



# The **Academy NEWSLETTER**

THE AMERICAN ACADEMY  
OF  
CARDIOVASCULAR PERFUSION  
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**SUMMER 2012**

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## **Women in Perfusion**

**Survey of North American Female Perfusionists**

*Presented at the Annual Seminar of The American Academy of  
Cardiovascular Perfusion, New Orleans, Louisiana, January 2012*

Perfusion as a career choice has never been an easy one. Being female in Perfusion, even harder. The Perfusion profession has long been dominated by males in the United States of America. Statistics now show that women in the work force represent 75% today vs. the 1920's when only 20% of women worked; we were curious as to what obstacles female perfusionists face today. This profession, though rewarding, is known to be extremely inflexible for balancing personal time with professional time effectively. Most perfusionists that you talk to will agree that life revolves around work, rather than work around life. Nonetheless, it's one of the greatest challenges to run the heart lung machine in cardiac surgery and know this sense of accomplishment.

To begin, I run a large program in New York City. In fact, our hospital is one of the largest hospitals in the world. Besides our world class ranking, we have a perfusion team that ranks among the finest. Our staff covers a wide range of experience from, >30 years to the new graduate. That means baby boomers to Generation Y. One afternoon I was being questioned by one of our younger perfusionists, Stacey Brewer, co-author of our paper. She wanted to know however would she be able to have a family and continue working as a perfusionist. She was serious and was depending on me for logical answers. She had a million reasons why she would not be able to keep her certification and how she would be up all night at work, instead of home with the kids,..... how her children would suffer.....of course I retorted, "You'll be fine, I did it, in fact I have three children".

But, the truth is I got to thinking about this and realized that it was quite difficult to be a full time perfusionist, take call, work all night, and raise a family. For men too! Many of us female perfusionists never had it any other way. We did not question our obligation, just persevered. Many of us did not have families, because when it came time to, it was too late. In the mist of this, unable to take some time off without being penalized and quite possibly have to retake the certification exam over and over based upon the current requirements to maintain certification. Recertification as it was really did not allow for any extended leave. Maybe this way was not the inevitable. It was

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then I decided we could possibly write to the ABCP and petition some change.

Women represent 33.3% of the present workforce in North America (1187 certified women) out of nearly 3700 perfusionists certified by the American Board of Cardiovascular Perfusion (ABCP). In October 2011, a 40-question survey (surveymonkey.com) was made available to all female perfusionists in North American via postcard mailing through the ABCP mailing list. There were 538 responses to the survey, which represents 45% of all female certified perfusionists in North America.

Upon analysis, 32.6% of the survey participants have been employed in perfusion for more than 20 years and 75% are staff perfusionists; working for a hospital (59.5%) rather than a contract group (36.7%). 44.7% of women that had children during their employment were out on leave 10 weeks or less. Ninety-five percent of women feel they miss important family functions due to their work schedules and 63% consider themselves under moderate stress. Direct supervision of the participants by men occurred in 76.5% of cases, and 68.2% felt that they were treated with the same respect as male co-workers. Nonetheless 50.9% felt discriminated against because of gender.

This survey suggests that the female perfusionists in North America share the same difficulties as women in the labor force. The role of women in society in general is clearly changing and female perfusionists will be part of that change. 70% of those surveyed would recommend perfusion as a career to both men and women.

This information was presented at the American Academy of Cardiovascular meeting in January 2012, New Orleans, LA. In addition, we hosted a fireside chat that gave all attendees the opportunity to voice their opinions, share experiences, and bring understanding to other new perfusionists. We have created a website, [www.womeninperfusion.com](http://www.womeninperfusion.com), (under construction) where we hope to develop and foster growth among female perfusionists.

The ABCP was sent a letter and asked to review the recertification credentialing mid-2011. We are happy to report that new guidelines have been adopted and will take effect in January of 2013. Any perfusionist may now be able to take an extended leave: including military time, or illness, and be able to verify cases in a new manner. No longer will we lose certification due to time out of the hospital for up to three years. Please go to the ABCP website to review the new policies.

In closing, a rather amusing notation, our paper was rejected from publication in "Perfusion" as one of the reviewers noted, "that we should have surveyed men so we could have made a similar correlation for recertification." We will resubmit to another journal for publication as our paper was intended to survey and discuss our career paths and similarities to other women in the workforce.

I would like to take this opportunity to invite you all to the next International American Academy of Cardiovascular Perfusion meeting, January 2013, Los Angeles, CA. We are looking forward to an excellent program including a dedicated fireside chat with Women in Perfusion, and once again collaboration with our surgeons as the Society of Thoracic Surgeons are in LA 2013 too! More to come!

Respectfully submitted,



Linda B. Mongero, CCP  
President,  
American Academy of Cardiovascular Perfusion

# Responsibilities of Being a Fellow Member of The Academy

To dispel any misconceptions we would like to review the duties and responsibilities of being a Fellow Member in The Academy. Fellow Members are required to pay their dues annually to remain as Fellow Members. Fellow Members must attend and participate in at least one out of every three annual seminars. Presentation of scientific papers is highly recommended but there are many other ways to participate in The Academy. Some of these other ways include: participate as a member of a scientific panel, co-moderate a Fireside Chat, serve on an AACP committee, help with registration, write a newsletter article, etc. If for some reason you are unable to attend at least one meeting within a three-year period, you should write a letter to the Membership Committee explaining your situation.

**One very important responsibility of each Fellow Member of The Academy is to seek out and nominate other individuals for Fellow Membership.** The nominating Fellow should explain the responsibilities of being a Fellow and make sure the individual is willing and able to accept and carry out those duties.

It is highly recommended that the individual being nominated for Fellow Membership currently be a Member of The Academy and had previously attended one of our meeting, but it is not a requirement. The nominee should fill out a Fellow Membership application and submit it along with a current CV, nominating letter from a Fellow Member and two seconding letters from current Fellow or Senior members to the National Office no later than two months prior to the annual meeting so that the Membership Committee has ample time to review the application.

If you are presently a Member of The Academy and have been for the last three years you can ask the Membership Committee to consider changing your membership status to Fellow Member. You must still submit an application, but no letters of nomination are necessary.

If you have any questions concerning Fellow

Membership in The Academy, please contact the National Office at [OfficeAACP@aol.com](mailto:OfficeAACP@aol.com) or 717-867-1485.

## Excerpts from the BYLAWS To The Constitution Of The American Academy of Cardiovascular Perfusion

### ARTICLE II.

Section 4. Attendance at the Annual Meetings and participation in the scientific programs shall be optional for all Honorary and Senior Members, but it shall be expected from all Fellows and Members.

### ARTICLE III.

Section 1. Candidates for Fellow membership in this Academy must be formally nominated and seconded, in an approved manner, by not less than three Fellow or Senior members.

Section 2. Fellow Membership shall be limited to two hundred (200). The candidate to be eligible must be a citizen of the United States of America or Canada, unless in unusual cases this citizenship requirement shall have been waived by the Council. The candidate shall have achieved distinction in the field or shall have made a meritorious contribution to knowledge pertaining to cardiopulmonary perfusion.

Section 3. The number of Senior members shall be unlimited. Fellow members automatically advance to Senior membership at the age of sixty years. In addition, a younger Fellow member may be eligible for Senior membership if incapacitated by disability or by retirement from the field of perfusion, but for no other reason.

Section 6. A Member may apply for Fellow Membership after having been a Member for three years. It is not necessary to have three Fellow Members nominate and second this membership application, but this application must proceed through the Membership Committee, Council, and The Academy in the same manner as prescribed for direct Fellow Membership application.

Section 9. The Council shall recommend that any Fellow or Member whose dues are in arrears for one year, or who has been absent without sufficient excuse from three consecutive meetings, have his membership terminated.

Section 10. Notwithstanding Section 6, any member of The Academy over 60 years of age is excused from the attendance requirement and upon his specific request may likewise be excused from payment of dues.

# 2013 Annual Academy Meeting



**Los Angeles, California**  
**January 24 - 27, 2013**

## Thursday, January 24, 2013

|                    |                                                    |
|--------------------|----------------------------------------------------|
| 9:00 AM – 1:00 PM  | Council Meeting                                    |
| 10:00 AM – 3:00 PM | REGISTRATION                                       |
| 2:30 PM – 4:30 PM  | Fireside Chats                                     |
| 4:30 PM – 5:30 PM  | REGISTRATION                                       |
| 5:00 PM            | Opening Business Meeting                           |
|                    | <i>Fellow, Member, Senior and Honorary Members</i> |
| 5:30 PM – 8:00 PM  | Sponsor's Hands-On Workshop & Reception            |

## Friday, January 25, 2013

|                     |                                                      |
|---------------------|------------------------------------------------------|
| 7:00 AM             | REGISTRATION                                         |
| 8:00 AM – 9:30 AM   | Scientific Session                                   |
| 9:30 AM – 10:00 AM  | Break                                                |
| 10:00 AM – 11:30 PM | Scientific Session                                   |
| 11:30 PM – 1:00 PM  | Lunch                                                |
| 1:00 PM – 3:30 PM   | Special Scientific Session (Panel)                   |
| 3:30 PM – 5:30 PM   | Fireside Chats                                       |
| 6:30 PM             | Induction Dinner                                     |
|                     | <i>Fellow, Senior, Honorary Members &amp; Guests</i> |

## Saturday, January 26, 2013

|                     |                    |
|---------------------|--------------------|
| 7:00 AM             | REGISTRATION       |
| 8:00 AM – 9:30 AM   | Scientific Session |
| 9:30 AM – 10:00 AM  | Break              |
| 10:00 AM – 11:30 AM | Memorial Session   |



11:30 AM – 1:00 PM

Lunch

1:00 PM – 3:30 PM

Special Scientific Session (Panel)

3:30 PM – 5:30 PM

Fireside Chats

5:30PM

Closing Business Meeting

*Fellow, Senior and Honorary Members Only***Sunday, January 27, 2013**

8:00 AM – 10:00 AM

Scientific Session

10:00 AM – 12:00 PM

Fireside Chats

## ***Our Host Hotel***

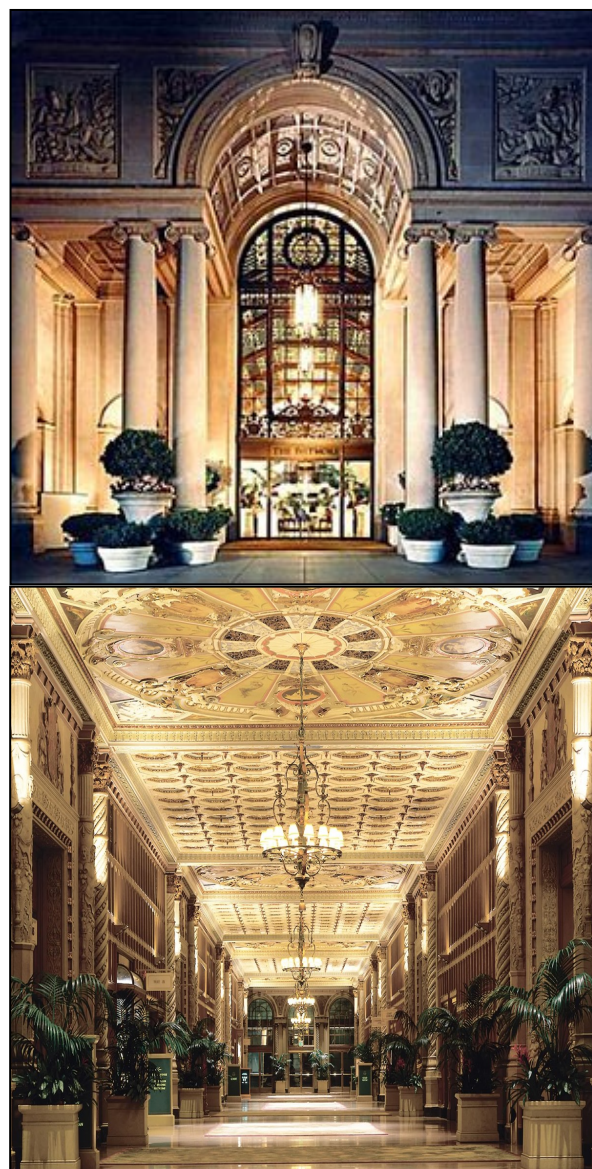
### **Millennium Biltmore Hotel**

A perfect model of stylish 1920s elegance, the Biltmore's unparalleled architecture and historic décor provide an exquisite backdrop for Los Angeles conferences, meetings and unforgettable social events.

Interiors feature hand-painted and vaulted ceilings, polished wood-paneled walls, magnificent chandeliers and carved friezes, while ballrooms boast unique details such as balconies, columned archways and rich brocade drapery.

**Guest Services:**

- Concierge
- High-speed internet access/wifi (fee)
- In-room dining available from 6:00am - 11:00pm daily
- Laundry/dry cleaning services (fee)
- Valet parking (\$40 overnight, including 24-hour in and out privileges)
- Check-in 3:00pm
- Check-out 12:00pm
- Safe deposit boxes
- In-room movies (fee)
- Currency exchange
- 24-hour security
- Non-smoking floors
- ADA-compliant accommodations
- Express check out
- Health club & Fitness Center with indoor pool
- Bloomies Florist Visage (Aveda Full Service Salon)
- W.H. Smith gift shop/newsstand
- 24-hour Business Center
- ATM machine in lobby



# The Student Section

## The Challenges of Hyperkalemia on Cardiopulmonary Bypass

The body is comprised of electrolytes that work in synchrony in the proper maintenance of the body's functions. When subject to cardiac surgery and cardiopulmonary bypass (CPB), stability of these electrolytes becomes distorted. One of these electrolytes is potassium. Besides the difficulties in some patients' kidneys' ability to excrete potassium ( $K^+$ ), excess potassium (hyperkalemia) can be caused by capillary leak secondary to systemic inflammatory response syndrome (SIRS), increased central venous pressure/fluid overload, fluid shift to potential fluid spaces, intracellular fluid shift (cellular edema), addition of high doses of potassium in the cardioplegia and decreased kidney perfusion. All of which lead to higher potassium levels. The focus of this communication is on  $K^+$  and various clinical approaches to correct hyperkalemia on CPB.

Synchronized cycles of contraction and relaxation allow the heart to efficiently pump blood and deliver oxygen throughout the body. These cycles are governed by the fluctuation of positively charged molecules in and out of each cell. Potassium is a major contributor to the regulation of the cardiac cycle and its regulation during CPB is of key importance. The cardiac cycle is regulated primarily by fluctuations of potassium, sodium and calcium in and out of each cardiac cell. These molecules are electrically charged particles that create an imbalance between the electrical charge inside and outside of each cell. At rest, the outside of the cardiac cell is more positively charged than the inside. The exchange of sodium and potassium, via the sodium-potassium pump, allows the cells to maintain this resting state. For a contraction to occur, more sodium and potassium will infiltrate the cell, which will

create a state of equilibrium between the inside and the outside of the cell. This process is called depolarization and is considered the start of a cardiac muscle contraction, or heartbeat. When the contraction has ended, the sodium-potassium pump will expel sodium and potassium out of the myocyte to re-establish the relaxed, resting state. Most of the potassium in the body is located within the cells and only a small fraction (2%) is found in the extracellular compartment, hence minor fluctuations in the net movement of potassium across the large cell membrane component may produce marked changes in the serum level. As serum potassium concentration increases, a decreased ratio of intracellular to extracellular  $K^+$  concentration occurs. This interrupts the normal function of the heart by creating an abnormal electrical equilibrium between the inside and outside of the heart's cells. This causes the heart to depolarize, or misfire and prevents a return to the resting state. This results in a decreased resting cell membrane potential leading to sudden cardiac arrest by preventing the heart from contracting and relaxing normally. Increased serum  $Na^+$  and  $Ca^+$  concentrations limit depolarization of the cell membrane. In addition, there is shortening of the action potential duration from increased membrane permeability to  $K^+$ . This is the concept of  $K^+$  rich cardioplegia solutions to arrest the heart.

The use of potassium in open heart surgeries is a valuable tool to the surgeon and the perfusionist. Potassium is used in various doses in cardioplegia solutions and is effective when administered to an isolated heart. Cardioplegia with excessive administration of  $K^+$  usually result in hyperkalemia.

Hyperkalemia is defined as a se-

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rum potassium level which exceeds the normal blood potassium level of 5.5 mEq/L. Excessive administration of potassium enriched cardioplegic solutions is one of the causes for hyperkalemia during CPB. One of the most common causes of hyperkalemia is poor kidney function. Kidneys are responsible for measured serum potassium levels and removing excess amounts. When the kidneys are dysfunctional or not functioning well, it will lead to high levels of  $K^+$ . Hyperkalemia can also occur with the use of older units of blood or packed cells, and in patients with uncontrolled diabetes. Aged blood products lead to hyperkalemia with longer periods of storage,  $K^+$  leaks into the supernatant as a result of fracture red blood cell membranes from aging and decreased synthesis of adenosine triphosphate (ATP). The magnitude of this leak increases with duration of storage. Irradiation of blood to inactivate T-lymphocytes and minimize the risk for graft vs. host disease enhances  $K^+$  leakage from red cells as a result of subtle membrane injury. Depending on the conditions, the supernatant of stored red blood cell units may contain greater than 60 mEq/L  $K^+$ . When fresh PRBCs are unavailable, the risk for post-transfusion hyperkalemia can be minimized by washing the cells and decreasing the amount of additive solution. In addition, uncontrolled diabetes will cause hyperkalemia because diabetic patients lack the insulin required to breakdown the excess glucose in the blood. High glucose levels affect the body negatively in two ways. The lack of insulin facilitates the breakdown of fat cells releasing ketones into the blood, making it acidic (ketoacidosis). The ketoacidosis coupled with high glucose blood levels cause potassium to shift out of the cells into the extracellular space. High glucose levels also hinder the kidneys ability to excrete potassium in the urine. Potassium being forced out of the cells and the kidneys not removing the excess potassium via urine leads to hyperkalemia.

Prevention is first step in making sure hyperkalemia does not occur on CPB. Maintaining renal function on CPB, being attentive during cardioplegia delivery, giving fresh blood when possible or using a cell washers to wash cells, and making sure a diabetic patient is properly medicated before surgery are all preventative measures that should always be taken. These preventative measures are helpful but it cannot always prevent hyperkalemia from occurring and treatment needs to be initiated. Pharmacological treatment is usually the first step taken to cor-

rect hyperkalemia. Normal pharmacological treatment of hyperkalemia is as follows:

1. 20 units of insulin which is used to drive the potassium into the cell, thus insulating the myocardium from high potassium levels, and 25 g of dextrose or glucose to replace the glucose driven off with administration of insulin. The glucose will further promote the movement of  $K^+$  from extracellular to intracellular compartments.
2. 500 mg to 1 g of calcium chloride which is used to activate the receptor sites of the potassium pumps on the cell membranes and to replace the serum calcium which will be driven into the cell upon administration of insulin.
3. 50 mEq sodium bicarbonate which will provide intracellular binding sites for the potassium in the form of potassium carbonate. This will correct the acidosis resulting from the shift of hydrogen ions from inside the cell to the extracellular space as electrical equilibrium is maintained.

When pharmacological treatment fails during CPB, alternatives such as zero-balance ultrafiltration (Z-BUF) can be used. The following is a case report that shows the successful treatment of hyperkalemia during CPB, after failed pharmacological treatment, with the use of Z-BUF.

The patient is an 84-year-old Caucasian female with a past medical history of aortic stenosis, hypertension, and hypercholesterolemia who presents for aortic valve replacement. No previous medical history of diabetes or impaired kidney function exists. The bypass time for the case was 113 minutes with an aortic cross clamp time of 84 minutes. The pre-operative potassium level was 4.2 mEq, the hematocrit was 31 and all other electrolytes values were within normal limits. After bypass was instituted and the patient was cooled to 32°C, the mean arterial blood pressure was kept above 70 mmHg, with the use of flow above 4.0 L/min and by infusion of phenylephrine. After aorta was cross clamped, 2000 mL of 8:1 blood cardioplegic solution at 4.5°C containing 120 mEq/L of potassium chloride was infused into the aortic root to produce electromechanical arrest. Following cardioplegia delivery, the potassium level increased to 5.9 mEq and the hematocrit dropped to 19. A unit of packed red blood cells was added and the hyperkalemia (range 5.5-6.0 mEq) continued throughout the majority of the case. During rewarming, recognition was that it would be difficult to wean off bypass with elevated potassium

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levels. A pharmacological treatment regimen was started and 10 units of insulin, 500 mg calcium chloride, and 50 mEq sodium bicarbonate were given sequentially at 20 minute intervals. 30 minutes after the sodium bicarbonate was given, the potassium level was still elevated at 5.9 mEq. At this time, a decision was made to use Z-BUF to try to correct the hyperkalemia. Z-BUF is a technique using a hemoconcentrator. First, the patient is diluted with an isotonic electrolyte solution without  $K^+$ , which will result in a lower value of  $K^+$  within the body. The amount added is removed via hemoconcentration as more dilutional volume is added until the patient reaches the desired electrolyte ( $K^+$ ) value. The net balance of electrolytes from volume added to volume removed is zero hence the term "zero-balance" ultrafiltration. For example, in the case presented, 500mL of solution was added to the extracorporeal circuit diluting the patient's  $K^+$  value from 5.9 mEq to 5.5 mEq. During onset and early period of CPB, there was no urine production, which indicates poor kidney function. However, once the patient was diluted and the Z-BUF technique was put into effect, the hemodilution and due to more time had elapsed on CPB, urine production began and steadily throughout the remainder of the CPB.

Hemoconcentration is only one of the concepts that can be used in the treatment of hyperkalemia and its use in this case report demonstrated its effectiveness. With the knowledge that the patient would experience hyperkalemia upon CPB initiation and cardioplegia administration, a pharmacological treatment regimen involving more aggressive diuretics could have been employed earlier during CPB to stimulate kidney function. Continuous ultrafiltration (CUF) from the beginning of the CPB would have reduced fluid shift to the third space, extra vascular and intracellular spaces to reveal a more accurate  $K^+$  level. This would also prevent any  $K^+$  rebound once the patient was weaned off CPB. Perhaps a more aggressive approach to correct the hyperkalemia would be a hybrid treatment regimen using both pharmacological and hemoconcentration methods simultaneously. Sodium bicarbonate could have been administered earlier, CUF and Z-BUF initiated immediately which may have eliminated the need for insulin. The pharmacological approach used in this case may not have worked effectively due to the fact that the insulin given was driving the  $K^+$  into the intracellular space which may already have overloaded

binding sites. Also, the  $K^+$  level in the intracellular space may already be higher or equal to the level in the extracellular spaces.

During CPB, hyperkalemia cause from dysfunctional kidneys, fluid shifts, systemic inflammatory responses and addition of large doses of  $K^+$  for cardioplegia were discussed. In a routine CPB case,  $K^+$  control maybe treated with drugs. In other cases, such as diabetic patients, when large amount of  $K^+$  is used, unusual level of inflammatory levels, fluid shift and donor blood transfusion, hyperkalemia may present a challenge. A hybrid approach is suggested. A combination of CUF, Z-BUF and pharmacologic treatment maybe the approach in getting hyperkalemia under control within a shorter clinical time frame and may also prevent rebound hyperkalemia in the post operative period. Pharmacological treatment is one of the accepted methods used to treat hyperkalemia on CPB but the case presented shows that Z-BUF had to be used to decrease potassium levels. And the patient presented was without renal disease was not a diabetic but had hyperkalemia during CPB which could not be pharmacologically treated. Using Z-BUF approach provided immediate results in the treatment of hyperkalemia.

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All  
About our  
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Partners

## Orpheus Perfusion Simulator Offers Realistic Training – Without The Risk Of Surgery



"These hands-on sessions are much more useful than sitting in a dark room listening to lectures," says David Biessenberger, CCP, Louisiana Perfusion Services, shown here monitoring the heart-lung machine, while the simulation is run by Ben Komorowski, Senior Clinical Specialist, Terumo Cardiovascular Systems.

*The patient is crashing.*

*Quickly run through the scenarios.  
Adjust flow? Look for line kink?  
Check the oxygenator?*

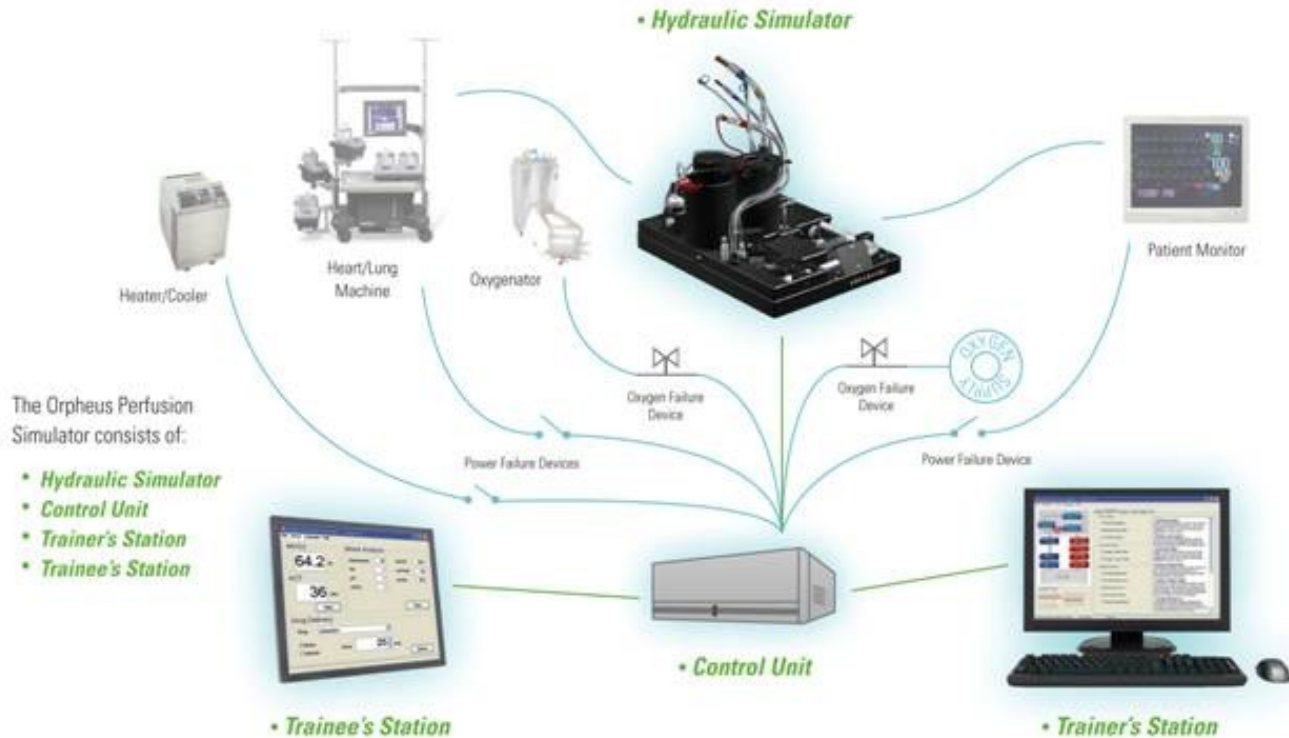
*When the issue is resolved, the perfusionist can breathe a quiet sigh of relief.*

There's no time to practice when a life is in your hands. The Orpheus Perfusion Simulator goes beyond traditional training to create a life-like experience of cardiopulmonary bypass procedures in a simulated environment. It provides perfusionists with unlimited opportunity to practice

emergency situations without the risk involved in real-life CBP.

The Orpheus High-Fidelity Perfusion Simulator is the first commercially available perfusion simulator available to the U.S. market. The product was first launched by Ulco Technologies in Australia in 2006. Terumo Cardiovascular Systems acquired the Orpheus Perfusion Simulator product line from Ulco Technologies in February 2012. Terumo CVS is the exclusive global owner of this technology and owns the manufacturing rights for the Orpheus simulator.

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### Non-Traditional Training

"Simulation sessions should drive out risks and errors in the care of patients," says Jeff Riley, CCP, Mayo Clinic, Rochester, Minnesota, which purchased an Orpheus Perfusion Simulator in 2008.

Riley co-published a study that asserts simulation training develops skills such as decision making, adaptability, situational awareness, leadership and communication (1). While simulation complements traditional training for perfusionists -- textbooks, lectures, observation and conducting animal labs -- simulation is a more innovative and effective way to learn and practice.

Riley believes that simulation is only the beginning of the training. His perfusion team's 10-minute simulation sessions are followed by a 30-minute debriefing. His study reinforces that the debriefing is a "respectful individual experi-

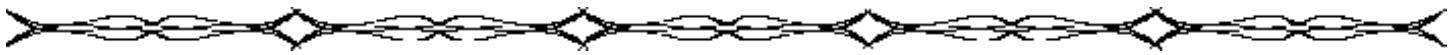
ence with several peer observers who are learning and are next in the "hot seat" to demonstrate their skills." (1)

"Simulation gives us the opportunity to practice scenarios over and over again," says Riley.

### High Tech Hardware

The Orpheus Perfusion Simulator provides a realistic model of human circulation. It provides a virtual and complete patient substitute for training perfusionists, students and clinicians involved in CPB. The system is made up of the hydraulic simulator, an electronic interface unit and a computer that runs the control application and its associated real-time computer models.

**Hydraulic Simulator:** The primary function of the hydraulic simulator is to replicate the behavior of a patient's circulation. It is made up of a physical analog of the venous capacitance, native heart and arterial capacitance as well as functional arterial and venous values.



**Control Unit:** This unit serves two primary functions. It controls some of the basic behavior of the hydraulic simulator and it manages the bidirectional transfer of data and control commands between the hydraulic simulator and the controlling computer.

**Trainer's Station:** This unit includes a supervisor's interface and a real time computer model of cardiovascular, blood gas, drug and thermal behavior.

**Trainee's Station:** This LCD touch screen displays blood gas values, gas flow, FiO<sub>2</sub> supplied to the oxygenator, and activated clotting time.

"Hi-fidelity simulation allows you to create multiple bypass scenarios in a controlled, safe environment where you don't have to worry about making mistakes with a human connected to it," says Ben Komorowski, Clinical Specialist, Terumo Cardiovascular Systems.

The Orpheus system is suited for a "trainer" – usually in the surgeon role – and a "trainee" in the role of the perfusionist:

- The trainer can connect the Orpheus simulator to any make or model of patient monitor using standard patient leads.

- The trainer can set the Orpheus simulator to realistically recreate a variety of rhythms and outputs. The Orpheus simulator also displays ECG, arterial and CVP wave forms, and nasopharyngeal temperature.

- A secondary display allows the trainees to practice monitoring mixed venous oxygen saturation, measuring activated clotting time, interpreting blood gas results and administering vasoactive drugs.

- A library of short videos reproduces many activities that occur during adult cardiac bypass surgery. The trainer can enhance the realism of the situation with video prompts.

### Sophisticated Software

The Orpheus simulator includes an intuitive software system. A trainer can run the system manually or use a pre-scripted automated mode with built-in physiological and pharmacological models. The system can mimic heating and cooling the patient for greater realism.

A touch-screen display allows trainees to gain valuable experience in:

- Initiating an ACT measurement
- Requesting a blood gas analysis
- Delivering drugs to the patient

The software can simulate equipment faults, from power or gas failures to kinking of the arterial line or air entrainment in the venous line. In this way, the trainee can practice what to do if these rarely-occurring emergencies take place during real-life cardiac bypass surgery.

Using the Orpheus simulator software, the trainer and trainee work together to fashion a customized training experience.

"We created simulator scenarios to demonstrate to customers the safety features of our heart lung machines and oxygenators," says Komorowski. "We create a safe and controlled environment that allows them to safely experience unusual perfusion situations. If these kinds of situations occur in clinical practice, they are able to react confidently because they've practiced in a controlled environment.

"Even more important, simulation improves safety and understanding of what perfusionists will see in a real bypass run," adds Komorowski.

### Reference

1. Austin J, Riley J. *Principles of simulation applied to perfusion technology: 2005 update. J Extra-Corpor Technol.* 2005;37:118A.

## Contact Information for Our Sponsoring Partners

### **ABIOMED, INC.**

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Fax: 310-76-8665  
Website: [www.avalonlabs.com](http://www.avalonlabs.com)

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Website: [www.invosurg.com](http://www.invosurg.com)

### **KIMBERLY-CLARK HEALTH CARE**

Phone: 770-587-8578  
Fax: 920-225-4531  
Website: [www.kchealthcare.com/warming](http://www.kchealthcare.com/warming)

### **MAQUET MEDICAL SYSTEMS, USA**

Phone: 888-627-8383  
Website: [www.maquet.com](http://www.maquet.com)

### **MEDTRONIC PERFUSION SYSTEMS**

Phone: 763-391-9000  
Websites: [www.medtronic.com](http://www.medtronic.com)  
[www.perfusionsystems.com](http://www.perfusionsystems.com)

### **NONIN MEDICAL INC.**

Phone: 763-553-9968  
Fax: 763-553-0363  
Website: [www.nonin.com](http://www.nonin.com)

### **QUEST MEDICAL, INC.**

Phone: 800-627-0226 or 972-390-9800  
Fax: 972-390-2881  
Website: [www.questmedical.com](http://www.questmedical.com)

### **SORIN GROUP USA, INC.**

Phone: 800-221-7943 or 303-467-6517  
Fax: 303-467-6375  
Website: [www.soringroup-usa.com](http://www.soringroup-usa.com)  
Email: [Sorin-CP.Info@sorin.com](mailto:Sorin-CP.Info@sorin.com)

### **SPECTRUM MEDICAL, INC.**

Phone: 800-265-2331  
Fax: 803-802-1455  
Website: [www.spectrummedical.com](http://www.spectrummedical.com)

### **SYNCARDIA SYSTEMS, INC.**

Phone: 520-545-1234  
Fax: 520-903-1783  
Website: [www.syncardia.com](http://www.syncardia.com)

### **TERUMO CARDIOVASCULAR SYSTEMS**

Phone: 734-663-4145 or 800-521-2818  
Fax: 734-663-7981  
Website: [terumo-cvs.com](http://terumo-cvs.com)

## Important Academy Dates

### The ACADEMY ANNUAL MEETING DEADLINES

|                            |                              |
|----------------------------|------------------------------|
| <b>ABSTRACT DEADLINE</b>   | <b>October 15, 2012</b>      |
| <b>MEMBERSHIP DEADLINE</b> | <b>November 24, 2012</b>     |
| <b>PRE-REGISTRATION</b>    | <b>January 3, 2013</b>       |
| <b>HOTEL REGISTRATION</b>  | <b>January 3, 2013</b>       |
| <b>2013 ANNUAL MEETING</b> | <b>January 24 - 27, 2013</b> |

### *Others Meetings*

#### **Mechanical Cardiac Support in Pediatric Heart Disease**

September 21-22, 2012  
St. Louis, Missouri  
Website: <http://cme.wustl.edu/PediatricCardiology>

#### **21st Century Treatment of Heart Failure**

*Synchronizing Surgical and Medical Therapies for Better Outcomes*  
October 18-19, 2012  
InterContinental Hotel & Bank of America Conference Center, Cleveland, Ohio  
*In cooperation with Cleveland Clinic Kaufman Center for Heart Failure and the American Association for Thoracic Surgery*  
Website: [www.ccfcm.org/heartfailure12](http://www.ccfcm.org/heartfailure12)