

# The Perfusionist

August 2014 aout ✦ Volume XXIV, Number II  
Tempora mutantur ✦ nos et mutamur in illis

The Official Publication of  
Canadian Society of Clinical Perfusion

La publication officielle de la  
Société Canadienne de Perfusion Clinique



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# Perfusionist

August 2014 août  Volume XXIV, Number II  
Tempora mutantur  nos et mutamur in illis

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## Mission Statement ❖ Rôle de la Société

The mission statement of the Canadian Society of Clinical Perfusion is to encourage and foster the development of clinical perfusion through education and certification so as to provide optimum patient care.

La mission de la société canadienne de perfusion clinique est d'encourager et de promouvoir le développement de la perfusion clinique à travers l'éducation et la certification, de manière à assurer des soins de qualité.

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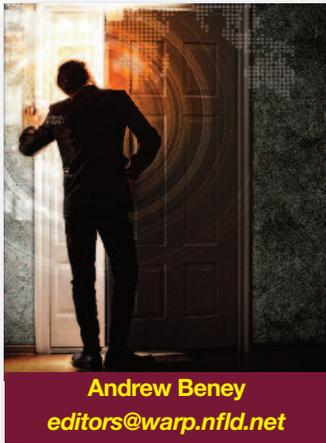
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**November 7 novembre**



**Andrew Beney**  
[editors@warp.nfld.net](mailto:editors@warp.nfld.net)

When I first looked into perfusion as a profession back in the late 80's and early 90's, I did a lot of searching into what this profession was. What do you think I found? Nothing. It was almost as if Perfusion were a protected profession; a black box profession. I did, however, find a professor from the Physiology Department at the University of Toronto, Dr. Bayliss, who was uniquely knowledgeable in perfusion. Although I doubt very few perfusionists would have heard of him, he was like a father figure and mentor to both pure science and medical students at U of T during the late 80's and early 90's, and really, one of the very few professors that I clearly remembered from those old days. He was instrumental in helping me understand what was involved with perfusion. Interestingly, there was one statement he made about our profession that clearly stood out in my mind: "Perfusion is a profession where you get out of it what you put into it."

Skip ahead a couple decades. We are slowly moving away from that black box mentality, and guess what? Several decades later, that description of our profession made by Dr. Bayliss, still holds true, more so than ever!

So what do those two elements have in common with our website? First, we are moving away from the black box model of perfusion. A question that I am constantly asked is "What is a perfusionist, and what do you do?" Our profession is responding; having Perfusion Week events. Becoming more multidisciplinary. Our website is our newest tool in public, patient, and perfusion education. In addition to offering a layman aspect of our profession, we will also be able to share information with our professional counterparts.

Second, the other element of getting what you put into the profession is very true for our website. Much of the material that will be appearing on the website will come from our profession, for the betterment of our profession. Those people who want to actively engage with their peers will have this website at their disposal.

The website is more than a dues collection tool. It is a communication tool for the members to use. If you have a solid idea of concept that should be shared within the perfusion community, the website is flexible enough to accommodate. If we actively contribute, our site will become a rich and comprehensive site. If you just sit back and watch, the site will get there, but it will get there a bit longer.

Quand j'ai commencé à m'intéresser à la perfusion vers la fin des années 80 et au début des années 90, j'ai effectué beaucoup de recherches sur cette profession. Que pensez-vous que j'ai trouvé? Rien. C'était presque comme si la perfusion était une profession protégée; une profession «boîte noire». Cependant, j'ai réussi à trouver un professeur du département de physiologie de l'Université de Toronto, Dr. Bayliss, qui avait une connaissance unique de la perfusion. Même si je doute que peu de perfusionnistes ont entendu parler de lui, il était un mentor et une figure paternelle pour les étudiants de sciences pures et de médecine de l'Université de Toronto durant les années 80 et début 90. Il est un des rares professeurs dont je me rappelle clairement de ce temps-là. Il a été d'une grande aide pour me faire comprendre ce que la perfusion impliquait. Fait intéressant, il a fait une remarque à propos de notre profession qui me reste clairement à l'esprit: "La perfusion est une profession dont on retire l'équivalent que ce qu'on y met."

Sautons en avant de deux décennies. Nous nous éloignons lentement de la mentalité de la «boîte noire», et devinez quoi? Plusieurs décennies plus tard, la description que Dr Bayliss a faite de notre profession est encore exacte, maintenant plus que jamais!

Alors qu'ont en commun ces deux éléments avec notre site web? Premièrement, nous nous écartons du modèle de la boîte noire en perfusion. On me pose constamment la question: «Qu'est-ce qu'un perfusionniste, et qu'est-ce que tu fais?» Notre profession y répond en organisant les activités de la Semaine de la Perfusion, en devenant plus multidisciplinaire. Notre site web est notre tout dernier outil d'éducation pour le public, les patients et les perfusionnistes. En plus d'offrir de l'information accessible pour le public général, nous serons aussi en mesure de partager de l'information avec nos collègues.

Deuxièmement, l'affirmation selon laquelle on retire de la profession ce qu'on y met est très vraie en ce qui concerne notre site. Beaucoup du matériel qui sera publié sur notre site proviendra de notre profession, pour l'amélioration de notre profession. Tous ceux qui voudront s'engager activement avec leurs pairs auront le site à leur disposition pour le faire.

Le site web est bien plus qu'un outil de collecte de frais d'adhésion. Il est un outil de communication disponible pour tous les membres. Si vous avez une idée ou concept à partager avec la communauté de perfusion, le site web est assez flexible pour le faire. Si nous y contribuons activement, le site deviendra riche et complet. Si vous ne faites qu'attendre et regarder le progrès, nous y arriverons quand même mais ça prendra plus de temps.

Le site web de la Société est maintenant fonctionnel depuis deux mois. Même si le site est publié, nous en sommes encore à mettre au point les opérations; et il en sera ainsi probablement pour les quelques mois à venir.

The Society's web page has now been up and running for the past couple of months. Although we are live, we are still in the phases of tuning its operation; and this will likely continue for the next several months. This is not a small task. Although something that doesn't quite work well may seem to be a quick fix on the surface, may, in fact, involve some extensive coding behind the scenes. Like an iceberg, the majority of the website is the behind-the-scene! Since its launch, just about each and every day, there have been revisions made. Just remember that we are not at our final form yet, and if you come across any area of the site where you notice something awry, whether it be an incorrect link, incorrect information, or even a typo, please use the "Report a Problem" link located at the bottom of the page to notify us. Reported problems are looked into immediately.

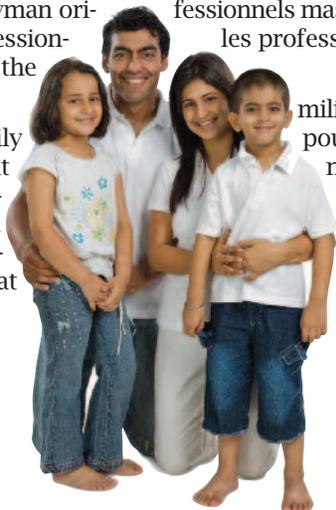
Compatibility issues have been our biggest bug in the system. It is impossible to offer support for every possible combination of operating system, browser, and device that exists in the world, and unfortunately, hospitals are notorious for using out-dated operating systems and browsers. The rule of thumb is that if you use a mainstream and current browser, with a mainstream and current operating system, the site will work with no problems. We have found that older versions of explorer and older windows operating system show varying degrees of dysfunction. If you have a problem with the website, first look at the operating system and browser that you are using. Our website works with Firefox, Chrome, and Safari. If you are using Explorer (less than 8), then you will probably experience issues.

Rather than looking at each and every detail of the website, in this editorial we will just discuss the landing page. Future discussions on the other sections will appear on the website shortly.

The landing page is designed to be clean and simple, and promotes our mission statement. This statement became lost with the old website, and was a challenge for any perfusionist to actually find our mission statement. The mission statement is an important part of our daily job, and so, is prominently displayed on our site. Most users will be exposed to it at least once when visiting our site.

The entry to the website is through one of two key photos. One is of the family, and the other, is of the three masked people. The family will take the visitor to the layman oriented part of the website, and the masked professionals will take you to the professional side of the website.

The family photo represents a typical family unit, and anyone within that photo can represent a patient. We should never forget that every patient we work with belongs somewhere within someone's family unit. The patient and their family component is clearly shown here, because, that is the reason d'être of our job.



Ce n'est pas une mince tâche. Même si un problème semble n'avoir besoin que d'un ajustement mineur en surface, il se peut qu'il demande un gros travail d'encodage. Comme un iceberg, la majorité du site est en coulisses ! Depuis son lancement, des révisions ont été faites pratiquement tous les jours. Rappelez-vous que nous n'en sommes pas encore à la forme finale, et que si vous voyez une anomalie, une mauvaise information ou même une coquille n'importe où dans le site, veuillez nous en aviser en utilisant le lien «Rapporter un problème» au bas de la page. Les problèmes qui nous sont rapportés sont traités immédiatement.

Le plus gros problème rencontré avec le système en est un de compatibilité. Il est impossible d'offrir du support pour toutes les combinaisons possibles de système d'exploitation, de navigateur et d'appareil qui existe dans le monde, et malheureusement, les hôpitaux sont reconnus pour l'utilisation de navigateurs et de systèmes désuets. En règle générale, si vous utilisez un navigateur et un système d'exploitation relativement répandus et récents, le site devrait fonctionner sans problème. Nous avons remarqué que les versions plus anciennes d'Explorer et de Windows semble démontrer des degrés variables de dysfonction. Si vous avez un problème avec le site, pensez d'abord à regarder quel système ou navigateur vous utilisez. Notre site fonctionne avec Firefox, Chrome, et Safari. Si vous utilisez Internet Explorer (version antérieure à 8), alors il est plus probable que vous rencontriez des problèmes.

Plutôt que de nous pencher sur chaque détail du site web, nous allons discuter seulement de la page d'accueil dans cet éditorial. Des discussions sur d'autres sections seront publiées directement sur le site web prochainement.

La page d'accueil a été conçue pour être simple et dégagee, et fait la promotion de notre mission. Cet énoncé s'était perdu dans notre ancien site, c'était un défi pour tout perfusionniste que de le trouver. Notre mission est une partie importante de notre travail au quotidien, alors il est affiché bien en vue sur notre site. La plupart des utilisateurs y seront exposés au moins une fois lors de leur visite du site.

L'entrée sur le site se fait par une des deux photos principales. Une représente une famille, et l'autre montre trois personnes masquées. La photo de la famille amènera le visiteur à la section du site orientée pour le public général, et les professionnels masqués vous conduiront à la partie du site visant les professionnels.

La photo de la famille représente une unité familiale typique, et n'importe qui sur cette photo pourrait être un patient. Nous devrions toujours nous rappeler que chacun de nos patients fait partie de la famille de quelqu'un. Le patient et sa famille sont clairement montrés ici, parce qu'ils sont la raison d'être de notre travail.

The three masked professionals represent our work triad. Perfusionists, doctors, nurses. Perfusionist, surgeon, anesthesiologist. It doesn't matter which, the triad is effectively represented. It is interesting to note that to find a picture of a typical "healthcare professional" that does not have a stethoscope in hand is almost impossible! Of the thousands (yes, thousands) of photos vetted for this cover position, all but a few were rejected because they had stethoscopes.

The third picture on the landing page is rather interesting. We felt that perfusion is more than just process and machinery. All too often, patients disappear behind a drape, and become nothing more than numbers on monitors. All too often, perfusionists are those people in the corner of the operating room that patients rarely interact with. It is very easy for the profession to become dissociated from the human aspect. To help remind us, and our patients, that we too are human, the landing page shows random photos that are taken by us perfusionists. Many perfusionists are avid photographers and have a prized collections of photographs. We encourage you to submit some of your photographs. We won't be showing photos of blood, or heart lung machines here; we see those everyday. This element is to help reconnect perfusionists together as people.

In the next chapter, we will look at some of the features of the professional side of the website. Stay tuned.



Halcyon Sunset, Photo by David

Les trois professionnels masqués représentent notre triade au travail. Perfusionnistes, docteurs, infirmières. Perfusionniste, chirurgien, anesthésiologiste. Il importe peu laquelle, la triade est ici représentée. Il est intéressant de noter qu'il est presque impossible de trouver une photo d'un professionnel de la santé typique sans stéthoscope à la main ! Des milliers (oui, oui, milliers) de photos considérées pour la page d'accueil, presque toutes sauf quelques-unes ont été rejetées car elles comportaient un stéthoscope.

La troisième image sur la page d'accueil est plutôt intéressante. Nous avons le sentiment que la perfusion est plus que des machines et des procédés. Bien trop souvent, les patients disparaissent derrière un champs, et ne deviennent que des chiffres sur un moniteur. Bien trop souvent, les perfusionnistes sont ces gens dans le coin de la salle d'opération avec qui les patients interagissent rarement. Il est trop facile pour la profession de se dissocier de son aspect humain. Pour nous en rappeler, la page d'accueil présente au hasard des photos prises par nous, les perfusionnistes. Plusieurs perfusionnistes sont des photographes accomplis et ont des collections impressionnantes de photos. Nous vous encourageons à nous envoyer quelques-unes de vos photos. Nous ne voulons pas montrer des images de sang ou de coeur-poumon artificiel, nous en

voyons tous les jours. Cet élément de la page d'accueil sert à rassembler les perfusionnistes en tant que personnes humaines.

Dans le prochain chapitre, nous verrons quelques caractéristiques du côté professionnel du site web. Restez à l'affût !



**Kathy Currado**  
 cscp@cscp.ca

Welcome to “Ask Kathy”, where my purpose is to help keep our membership informed about National Office issues and matters of interest to our members.

By now you are aware that the new CSCP website has been launched. Hallelujah! Praise the Lord!

Where we are now is amazing when I sit down and think about it. We are finally at the end of something that I've been dreaming about since putting together the business case for the redevelopment of the CSCP website back in early 2011. Reflecting back on this whole experience I thought this might be a good time to thank our Lead, Andrew Beney for a job well done. Without his leadership, incite, creative niche, organization, and continued dedication to this project I don't believe we could have pulled this off so successfully! He truly went above and beyond. I believe that surrounding a project with 3 completely different people who offer different skill sets is a recipe for success which leads me to my next thank you. Marie-France Raymond: We are so fortunate to have you as part of our committee. Not only for your dedication to ensuring our French culture is as robust and up to date as our English but for your dedication to the long-term viability of the project through your translation so we can offer better services to our overall membership.

We've been troubleshooting and will continue to work through the bugs over the next several months. We will also continue to add new content over the next several months. Everyone's patience through this process is much appreciated.

I would like to take this opportunity to remind everyone going forward to read the content within your Profile section carefully. This content was developed to guide you through the payment and recertification process. The side menus under “Your Information” are laid out in a logical order for the recertification process. Please do not submit your declaration of cases (Clinical activity) prior to logging your CEU Professional activity. The 80 case declaration is the FINAL step in the process of submitting your recertification to the National Office. If you change the order of submission, the result will be that you will no longer be able to see the CEU activities you have already logged.

The National Office has had some tremendous difficulty reaching members who use their hospital email accounts for communication. Hospital email quarantine systems are quite tough to penetrate. Unfortunately we can't support these issues so if you choose your hospital address as your username to our website you can risk missing out on important communications from your society. The majority of our communications going forward will be done via email. If you would like to change your email address/username to ensure safe delivery of our emails please contact the National Office.

I'd rather send out a mass email than hang posters all over the place.

- Todd Barry

I'd rather send out a mass email  
 than hang posters all over the place.

~ Todd Barry



**Kathy Currado**  
[cscp@cscp.ca](mailto:cscp@cscp.ca)

**B**ienvenue à « Demandez à Kathy » où mon objectif est de garder nos membres informés sur les sujets relatifs au bureau National et de tous autres sujets qui pourraient les intéresser.

A présent vous savez que le nouveau site Web de la SCPC a été lancé. Alléluoia! Louez le Seigneur!

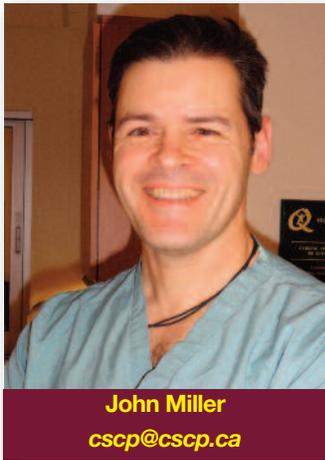
Quand j'y repense, je trouve extraordinaire de voir où nous sommes rendus maintenant. Nous avons réalisé quelque chose à laquelle je rêvais depuis que nous avons développé un plan pour le renouveau du site Web de la SCPC au début novembre. En repensant à cette période, je crois que c'est le moment de remercier notre responsable du projet, Andrew Bennet, pour son travail très bien fait. Sans son dévouement, sa vision et son sens de l'organisation, ce projet n'aurait pu être réalisé avec autant de succès. Ce projet a été mené par trois personnes de compétences différentes mais complémentaires. Cette vision créatrice m'incite maintenant à remercier Marie-France Raymond : nous sommes tellement chanceux de l'avoir comme membre de notre comité. Elle assure, par son dévouement, le rayonnement de la culture française et assure la viabilité à long terme du projet à travers ses traductions qui permettent d'offrir un service complet à tous nos membres.

Nous allons continuer d'améliorer notre plateforme dans les mois qui suivent et nous allons aussi ajouter du nouveau matériel. Nous apprécions votre patience.

J'aimerais prendre cette opportunité pour rappeler à chacun d'aller lire attentivement le contenu de votre section profil. Ce contenu a été développé pour vous aider à vous acquitter des frais annuels et pour accomplir le processus de « re » certification. Le menu sous « Votre information » est organisé de façon logique pour le processus de « re » certification. SVP ne pas soumettre votre déclaration de cas (activités cliniques) avant d'enregistrer vos activités professionnelles CEU. La déclaration des 80 cas cliniques est l'étape finale dans le processus pour soumettre votre « re » certification au bureau National. Si vous changez l'ordre de soumissions, le résultat sera qu'il vous sera impossible de voir les activités CEU que vous avez déjà enregistrées. Le bureau National a eu beaucoup de difficulté à rejoindre les membres qui utilisaient leur courriel hospitalier comme outil de communication : il est très difficile de communiquer avec ces systèmes. Malheureusement il nous a été impossible de régler cet imbroglio : si vous choisissez quand même votre courriel hospitalier comme mot de passe pour accéder à notre site web, vous risquez de ne pas recevoir les communications importantes venant de notre part. À partir de maintenant la majorité de nos communications vous seront adressées via votre courriel. Si vous voulez échanger votre mot de passe courriel pour vous assurer une réception complète de nos courriels, SVP communiquez avec le bureau National.

Je préfère envoyer un courriel à tout le monde plutôt que de mettre des affiches partout.

~ Todd Barry



**A**nother milestone achieved! Please join me in congratulating the Website Design Sub-committee, consisting of Andrew Beney, Marie-France Raymond, and Kathy Currado, on the launch of the new CSCP website. This group has put in countless hours and an incredible energy to their project. They are truly deserving of our While there is still a great deal of work to be done, our new website presents a tremendous opportunity to "flesh it out" with engaging content, and to foster improved communication and exchange of ideas and information within our profession. It is my sincere hope that we all take full advantage of this new tool, and all that we can achieve with it.

Although a considerable amount of CSCP resources, (namely time and money) have been spent over the last year on the new website development, we still have several important undertakings to attend to. The September Board of Directors Meeting will re-visit our 5-year plan to keep us on track. Issues we need to now re-direct our efforts to include:

- Submission of the CSCP By-laws and Articles of Continuance to Corporations Canada to maintain our status as a not-for-profit professional society

- Re-developing our National Recommended Standards of Practice (with the International Consortium of Evidence-Based Perfusion - ICEBP). The Standards of Practice outline what things we should do and how they should be organized.

- Establishing a national repository of Recommended Practice Guidelines. The guidelines suggest specific procedural steps for carrying out our clinical activities.

- Pursuing "titling" (and protection of or titles CPC and Perfusionist) at the provincial and national levels

- Recognition of the CSCP 25th anniversary, and planning for a very special AGM in Vancouver this October

- Planning for the 2015 CSCP Western Regional Meeting in June 2015

- Preparing for update renewal of our National Competency Profile

All of this on time, and on budget!

Each new challenge that we take on ensures the development and growth of our Society and the profession of Perfusion in Canada. The Board of Directors welcomes your input, feedback, and your involvement in our National Society. In fact, we depend on you.

Thank you for your continued support I look forward to seeing you in Vancouver this October!

**U**ne autre étape importante de franchise. SVP joignez-vous à moi pour féliciter le comité de la conception du nouveau site Web qui est formé d'Andrew Beney, de Marie-France Raymond et de Kathy Currado. Ce groupe a mis d'innombrables heures et une énergie incroyable sur leur projet. Nous leur devons énormément. Bien qu'il reste beaucoup de travail à faire, avec son contenu attrayant notre nouveau site Web présente une grande opportunité de développement et favorisera la communication, l'échange d'idées et d'information au sein de notre profession, C'est mon espoir le plus sincère qu'avec son utilisation, nous tous tirions pleinement parti de ce nouvel outil pour la réalisation de plusieurs projets.

Bien qu'une quantité considérable de ressources ait été utilisée l'an dernier, nous avons encore plusieurs dossiers importants à régler. À la réunion de septembre, les membres du CA reverront les plans sur 5 ans pour nous garder sur la bonne voie. Nous devons maintenant diriger nos efforts vers :

- Les soumissions des statuts et règlements du CSCP et des clauses de Continuité à Corporations Canada pour maintenir notre statut en tant que société professionnelle sans but lucratif.

- Revoir les recommandations de nos normes nationales de pratique (avec le consortium international de Perfusion basé sur les évidences-ICEBP). Les normes de pratique décrivent les tâches que nous avons à faire et comment elles doivent être organisées.

- La création d'un répertoire national des normes de pratique recommandées. Les lignes directives suggèrent des étapes de procédure spécifiques pour la réalisation de nos activités cliniques.

- Maintenir notre titre au niveau Provincial et National (et protéger les titres de perfusionniste et de perfusionniste clinique canadien).

- Souligner le 25ième anniversaire du CSCP et planifier un congrès très spécial en Octobre à Vancouver.

- Préparer une mise à jour de nos profils de compétences Nationaux.

Tout ceci en temps et en respectant le budget.

Chaque nouveau défi que nous relevons assure le développement et fait grandir notre Société et la profession de perfusionnistes au Canada.

Vos commentaires, vos réactions et votre implication dans notre Société Nationale sont toujours appréciés par le CA. En fait nous comptons sur vous.

Nous vous remercions de votre soutien continu. J'ai hâte de vous voir à Vancouver en Octobre.

# Eastern Region ❖ Région est



**Maureen Young**  
[cscp@cscp.ca](mailto:cscp@cscp.ca)

**H**ello everyone, I hope you are enjoying Summer.

In Halifax the situation regarding donations of items for mission trips is ongoing. Steve Taylor as reported in the last issue of this journal is awaiting the settlement of legal issues and information will be given as soon as that happens. In the meantime, please continue to consider donating surgical items that are no longer of use as they may assist in saving lives in other less fortunate places.

Justin Hawkins has just returned from a mission to Jimani in the Dominican Republic and is involved with Steve in the collection of items. For a birds' eye view of pumping on a mission have a look at Justin's photo paying particular attention to the duct tape. Please call our pump room 902-473-4050 and ask for either Steve or Justin if you have an interest in going on a mission and want more information or if you have items to donate and would like more details.

From the team in Newfoundland comes the news that The Eastern Region meeting will be held in St. John's in 2016. Please consider attending and perhaps presenting.

**B**onjour à tous, J'espère que vous profitez de l'été. À Halifax, la situation reste la même pour ce qui est des dons d'items pour missions humanitaires. Tel que discuté dans la publication d'avril, Steve Taylor attend le règlement de certaines questions légales et nous informera une fois réglé. En attendant, considérez toujours faire don des items chirurgicaux qui ne sont plus utilisés dans votre centre, car il pourrait contribuer à sauver des vies dans des endroits moins fortunés. Justin Hawkins vient de revenir d'une mission à Jimani, en République Dominicaine et s'implique avec Steve dans la collecte d'items. Pour avoir un aperçu de la mission, regardez la photo qu'a prise Justin en portant une attention particulière au ruban gommant. Appelez notre bureau au 902-473-4050 et demandez à parler à Steve ou Justin si vous êtes intéressé par une mission et vous aimeriez avoir plus d'information, ou si vous avez du matériel à donner et que vous aimeriez connaître les détails.

De l'équipe du Newfoundland, nous apprenons que le Congrès de la Région de l'Est se tiendra à St. John's en 2016. Préparez-vous à y assister ou peut-être à y présenter .

# Central Region ❖ Région central



**Chris McKay**  
cscp@cscp.ca

**F**inal thoughts on the Central Regional Meeting... What a great job! The team at Ottawa Heart Institute is to be commended for the outstanding accomplishment that they achieved. By all accounts, the meeting was a tremendous success. Attendance was in excess of 90 perfusionists and students. There were 18 speakers and, as always, a great presence from Corporate. Once again, I would like to recognize the ongoing and extremely generous support that comes from our Corporate Spon-

sors. Not only the National Meeting, but our Regional Meetings are highly dependent on their continued contributions.

The OSCP board meeting was held after the Regional Meeting, at which time the board and its members received the resignation of our Secretary/Treasurer, Andrew Dooley. Thank you Andrew, for your time and commitment to the OSCP. Fortunately attending the meeting was Diana Galley, from London. Diana very graciously offered to take over the role of Secretary/Treasurer until a new one can be elected.

Of note to the membership, please consider any one of the OSCP board of directors positions, as they will all be due for a call for nominations, in a years' time. If numbers are not your thing, then you may consider the presidency or if you would like experience at the national level, I would highly recommend the Central Regional Liaison to the CSCP. This is a role that has taught me a great deal about so much and on so many levels, the workings of our National Society. It has definitely been a positive experience.

On a final note a quick reminder to all the perfusion teams that wish to submit their efforts towards "Perfusion Week", and how they promoted Perfusion within their hospital and community, to the Board of Directors. The Board will be meeting in September to review all the entries. Maybe your perfusion team will win \$500.00.

Best of Luck to all!

**D**ernières pensées sur la réunion régionale central... Quel excellent travail! L'équipe de l'Institut de cardiologie d'Ottawa se doit d'être félicitée pour l'accomplissement exceptionnel qu'elle a réalisé. En tous points, la réunion a été un énorme succès. Plus de 90 perfusionnistes et étudiants y ont participé. Il y avait 18 présentateurs et, comme toujours, une grande présence de l'industrie. Une fois de plus, je tiens à souligner le soutien constant et extrêmement généreux qui vient de nos commanditaires corporatifs. Non seulement la réunion nationale, mais les réunions régionales sont également fortement tributaires de leurs contributions continues.

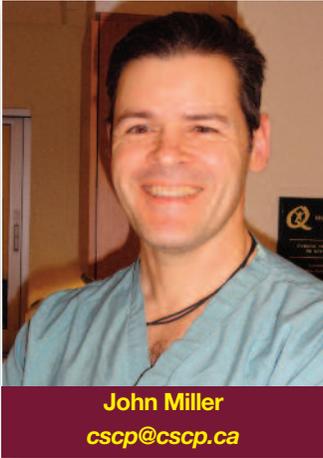
Après la réunion régionale, l'assemblée du conseil de l'OSCP a eu lieu, lors de laquelle le conseil d'administration et ses membres ont reçu la démission de notre secrétaire/trésorier, Andrew Dooley. Merci Andrew, pour ton temps et ton engagement à l'OSCP. Heureusement, Diana Galley de London qui assistait à la réunion s'est très gracieusement offerte pour prendre en charge le poste laissé libre par Andrew jusqu'à l'élection d'un nouveau secrétaire/trésorier.

Un petit rappel aux membres de l'OSCP, tous les postes de direction seront en appel de candidatures l'an prochain, s.v.p. prenez en considération l'idée de vous impliquer. Si les chiffres ne sont pas votre truc, alors vous pouvez envisager la présidence ou si vous voulez l'expérience au niveau national, je vous recommande vivement le poste régional à la liaison avec la SCPC. C'est un rôle qui m'a appris beaucoup de choses et à plusieurs niveaux, le fonctionnement de notre Société nationale. Ce fut certainement une expérience positive.

En finissant, un rappel rapide à toutes les équipes de perfusion qui souhaitent soumettre leur candidature au conseil d'administration pour leurs efforts faits lors de la « Semaine de la perfusion », à faire la promotion de la perfusion au sein de leur hôpital et de la communauté. Le Conseil se réunira en Septembre afin d'examiner toutes les soumissions reçues. Peut-être que votre équipe de perfusion gagnera 500,00\$

Bonne chance à tous!

# Western Region ❖ Région ouest



...and the cry from the West was heard across the nation: "We are short staffed!"

Funny? Not really. It seems that Perfusion department staffing shortfalls are an increasingly common theme in the Western Region, and indeed across the country. Even Alberta, wallowing in the gluttonous excesses of oil revenues, is not immune to difficulties in recruiting and retaining staff Perfusionists.

What has caused this crisis? In most instances, it's a combination of factors. On one hand, vacancies have been created by such things as increased workload of CPB cases, ECMO, VAD's, and more ECMO; staff moving on to new opportunities; staff on medical and maternity leaves. Combine these vacancies with the fact that nearly all of the last graduating classes from our three national Cardiovascular Perfusion education programs have settled into staff positions, and we are now left with a paucity of qualified and suitable applicants to fill our staffing rosters.

What does this lead to? I think you know all too well what this leads to. Overtime. Long days. Longer nights. Weekends, what weekends? Stretching existing staff to accommodate caseload and program requirements. Inability to get vacation time. Increased sick time. Deteriorating morale. More overtime.

What's the answer? We all eagerly await the next cohort of graduating Perfusion students. While we guide and mentor them in their clinical training, we are also grooming them to join the ranks of our staff. We poach and shuffle existing Perfusion staff from one cardiac centre to the next. We recruit from outside our borders, posting positions on U.S. and international websites and forums. We hire locums. We get creative with scheduling and staff assignments. We seek assistance from other professions (namely RT's and RN's) with ECMO and VAD management.

Why all the questions? Because I've posted a couple of questions on the "Message Board" of the new CSCP website. Log in to the Professionals section and check it out. Let's get the discussions rolling. Please take a minute to read and respond to the posts. Maybe even start a new discussion topic of your own.

I can't wait to read your responses. Oh-oh, there goes my pager. Again. I really can't wait to read your responses.

... Et le cri de l'Ouest a été entendue dans tout le pays: «Nous sommes à court de personnel!"

Drôle? Pas vraiment. Il semble que le déficit de personnels des départements de perfusion soit un thème de plus en plus commun dans la région de l'Ouest, de même qu'à travers le pays Même en Alberta, se vautrer dans les excès gourmands de revenus pétroliers, ne met pas à l'abri des difficultés de recrutement et du maintien du personnel en perfusion.

Qu'est-ce qui a causé cette crise? Dans la plupart des cas, il s'agit d'une combinaison de facteurs. D'une part des postes vacants ont été créés par différentes choses telles que les tâches accrues de travail dues à l'augmentation des nombres de CEC d'ECMO et de VAD, la migration du personnel vers de nouvelles opportunités et les arrêts de travail dus à la maladie et au congé de maternité. Combinez ces postes vacants avec le fait que presque tous les dernières finissants de nos trois programmes nationaux d'éducation en perfusion cardiovasculaire se sont installés dans des postes de fonctionnaires, et nous sommes maintenant à gauche avec une pénurie de candidats qualifiés et aptes à combler nos listes de personnels.

À quoi cela nous mène-t-il? Je pense que vous savez trop bien ce que cela entraîne : des heures supplémentaires, de longues journées, des nuits plus longues, des weekends, et quels weekends? On demande encore plus au personnel en place pour palier à la surcharge de travail et satisfaire aux exigences du programme, l'incapacité d'obtenir du temps pour les vacances, l'augmentation des journées de maladie, la baisse du moral et plus d'heures supplémentaires.

Quelles sont les réponses? Nous attendons tous avec impatience la prochaine cohorte de finissants en perfusion. Bien que nous accompagnons et encadrons dans leur formation clinique, nous devons aussi les courtiser afin qu'ils rejoignent les rangs de notre personnel. Nous pourchassons et entraînons le personnel de perfusion existant d'un centre de cardiologie à l'autre. Nous recrutons à l'extérieur de nos frontières en affichant des postes sur les sites Web et les forums américains et internationaux. Nous embauchons des remplaçants. Nous faisons preuve de créativité avec des horaires et du personnel restreint. Nous cherchons l'aide d'autres professions (à savoir inhalothérapeute et personnel infirmier) pour l'ECMO et la gestion des VAD.

Pourquoi toutes ces questions? Parce que j'ai posté quelques questions sur le "Message Board" du nouveau site Web de la SCPC. Connectez-vous à la section professionnelle et surveillez cela. Faire dérouler les discussions. S'il vous plaît prendre une minute pour lire et répondre aux messages. Peut-être même commencer un sujet de discussion de votre choix.

J'ai hâte de lire vos réponses. Oh-oh, il y va de mon téléavertisseur. Encore une fois j'ai vraiment hâte de lire vos réponses.

# UHN ECLS Symposium

The Perfusion Department at University Health Network hosted its first ECLS (Extra-Corporeal Life Support) Symposium April 4<sup>th</sup> and 5<sup>th</sup>, 2014 and received overwhelmingly positive feedback. The theme was *Healing, Teaching and Innovation Unite*. Interest in the event, from all across Canada and parts of the US, was so strong that the entire venue was shifted to the Michener Institute. The symposium ran over two full days with presentations and simulation lab scenarios. Registration was capped at 60 participants in order to take advantage of the simulation stations that were created.

ECLS is growing and we have devoted our attention to establishing UHN as a Centre of Excellence for Respiratory Failure as well as a referral centre for other institutions. Under the leadership of Dr. Shaf Keshvjee, Chief of Surgery, Marcelo Cypel, Surgical Director, Dr. Eddie Fan, Medical Director, and Cyril Serrick, Manager of Perfusion for the ECLS Program at UHN, we have developed a multi-disciplinary approach to the care of patients with ARDS. With the experience built from bridge to transplant, we have now successfully treated a series of patients with respiratory and ventilatory failure on ECLS who were failing on conventional therapy.

Why is our management of post-influenza patients today more successful than previous years' results? For one, our circuits are better with less surface area, better oxygenators, coated surfaces and minimized complexity with fewer stasis points. Our understanding of the destructive nature of shear forces with positive pressure ventilation is better so we use protective ventilation strategies to allow the lungs the time necessary to heal. Also the team is better prepared, educated and dedicated to care for these very sick patients.

UHN's ECLS program has grown out of a collaborative approach to patient care. ECLS skills have been taught to over 140 critical care nurses and a new patient classification system has been established that brought multi-disciplinary involvement to patient care allowing perfusionists to be at the bedside when necessary with unstable patients, in hospital when required and on-call from home with our most stable patients. This has allowed minimal interruption to servicing our regular OR schedule and emergency workload so cases are getting done and ECLS patients are receiving optimal care. Daily rounds with the ICU staff, ECLS surgeons, RNs, Perfusionists, Respiratory Therapists, Pharmacists, Physiotherapists and family members allow us to review patient progress and establish customized therapeutic plans.

Some of the highlights from the symposium were the simulations that involved decision algorithms covered in the pre-

sentations; case presentations; equipment updates; program evolution statistics; and multiple images of our patients mobilizing and rehabilitating while on ECLS. The interview and discussion between the attendees and Huyen and Ken Hare (one of our ECLS patients and her spouse) facilitated by Cyril was particularly moving. It really reinforced the reasons why we chose this profession and how rewarding it is to be a Perfusionist. We don't just save patients — we save whole families!

The event was a total team effort with all of our staff contributing to the symposium's success. We would like to take this opportunity to thank all our speakers from within the department, the surgical and medical directors, ICU physicians, our physiotherapist, dialysis nurse, ICU nurse educator as well as our Centrimag clinical specialist. Valerie Cunningham, our Perfusion Educator, deserves special recognition. She spent many tireless hours planning the event and came up with the simulations.

Also we would like to extend our thanks to the Michener Institute for their dedication to this event, as well as Medtronic and Thoratec Corporations for their sponsorship. We were honoured to have you all support this educational event and would not have been able to offer this event free of charge to the community if it were not for your support. The social event at Joey's was a great success. It generated tremendous discussion and the feedback demonstrated how timely and informative the symposium really was.

Lastly we would like to thank all who took the time out of their busy schedules to join us. The response was overwhelming. We could not have anticipated the amount of interest that the UHN ECLS Symposium would have generated and we profusely apologize to those people whom we had to turn away due to exceeding capacity. We hope to see everyone again next year!

Patsy Chalmers

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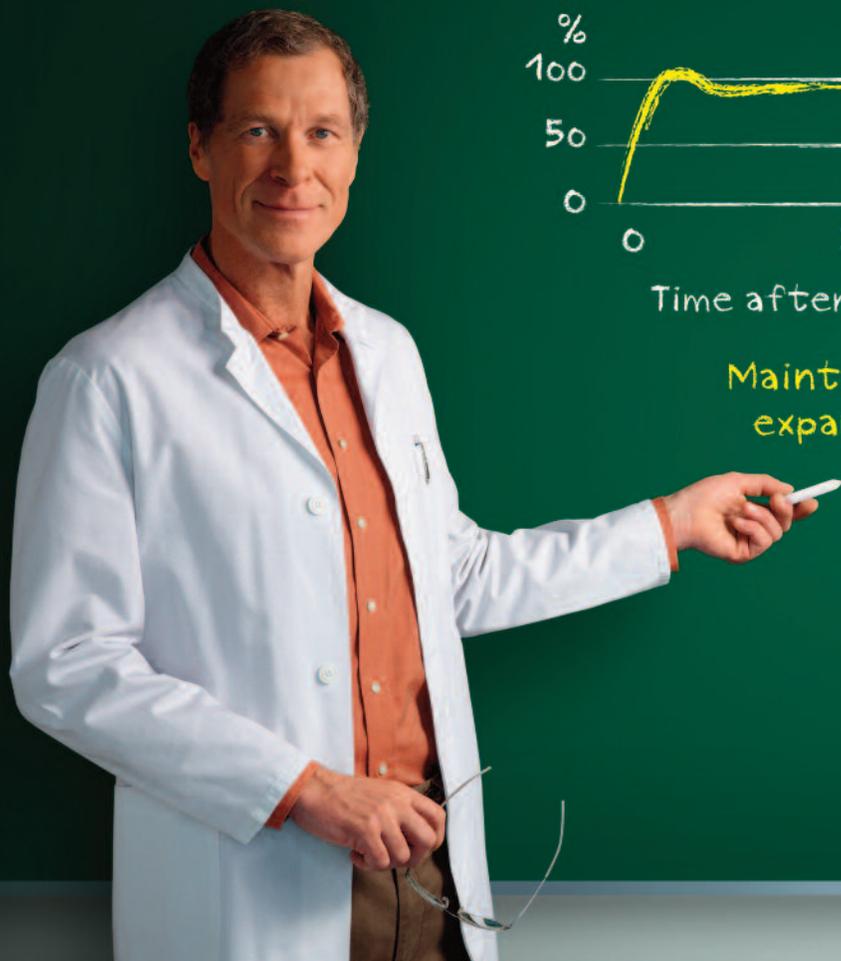
Plasma volume expansion in % of infused volume†



Maintained a plasma volume expansion for 4 - 6 hours

Adapted from Waitzinger J et al., 1999.‡

\*Clinical significance unknown.



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†Based on a study of 12 healthy male volunteers. Subjects received 500mL VOLUVEN® following a 500 mL bleed.

**REFERENCES:** 1. VOLUVEN® Product Monograph, Fresenius Kabi, June 28, 2011. 2. Waitzinger J, et al. Pharmacokinetics and Tolerability of a New Hydroxyethyl Starch (HES) Specification (HES (130/0.4)) After Single Dose Infusion of 6% or 10% Solutions in Healthy Volunteers. Clin Drug Invest 1998; Aug 18 (2): 151-160.

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See Prescribing summary on page 78

# AGM • RGA

## Vancouver

Saturday October 25, 2014

- 8 to 12:30**      **CSCP Certification Exam**  
BCIT Downtown Campus  
Room 480  
555 Seymour Street
- 9 to 11**      **Opening Ceremony and HSFC Lecture**  
Vancouver Convention Centre, West Building, Level 2, Rooms #301 to 305
- 9 to 12**      **CSCP Board of Directors Meeting**  
Vancouver Convention Centre, West Building, Room #113
- 12:30 to 5:30**      **Scientific Sessions**  
Vancouver Convention Centre, West Building, Rooms #116 and #117
- 12:30 to 12:35**      **Opening Remarks**  
John Miller, President CSCP
- 12:35 to 5:30**      **Topics TBA**

Sunday October 26, 2014

- 8 to 9**      **Corporate Sponsored Breakfast Session**  
Sponsored by Alere Medical Canada  
Vancouver Convention Centre, West Building, Rooms #114 and 115

- 9 to 12:30**      **Hands-On Simulation Workshops**  
Vancouver Convention Centre, West Building, Room #113

### **Terumo Cardiovascular Systems Workshop: Training to Prevent Perfusion Emergencies**

Practice difficult perfusion scenarios in a safe, supportive environment.  
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Participants will:

- Practice emergency procedures in a safe and supportive environment
- Gain experience and competence responding to incidents rarely encountered during CPB
- Administer and observe simulated patients' responses to various pharmaceutical agents
- Gain confidence handling a wide range of realistic perfusion emergencies

Each workshop lasts 30 minutes, and will run Sunday October 26 and Monday October 27, starting at 9 am each day until 4:30 pm, with lunch and breaks.

Space is limited, and will be assigned on a first-come, first-served basis. If interested, please register for the Perfusion Simulation Workshop by contacting the National Office.

You will be contacted by email with complete details about registering and time slots available.

# AGM • RGA

## Vancouver

9 to 12:30	<b>Scientific Sessions</b> Vancouver Convention Centre, West Building, Rooms #116 and #117
12:30 to 2	<b>Lunch and Poster Presentations</b> Vancouver Convention Centre West Building, Level 1, Ballrooms A, B, C, & D
2 to 5	<b>Scientific Sessions</b> Vancouver Convention Centre, West Building, Rooms #116 and #117
2 to 4:30	<b>Hands-On Simulation Workshops</b> Vancouver Convention Centre, West Building, Room #113
4 to 5	<b>CSCP Business Meeting</b> All members of the CSCP Vancouver Convention Centre, West Building, Rooms #116 and #117
6:30 to midnight	<b>CSCP Annual Banquet and Awards</b>  vancouver aquarium™

Monday October 27, 2014

8 to 9	<b>Corporate Sponsored Breakfast Session</b> Sponsored by Instrumentation Laboratories Vancouver Convention Centre, West Building, Rooms #114 and #115
9 to 12:30	<b>Hands-On Simulation Workshops</b> Vancouver Convention Centre, West Building, Room #113
9 to 12:30	<b>Scientific Sessions</b> Vancouver Convention Centre, West Building, Rooms #116 and #117
9:45 to 10:30	<b>Bigelow Lecture</b> Dr. Irving Kron Surgical Mentorship
10:30 to 11	<b>Health Break, Poster Presentations, and Exhibits</b>
11 to 12:30	<b>Scientific Sessions</b> Vancouver Convention Centre, West Building, Rooms #116 and #117
12:30 to 2	<b>Lunch, Poster Presentations, and Community Forum</b> Vancouver Convention Centre West Building, Level 1 Ballrooms A, B, C, & D
2 to 4:30	<b>Hands-On Simulation Workshops</b> Vancouver Convention Centre, West Building, Room #113
2 to 5:30	<b>Scientific Sessions</b> Vancouver Convention Centre, West Building, Rooms #116 and #117

# AGM • RGA

## Vancouver

6:30 to Whenever

### Corporate Members Reception

SteamWorks  
375 Water Street, Vancouver



The CSCP Corporate Members invite you all to join them in a reception to celebrate the history of perfusion products. Featuring a truly amazing display of oxygenators and devices from the past arranged by the perfusion department of the Vancouver General Hospital and our corporate sponsors.

Tuesday October 28, 2014

8 to 9

### Corporate Sponsored Breakfast Session

Sponsored by Teleflex Medical Group LP  
Vancouver Convention Centre, West Building, Rooms #114 and 115

9 to 12

### Scientific Sessions

Vancouver Convention Centre, West Building, Rooms #116 and #117

12

### Meeting Adjournment

President, CSCP

## Message from the AGM



The 25<sup>th</sup> AGM of the CSCP is taking shape for Vancouver in October. This year we will begin on Saturday and run until Tuesday. Make plans to attend our banquet being held at the fantastic Vancouver Aquarium on Sunday evening the 26<sup>th</sup> of October. It promises to be a great evening. Be sure to book a ticket for a guest as numbers are limited as always.

We are joining our corporate friends on Monday evening at the Steamworks Brew Pub for our corporate reception. There will be a special oxygenator display brought to you by the VGH team. Be sure to attend this fun event.

The program is not yet complete so there is still time to get a talk submitted to present. Remember it reduces the registration to \$200 if you present at the meeting.

This year we will not have an AGM program booklet in printed form as our new website will enable us to have an up to date program on line and accessible from your smartphone or tablet. Or you can download it before you leave for Vancouver if you wish to have a printed copy.

We will hopefully have students from all three of our perfusion schools presenting this year. To celebrate our 25<sup>th</sup> CSCP anniversary we will have the student presentations evaluated by the audience with a great prize for the best student presentation and a gift for one lucky audience member who help evaluate the talks.

The good folks at Ryan Medical and Terumo are again hosting a simulator perfusion suite this year held on Sunday and Monday. See the program at our website for further information.

Going to be another great meeting this year I hope to see you in Vancouver.

La 25<sup>ème</sup> AGA de la SCPC qui se tiendra à Vancouver en octobre prend forme. Cette année, elle commencera le samedi et se poursuivra jusqu'au mardi. Prévoyez assister à notre banquet qui aura lieu au fantastique Aquarium de Vancouver le dimanche soir du 26 Octobre. Cela promet d'être un grand soir. N'oubliez pas de réserver un billet pour un invité si nécessaire, le nombre de billets étant limités, comme toujours.

Le lundi soir, nous nous joindrons à nos amis les fournisseurs au Pub Steamworks Brew pour la soirée corporative. Il y aura présentation d'un oxygénateur spécial par l'équipe du VGH. Assurez-vous de participer à cet événement amusant.

Le programme scientifique n'est pas encore complet, il est donc encore temps de soumettre un texte pour présentation. Rappelez-vous que les frais d'inscription sont réduits de 200 \$ pour les présentateurs de l'AGA.

Cette année, nous n'aurons pas de version imprimée du programme de l'AGA, notre nouveau site nous permettra d'avoir une mise à jour de la programmation en ligne et accessible à partir de votre téléphone intelligent ou de votre tablette. Par contre, vous pourrez toujours télécharger avant de partir pour Vancouver si vous préférez avoir une copie imprimée.

Nous espérons que les élèves de nos trois écoles de perfusion présenteront cette année. Pour célébrer le 25<sup>e</sup> anniversaire de la SCPC, les présentations des étudiants seront évaluées par le public avec un grand prix pour la meilleure présentation étudiante et un cadeau pour un membre chanceux de l'auditoire qui aura aidé à évaluer les présentations.

Les gens de Ryan médical et Terumo seront encore présents cette année avec le simulateur de perfusion le dimanche et le lundi. Consultez le programme sur notre site web pour obtenir plus d'informations.

Ce sera une autre grande réunion cette année et j'espère vous voir à Vancouver.

# Reprint Article Article Reprint

## Blood Flow and Pressure in an Extracorporeal Membrane Oxygenation Circuit

Harry Mickelson, CPC, CCP  
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Vancouver, British Columbia

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*Originally published in The Perfusionist, December 2012*

### Abstract

This paper discusses flow dynamics in an Extracorporeal Membrane Oxygenation (ECMO) circuit with a shunt between the oxygenator outlet and pump inlet. When an additional flow probe was added to the ECMO circuit, it was discovered that the presumed shunt flow was underestimated by simply clamping the shunt line and noting the difference in flow to the patient. The circuit resistances were calculated and compared to clinical data to roughly confirm the calculations. A constrained vortex pump responds to resistance change like a battery. Blood flow, pressure, and resistance are analogous to electronic current, voltage, and resistance. An electronic schematic is used to show the circuit parameters. Ohm's law may be applied to analyze the flow dynamics in this circuit.

### Sommaire

Ce document examine la dynamique des fluides à travers une membrane d'oxygénation extra-corporelle (ECMO) avec une dérivation entre la sortie de l'oxygénateur et l'entrée de la pompe. Une sonde de débit supplémentaire a été ajoutée au circuit d'ECMO et on a découvert que le débit de dérivation présumé était sous-estimé par simple compression de la ligne de dérivation et en notant la différence de débit au patient. Les résistances du circuit ont été calculées et comparées aux données cliniques pour confirmer approximativement les calculs. Une pompe centrifuge répond à changement de résistance comme une batterie. Le débit, la pression et la résistance du sang sont semblables au voltage et à la résistance d'un courant électrique. Un schéma électronique est utilisé pour afficher les paramètres du circuit. La loi d'Ohm peut être appliquée à l'analyse de la dynamique d'écoulement dans ce circuit.

## Introduction

The clinical use of extracorporeal circuits used for Extracorporeal Membrane Oxygenation (ECMO) requires knowledge of blood flow in series and parallel circuits. Arterio-venous (AV) shunt lines and parallel cannulation sites create added complexity to the flow dynamics that should not be overlooked. Poiseuille's Law may be used to mathematically explain blood flow through the circuit, however, the calculations become quite cumbersome. The analogy of an electronic schematic using Ohm's Law simplifies the analysis. The pressure generated by a constrained vortex pump affecting blood flow through resistances to flow is proportionally the same as the effects that battery voltage has on current flow through electronic resistors. I have used clinical data to construct an electronic schematic to mathematically explain blood flow through an ECMO circuit with a 1/4" AV shunt line

## The Dilemma

The objective of this paper is to highlight the importance of understanding blood flow dynamics in an ECMO circuit with an AV shunt line and parallel cannulation sites.

The ECMO circuit at St. Paul's Hospital incorporates a 1/4" AV shunt line from the recirculation port on the oxygenator to the pump inlet line (see figure 1). Flow through the AV shunt line is controlled with a partially occluding clamp. Traditionally, to estimate blood flow in the shunt line, the shunt line would be completely occluded, and the increase in flow to the patient (for example 300 mL/min) was considered the blood flow rate through the shunt line. The blood flow to the patient was measured with a Biomedicus Bioprobe TX-50 electromagnetic flow transducer at the ECMO circuit's arterial line (Figure 1, 4.1 L/min). The zero was calibrated on a separate Spectrum Medical H9X2M ultrasonic flow transducer, and was placed on the pump outlet/oxygenator inlet line. This measured flow was 6.1 L/min (Figure 1), which was much higher than expected. When the shunt line was clamped, both the flow meters showed the same flow, which confirms the flow meters were working correctly.

## Data

Representative data were collected from a clinically operating ECMO circuit: Patient's central venous pressure (CVP), pump inlet pressure, pump speed, oxygenator inlet pressure, oxygenator outlet pressure, flow into the oxygenator, flow to the patient, and patient's mean arterial pressure (MAP). An ECMO circuit schematic (Figure 1) was constructed using this data

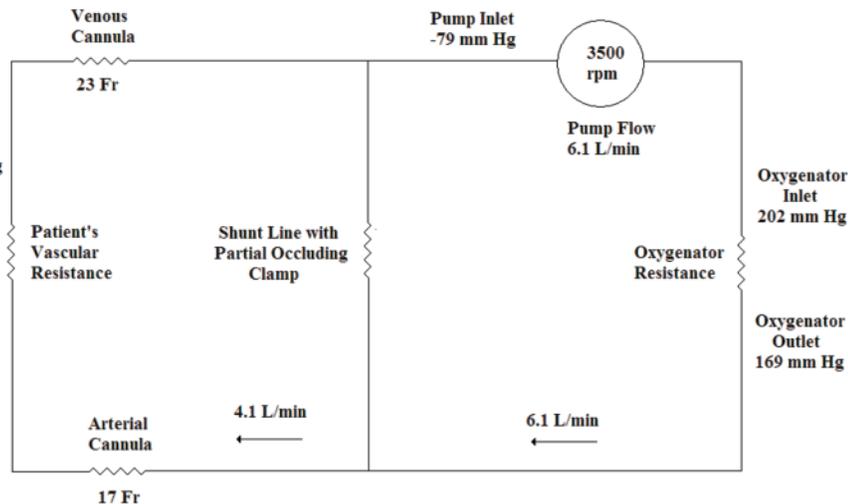


Figure 1: Schematic of a representative ECMO circuit at St. Paul's Hospital.

### Calculation of Flow in Shunt Line

$$\begin{aligned} &= \text{Pump Flow} - \text{Arterial Line Flow} \\ &= 6.1 \text{ L/min} - 4.1 \text{ L/min} \\ &= 2.0 \text{ L/min} \end{aligned}$$

### Calculation of Resistances

In a shunt line with partial occluding clamp,  $N$  is a constant, which assumes that viscosity is constant in the circuit.

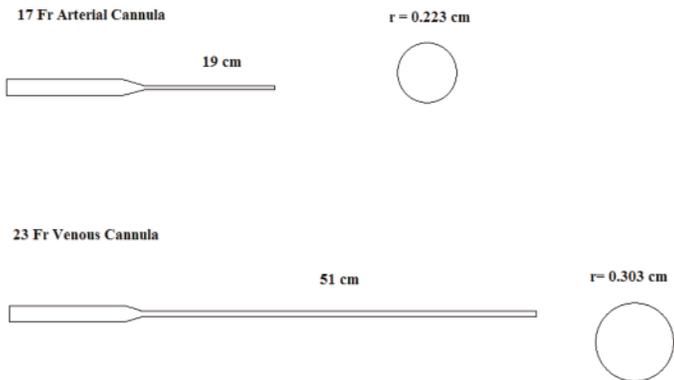
$$\begin{aligned} R &= \frac{\text{Change in Pressure}}{\text{Flow}} \times N \\ &= \frac{169 \text{ mmHg} - (-79 \text{ mmHg})}{2 \text{ L/min}} \times N \end{aligned}$$

$$R = 124N$$

Similarly, Table 1, below, provides further calculations of resistances within this ECMO circuit.

Component	P1 (mmHg)	P2 (mmHg)	$\Delta P$ (mmHg)	Flow (L/min)	Resistance
Venous Cannula	15	-79	94	4.1	23 $N$
Oxygenator	202	169	33	6.1	5.4 $N$
Shunt Line	169	-79	248	2.0	124 $N$
Arterial Cannula	169	67	102	4.1	25 $N$

Table 1: Calculated resistances in circuit components.



**Figure 2:** Comparison of resistances of the 17 Fr arterial cannula and the 23 Fr venous cannula.

Variables in resistance calculations are radius (r) and length (L). The constants are fluid density ( $\rho$ ), viscosity ( $\eta$ ), and  $\pi$ , collectively labeled  $N$ . Therefore we get

$$R = \frac{N \cdot L}{r^4}$$

So, for the 17 Fr arterial cannula we have:

$$R = \frac{N \cdot 19}{(0.223)^4}$$

$$R = 7,683N$$

and for the 23 Fr venous cannula, we have:

$$R = \frac{N \cdot 51}{(0.303)^4}$$

$$R = 6,051N$$

which gives us the ratio of

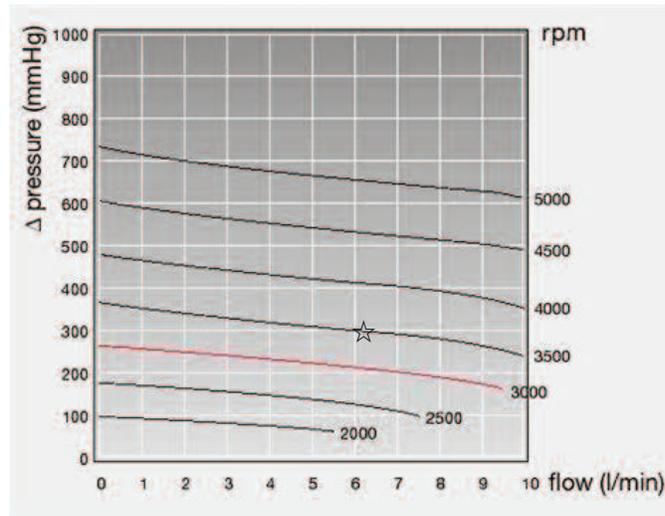
$$\begin{aligned} &23 \text{ Fr Venous} : 17 \text{ Fr Arterial} \\ &6,050 : 7,684 \\ &1 : 1.27 \end{aligned}$$

Remembering the resistance numbers for the arterial and venous cannula from the Table 1,

$$\begin{aligned} &23N : 25N \\ &1 : 1.09 \end{aligned}$$

So, the resistances calculated in the table from the pressure and flow data shows a similar ratio when compared to the resistances calculated from the cannula dimensions.

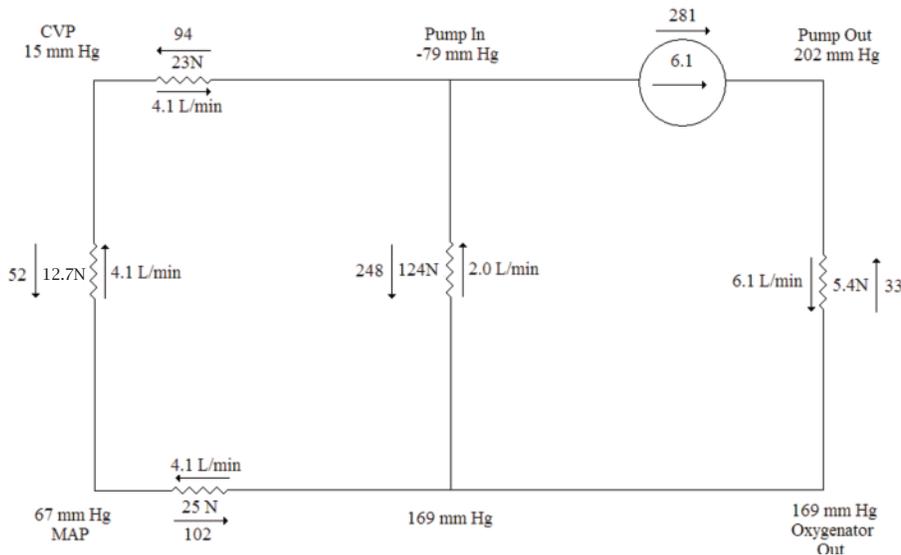
The pressure change across the pump in the ECMO schematic, Figure 1, is 281 mmHg, and the manufacture's data (supplied from Maquet-Dynamed), shown below in Figure 2, predicts that the pressure change to be roughly 300 mmHg at 3,500 rpm and 6.1 L/min (☆).



**Figure 2:** Pressure versus Flow curve, supplied from Maquet-Dynamed.

This figure also demonstrates a parallel relationship between battery voltages and the pressures generated by a constrained vortex pump: Battery voltage will drop slightly when the current flow increases. When the current flow decreases, the battery voltage increases slightly.

Reviewing the following two schematics, Figures 3 and 4, an ECMO circuit with the AV shunt line *not clamped*, and an ECMO circuit with the AV shunt line *clamped*, clamping the shunt line increases the blood flow to the patient by 300 mL/min. A constrained vortex pump is preload and afterload sensitive. When the shunt line is clamped the preload is decreased and the afterload is increased. The constrained vortex pump flow drops from 6.1 L/min to 4.4 L/min with the shunt line closed.



**Figure 3:** ECMO Schematic with Shunt NOT CLAMPED.



## Discussion

Blood flow in ECMO circuits using an AV shunt line should have a flow transducer placed in the circuit proximal and distal to the shunt line to determine the shunt line flow. This will ensure the rated maximum flow for the oxygenator will not be exceeded.

Blood flow velocities throughout the ECMO circuit are important to know when running these circuits with minimal anticoagulation. A better understanding of blood flow velocities and blood coagulation in extracorporeal circuits are necessary before any significant recommendations can be made.

High negative pressure in blood flowing in a tube does not create hemolysis if there is no blood-gas interface. Experience with ECMO at St. Paul's Hospital is that complications with peripheral cannulation have occurred, and smaller cannulae are now being used. Hemolysis is not an issue with negative pressures in the -100 mmHg to -150 mmHg range.

## Recommendations

When using an ECMO circuit with an AV shunt line, measure blood flow both proximal and distal to the AV shunt line to accurately assess blood flow.

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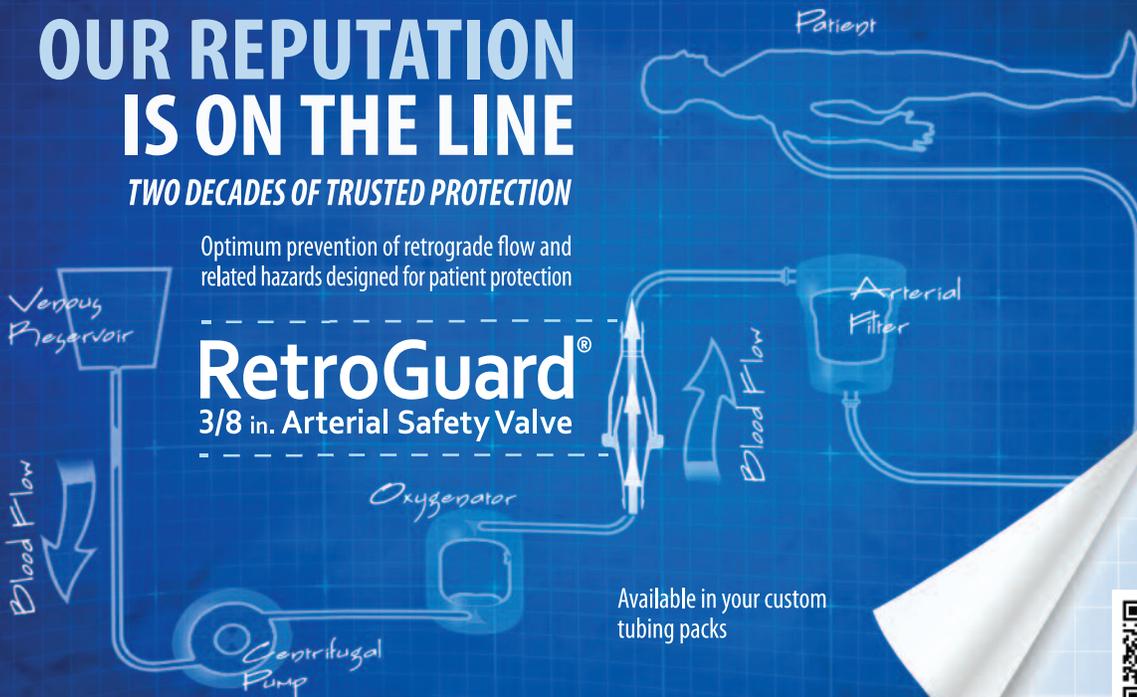
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# Reprint Article Article Reprint

## Evaluating Point of Care Devices for the Perfusionist

Mark Rosin, BSPE, RCPT(C), CPC, CCP  
Assistant Editor, *The Perfusionist*

*Perfusionists are faced with evaluating and employing several types of point of care analyzers and monitors in their practice. These devices can be assessed for their accuracy and precision in their measurements. Basic data collection and statistics are applied to determine these values. Based on this work, informed decisions can be made as to whether clinical use of an evaluated device is warranted.*

Perfusionists are faced with attempting to determine if the machines they are using are providing reliable results upon which decisions can be made. We will consider machines that we can compare to a “gold standard” such as a blood gas monitor or analyzer and machines that may have no comparative standard to compare to, such as an activated coagulation/clotting time (ACT) analyzer. This is not meant to be a comprehensive statistical method to study the results of a given analyzer but to give a perfusionist a way of checking the precision and accuracy of an analyzer with the use of software such as Microsoft® Excel™. For those so inclined, statistical packages such as SAS (1) or SPSS (2) offer more statistical performance.

The STARD Initiative (3) defines accuracy as *the amount of agreement between the information from the test being evaluated (the index test and the reference test.)* For this we may choose to compare the results of the analyzers we are studying with a “gold standard” which for a perfusionist most often will be the hospital’s central laboratory’s results. *Constant error* is defined as the same magnitude of error throughout the concentration of the analyte. *Proportional error* is defined as error that increases as the concentration of the analyte increases.

Both of these errors are found and easily seen when plotted test *versus* reference test. A correct plot of a measured value compared to its “true value” (test versus reference) shows a 45° best-fit line. See the example below.

*Inaccuracy* and *Bias* indicate the lack of agreement (difference) between the two methods being compared (4). For example comparing a pO<sub>2</sub> taken from a point of care device and the pO<sub>2</sub> measured in your hospital’s laboratory on the same sample. These two values will almost certainly not be identical. The difference between these two values is called the *inaccuracy* or *bias*. For an example see Johi *et al* (5).

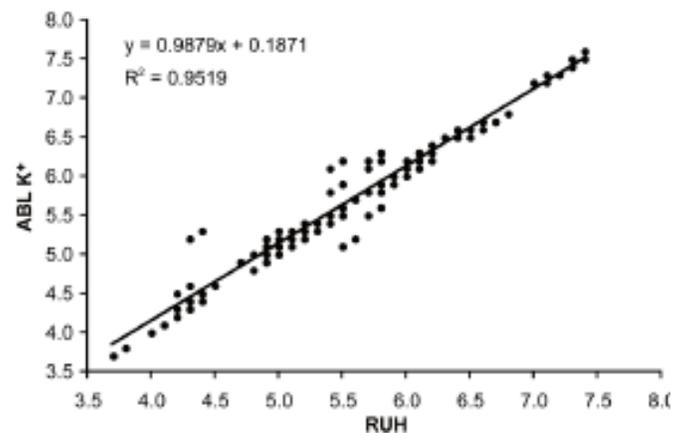
Accuracy should be ±10% or less (6). Values we can study in this way are all the values we take from an in-line monitor or point of care analyzer. Caution would be exercised as to applying a standard of ±10% or less in accuracy to an in-line monitor. In this setting the ±10% rule should be applied more generally.

Blood gas analyzers and in-line monitors, as well as oxygen saturation and hematocrit monitors may be measured against a reference standard for accuracy.

Examples of laboratory values that can be studied for accuracy.

pH	Na
pO <sub>2</sub>	K
pCO <sub>2</sub>	Cl
BE	Glucose
NaHCO <sub>3</sub>	Lactate
HgB	SaO <sub>2</sub>
Hct	SvO <sub>2</sub>

### Example



In the above example the authors (7) have compared the potassium results of a point of care blood gas analyzer to their hospital’s central laboratory. They have applied a correlation coefficient, R<sup>2</sup>. A correlation coefficient attempts to describe the strength and direction of a relationship between two values (8). In this test these authors compared each set of the two values from the same sample. No proportional or constant error is shown here.

For this study, these perfusionists took a sample from the manifold on the heart lung machine. Some of that sample was analyzed on a point of care device and the remainder of that same sample was sent to the central laboratory for analysis. The two values from the same sample were then compared by plotting "RUH" laboratory result (x axis) against the "ABL" point of care device result (y axis). When all results are plotted we see a scattergram in a rough 45° slope. As the values rise from the point of care device the values from the central laboratory values also rise. This is a positive correlation. If one set of values rise while the other falls this would be described as a negative correlation. One need only to load the values into a Microsoft® Excel™ worksheet and select the X-Y scattergraph (depending on what version you are using). Next the R<sup>2</sup> function is applied after clicking on the points on the graph drawn by Excel™. Portney and Watkins provide some guidelines for the strength of the relationship provided by this method (8).

R <sup>2</sup> Values	
0.00 to 0.25	little or no relationship
0.25 to 0.50	fair relationship
0.50 to 0.75	moderate to good relationship
> 0.75	good to excellent relationship

For the most part in laboratory work a R<sup>2</sup> value of 0.95 or greater is considered acceptable (7). It has been suggested that the R<sup>2</sup> value should not be used alone in determining test value accuracy (4). While that may be true it is provided here due to its ease of use and availability. For more complete accuracy determination the slope and y-intercept can also be calculated.

*Precision* is defined as the ability of a method to produce the same value for repeated measurements of the same sample (4). In simpler terms this means if we repeatedly measure the same sample we should get the same answer. *Precision* is usually calculated by repeated measurements that are analyzed a minimum of 20 times (4) and the standard deviation calculated. The standard deviation provides a measure of the variability of the values (4). *Precision* should be ±25% or less (6). An ACT machine appears to be a device that we may only measure precision and not accuracy easily. ACT Machines have no gold standard or *true* value to measure against. The closest we can get to an accuracy assessment of ACT analyzers is to compare the results from QC testing and determine how many times these values fall within the ranges given for the particular lot of QC solution. Outside of this we would need to compare the ACT results to prepared and measured heparin concentrations (8).

Some QC solutions available currently have a wide range of values that are acceptable (in range), especially in the abnormal or high ranges. By using liquid quality control normal and abnormal levels, we can assess the precision of ACT analyzers by repeatedly measuring the QC solutions available for the given analyzer. A minimum of twenty samples of the same lot and range are measured either on the same day or on different days. If two results per sample are obtained, the mean (average) of these two results are added and averaged with the remaining sample results.

### Example for an ACT Analyzer

Normal QC of the same lot and range measured on multiple days.

Normal Range	075 — 115
1	101
2	97.0
3	100
4	102
5	100
6	104
7	110
8	115
9	105
10	110
11	99.3
12	101
13	99.3
14	96.4
15	106
16	108
17	88.8
18	105
19	114
20	114
<b>Average:</b>	<b>103.8</b>

In this example when we apply the ±25% precision rule to the mean 103.8 seconds (77.8 to 129.8 seconds) we find that all values fall within those boundaries. Next, in terms of attempting to ascertain accuracy we see that all values fall within range values provided by the manufacturer.

Abnormal QC of the same lot and range measured on multiple days.

Abnormal Range	296 — 900
1	573
2	424
3	634
4	498
5	493
6	557
7	425
8	428
9	591
10	489
11	499
12	579
13	446
14	487
15	500
16	449
17	470
18	603
19	615
20	487
<b>Average:</b>	<b>512.4</b>

In this next example when we apply the  $\pm 25\%$  precision rule to the mean, 512.4 seconds (384.3 to 640.5 seconds) we find that all values fall within those boundaries. This precision rule of  $\pm 25\%$  is not the same rule as a manufacturer may suggest be applied to a clinical or Quality Control test. At least one manufacturer (9) suggests precision of  $\pm 10\%$  for normal or  $\pm 12\%$  of abnormal samples mean of two tests on the same Quality Control sample.

## Expanding the Statistics

Presented thus far are these values that a perfusionist can apply with simple use of commonly available software. The coefficient of variation, confidence intervals and others are available to those who wish to expand their calculations (10).

## Quality Control

Perfusionists place considerable amount of faith in analyzers such as the ACT. The information these machines provide must be verified as reliable via an ongoing and comprehensive Quality Control program. Each manufacturer provides Quality Control reagents and procedures. Following these procedures at the recommended intervals is the work that ensures that the values presented by these machines are verified, to a standard that we can determine, and therefore safe to use clinically. Using electronic controls are one step but are not the complete answer. Guidance has been given, for those analyzers manufactured in the United States, for Quality Control intervals (11). This includes performing quality control tests every day for thirty days during the evaluation

phase; when your institution first uses the machine. If the results are acceptable, Quality Control testing may then be completed weekly.

## Summary

Two simple methods for statistically evaluating point of care devices have been described. This is not meant as comprehensive review of statistical methods that could be applied to such study but rather to present a couple of simple methods to assess accuracy and precision in such devices. Any perfusionist can apply these methods and add those results to their evaluation of point of care devices.

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# VOLUVEN®

6% Hydroxyethyl starch 130/0.4

## Prescribing Summary



### Patient Selection Criteria

**THERAPEUTIC CLASSIFICATION:** Plasma Volume Expander.  
VOLUVEN®, 6% hydroxyethyl starch (HES 130/0.4), tetrastarch, is an artificial colloid, third generation starch, for plasma volume expansion.

#### INDICATIONS AND CLINICAL USE

VOLUVEN® is indicated for the treatment of hypovolemia when plasma volume expansion is required.  
It is not a substitute for red blood cells or coagulation factors in plasma.

#### CONTRAINDICATIONS

VOLUVEN® is contraindicated in patients:

- with fluid overload (hyperhydration), especially in cases of pulmonary edema and congestive cardiac failure.
- with renal failure with oliguria or anuria not related to hypovolemia.
- receiving dialysis treatment.
- with severe hyponatremia or severe hyperchloremia.
- with known hypersensitivity to hydroxyethyl starch.
- with intracranial bleeding.

#### Special Populations

##### Pregnant Women:

There are no adequate and well-controlled studies using VOLUVEN® in pregnant women. However, animal studies do not indicate harmful effects with respect to embryo/fetal development, pregnancy, parturition or postnatal development. There were no post-marketing reports of harm when VOLUVEN® was used in pregnant women.

Embryotoxic effects were observed in rabbits when 10% HES 130/0.4 in 0.9% sodium chloride solution is given at 50 mL/kg BW/day. No evidence of teratogenicity was observed.

VOLUVEN® should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

##### Nursing Women:

It is not known whether HES 130/0.4 is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when VOLUVEN® is administered to a nursing mother.

A decision on whether to continue/discontinue breast-feeding or to discontinue/continue therapy with VOLUVEN® should be made taking into account the benefit of breast-feeding to the child and the benefit of VOLUVEN® therapy to the nursing mother.

##### Pediatrics:

There is limited experience on the use of VOLUVEN® in children available. In non-cardiac surgery in 41 children including newborns to infants (< 2 years), a mean dose of 16 ± 9 mL/kg was administered safely and was well tolerated for stabilisation of hemodynamics. The tolerability of this product administered perioperatively was comparable to 5% albumin.

VOLUVEN® may be given to premature infants and newborns only after careful risk/benefit evaluation.

##### Geriatrics:

Of the total number of patients in clinical trials of VOLUVEN® (N= 471), 25% were 65-75 years old, while 7% were 75 and older. No overall differences in safety or effectiveness were observed between these subjects and younger subjects. Other reported experience has not identified specific risks for the application of VOLUVEN® in this patient group.



## Safety Information

### WARNINGS AND PRECAUTIONS

#### General:

Fluid overload caused by overdose should be avoided in general. Particularly, for patients with cardiac insufficiency or severe kidney dysfunctions the increased risk of hyperhydration must be taken into consideration; posology must be adapted.

In case of severe dehydration a crystalloid should be given first.

#### Carcinogenesis and Mutagenesis:

No mutagenic effects were observed with HES 130/0.4 10% solution according to the following tests on mutagenic activity: Salmonella typhimurium reverse mutation assay (in vitro), mammalian cells in the in vitro gene mutation assay (HPRT), assessment of the clastogenic activity in cultured human peripheral lymphocytes (in vitro), bone marrow cytogenetic test in Sprague-Dawley rats.

#### Hematologic:

Caution should be observed before administering VOLUVEN® to patients with severe liver disease or severe bleeding disorders (e.g. severe cases of von Willebrand's disease).

Administration of large volumes of hydroxyethyl starch may transiently alter the coagulation mechanism and decrease hematocrit and plasma proteins due to hemodilution.

#### Hepatic/Biliary/Pancreatic:

Caution should be observed before administering VOLUVEN® to patients with severe liver disease.

Serum amylase can rise during administration of VOLUVEN® and can interfere with the diagnosis of pancreatitis. The elevated amylase is due to the formation of an enzyme-substrate complex of amylase and hydroxyethyl starch subject to slow elimination and must not be considered diagnostic of pancreatitis.

#### Immune:

If a hypersensitivity reaction occurs, administration of the drug should be discontinued immediately and the appropriate treatment and supportive measures should be undertaken until symptoms have resolved (please refer to section ADVERSE REACTIONS).

#### Renal:

It is important to supply sufficient fluid and to regularly monitor kidney function and fluid balance.

Serum electrolytes should be monitored.

#### Skin:

Pruritus is a known complication of administration of hydroxyethyl starches, though is typically more common with prolonged use of high doses.

HES-induced pruritus may be delayed in onset, typically one to six weeks after exposure, may be severe and may be of protracted (weeks and months) persistence. It is generally unresponsive to therapy. However, the decreased molecular weight, lower degree of substitution, decreased tissue storage and intra-vascular persistence in conjunction with a shorter plasma half-life of HES 130/0.4 may result in a lower incidence of pruritus related to its use.

### ADVERSE REACTIONS

Adverse reactions with VOLUVEN® reported spontaneously, from clinical trials and in the literature include:

#### Immune system disorders

*Rare:* Anaphylactoid reactions (hypersensitivity, mild influenza-like symptoms, bradycardia, tachycardia, bronchospasm, non-cardiac pulmonary edema) have been reported with solutions containing hydroxyethyl starch (see WARNINGS AND PRECAUTIONS).

#### Abnormal Hematologic and Clinical Chemistry Findings (Investigations)

*Common (dose dependent):* Increase in serum amylase (see WARNINGS AND PRECAUTIONS).

**Common (dose dependent):** At high dosages the dilution effects may result in a corresponding dilution of blood components such as coagulation factors and other plasma proteins and in a decrease of hematocrit.

**Skin and subcutaneous tissue disorders**

**Common (dose dependent):** Pruritus, itching (see WARNINGS AND PRECAUTIONS).

**Blood and lymphatic system disorders**

**Rare (in high dose):** Blood coagulation disturbances beyond dilution effects can occur depending on the dosage.

For frequency of occurrence of ADRs see Supplemental Product Information.

**DRUG INTERACTIONS**

No interactions of VOLUVEN® with other drugs or nutritional products are known or have been reported to date.

However, mixing VOLUVEN® with other drugs should be avoided.

To report an adverse event, contact Health Canada's Canada Vigilance Program at 1-866-234-2345 or contact Fresenius-Kabi at 1-877-953-9002.



**Administration**

**DOSAGE AND ADMINISTRATION**

VOLUVEN® (6% HES 130/0.4 in 0.9% sodium chloride injection) is administered by intravenous infusion only.

Total volume and rate of infusion are dependent on the clinical situation and the individual patient. As with any intravenous fluid, VOLUVEN® should be administered in accordance with accepted clinical practices for fluid and electrolyte management.

In clinical trials, infusions up to 33 mL/kg/day were most commonly used. There is limited experience with infusions between 33 mL/kg/day and 50 mL/kg/day.

The initial 10-20 mL is to be infused slowly, keeping the patient under close observation for possible anaphylactoid reactions.

VOLUVEN® can be administered repetitively over several days according to the patient's needs. The dosage and duration of treatment depends on the duration and extent of hypovolemia, the hemodynamics and on the hemodilution.

**Children:**

There is limited clinical data on the use of VOLUVEN® in children. In 41 children including newborns to infants (< 2 years), a mean dose of 16±9 mL/kg was administered safely and well tolerated for stabilization of hemodynamics.

The dosage in children should be adapted to the individual patient colloid needs, taking into account the disease state, as well as the hemodynamic and hydration status.

**SUPPLEMENTAL PRODUCT INFORMATION**

**ADVERSE REACTIONS**

**Table: Frequency of Occurrence of Adverse Drug Reactions**

System Organ Class	Adverse Drug Reaction	Frequency of Occurrence
Blood and lymphatic system disorders	Coagulation disorders beyond dilution effects	Rare (in high doses) (> 0.01% – ≤ 0.1%)
Immune system disorders	Anaphylactoid reactions	Rare (> 0.01% – ≤ 0.1%)
Skin and subcutaneous tissue disorders	Pruritus	Common (dose dependent) (≥ 1% – < 10%)
Abnormal hematologic and clinical chemistry findings (Investigations)	Increase of serum amylase	Common (dose dependent) (≥ 1% – < 10%)
	Decrease of hematocrit	Common (dose dependent) (≥ 1% – < 10%)
	Decrease of plasma proteins	Common (dose dependent) (≥ 1% – < 10%)

**OVERDOSAGE**

As with all volume substitutes, overdose with VOLUVEN® can lead to overloading of the circulatory system (e.g. pulmonary edema). In this case the infusion should be stopped immediately and if necessary, a diuretic should be administered.

For further information on the management of a suspected drug overdose, contact your regional Poison Control Centre.

**STORAGE AND STABILITY**

To be used immediately after the bag is opened. The solution is intended for intravenous administration using sterile equipment. Use only clear solutions and undamaged containers.

*Parenteral drug products should be inspected visually for clarity, particulate matter, precipitate, discoloration and leakage prior to administration. Solutions showing haziness, particulate matter, precipitate, discoloration or leakage should not be used. Discard unused portion.*

Do not use VOLUVEN® after expiry date.

**freeflex®** bag storage: at 15° - 25°C for 3 years.

Do not freeze.

This document plus the full product monograph, prepared for health professionals can be found at:

<http://www.fresenius-kabi.ca>

or by contacting Fresenius Kabi Canada at:

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# Professional Events ✨ Évènements professionnels



**AmSECT Quality and Outcomes**  
October 1 — 4  
Baltimore, Maryland  
[amsect.org](http://amsect.org)



**40<sup>th</sup> Anniversary Conference of Japanese Society of Extracorporeal Technology (JaSECT)**  
October 11 — 12, 2014  
Hiroshima, Japan  
[convention-w.jp/40thjasect-sp/index.html](http://convention-w.jp/40thjasect-sp/index.html)



**CSCP AGM**  
October 25 — 28, 2014  
Vancouver, British Columbia  
[cscp.ca](http://cscp.ca)



**53<sup>rd</sup> International Conference**  
April 14 — 18, 2015  
Tampa, Florida  
[amsect.org](http://amsect.org)



## Industry Supporters ❖ Membres corporatifs

The Canadian Society of Clinical Perfusion is grateful for its industry support.  
La société Canadienne de perfusion clinique est reconnaissante du support corporatif.

To become an industry member of the Canadian Society of Clinical Perfusion, please contact the CSCP National Office at  
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Our new corporate structures offers simplified invoicing and more streamlined services.  
Please contact the National Office or our website for further information.

### Corporate Full

Enjoys full advertising within the CSCP, including full Website (both healthcare professional and public content options), all publications, and all CSCP meetings. Receives three banquet tickets for the Annual General Meeting, and enjoys two annual mail outs. This level provides the most substantial support for the Canadian Perfusion community.

### Corporate Plus

Enjoys comprehensive advertising within the CSCP Website (both healthcare professional and public content options), and the Annual General Meeting. Receives one banquet ticket for the Annual General Meeting, and enjoys one annual mail out. This level provides significant support for the Canadian Perfusion community.

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Designed for those who want to show their support for the Canadian Perfusion community. The Corporate Basic supporter enjoys comprehensive advertising within the CSCP Website (healthcare professional option), and the Annual General Meeting. Receives one banquet ticket for the Annual General Meeting.

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# Perfusion Black Book ❖ Livre noir de perfusion

This list is a compilation of telephone numbers for the Perfusion Departments across Canada. **Recent changes are listed in RED.** Please let us know if your information changes and needs to be updated, by contacting us at:

Cette liste est un registre des numéros de téléphone des départements de perfusion à travers le Canada. Si ces informations doivent être mises à jour, veuillez nous en aviser par messagerie électronique aux adresses suivantes:

*editors@warp.nfld.net*

## East

Eastern Health, St. John's, Newfoundland	(709) 777-7329
New Brunswick Heart Centre, Saint John, New Brunswick	(506) 648-6396
Queen Elizabeth II Health Sciences Centre, Halifax, Nova Scotia	(902) 473-4050
Centre Hospitalier de la Sagamie, Ville de Saguenay, Québec	(418) 541-1234 ext 2531
Centre Universitaire de Santé de Sherbrooke, Sherbrooke, Québec	(819) 346-1110 ext 14241
Hôpital Laval, Sainte-Foy, Québec	(418) 656-8711 ext 5883
CHUM, Campus Sainte-Luc, Montréal, Québec	(514) 890-8000 ext 34024
CHUM, Campus Hôtel-Dieu, Montréal, Québec	(514) 890-8000 ext 15388
CHUM, Campus Notre-Dame, Montréal, Québec	(514) 890-8000 ext 27403
Hôpital Sacré-Coeur, Montréal, Québec	(514) 338-2222 ext 2140
Hôpital Sainte-Justine, Montréal, Québec	(514) 345-4931 ext 5633
CUSM, Hôpital Royal Victoria, Montréal, Québec	(514) 934-1934 ext 35863
CUSM, Hôpital Général de Montréal, Montréal, Québec	(514) 934-1934 ext 35863
CUSM, Hôpital de Montréal pour Enfants, Montréal, Québec	(514) 412-4400 ext 22399
Hôpital Général Juif, Montréal, Québec	(514) 340-8222 ext 3565
Institut de Cardiologie de Montréal, Montréal, Québec	(514) 376-3330 ext 3734

## Central

Ottawa Heart Institute, Ottawa, Ontario	(613) 761-5000 ext 4656
Children's Hospital of Eastern Ontario, Ottawa, Ontario	(613) 737-7600
Kingston General Hospital, Kingston, Ontario	(613) 549-6666 ext 3524
Sunnybrook, Toronto, Ontario	(416) 480-4218
St. Michael's Hospital, Toronto, Ontario	(416) 864-5753
The Hospital For Sick Children, Toronto, Ontario	(416) 813-6870
Toronto Hospital, Toronto, Ontario	(416) 340-4800 ext 4703
Trillium Health Centre, Mississauga, Ontario	(905) 848-7580 ext 3515
SouthLake, Newmarket, Ontario	(905) 895-4521 ext 2566
Hamilton, Hamilton, Ontario	(905) 527-0271 ext 46684
St. Mary's General Hospital, Kitchner, Ontario	(519) 749-6578 ext 1949
London Health Sciences Centre, London, Ontario	(519) 663-3804
Sudbury Regional Hospital, Sudbury, Ontario	(705) 523-7100 ext 8375

## West

Health Sciences Centre, Winnipeg, Manitoba	(204) 787-7524
St. Boniface General Hospital, Winnipeg, Manitoba	(204) 235-3888
Royal University Hospital, Saskatoon, Saskatchewan	(306) 655-2128
Regina General Hospital, Regina, Saskatchewan	(306) 766-3846
Foothills Medical Centre, Calgary, Alberta	(403) 944-1092
University of Alberta, Edmonton, Alberta	(780) 407-6969
Vancouver Acute Hospital, Vancouver, British Columbia	(604) 875-4111 ext 63634
St. Paul's Hospital, Vancouver, British Columbia	(604) 682-2344 ext 62271
British Columbia Children's Hospital, Vancouver, British Columbia	(604) 875-2345 ext 7935
Royal Columbian Hospital, New Westminster, British Columbia	(604) 520-4363
Royal Jubilee Hospital, Victoria, British Columbia	(250) 370-8449

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*The Perfusionist* is the non-indexed, official publication of the Canadian Society of Clinical Perfusion. *The Perfusionist* serves three core functions for the Canadian perfusion community: A vehicle for communication between and within the society's executive board of directors, committees, and the membership; provide a forum for both original and solicited scientific and educational material, as well as informal membership communication; and a source of recurring administrative information.

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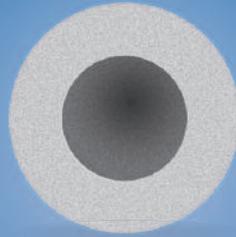
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