Increases the impact of CCCTG work

Potential Risks

- Leads to loss of control of scientific agenda
- Leads to loss of control of "the way we do things" (e.g., collegiality)
- Increases burden on membership (e.g., through number of meetings)
- Leads to loss of control of the CCCTG "brand"

The Strategic Planning Working Group on Communications and Partnerships undertook an early assessment of potential partners, outlining areas of interest, advantages and risks. This assessment will form the basis for further exploration of partnerships.

Goals to Strengthen Partnerships and Engagement

The following three goals are proposed to strengthen the partnerships of the CCCTG.

4-1 Develop strategic partnerships with institutional, provincial and national organizations to identify research priorities and enhance the impact of CCCTG research

New or expanded partnerships at the institutional, provincial and national level are expected to focus on improving access to funding or other resources, increasing opportunities for research and knowledge translation, and increasing the impact of the CCCTG's research on policy and on clinical care. The CCCTG has already begun to strengthen its ties to academic hospitals and is actively engaging with ministries of health and of industry and innovation in some provinces.

"There are opportunities for the CCCTG to align with health care system directions and priorities at provincial and local levels. Engaging with provincial bodies may yield shared interests in research topics and knowledge translation for impact on patient care. CCCTG should consider undertaking policy/practice research and implementation science."

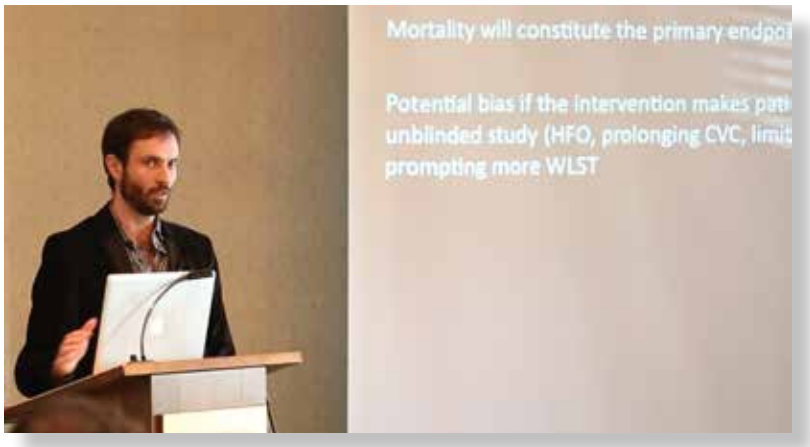
—Tom Noseworthy

The CCCTG maintains a strong partnership with the Canadian Critical Care Society, specifically in the areas of knowledge translation and development of guidelines for clinical practice. Opportunities may be explored for sharing infrastructure resources, membership services and supports, web resources and fundraising with this organization. Other potential partners include the Canadian Intensive Care Foundation, the Critical Care Canada Forum and the Canadian Association of Critical Care Nurses, among many others.

4-2 Foster international partnerships and collaborations in critical care research

The CCCTG has a solid track record of leading and participating in international critical care trials. In particular, international collaborations are often necessary to enrol the large number of patients required for multicentre trials.

In addition to the CCCTG, the community of critical care research groups around the world includes the Acute Respiratory Distress Syndrome Network, the Australian and New Zealand Intensive Care Society Clinical Trials Group, the Gruppo Italiano per la Valutazione degli Interventi in Terapia Intensiva Network, the Irish Critical Care Trials Group, the Latin American Sepsis Institute, the Pediatric Acute Lung Injury and Sepsis Investigators Network, the Scandinavian Critical Care Trials Group, the Scottish Critical Care Trials Group, the SepNet trials group of the German Sepsis Society and the United States Critical Illness and Injury Trials Group. These groups and others have come together to create the International Forum for Acute Care Trialists (INFACT), an international collaborative promoting cooperation and collaboration among investigator-led acute care research groups from around the world. There may be other opportunities to explore shared research initiatives through similar collaborations.



Francois Lamontagne presenting the OVATION trial

The CCCTG is highly regarded among the leading critical care research groups and is well positioned to build partnerships and collaborations with international groups and thus to increase its own research opportunities. In exploring potential partnerships, the CCCTG is interested in advocating for and safeguarding its intellectual property and its ideas for CCCTG-led research. It is proposed that formalized principles or terms of engagement be developed that will provide mechanisms for prioritizing and protecting CCCTG's research. Such terms may include guidelines for inviting guests to CCCTG meetings and for disclosure of information to researchers outside the CCCTG.

4-3 Advance a stakeholder engagement strategy to include patients and their families, citizens, and policy- and decision-makers

The CCCTG is committed to improving the engagement of patients and decision-makers by setting up new advisory groups and fostering input from patients and other citizens

through citizen councils and focus groups. Efforts are under way to explore how the interests of our many stakeholders may be reflected in setting priorities and implementing research results. An environmental scan on practices for public engagement has been outlined as an early implementation initiative.

How will we know that we have achieved our partnership and stakeholder engagement goals?

- Increased institutional, provincial and national partnerships, bringing new resources to the CCCTG for research and infrastructure
- Development of principles and terms of engagement for international collaborations and partnerships
- Increased number of international collaborative research programs
- Increased engagement with INFACT working groups
- Increased patient recruitment and shorter times to trial completion through partnerships
- Development of new research programs involving partners
- Increased knowledge translation activities affecting policy and/or clinical practice
- Engagement of patients and their families, the general public, and policy- and decision-makers in research

Enabling and Supporting Strategies

To move forward in these four strategic directions, several enabling and supporting strategies are required, beginning in the first year of the plan.

Enabling Strategy	Goal
Funding and Sustainability	**Goal: Identify and implement targeted revenue strategies to increase annual revenues to $5 million per year.** Securing sustainable funding will be the key enabler for the CCCTG to achieve its vision and mission. A number of alternative revenue strategies have been identified as priority funding sources, including network grants, provincial government funding and institutional–CCCTG partnerships. A task force will be struck to review the risks and benefits associated with CCCTG–industry funding partnerships.
Communications (External)	**Goal: Enhance the CCCTG's interface with the public and other external audiences, building on a shared vision of improved care for critically ill patients.** The CCCTG seeks to strengthen its interfaces and build its profile with external audiences, including other research organizations, health care provider organizations, governments, media and the general public. Specific communication tools and approaches must be customized to each audience and to the key messages being conveyed. Early efforts should focus on clarifying the intended audiences and information priorities, increasing website content appropriate to broader audiences, customizing the "messaging" of research findings for wide distribution and designing communications vehicles (e.g., brochures, videos). If the CCCTG decides to explore potential fundraising opportunities, materials must be developed for that purpose.

Enabling Strategy	Goal
Governance	**Goal: Renew CCCTG governance, organizational structure and decision-making processes to enable achievement of the new strategic vision and directions.** The CCCTG is guided by a constitution that was developed in 2006. Currently, decision-making and structural renewal processes are informal and have evolved over the years. Lack of formal status as a corporate not-for-profit organization may be less than desirable with respect to liability and fund-raising. A governance review has not been undertaken for some time, and it is therefore timely to identify this as a priority for the next 12 to 18 months. Attention should also be paid to succession planning for leadership roles.

Implementation and Measurement

This Strategic Plan has outlined a broad range of goals across four key strategic domains. To ensure that these goals are achieved in a timely manner, there will be appropriate oversight, implementation and measurement of the plan. An accountability framework will guide implementation of the plan.

Implementation Oversight and Guidance

The CCCTG Executive Committee will provide leadership and oversight for implementation of the Strategic Plan. Individuals will be chosen to lead each strategic direction. Standing committees such as the Education Committee will provide leadership for relevant parts of the plan. The Executive Committee will develop a monitoring and tracking process, will confirm the specific measures and indicators to be used and will report to the membership regularly on progress.

Measures and Performance Indicators

The CCCTG Executive Committee will select and measure performance indicators that track strategic priorities and goals.

Performance measures and indicators should include both traditional and novel metrics specific to this Strategic Plan. The following list is considered a starting point for further development:

Research	Value of research funding, number of publications, number of citations and impact factors
	Securing at least 1 network grant
	Number of clinical trials under way and number of patients involved
	Unit-specific recruitment rates and other unit-level metrics of activity
	Number of trials on track with targeted milestones
	Number of knowledge translation initiatives, e.g., clinical guidelines
Operations and Infrastructure	Number of members receiving high-quality, constructive feedback on their research programs
	Evaluation scores at scientific meetings
	Time to completion of research initiatives
	Scope of central resources and databases
	Development of a national platform for patient-level data collection describing patients, the care provided, outcomes, quality of care, impact of the work
	Use of online tools, tutorials and other documents
Education and Mentoring	Number of attendees at educational events
	Support from program directors and others for trainee attendance
	Numbers of projects, posters, grants and manuscripts prepared by learners
	Tracking of mentorship activities
Partnerships and Engagement	Number of institutional, provincial and national partnerships
	Number of international collaborations
	Measure of increased resources for critical care research
	Number of knowledge translation initiatives undertaken through partnerships
	Engagement in INFACT and other global research groups
Funding and Sustainability	Growth in infrastructure funding
Communications	Website hits, media coverage
	Donations and fundraising
Governance	Number of members

Implementation Activities: Year 1

The Strategic Plan outlines a broad range of goals. It will not be possible to move forward on all of them at the same time. The following implementation activities have been identified as priorities for the first year and will be a solid foundation for work on the remaining goals in future years.

Strategic Direction	Implementation Activities: Year 1
Research	Identify key themes, an overarching organizational framework, gaps and opportunities in CCCTG research activities. Build capabilities in core functions, platforms or methodologies that will support CCCTG programs of research. Prepare and submit application for CIHR SPOR Network grant. Select relevant traditional and non-traditional measures of research impact as performance measures for strategic directions.
Operations and Infrastructure	Refine the CCCTG's scientific meetings for efficient and effective approaches to peer review, member support and collaboration. Develop templates and formats for presentations and formal peer review. Introduce evaluation mechanisms for scientific meetings. Introduce monitoring and accountability processes for patient recruitment. Establish a team to develop common definitions, to standardize data collection and to prepare for a national database. Implement standardized processes for verification of source data, as well as standardized operating procedures and other quality assurance processes. Establish an approach that will be used to select and work with methods centres. This may include establishing a competitive process such as requests-for-proposal process and setting standards for deliverables. Develop a communication plan and data-sharing tools to facilitate collaborations among members and to support scientific activities (e.g., meetings, peer review).

Strategic Direction	Implementation Activities: Year 1
Education and Mentorship	Assess the research education needs of Canadian critical care fellows working in clinical and research settings. Host a workshop in specific areas of science (e.g., health services and systems, quality of care and patient safety research). Survey research faculty and coordinators about their educational needs, and clarify the supports and barriers to attending educational programs. Develop mechanisms to document and track mentorship activity.
Partnerships and Engagement	Seek partners (e.g., provincial ministries of health and of industry and innovation) for CIHR SPOR grant application. Engage with institutions (academic and clinical) to partner on specific grant and research initiatives. Formalize principles to guide collaborations with international research networks and find creative ways to increase these collaborations. Conduct an environmental scan of effective public engagement strategies

Enabling and Supporting Strategies

Funding and Sustainability	Pursue funding partners who can provide matching funds ($10 million to $12 million) for CIHR SPOR grant, with priority being given to provincial governments and institutions. Develop a business plan to confirm and elaborate on optimal funding sources and strategies to support strategic directions.
Communications	Develop key messages for targeted external audiences.
Governance	Undertake a formal review of governance, organizational structures and decision-making to align with new strategic vision and directions. Establish a paid executive director position and recruit someone to fill the position. Investigate the merits and feasibility of establishing the CCCTG as an incorporated entity.

Concluding Remarks

This is an exciting time for the CCCTG. We have the opportunity to build on more than 20 years of extraordinary success, having earned an outstanding international reputation, with an exceptional track record of large multicentre clinical trials, numerous publications in high-impact journals and the generation of research that has changed the practice of critical care around the world. The CCCTG has led the way with innovative trials methodology and design, has been a model for at least 10 other national networks and has demonstrated the effectiveness of critical care practice in improving care and saving lives. More recently, we have expanded our repertoire of research activities well beyond clinical trials to include large multicentre observational studies and knowledge translation activities.

In the next five years, we are poised to have an even greater impact nationally and internationally, provided we can harness the resources required to build effective research, evaluation and monitoring infrastructure and platforms, to better align and coordinate evaluation programs across multiple jurisdictions and to actively engage patients, families and decision-makers in key choices.

We hope that the CCCTG will become the model of comparative effectiveness and patient-centred research for other disciplines, that it will enhance its research readiness for public health threats and that it will achieve its vision of collaborating to advance the care of our sickest patients through excellence in research. With the ongoing commitment of our members and strategic partners to a shared vision and the ambitious directions outlined in this plan, we will continue to be recognized for significant contributions, both leading science and improving lives in Canada and across the globe, for many years to come.

References

1 Leeb, K, Jokovic, A. Sandhu, M, and Zinck, G. 2006. CIHI Survey: Intensive care in Canada. *Health Quarterly* 9:32-33.

2 Needham, DM, Bronskill, SE, Sibbald, WJ, Pronovost, PJ, and Laupacis, A. 2004. Mechanical ventilation in Ontario, 1992–2000: incidence, survival, and hospital bed utilization of noncardiac surgery adult patients. *Crit. Care Med.* 32:1504-1509.

3 Root, HD. 1990. The way were were: 1989 presidential address, American Association for the surgery of trauma. *J. Trauma* 30:1309-1315.

4 Laupland, KB, Svenson, LW, Grant, V, Ball, CG, Mercado, M, and Kirkpatrick, AW. 2010. Long-term mortality outcome of victims of major trauma. *Injury* 41:69-72.

5 From 1980 to 2010, the mortality rate in Canadian pediatric ICUs has dropped even more, from 36% to 3.6%.

6 Jacobs, P, and Noseworthy, TW. 1990. National estimates of intensive care utilization and costs: Canada and the United States. *Crit. Care Med.* 18:1282-1286.

7 Halpern, NA, Bettes, L, and Greenstein, R. 1994. Federal and nationwide intensive care units and healthcare costs: 1986–1992. *Crit. Care Med.* 22:2001-2007.

8 Ferguson ND, Cook DJ, Guyatt GH, Mehta S, Hand L, Austin P, Zhou Q, Matte A, Walter SD, Lamontagne F, Granton JT, Arabi YM, Arroliga AC, Stewart TE, Slutsky AS, Meade MO; OSCILLATE Trial Investigators; for the Canadian Critical Care Trials Group. High-frequency oscillation in early acute respiratory distress syndrome. *N Engl J Med.* 2013 Feb 28;368(9):795-805.

9 Heyland D, Muscedere J, Wischmeyer PE, Cook D, Jones G, Albert M, Elke G, Berger MM, Day AG, for the Canadian Critical Care Trials Group. A randomized trial of glutamine and antioxidants in critically ill patients. *N Engl J Med.* 2013 Apr 18;368(16):1489-97.

10 Hebert, PC, Wells, G, Blajchman, MA, Marshall, J, Martin, C, Pagliarello, G,

Tweeddale, M, Schweitzer, I, Yetisir, E, and the Transfusion Requirements in Critical Care Investigators for the Canadian Critical Care Trials Group 1999. A multicentre randomized controlled clinical trial of transfusion requirements in critical care. *N. Engl. J. Med.* 340:409-417.

11 The PROTECT Investigators for the Canadian Critical Care Trials Group & the Australian and New Zealand Intensive Care Society Clinical Trials Group. A Randomized Trial of Dalteparin versus Unfractionated Heparin in Critically Ill Patients. *N Engl J Med* 2011;364(14):1305-1314. PMID: 21417952

12 Herridge, MS, Tansey, CM, Matté, A, Tomlinson, G, Diaz-Granados, N, Cooper, A, Guest, CB, Mazer, CD, Mehta, S, Stewart, TE, Kudlow, P, Cook, D, Slutsky, AS, Cheung, AM; for the Canadian Critical Care Trials Group. Functional disability 5 years after acute respiratory distress syndrome. *N Engl J Med.* 2011 Apr 7;364(14):1293-304.

13 The NICE SUGAR Study Investigators for the Australian and New Zealand Intensive Care Society, the George Institute for International Health, for the Canadian Critical Care Trials Group, and the Vancouver Coastal Health Research Institute. Intensive versus conventional glucose control in critically ill patients. *N Engl J Med* 2009;360(13):1283-1297.

14 Hutchison, SJ, Ward, RE, Lacroix, J, Hébert, PC, Barnes, MA, Bohn, DJ, Dirks, PB, Doucette, S, Ferguson, D, Gottesman, R, Joffe, AR, Kirpalani, HM, Meyer, PG, Morris, KP, Moher, D, Singh, RN, Skippen, PW, for the Hypothermia Pediatric Head Injury Trial investigators and for the Canadian Critical Care Trials Group. Hypothermia Therapy Following Traumatic Brain Injury in Children. *N Engl J Med.* 2008 Jun 5;358(23):2447-56.

15 Lacroix, J, Hébert ,PC, Hutchison, JS, Hume, HA, Tucci, M, Ducruet, T, Gauvin, F, Collet, JP, Toledano, BJ, Robillard, P, Joffe, A, Biarent, D, Meert, K, Peters, MJ, on behalf of the TRIPICU investigators, *f*or the Canadian Critical Care Trials Group and the Pediatric Acute Lung Injury and Sepsis Investigators (PALISI) Network. Transfusion Requirements In Pediatric Intensive Care Units: A Noninferiority Trial. *N Engl J Med* 2007;356(16):1609-1619.

16 The Canadian Critical Care Trials Group. A randomized trial of diagnostic techniques and empiric broad-spectrum antibiotics for suspected ventilator-associated pneumonia. *N Engl J Med* 2006;355(25):2619-2630.

17 Cook, DJ, Rocker, G, Marshall, J, Sjokvist, P, Dodek, P, Griffith, L, Freitag, A, Varon, J, Bradley, C, Levy, M, Finfer, S, Walter, S, Guyatt, GH, for the Level of Care Study Investigators and The Canadian Critical Care Trials Group. Withdrawal

of mechanical ventilation in anticipation of death in the intensive care unit. *N Engl J Med* 2003;349:1123-1132.

18 Herridge, MS, Cheung, AM, Tansey, CM, Matte-Martyn, A, Diaz-Granados, N, Al-Saidi, F, Cooper, A, Guest, C, Mazer, D, Mehta, S, Stewart, T, Barr, A, Cook, DJ, Slutsky, A, for The Canadian Critical Care Trials Group. One year outcomes in survivors of the acute respiratory distress syndrome. *N Engl J Med.* 2003 Feb 20;348(8):683-93.

19 Sandham, JD, Hull, RD, Brant, RF, Knox, L, Pineo, GF, Doig, CJ, Laporta, DP, Viner, S, Passerini, L, Devitt, H, Kirby, A, Jacka, M, for The Canadian Critical Care Trials Group. A randomised controlled trial of the use of pulmonary-artery catheters in high-risk surgical patients. *N Engl J Med.* 2003 Jan 2;348(1):5-14.

20 Cook, DJ, Guyatt, GH, Marshall, J, Leasa, D, Fuller, H, Hall, R, Peters, S, Rutledge, F, Griffith, L, McLellan, PA, Wood, G, Kirby, A, Tweeddale, M, Pagliarello, J, Johnston, R, for The Canadian Critical Care Trials Group. A comparison of sucralfate and ranitidine for prevention of upper gastrointestinal bleeding in patients requiring mechanical ventilation. *N Engl J Med* 1998;338(12):791-797.

21 Cook, DJ, Fuller, H, Guyatt, GH, Marshall, JC, Leasa, D, Hall, R, Winton, TL, Rutledge, F, Todd, TRJ, Roy, P, Lacroix, J, Griffith, LE, Willan, A, for The Canadian Critical Care Trials Group. Risk factors for gastrointestinal bleeding in critically ill patients. *N Engl J Med* 1994;330:377-381.