



June / July 2017



*"What mankind can dream, research and technology can achieve."*

## The 28th Annual ELSO Conference

September 24 – September 27

Baltimore, MD



Join us at our 28<sup>th</sup> ELSO Annual Congress Sept 24-27<sup>th</sup> at the Hilton Hotel in Baltimore, Maryland. This years pre-conference will contain a variety of lecture style talks over both general didactic and cutting edge topics, paired with multiple hands-on small group demonstrations and simulations. Lecture topics include ECMO for Cardiogenic Shock, Sepsis, and Respiratory Failure each containing case discussions with expert panels. Cutting edge topics such as Obesity, Pregnancy, Lung Transplant, and Mobilization will be covered as well. Small group demonstrations include Use of Ultrasound and Percutaneous Cannulation, coupled with hands-on simulations over ECPR, Transport, and VA-VV Conversion. Expanding Horizons in ECLS will also include an optional Special topic: "How to Start a Program".

At the conclusion of the Pre-conference, a special lecture will be given by a recently established program regarding the benefits, pitfalls, and nuts and bolts of establishing a new program. Full details of the entire program will soon be on the agenda page.

Visit the [ELSO Conference website](#) for more details.



A Message  
From Our Chairman



The 6<sup>th</sup> EuroELSO Congress held on May 4-7 in Maastricht, The Netherlands was a remarkable success. Several hundred attendees participated in the pre-conference symposium on ECPR and the main conference, which covered all facets of contemporary ECMO care and highlighted important extracorporeal life support research. Release of the 5<sup>th</sup> edition of *Extracorporeal Life Support: The ELSO Red Book* was also celebrated during the EuroELSO Congress. The *Red Book* remains the most comprehensive source for ECMO care providers and has been extensively revised and updated by dozens of highly respected authors to provide up-to-date information on all aspects of ECMO care.

We anticipate that the ELSO Registry will include data from over 100,000 patients by the end of this year. This noteworthy milestone highlights the dramatic increase in ECMO utilization during the past few years and provides new opportunities to examine data-based outcomes that may improve patient care. Registry data request forms may be found on the ELSO.org website.

Finally, nominations for ELSO Steering Committee positions are now being accepted. Additional information about the nomination process may be found in the *Newsletter*. I encourage members who wish to become more involved in ELSO to consider submitting a self-nomination application before the nomination period closes on July 31.

D. Michael McMullan, MD, FACS  
President, Extracorporeal Life Support Organization

### ***ELSO Steering Committee - Call for Nominations***

ELSO is now accepting nominations for the following Steering Committee positions:



*Conference Chair*

*Communications Chair*

*Member At-large*

Selected members will serve a three-year term, beginning September 2017.

Nominees must be active members of ELSO and have a leadership role in ECMO at an ELSO center.

Please submit nominations to Peter Rycus [prycus@elso.org](mailto:prycus@elso.org). Nominations should specify preferred Steering Committee position and include a concise, one-paragraph biographical sketch that highlights the nominee's relationship with ECMO and previous participation/service with ELSO. Please do not submit a CV.

After review by the Nominations Committee, a final ballot of nominees will be submitted to ELSO centers.

The nomination period ends July 31, 2017.



## Bedside with Dr. Bartlett

*Dr. Bartlett is considered by many to be the “father” of ECMO. He has a vast amount of experience and has faced many critical situations and decisions. In this newsletter series, he will join us on ECMO rounds at the bedside.*

An 18 year old girl is on VV support for five days because of viral pneumonia. She has no native lung function. Oxygenation support is going well at 3 L/min but her PaCO<sub>2</sub> is rising despite increases in the sweep gas flow to 9 L/min. The sweep gas is 100% oxygen. The oxygenator is a Quadrox with PMP fibers. The inlet blood is SaO<sub>2</sub> 60%, PO<sub>2</sub> 35, PCO<sub>2</sub> 58, outlet blood is SaO<sub>2</sub> 100%, PO<sub>2</sub> 400, PCO<sub>2</sub> 54.

### *What is happening and what should we do?*

Usually CO<sub>2</sub> clearance is much better than oxygenation. Selective loss of CO<sub>2</sub> clearance happens when the hollow fibers are filled with static water (condensate from water vapor). The water has a high PO<sub>2</sub> because it is exposed to the sweep gas so oxygenation is not affected. However, the PCO<sub>2</sub> in the water equilibrates with the inlet blood PCO<sub>2</sub> over most of the length of the fibers so CO<sub>2</sub> clearance is very little. The solution is to clear the water by “coughing” the oxygenator (short blasts of maximum sweep gas flow). Usually you can see water in the exhaust gas and CO<sub>2</sub> clearance returns. If the sweep gas pressure exceeds the blood side pressure this can cause air embolism (even with “solid PMP fibers”), so it is always done with a pressure popoff valve in the sweep gas inflow set well below the blood side pressure. It is also helpful to increase the blood flow to maximum when coughing the oxygenator to raise the blood side pressure in the oxygenator to avoid air embolism. Rarely it is necessary to change the oxygenator.

**Is there a question or clinical situation that you would like to consult**

**Dr. Bartlett with? Send your question to [newsletter@elso.org](mailto:newsletter@elso.org)**

# Surveys...



Neonatal and Pediatric ECMO Centers,

The Pediatric Cardiology division at Yale New Haven Children's Hospital is conducting a national survey of pediatric ECMO centers in order to better understand the current practices utilized for the cardiac evaluation of neonatal and pediatric respiratory ECMO patients. We invite you to participate in this national survey by completing 21 question online survey that should take approximately five minutes to complete.

If you would like to participate, please follow this link:

[https://yalesurvey.qualtrics.com/jfe/form/SV\\_bfJ1dM6NxsIJB1H](https://yalesurvey.qualtrics.com/jfe/form/SV_bfJ1dM6NxsIJB1H)

Although the survey asks for the name of your institution, this information is not required. If provided, the institution name will be stored separately from the responses given in the survey, and will only be used to quantify the number of participating institutions.

## **Infections on Extracorporeal Life Support (ECLS) in Adults and Children A Survey of International Practice on Prevention, Diagnosis, and Treatment**

**This survey looks to assess the variability in practice of ECLS practitioners regarding strategies for infection prevention, surveillance investigations and thresholds for diagnosis.**

**Completing the survey should take no more than 5 minutes.**

**Thank you.**

Background and Rationale:

Infections (such as ventilator-associated pneumonia, blood stream infection, urinary tract infection, wound infection) acquired during Extracorporeal Life Support (ECLS) represent one of the most common ECLS complications. Infection can lead to increased mortality and morbidity. Infection prevention and early identification of infection, allowing prompt treatment, are therefore important strategies to achieve improved ECLS outcomes overall.

<https://www.surveymonkey.com/r/InfectionsonECLS>

The identification and diagnosis of infection whilst on ECLS represents unique challenges. Whilst on ECLS, clinical signs of infection (such as temperature, blood pressure, heart rate, respiratory rate) are masked and often unreliable. ECLS therapy also provokes a systemic inflammatory response that leads to non-specific increases in the levels of traditional infection biomarkers. This high risk of infection coupled with poor sensitivity and specificity of clinical signs and markers of infection may lead to a delay in identification and treatment of infection. At the same time, it may be associated with unnecessary use of antimicrobial therapy.

Consensus guidelines acknowledge the lack of evidence to guide optimal management on patients on ECLS in relation to infection prevention, recognition and management.

### **HREC Information:**

The Children's Health Queensland Hospital and Health Service Human Research Ethics Committee (HREC) has approved this study.

HREC/17/QRCH/130

Investigators:

Deborah Farrell, Lady Cilento Children's Hospital, Brisbane, PICU

Graeme MacLaren, Royal Children's Hospital, Melbourne, PICU

Luregn Schlapbach, Lady Cilento Children's Hospital, Brisbane, PICU

# ECMO Center Spotlight



*Neck cannulation simulation mannequin developed by our coordinators*

In order to maximize efficiency in responding to patient needs, we have established an ECLS alert system, whereby PICU physicians and ECLS specialists are able to notify various team members of a potential ECLS candidate and all equipment and personnel can be prepared quickly.

Our ECLS team is currently led by medical director Dr. Jaime Blackwood, and two ECLS coordinators: Tanya Spence, Clinical Nurse Specialist, and Steve Menzies, Clinical Perfusionist. There is also an ECLS Steering Committee with representation from surgery, cardiology, and PICU that meets every two months to review education goals, quality assurance, and future plans.



*Simulation mannequin in use*

Based in Calgary, the Alberta Children's Hospital (ACH) is a large, freestanding tertiary care center that serves a population of approximately three million people. ACH's Pediatric Intensive Care Unit (PICU) is a 16-bed medical surgical unit that sees over 1000 admissions annually.

In 2009, we determined a need for a rescue ECLS program for pediatric patients who needed emergent cardiac or respiratory support. ACH does not have a pediatric cardiac surgery program, and the regional program for the province is three hours north of Calgary at the Stollery Children's Hospital (Edmonton, Alberta).

Starting from scratch, a multi-disciplinary team collaborated to establish this life-saving program. In the beginning, our surgeons had minimal experience in cannulation, we had no access to pediatric-trained perfusionists, and the PICU staff had little exposure to ECLS patient management. There was no doubt, however, that this team was extremely keen and determined to work together to establish the best possible ECLS program.

Thanks to the amazing fundraising work of the Alberta Children's Hospital Foundation and our community, we were able to begin implementation. Our entire hospital was very supportive and enthusiastic about having this crucial program in place. Partnering with Stollery Children's Hospital, our ECLS team underwent didactic teaching sessions, wet labs, animal labs and multiple inter-

professional simulations that would prepare us for the program's upcoming launch.

With the help of visiting cardiac surgeons from our regional pediatric cardiac surgery program, our general surgeons stepped up to the challenge, and learned how to perform neck cannulations, initially for VA, and eventually for VV.

A key component in the development of the program was establishing a unique

partnership with our adult perfusion program out of the Foothills Hospital (Calgary, Alberta). This collaboration has allowed us to have a dedicated perfusionist on-call 24/7 for our program.

Utilizing ELSO's guidelines for training, we have 32 trained RNs and RRTs working in the PICU as ECLS specialists. They work closely with our perfusion colleagues to manage everything from the activation of ECLS through to cannulation and stabilization of the patient.

ACH is home to the largest pediatric simulation program in Canada (KidSim). Simulation was a key component of smoothing the learning curve with ECLS, allowing the program to launch with great initial success. Ongoing task training and crisis resource management (CRM) simulations are necessary to maintain competency in a low volume center like ACH. We run ECLS simulations at minimum every two to three months and have developed a low-fidelity mannequin that our pediatric surgeons are able to cannulate. The mannequin allows for a circuit to be run, enabling all team members to practice their role and troubleshoot problems.

Since the official launch of our program in October 2011, we have cannulated 40 patients. In keeping with reported ELSO outcomes, 30 of the cannulated patients have survived. We offer ECLS and ECPR to patients in the PICU, NICU, OR, ED, and inpatient floors, with all cannulations occurring in the PICU or operating room. After each cannulation, our team reviews the process to evaluate our practices and determine areas for improvement.

It is important to note that our program is a rescue ECLS program in a center with no cardiac surgery. These comparatively small numbers reflect children who would have otherwise died without this next level of support. Indications for ECLS have included more common diagnoses such as myocarditis, septic shock and ARDS. Unexpected indications were sand aspiration after a boy was buried in the sand, and a traumatic ventricular septal defect due to chest trauma.

Our program also stands out from others insofar as once patients are cannulated, they are stabilized and medically managed for 12 to 24 hours, then air transported to our regional pediatric CV surgery center for the remainder of the ECLS run with the help of our partner program at Stollery Children's Hospital. An extraordinary effort goes into the safe transport of a fully anti-coagulated patient on an extra-corporeal circuit, and our teams have been highly successful with these challenging transitions thus far.

We are extremely proud to offer ECLS to patients who may not have survived prior to our program, and our success can be credited to the tireless efforts of our team at ACH. Together with our dedicated specialists, pediatric intensivists, cardiologists, surgeons and transfusion medicine team, and our bedside RNs and RTs, we strive to run the best possible rescue ECLS program, saving lives through innovation, dedication and determination.

We are thankful to our partner program at Stollery Children's Hospital and to ELSO, the support and guidance we have received have been a key part of our program's success.



*Dr. Jaime Blackwood, center Steve Menzies, left and Tanya Spence, right*

*Pediatric General Surgeons during animal lab training*

# Extracorporeal Life Support: The ELSO Red Book



## 5th Edition

### Editors

Thomas V. Brogan, M.D.  
Laurance Lequier, M.D.  
Roberto Lorusso, M.D., Ph.D.  
Graeme MacLaren, M.D.  
Giles Peek, M.D.

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The 5th Edition ELSO Red Book is *available!!* This edition is the largest and most comprehensive Red Book ever. Ensure your team has a copy of the most up to date ECMO resource available!!



*GREAT*  
~~Good~~ things  
come to those  
who <sup>^</sup>wait.  
*DON'T*

## *ELSO Adult ECMO Training Course*



Emory University Conference Center

Atlanta GA

Date: November 8, 2017 - November 11, 2017

<https://www.else.org/Members/Courses/November2017Atlanta.aspx>

*For more information contact:*

***Kennethia Banks-Borden*** 734-998-6600

[\*kbanksborden@else.org\*](mailto:kbanksborden@else.org)

**REGISTRATION  
NOW OPEN!**



# Upcoming Courses and Meetings



## AP-ELSO Adult ECMO Training Course 2017

07/17/2017 - 07/21/2017

<https://goo.gl/forms/nd9ztDurl1GSuKnW2>

Location: Hong Kong

Registration is now open. Deadline: 15 June 2017

Please contact Peter Lai at [lck230@ha.org.hk](mailto:lck230@ha.org.hk) or Viann Yu at [yth184@ha.org.hk](mailto:yth184@ha.org.hk) for further details.

## 28th Annual ELSO Conference

9/24/2017 - 9/27/2017

Location: Baltimore, MD

Peter Rycus, MPH 734-998-6601 at [prycus@elso.org](mailto:prycus@elso.org)

<http://www.cvent.com/d/x5qj6f>

28th Annual ELSO Conference September 25-27, Pre-Conference Symposium September 24-25.

Venue: Hilton Baltimore

## Asia-Pacific ELSO Conference 2017

10/12/2017 - 10/17/2017

Location: Gold Coast, Queensland, Australia

<http://apelso.com/>

## EuroELSO ECMO Course: Adult ECMO for respiratory failure and septic shock

11/06/2017 - 11/09/2017

Location: Stockholm, Sweden

Bjorn Frenckner +46-70 722 61 15 at [bjorn.frenckner@karolinska.se](mailto:bjorn.frenckner@karolinska.se)

## ELSO Adult ECMO Training Course

11/08/2017 - 11/11/2017

Location: Emory Conference Center, Atlanta GA

Kennethia Banks-Borden 734-998-6600 [kbanksborden@elso](mailto:kbanksborden@elso)

## 29th Annual ELSO Conference

09/13/2018 - 09/16/2018

Location: Phoenix Arizona

Kennethia Banks-Borden or Peter Rycus 7347-998-6600 [kbanksborden@elso.org](mailto:kbanksborden@elso.org)



# Website Corner



## Summer Fun with ELSO

Looking for a good read while at the pool? Why not check out the Discussion Board?! New posts are coming in every day and your colleagues want to hear from you! Share your wisdom and experience today!

## Discussion Board Topics of the Month

These are the hottest topics. Stop by and provide your input!

The Case of the “White Fog”: Folks are looking for some insights and incidences of the appearance of a white fog/clouding on the faces of their CardioHelp oxygenators.

Flolan used for Anticoagulation: What experience do others have with Flolan for anticoagulation?

## Discussion Board Contributor of the Month

Congratulations to Sara Mathews, RN from Omaha Children’s Hospital and Medical Center for being our Discussion Board Contributor of the Month! Keep sharing your experience!



## Logging On

All ELSO Member institutions have an Administrative Account for your ELSO Registry data entry. This account can create separate accounts for your local physicians and ECMO Specialists. Contact your local ECMO Coordinator to get your accounts set up! Conversely, you can sign up for an individual membership to take advantage of discounts on Red Books and ELSO Conference Registration.





# Coordinator Corner



This section of the newsletter is for new and experienced coordinators to share their thoughts and ideas about managing an ECMO department. Evan Gajkowski is the ECMO coordinator at Geisinger Medical Center, Danville, Pa. He is a relatively new coordinator and graciously agreed to share his perspective about taking on this responsibility. If you are interested in contributing to this section or have questions, please contact [newsletter@ELSO.org](mailto:newsletter@ELSO.org)

I was first exposed to ECMO early in my career as a PICU nurse and it sparked an interest with me. I immediately knew that I wanted to care for these critically ill patients and to learn as much as possible about this technology. Ten years later an opportunity became available and I found myself as the ECMO coordinator at the same hospital where I started my nursing career. Ecstatic about this opportunity, I quickly realized this was not going to be an easy task. The hospital system wanted to migrate from using perfusion-based bedside ECMO support to having RN and RT ECMO specialists. There were so many things that needed to happen before making this change. What equipment were we going to use? Oh, we need a policy for this? Where do we want to cannulate for ECMO? Wait, you want to do what? Well, what anticoagulation policy are we going to use? Which unit are these patients going to be cared for in? What doctors need to be trained? Wait, most importantly, who else is going to take call for me?! Thankfully, I was not alone. Perfusion services assisted me with every policy change and provided input as to how we should structure our program. Critical care medicine and the cardiac surgery staff supported me with whatever we needed to grow the program. Having an idea of what we wanted, I wanted to see what other programs were doing. So I spent the first three months of my new job traveling to other ELSO centers, going to training courses, and developing policies and procedures for a structured ECMO program. I was delighted by the support I received from these other centers and their eagerness to help. We are now two and half years into our program and we are supporting three to four ECMO patients at a time, providing physical therapy while patients are on ECMO, and growing into a regional ECMO center. I am excited for what the future brings and have realized we can always improve our care for our ECMO patients. It has been said that you are only as successful as the people that surround you; I am lucky to have such a dedicated staff support the program and want to provide patients with cutting edge Extracorporeal Life Support.



## Facebook

If you use Facebook please visit our sites and “like” us! We intend to use Facebook as a way to present information to not only ELSO members but to anyone who is interested in our organization. [www.facebook.com/ELSO.org](http://www.facebook.com/ELSO.org)

Euro-ELSO Facebook page:  
[www.facebook.com/EuroELSO](http://www.facebook.com/EuroELSO)



## Twitter

Follow us on twitter!  
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The ELSO Newsletter editorial team’s goal is to bring you a newsletter that is entertaining, informational, and educational. Please welcome Rebecca Rose, ECMO Manager from the University of Chicago to our editorial team. If you would like to join us or have any suggestions for improving the newsletter or would like to contribute content, please contact Joel Davis at [jdavis@elso.org](mailto:jdavis@elso.org).

Thank you from the ELSO Newsletter editorial team  
Joel Davis, Kennethia Banks-Borden, Teka Siebenaler, Omar Al-Ibrahim, Terri Wells, Nandini Nair, and Rebecca Rose

