The Sanibel Symposium

APRIL 22-25, 2020

LIVE ONLINE

FORT MYERS, FLORIDA

Sanibel SYMPOSIUM

17080 Safety St., Suite 109
Fort Myers, FL 33908
Phone: 888.499.5672
www.sanibelsymposium.com

The Sanibel Symposium

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SHARK TANK

Shark Tank! QUEST MEDICAL

SHARK TANK!

Questions for the audience?

1. What are the clinical benefits of using all blood single dose vs. classic del Nido?
2. Are there concerns with using all crystalloid cardioplegia and AKI due to excessive hemp concentration?
3. Cardioplegia poll. Who is using MPS all blood single dose?
4. How many centers are using some form of single dose cardioplegia?
5. What is the appropriate / current interval for re-dosing?
6. If using a single dose strategy, what is your blood / crystalloid ratio?
7. How many cardioplegia protocols are there at your hospital?
8. Who is using syringe pumps to deliver cardioplegia?

There will not actually be sharks during the event, as sharks thus far have been unable to participate in online meetings.

Sanibel SYMPOSIUM

· SAFETY · QUALITY · BLOOD MANAGEMENT ·
· NEW TECHNOLOGY · LEADERSHIP · ECLS ·
· PROFESSIONAL BUILDING · SIMULATION ·

Wednesday, April 22nd, 2020
Moderators-Ty Walker, CCP, CPBMT and William Harris, CCP, LP

0800-0810	**Opening Remarks**
0810-0910	**Myocardial Preservation and Resulting Hemostasis** **Essential Pharmaceuticals Sponsored Session** Kevin McCusker Ph.D., CCP, Assistant Professor of Surgery, New York Medical College, Valhalla, New York Serdar Gunaydin, MD, PhD, Chair & Clinical Professor, Department of Cardiovascular Surgery, Numune Training & Research Hospital, University of Health Sciences, Ankara-Turkey William Nicotra, CCP, LP, Medical Science Liaison, Essential Pharmaceuticals
0910-0940	**Role of ECMO for the Critical COVID-19 Cases in Shanghai, China** Xin Li, MD, PhD, Director of ECC and ECMO Program, Zhongshan Hospital, Fudan University, Shanghai China
0940-1010	**COVID Pandemic - Community Hospital Perspectives.** Dr. Mary Beth Saunders, DO, Infectious Disease Specialist, Cape Coral Hospital and Lee Memorial Hospital, Fort Myers, Fl
1010-1020	**BREAK**
1020-1050	**The ELSO Award of Excellence in Life Support: Why is This Important to my Center?** Micheal Heard, Advanced Technologies Coordinator, Children's Healthcare of Atlanta
1050-1130	**Haemonetics Sponsored Speaker** **The Use of Thromboelastography for Peri-Operative Coagulation and Blood Product Management in Cardiac Surgery – Our Journey** Michael Moront, MD, Cardiothoracic Surgeon, ProMedica Health Systems, Toledo, Ohio

1130-1300	**Come Together, Right Now, Over You** **Companies Coming Together With COVID-19** **Moderator Carla Maul, CCP, LP, Clinical Manager Perfusion.com** **Spectrum Medical:** Jeremy Tamari, VP of Global Perfusion Technology **Terumo:** Patrick Ferguson, Sr VP, Global Commercial Operations **Quest Medical:** Deborah White, National Sales Director **LivaNova**: Joel Campeau, Manager, Global Strategic Planning **Haemonetics Corporation:** Stew Strong, President of Global Hospital **Fresenius Medical Care North America:** Tom Shannon, Marketing Director, Heart and Lung Therapies
1300-1330	**Acute Kidney Injury in the Post-CABG Patient** L. Keith Scott, MD MSc FCCM, Professor of Medicine, Pediatrics and Surgery LSU Health - Shreveport
1330-1400	**Frontiers in Perfusion Education: Developing ECMO Competence During Initial Training** Edward Darling, Associate Professor & Faculty, SUNY Upstate Medical Univ., College of Health Professions, Dept. Cardiovascular Perfusion Bruce Searles, Associate Professor and Department Chair Department Chair, SUNY
1420-1450	**Challenges and Patient Management Strategies Related to Dual Circulations During Veno-Arterial Extracorporeal Membrane Oxygenation** Cory Alwardt, PhD, CCP, Chief Perfusionist / ECMO Coordinator, Mayo Clinic Hospital, Phoenix, AZ
1450-1505	**ECLS Speaker Panel**
1505-1510	Break
1510-1550	**Coronavirus-Driven Blood Shortage – Cell Salvage Offers a Helping Hand** David Williams, Senior Clinical Specialist, Haemonetics
1550-1620	**New Technology of the Quest MPS3 System** Sponsored by Quest Medical Courtney Novello, SpecialtyCare Area Manager

1620-1730	**Shark Tank Sponsored by Quest Medical** Nick Martini, Chief Perfusionist, Tampa General, Tampa, Florida Scott Noesges, Chief of Perfusion, Baylor University Medical Center, Dallas, TX Courtney Novello, SpecialtyCare Area Manager

Thursday, April 23rd, 2020
Moderator-Ty Walker, CCP, CPBMT

0800-0805	**Opening Remarks**
0805-0905	**Adenocaine Cardioplegia: Safe Cardioprotection That Mimics Natural Hibernation** Session Sponsored by Leiters Todd Meyerrose, Ph.D., Hibernation Therapeutics, CEO
0905-0935	**Mechanical Assist with IABP: A Bridge to the Future?** Kacey Dee, Clinical Team Lead, Teleflex
0935-1005	**BREAK**
1005-1100	**Understanding Vacancy and Turnover Among Perfusionists in the USA** Dr. Michael Colligan, DHA, RN, CCP
1100-1200	**Keynote Address** **Heart to Heart: The Real Effects of Addiction with Paige Coleman** Paige Coleman, Family Services Coordinator, Banyan Treatment Center
1200-1300	**Coronavirus For Employers** Donna Flammang, Partner, Brennan Manna & Diamond, P.L.
1300-1315	**Break**
1315-1400	**Multifaceted Approaches in ECMO and Ventricular Support Using the Protek-Duo** Dr. Tony Shackelford MHA, DHA, CCP, CCT, Chief Perfusionist – Perfusion Medical University of South Carolina, Charleston South Carolina
1400-1420	**Transforming Clinical Perfusion practice into a "High Reliability Organization"** Sean M. Murtha, Chief Operating Officer, Comprehensive Care Services Inc
1420-1440	**Perfusion Information Management Systems Quality, Safety, Compliance and Decision Support Engines** Sean M. Murtha, Chief Operating Officer at Comprehensive Care Services Inc

1440-1530	Break
1530-1610	**Do We Need A Weaning Checklist** Luc Puis, ECCP
1610-1710	**Building a Safety System in Perfusion** Dr. Michael Colligan, DHA, RN, CCP

Friday, April 24th, 2020
Moderator- Susan Englert, RN, CCP, LP, CPBMT

0800-0805	**Opening Remarks**
0805-0845	**Minimally Invasive LVAD Insertions** Laura Dell'Aiera, MS, CCP, Medical University of South Carolina Clinical Instructor
0845-0925	**2019 EACTS/EACTA/EBCP Guidelines on Cardiopulmonary Bypass in Adult Cardiac Surgery** Luc Puis, CCP
0925-1005	**American Board of Cardiovascular Perfusion 2020 Update** Bradley Kulat, CCP, LP, American Board of Cardiovascular Perfusion, President
1005-1045	**Global Privacy Regulatory Health Care Update** Timothy Smit, Sr. Global Cyber & Privacy Risk Consultant, Lockton Companies
1045-1130	**Win Your Next Negotiation - A Systematic Approach** David Norris MD, MBA, Consultant, David Norris, LLC
1130-1230	**Adenocaine Cardioplegia: Superior Myocardial Protection Through Hyperpolarization** Session Sponsored by QuVa Pharma Todd Meyerrose, PhD, CEO, Hibernation Therapeutics
1230-1245	**Break**
1245-1330	**AmSECT's Ongoing Strategic Plan and Initiatives** James Reagor, CCP, LP, Director-Department of Cardiovascular Perfusion, Cincinnati Childrens's Hospital
1330-1415	**Anemia: Treatment Pre-Cardiac Surgery, A Tremendous Opportunity**

	Bruce D. Spiess, MD, FAHA, Professor and Associate Chair for Research, Department of Anesthesiology, University of Florida School of Medicine, Gainesville, Florida, USA
1415-1500	**Viscoelastic Coagulation Testing: Reflections on 38 Years of Experience and Sonnorheometry- The Next Generation** Bruce D. Spiess, MD, FAHA, Professor and Associate Chair for Research, Department of Anesthesiology, University of Florida School of Medicine, Gainesville, Florida, USA
1500-1535	**Hematocrit or RBC Recovery in ATS: Which is More Important?** Susan D. Roth, MLT, PBMS, Sr. Clinical Specialist, Cardiac Surgery Perioperative Blood Management/Autotransfusion LivaNova

Saturday, April 25th, 2020
Moderator- Susan Englert, RN, CCP, LP, CPBMT

0900-0905	**Opening Remarks**
0905-0955	**AmSECT Pediatric and Congenital Standards and Guidelines** Ashley Hodge, CCP, MBA, FPP, Associate Chief, Perfusion Services Cardiothoracic Surgery Quality and Safety Officer, Nationwide Children's Hospital
0955-1045	**AmSECT Adult Patient Standards and Guidelines** Shahna Helmick, CCP, Associate Director at the University of Iowa Hospitals and Clinics Perfusion Education Program
1045-1130	**Does Simulation Impact Clinical Readiness?** Nicole Michaud, MS, CCP, CPMBT, CDEI, Chief, Pediatric Perfusionist, Monroe Carell Jr. Children's Hospital at Vanderbilt, Vanderbilt University Medical Center
1130-1230	**Lunch Session** **Staffing for Success: Delivering Excellent Care to Your Patients and Yourself** Dr. Tony Shackelford MHA, DHA, CCP, CCT, Chief Perfusionist – Perfusion Medical University of South Carolina, Charleston South Carolina
1230-1330	**Ken Farmer Memorial Scholarship** The Ken Farmer Scholarship is awarded to a perfusion student(s) who composes and presents an outstanding presentation for the upcoming Sanibel Perfusion Symposium meeting. This Scholarship will be in the amounts of $1500 dollars for 1st place, $1000 dollars for 2nd, $600 dollars for 3rd & $400 dollars for 4th.
1230-1245	**Direct Comparison of Four Biocompatible Circuit Coatings used in Cardiopulmonary Bypass Surgeries**

	Breanna Hackworth M.S, Department of Cardiovascular Science, Midwestern University, Glendale, Arizona, USA
1245-1300	**Effects of Hemodilution on Sonoclot Parameters** Mallory Gillispie, University of Nebraska Medical Center
1300-1315	**Evaluating the Differences in Renal Function and Coagulation Status through the Implementation of Priming Additives in Cardiopulmonary Bypass Circuits** Paul Mangine, Quinnipiac University
1315-1330	**Effects of Oxygenator Change-Out Simulations on Patient Safety** Jake Shore, University of Nebraska Medical Canter

EVALUATIONS

SPEAKER EVALUATION & CERTIFICATE LINKS

Online Speaker Evaluations

Online CME Certificates

- CME Certificates will be available online approximately 2-3 weeks after the conference via the link above under your Perfusion.com member profile.
- Please complete your speaker evaluations using the link on this page of the booklet. Please do not rate any speaker that you did not observe.
- For additional conference details and instructions, please visit our website at www.sanibelsymposium.com

Faculty

BRYAN V. LICH, CCP, LP, CPBMT

Greetings Sanibel Symposium Guests!

I was born in Omaha, Nebraska and attended the University of Nebraska-Lincoln (Go Huskers!). In college, I first learned about perfusion while working as a phlebotomist at Bryan Memorial Hospital. After graduating from the University of Nebraska, I went on to the Texas Heart Institute to study Perfusion. I began Perfusion.com as a student project in 1995 while attending perfusion school in Houston, TX. After graduation, I moved to Ft. Myers, Florida to begin my career.

Presently, I reside and work in Ft. Myers, Florida as the owner of Perfusion.com, Inc. I serve on the board of directors for the Florida Perfusion Society, and I am involved in several other professional societies. I'm the one dressed in black in the front running the AV equipment and looking stressed.

PROFESSIONAL AFFILIATIONS & ACHIEVEMENTS

- Past Member, AmSECT Perioperative Blood Management Committee
- Past Director Zone 3, The American Society of Extracorporeal Technology
- Treasurer, Florida Perfusion Society 2009-Present
- Chairman, International Perfusion Association
- Board Member, Perfusion Research & Education Foundation 1996-2000
- Perfusion Director, Heart-to-Heart Mission 2004-Present
- Perfusionist of the Year, Nominee, AmSECT 2007
- Award of Excellence Nominee, AmSECT 2008, 2011
- Perfusionist of the Year, AmSECT 2009
- President's Award, AmSECT 2012

IRIS J. CHACON, LP, RRT, CCP

Hi, my name is Iris J. Chacon. I was born in Honduras Central America. At the age of 14, my family moved to the United States where it was difficult to adjust as a teenager. I was unable to speak English and had to adjust to a different culture. I survived my first year of school and eventually finished High School. I enrolled at Loyola University, in New Orleans and graduated with a Biology degree and minor in both Chemistry and Psychology.

Soon after Loyola I went to Respiratory Therapy School and worked in the NICU at Ochsner Hospital. At Ochsner I was involved with ECMO patients and became interested in perfusion. I applied to the perfusion program at Ochsner Hospital in 1993 and was accepted in the program out of 100 applicants. After graduation, I moved to Gainesville, FL and have lived here for the past 12 years. My husband and I relocated to Texas for one year and decided to return to Florida where I began traveling for Perfusion.com.

Since then I have worked my way up the ladder becoming Vice President of Perfusion.com. I can sincerely say I have enjoyed every moment of this great adventure with Perfusion.com.

C. TY WALKER, LP, CCP, CPBMT

Ty Walker has been a pioneer and vocal advocate for blood management for the last 20 years. Ty has shared his research and ideas with the perfusion community at countless meetings throughout his career in perfusion. Recently, Ty's institution (St. Francis Hospital, Columbus, GA) has received a PHA Quality and Patient Safety Award and the ITC Award for Patient Safety & Quality, directly because of Ty's involvement is spearheading a blood management program. Ty currently works for Perfusion.com, Inc. in the role of Blood Management Director.

PROFESSIONAL AFFILIATIONS & ACHIEVEMENTS

- St. Francis Quality and Safety Storyboard Award, 2011
- Blood Management, 1st Place, Georgia Hospital Association's PHA Patient Safety Summit, 2011
- AmSECT Award of Excellence Nominee, 2010
- Institute for Healthcare Improvement (IHI) National Forum, 2010
- Malcolm Baldrige National Quality Award, Committee Mbr, Baptist Hospital, 2004
- International Board of Blood Management 2009/Present
- American Board of Cardiovascular Perfusion, 1976-Present
- AABB Assessor, 2004/2006
- CV Service Line, St. Francis, 2011-Present
- Blood Management, St. Francis, 2010-Present
- President of Florida Perfusion Society, 2005-2007

SUSAN J. ENGLERT, RN, CNOR, CPBMT, CCP, LP

I received my BSN from St. Mary of the Plains School of Nursing located in Wichita, Kansas. Given the opportunity to scrub and circulate on the CVOR team, I quickly fell in love with the perfusion profession and enrolled in the St. Mary of the Plains School of Perfusion. I continued working as a perfusionist for Via Christi Medical Center and Specialty Care. My 30 years of employment in the Wichita area came to an end when I transferred to Florida, with an opportunity of starting a brand new open-heart program and employed by Perfusion.com. In July 2013, I started a new adventure, my own company, Perfusion Services LLC. I am an international speaker with a major focus on patient safety, quality initiatives and total blood management based on evidence-based practices. I now enjoy traveling as a perfusionist to hospitals throughout the United States!

PROFESSIONAL AFFILIATIONS & ACHIEVEMENTS

- RUSH Adjunct Professor Cardiovascular Perfusion Program 2017-Present
- AmSECT Award of Excellence 2019
- AmSECT, President 2010-2012
- AmSECT Presidential Golden Gavel Award 2012
- AmSECT, Secretary 2014-2016
- Director International Board Blood Management 2010-2012
- AmSECT Foundation Board of Directors 2010-2012
- AmSECT Award of Excellence Nominee 2012, 2007, 2005
- AmSECT President's Award 2010, 2006
- AmSECT Perfusionist of the Year 2008
- Baxter Perfusionist of the Year, Central Region 1999
- AmSECT Perfusionist of the Year Nominee 2005, 2004, 2003, 2002, 2001
- Past Kansas Practicing Perfusionist Society, KPPS, Secretary/Treasurer
- Past American Board of Cardiovascular Perfusion, ABCP, Oral Examiner
- President Association of Operating Room Nurses, AORN, #1701, 1985-1986

MARCO POLIZZI, RN, MHA, LHRN

I was born in Lucca, Italy and grew up between Florence, Italy & Brussels, Belgium. I spent my childhood living in Belgium and Italy, and often traveled from England to North Africa. I attended The Brussels State Technical School for Electrical Engineering and lived in Belgium till the end of 1989.

I received my Nursing Degree from Edison College, and my Master of Health Care Administration from National-Louis University, Chicago.

I have more than 10 years of diverse leadership experience as a clinical/administrative manager, educator and perioperative nursing while promoting professional healthcare delivery, supported by progressive clinical coaching, and clinical/administrative staff development.

PETER M. ZUCK, CCP, RN, CPBMT

I was born and raised in St. Louis, Missouri and graduated with a BA from Washington University with a major in architectural design. I received my RN from Barnes Hospital, part of the Washington University Medical Center, where I worked in open heart surgery as a scrub and circulating nurse.

I graduated from Texas Heart Institute in 1988 and received a BS from the University of Texas in perfusion technology. I've worked in Southwest Florida as a perfusionist ever since and am currently employed as the Chief Human Resource Officer for Perfusion.com, Inc.

I'm a former executive board member of the Florida Perfusion Society and practice perfusion at HealthPark Medical Center and Naples Community Hospital. I'm a retired rugby player, advanced scuba diver, NRA instructor, and an avid golfer.

Michael Springer, CCP

Mr. Springer is the founder of HEME Perfusion started in 2001 in Lincoln Nebraska where prior to the merger with Perfusion.com January 1st of last 2018, was one of the most respected perfusion service providers in the Midwest.

Michael received his certificate in Perfusion Science from the University of Nebraska Medical Center in 1993. Prior to this he earned his Bachelors' in Science in Bio-Psychology from Nebraska Wesleyan University where he played football and was an active member of the student body.

Michael enjoys substantial amounts of coffee, travel with his family, attending sporting events, and learning new non-perfusion skills on YouTube. He and wife of 25 years, Daria, live in Lincoln, Nebraska where they have 3 children, two daughters of which are in college and a son who is a sophomore in high school.

Michael is proud to be working alongside all the outstanding staff and partner hospitals in Perfusion.com and looks forward to the continued establishment one of the most dynamic and diverse perfusion service providers in the industry.

Benjamin Greenfield, MPS, CCP, LP

Ben Greenfield is from Aurora, Nebraska. He attended Nebraska Wesleyan University in Lincoln, Nebraska for his undergraduate degree (Biology and Chemistry). While at NWU he was a member of the basketball and golf teams as well as the Nebraska Wesleyan Chamber Choir. As an undergrad, he conducted breast cancer research at the University of Nebraska Medical Center in Omaha.

Ben received his Masters' degree in Perfusion Science from UNMC in 2003. He has been employed at the Nebraska Heart Hospital and St. Elizabeth Hospital (Heme Management) in Lincoln and has performed over 3000 heart surgeries and over 2000 orthopedic and neurosurgeries. He is currently employed by Perfusion.com as the Director of Recruitment and Retention and as a Clinical Perfusionist. Ten years after graduation (2013), Ben was named UNMC's most distinguished alumnus. In July, 2014 he was appointed as an associate professor of perfusion at UNMC as well as a clinical coordinator and liaison for potential perfusion students. In April, 2017, Ben was awarded the Excellence in Teaching award by the UNMC College of Medicine.

Ben has lobbied in the Nebraska Unicameral and currently sits as the government liaison for Perfusion in the Nebraska legislature. In 2008, as President of the Nebraska Perfusion Society, he helped to write the licensure law for perfusion for the state of Nebraska. He has also most recently been added to the State of Nebraska Board of Medicine and Surgery as a representative who will help oversee licensure proposals governing new health care specialties including radiation assistants, surgical first assistants, and nursing.

As a published author in both breast cancer research (UNMC) and Perfusion (UNMC) for his work using pharmacological agents and surface modifications on biocompatibility of the extra-corporeal circuit, Ben receives invitations to address audiences across the country about medicine, changing perfusion technology, and integration of a multidisciplinary approach to cardiac surgery.

Ben currently resides in Roca, Nebraska and is married to his wife Tarah. The couple has two children, Addison (11) and Evan (10). In his spare time Ben spends time as a guest speaker on positivity and perspective in the face of adversity. He also enjoys outdoor activities such as hunting and fishing as well as playing the guitar, ukulele, and singing in a band aptly named SynkopE.

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Wednesday, April 22nd, 2020
Moderators-Ty Walker, CCP, CPBMT , William Harris, CCP, LP and Carla Maul, CCP, LP

0800-0810	**Opening Remarks**
0810-0910	**Myocardial Preservation and Resulting Hemostasis** **Essential Pharmaceuticals Sponsored Session** Kevin McCusker Ph.D., CCP, Assistant Professor of Surgery, New York Medical College, Valhalla, New York Serdar Gunaydin, MD, PhD, Chair & Clinical Professor, Department of Cardiovascular Surgery, Numune Training & Research Hospital, University of Health Sciences, Ankara-Turkey William Nicotra, CCP, LP, Medical Science Liaison, Essential Pharmaceuticals  **Bio:** Dr. McCusker is an Assistant Professor of Surgery at New York Medical College in Valhalla, New York. He trained in the disciplines of physiology, biostatistics and multidisciplinary health and human services. He also serves as an Adjunct Professor, teaching Pathophysiology at the University of New Hampshire and Cardiopulmonary Physiology at Northeastern University. Dr. McCusker has several United States Patents towards the advancement of extracorporeal circulation and holds the United States Method Patents for inventing Condensed Perfusion Circuitry for Cardiopulmonary Bypass and Cardioplegia. He has been a practicing Perfusionist for over 30 years; he is the author of over 60 publications and serves on the Editorial Boards of several medical journals. Dr. McCusker has just released two new books “Systems Theory: A Modified Extracorporeal Circuit to Attenuate Systemic Inflammatory Response” and “Acid-Base Balance”  **Bio:** Dr. Gunaydin received his cardiac surgical training in Turkey, England, and the Netherlands and worked as a clinical fellow in Heinrich Heine University in Dusseldorf-Germany and the Heart Institute of Japan. He studied histology and embryology for three years and completed his PhD in Tissue Engineering and Biomaterial Science at Tokyo University.

	Dr. Gunaydin currently serves as director of department of cardiovascular surgery in Numune Training and Research Hospital, Ankara-Turkey. He is chief of basic sciences subcommittee, Turkish Society of Cardiovascular Surgery and also a member of the Steering Committee for Minimally Invasive Extracorporeal Technology International Society (MiECTIS). Dr. Gunaydin's main research interests are clinical evaluation and biomaterial confirmation of novel cardiopulmonary bypass-related technologies based on the prevention of inflammatory response.  **Bio:** William Nicotra, CCP, LP, Medical Science Liaison, Essential Pharmaceuticals **Abstract:** Cardioplegia is a complex and controversial therapy. It often has varying effects on hemostasis intraoperatively. Our discussion will focus on crystalloid based myocardial protection strategies and resulting hemostatic considerations. We will offer varying modalities of therapy which addresses both.
0910-0940	**Role of ECMO for the Critical COVID-19 Cases in Shanghai, China** Xin Li, MD, PhD, Director of ECC and ECMO Program, Zhongshan Hospital, Fudan University, Shanghai China  **Bio:** Xin Li. M.D & Ph.D Date of Birth 08-19-1972 Attending Doctor and Professor, Chief Perfusion Doctor and Director of ECMO Program, Dept. Cardiovascular Surgery Zhongshan Hospital, Fudan University, Shanghai China, Elected Chairman of Chinese Society of Extracorporeal Circulation Chairman of Shanghai Society of Extracorporeal Circulation Co-Chief Editor of " The Chinese Journal of Extracorporeal Circulation" 2016.6 Dept. Cardiovascular surgery, Zhongshan Hospital, Fudan University. Chief Perfusion Doctor and Director of ECMO Program 2012.1-2016.6 Dept. Extracorporeal circulation, Shanghai Chest Hospital. Chief Perfusion Doctor & Director of Scientific Research and Medical Education of Shanghai Chest Hospital 2002.4-2012.1 Dept. Extracorporeal circulation, Shanghai Chest Hospital. Chief Perfusion Doctor 2000.8-2002.3 Dept. Extracorporeal circulation, Shanghai Chest Hospital. Attending Perfusion Doctor 2007. 3-6 Medical school of Michigan University. Ann Arbor, Michigan, USA. ECMO training program 2005.3-6 Massachusetts General Hospital, Medical School, Harvard University. Boston, MA, USA. Clinical Perfusion training program

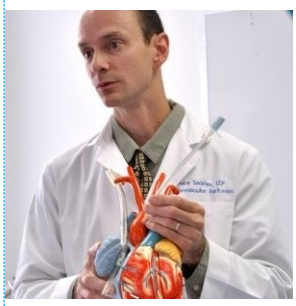
	2000.8-2001.10 Fuwai Hospital, Chinese Institute of Medical Science, Beijing, China. Clinical Perfusion training program. **Abstract:** Severe cases of coronavirus disease 2019 (COVID-19) cannot be adequately managed with mechanical ventilation alone. The role and outcome of extracorporeal membrane oxygenation (ECMO) in the management of COVID-19 is currently unclear. Eight COVID-19 patients have received ECMO support in Shanghai with 7 with VV ECMO support and 1 VA ECMO during cardiopulmonary resuscitation. As of March 25, 2020, 4 patients died (50% mortality), three patients (37.5%) were successfully weaned off ECMO after 22, 40 days and 47 days support respectively, but remain on mechanical ventilation. One patient is still on VV ECMO with mechanical ventilation. The PaO2/FiO2 ratio before ECMO initiation were between 54 to 76 and all were well below 100. The duration of mechanical ventilation before ECMO ranged from 4-21 days. Except the one emergent VA ECMO during cardiopulmonary resuscitation, other patients were on ECMO support for between 18 to 47 days. In conclusion, ensuring effective, timely, and safe ECMO support in COVID-19 is key to improving clinical outcomes. ECMO support might be an integral part of the critical care provided for COVID-19 patients in centers with advanced ECMO expertise.
0940-1010	**COVID Pandemic - Community Hospital Perspectives.** Dr. Mary Beth Saunders, DO, Infectious Disease Specialist**,** Cape Coral Hospital and Lee Memorial Hospital, Fort Myers, Fl  **Bio:** Dr. Mary Beth Saunders is an infectious disease specialist in Fort Myers, Florida and is affiliated with multiple hospitals in the area, including Cape Coral Hospital and Lee Memorial Hospital. She received her medical degree from Kansas City University College of Osteopathic Medicine and has been in practice for more than 20 years.
1010-1020	**BREAK**
1020-1050	**The ELSO Award of Excellence in Life Support: Why is This Important to my Center?** Micheal Heard, Advanced Technologies Coordinator, Children's Healthcare of Atlanta  **Bio:** Micheal has been a practicing 'ECMOlogist' for over 30 years, having started the ECMO programs at Miami Children's Hospital and the University of Virginia. She is a charter member of the Extracorporeal Life Support Organization. She has been involved in many research projects including the use of inhaled nitric oxide, tidal flow ECMO and the use of Venovenous ECMO in pediatric patients. She has presented at multiple conferences on a variety of subjects related to ECMO. She has written chapters for the ELSO ECMO Specialist

	Training Manual and most recently has written a chapter on nursing care of the pediatric patient on ECMO for the 5th Edition of the "Red Book." Finally, Micheal is a co-founder of the Award for Excellence in Life Support Committee and continues to serve as a co-chair. **Abstract:** The ELSO Award, established in 2006, is the quality award for ECMO Programs to use to evaluate and document their Centers' quality processes, educational requirements, equipment, staffing and medical structures in place. The ELSO Award remains important to international as well as national ECMO programs. Centers have gained points on the US News and World Report hospital rankings survey and it will be a question on the 2021 Adult survey. Quality ECMO programs continuously review internal procedures and processes, and assure that they are up to date with the latest technology and research in extracorporeal life support in order to assure they are providing a high level of care. This lecture will review a few of the high value questions and how Centers can use the resources and tools available to them to improve their application.
1050-1130	**Haemonetics Sponsored Speaker** **The Use of Thromboelastography for Peri-Operative Coagulation and Blood Product Management in Cardiac Surgery – Our Journey** Michael Moront, MD, Cardiothoracic Surgeon, ProMedica Health Systems, Toledo, Ohio  **Bio:** Dr. Michael G. Moront is a thoracic surgeon in Toledo, Ohio and is affiliated with multiple hospitals in the area, including ProMedicaa Bay Park Hospital and ProMedica Flower Hospital. He received his medical degree from Georgetown University School of Medicine and has been in practice for more than 20 years.
1130-1300	**Come Together, Right Now, Over You** **Companies Coming Together With COVID-19** **Moderator Carla Maul, CCP, LP, Clinical Manager Perfusion.com** **Spectrum Medical:** Jeremy Tamari, VP of Global Perfusion Technology **Terumo:** Patrick Ferguson, Sr VP, Global Commercial Operations **Quest Medical:** Deborah White, Director of Global Sales **LivaNova**: Joel Campeau, Manager, Global Strategic Planning **Haemonetics Corporation:** Stew Strong, President of Global Hospital **Fresenius Medical Care North America:** Tom Shannon, Marketing Director, Heart and Lung Therapies

1300-1330	**Acute Kidney Injury in the Post-CABG Patient** L. Keith Scott, MD MSc FCCM, Professor of Medicine, Pediatrics and Surgery LSU Health - Shreveport  **Bio:** Dr. L Keith Scott is an adult and pediatric intensivist and director of the SICU at LSU Health in Shreveport. Dr. Scott has particular expertise in ECMO having performed that procedure for more than 20 years. Also, he is former Chief of the CVICU at Wake Forest University. Currently he is Professor of Pediatrics, Surgery and Medicine at LSU Health. Dr. Scott also holds a master's degree in Global Health and infectious Diseases from the University of Edinburgh and is active in developing ICU care models in Haiti and parts of rural Africa. **Abstracts:** Acute Kidney Injury (AKI) is common after cardiac surgery. The etiology is complex and includes pump dynamics, non-pulsatile blood flow, cytokines releases and free radicals just to name a few. What is often under appreciated is that the development of AKI significantly affects both short and long term mortality. One of the issues is we have relied on either creatinine or urine output to signal injury but these are often late signs of AKI. Recently, testing of urinary TIMP-2 and ILGFBP7, signals of cell arrest, have been shown to detect AKI in a little as 3 to 4 hours post-CABG. Using these biomarkers and Implementing and "nephro protective bundle" it has been demonstrated early intervention can significantly reduce AKI in this group of patients. We will discuss these test and discuss the specifics of a "nephro protective bundle" will impact AKI in patients who have undergone CABG.
1330-1400	**Frontiers in Perfusion Education: Developing ECMO Competence During Initial Training** Edward Darling, Associate Professor & Faculty, SUNY Upstate Medical Univ., College of Health Professions, Dept. Cardiovascular Perfusion Bruce Searles, Associate Professor and Department Chair Department Chair, SUNY  **Bio:** Edward Darling graduated from the ExtraCorporeal Technology program at Ochsner Foundation Hospital, School of Allied Health Sciences in New Orleans. Certified Clinical Perfusionist since 1987, Ed spent 10 years at Duke University Health Systems serving as a staff perfusionist and liaison to the ECMO program. Since 2000, Ed has been a perfusion school faculty member with teaching, clinical & research responsibilities. He is an Associate Professor at Upstate Medical University in the Department of Cardiovascular Perfusion in Syracuse, NY. He is also an ECMO consultant & trainer at crouse Hospital Ed's professional activities have included research and he has authored over 40 scientific articles abstracts and chapters. He is a Fellow (and former President) of

the American Academy of Cardiovascular Perfusion, an Associate Editor for the Journal of ExtraCorporeal Technology, and serves on the AmSECT simulation taskforce.

Ed resides in Baldwinsville, NY with his wife Donna and children Jamie, Danielle, and Lydia.



Bio: Bruce Searles completed his perfusion training at SUNY Upstate in Syracuse NY in 1993. He was hired on at this university and held roles as a clinical perfusionist, laboratory researcher and ECMO coordinator before he was selected as Chairman of the perfusion school, a role he still holds.
In this role as chairman, the smartest thing he ever did was to hire Ed Darling away from Duke in 2000.

Over the past 27 years Bruce has published dozens of papers and givens scores conference presentations. He has served on AmSECT committees and been a member and occasional leader of the Perfusion Program Directors Council as well as the New York State Perfusion Society and more recently the NYS Licensure Committee. Bruce Reviews articles for JECT and Perfusion and has received a couple AmSECT awards in recognition of his service. He like to use these activities as an excuse to explain why he hasn't finished his doctoral degree. He's been working on it for over 10 years and well – really Bruce, C'mon – enough is enough. Just finish it already.

Abstract: Frontiers in Perfusionist Education: Developing ECMO competence during initial training

Searles, B Darling, E, Riley J, SUNY Upstate Medical University, Syracuse, NY

Introduction: ExtraCorporeal Membrane Oxygenation (ECMO) has evolved as a multi-disciplinary service with a variety of health care providers (RN, RT, CCP) operating the ECMO systems. However, Perfusion is the only health care profession with an accredited curriculum and preceptorship requirement that focuses on the techniques and physiology of extracorporeal circulation. Perfusionists then are often relied upon to provide clinical support and technical expertise to ECMO services. With the recent explosion of adult ECMO in the critical care setting, perfusionists are increasingly being called upon and our educational program has received feedback from clinicians and employers that entry-level perfusionists would benefit from a more detailed ECMO experience during their initial training. Therefore, we developed a focused curriculum to teach ECMO to perfusion students and compared it to our traditional method.

Methods: An "ECMO Capstone" (CAP) curriculum was developed which included 2 credits of specific classroom instruction, 70 hours of simulation-based practice, 7 weeks of clinical preceptorship with a busy ECMO service, and a detailed written portfolio covering the entry level body of knowledge for Cardiac and Pulmonary Adult ECMO. This curriculum was compared to the traditional model which included only the classroom instruction and the simulation practice. In the

	traditional (CTL) model clinical preceptorship was not structured and was developed out of random opportunity for students during their CPB preceptorship rotations. Outcome measures included knowledge-based tests, skills demonstrations, clinical experience and fluency with ECMO clinical applications. Four perfusion students were enrolled into the ECMO Capstone track. Following 2.5 semesters of didactic perfusion education, **Results:** There was no difference between CAP and CTL students with regard to introductory knowledge, demonstrated skills, and total number of CPB cases performed during training. CAP students performed 15x more ECMO interventions and demonstrated a higher level of fluency with their mastery of ECMO clinical concepts. **Discussions:** While the CTL curriculum adequately prepares students with knowledge and skills it falls short of developing competency within the clinical specialty. The ECMO capstone track provided the student with a robust ECMO experience well beyond the typical student receives and better prepared them to be a contributing team member on a busy ECMO service immediately after graduation. We conclude that the focused ECMO clinical rotation provides the student a greater understanding in the delivery, management, logistics of ECMO and provides them greater insights in working in collaborative environments outside the O.R.
1400-1420	**Break**
1420-1450	**Challenges and Patient Management Strategies Related to Dual Circulations During Veno-Arterial Extracorporeal Membrane Oxygenation** Cory Alwardt, PhD, CCP, Chief Perfusionist / ECMO Coordinator, Mayo Clinic Hospital, Phoenix, AZ  **Bio:** Cory Alwardt, PhD, CCP has been the Chief Perfusionist and ECMO Coordinator at the Mayo Clinic Hospital in Arizona for the last 12 years. He is an Assistant Professor of Surgery in the Mayo School of Health Sciences and in the Mayo Clinic Alix School of Medicine. Cory is currently on the AmSECT Board of Directors and has also taken an active role in other societies such as ELSO, the STS and AATS, and the Arizona State Perfusion Society. His professional interests include the hemodynamics of ECMO, education at both the basic science and clinical levels, and he has participated in medical mission trips to numerous developing countries throughout his career. Outside of his professional life, Cory enjoys traveling the world, enjoying food and wine, and spending time with his rescue doberman, Shiloh. **Abstract:** Two unique aspects of managing patients on venoarterial extracorporeal membrane oxygenation (VA ECMO) support are the impact of retrograde blood flow and the interaction of native blood flow versus blood flow from the ECMO circuit. Retrograde blood flow from the ECMO circuit during peripheral cannulation can add afterload to the left ventricle and cause a delay in cardiac recovery. Various strategies to minimize cardiac distension and injury with varying degrees of success include surgical venting of the heart, use of intra-aortic balloon pumps, and

	percutaneous left ventricular assist devices. In addition, retrograde blood flow from the ECMO circuit can cause problematic variations in regional blood gases if oxygenated blood from the circuit is unable to reach the aortic arch vessels. Strategies to address upper body hypoxemia include maximizing blood flow from the circuit, minimizing left ventricular ejection, manipulation the venous cannula, and possibly increasing mechanical ventilator support. Interestingly, hypoxemia and regional variations in blood gases can also occur during central and upper body cannulation as well. This presentation will discuss various problems and strategies that can occur during VA ECMO related to the mixing of native blood flow and blood flow from the ECMO circuit.
1450-1505	**ECLS Speaker Panel**
1505-1510	Break
1510-1550	**Coronavirus-Driven Blood Shortage – Cell Salvage Offers a Helping Hand**  Sponsored by Haemonetics David Williams, Senior Clinical Specialist, Haemonetics **Bio:** Sr. Clinical Specialist…David Williams has over 16 years of experience as a clinical trainer in cell salvage and patient blood management. He has dedicated his career to advancing the field through education and the clinical application of autotransfusion globally.
1550-1620	**Quest MPS2 Usage With Modified Whole Blood Microplegia** Sponsored by Quest Medical Courtney Novello, SpecialtyCare Area Manager
1620-1730	**Shark Tank Sponsored by Quest Medical** Nick Martini, Chief Perfusionist, Tampa General, Tampa, Florida Scott Noesges, Chief of Perfusion, Baylor University Medical Center, Dallas, TX Courtney Novello, SpecialtyCare Area Manager **QUESTIONS FOR THE AUDIENCE?** 1. What are the clinical benefits of using all blood single dose vs. classic delNido? 2. Are there concerns with using all crystalloid cardioplegia and AKI due to excessive hemp concentration? 3. Cardioplegia poll. Who is using MPS all blood single dose? 4. How many centers are using some form of single dose cardioplegia?

5. What is the appropriate / current interval for re-dosing?

6. If using a single dose strategy, what is your blood / crystalloid ratio?

7. How many cardioplegia protocols are there at your hospital?

8. Who is using syringe pumps to deliver cardioplegia?

Thursday, April 23rd, 2020
Moderator-Ty Walker, CCP, CPBMT

0800-0805	**Opening Remarks**
0805-0905	**Adenocaine Cardioplegia: Safe Cardioprotection That Mimics Natural Hibernation** Session Sponsored by Leiters Todd Meyerrose, Ph.D., Hibernation Therapeutics, CEO

Bio: Dr. Todd Meyerrose is a serial entrepreneur and investor in biotechnology and healthcare ventures that use emerging technology to accelerate the process of discovery and bring innovative products to market. He has been a founding member of 4 venture-backed startups, and currently serves as the Managing Director of venture investments in a multi-family investment office. Todd is an Adjunct Professor at the Stanford University School of Medicine, completed post-doctoral work in the Jaenisch lab at the Whitehead Institute, received a Ph.D. in Molecular Cell Biology from Washington University in St. Louis, and holds a B.S. from the University of Kentucky.

Abstract: For over 50 years, the most common practice for myocardial protection has been the use of hyperkalaemic or high potassium solutions to maintain the heart in an unnatural and highly depolarized condition. Extensive research has shown that these high levels of potassium can produce several adverse events, including arrythmia, ischemic injury, and edema. All of these can contribute to lasting ventricular performance deficits, complications both during or post-procedure, and reduced patient outcome measures. In nature, many animals hibernate, or otherwise reduce their heart rates and metabolic demands, without experiencing these negative aftereffects. Adenocaine cardioplegia was modeled after these natural events, using a proprietary formulation of adenosine,

	lidocaine,and magnesium to create a safe, natural, and effective cardioplegia. This resting myocardial membrane potential is closer to physiologic normal, with a lower metabolic demand and reliable quiescence in procedures.
0905-0935	**Mechanical Assist with IABP: A Bridge to the Future?** Kacey Dee, Clinical Team Lead, Teleflex  **Bio:** Kacey has been in the cardiology space for 19 years. While at the Cleveland Clinic, she worked in the CTICU, moving up into management and was part of the Organ Procurement Team. She then left the hospital setting and moved into sales with a hemostatic dressing company. She has been with Teleflex for almost 12 years advancing from a Clinical Support Specialist to now managing the Clinical Specialists as the Clinical Team Lead. **Abstract:** This lecture will review the physiological benefits of IABP therapy on left ventricular function from the pressure volume plane. Contemporary studies relevant to outcomes or the efficacy of IABP therapy will also be reviewed. Future technologies related to monitoring IABP efficacy in patients will be discussed.
0935-1005	**BREAK**
1005-1100	**Understanding Vacancy and Turnover among perfusionists in the USA** Dr. Michael Colligan, DHA, RN, CCP  **Bio:** Michael Colligan graduated from the University of Arizona perfusion training program in 2003 under then director Doug Larson. His career has spanned several organizations in the State of Texas, working for a variety of contract and hospital perfusion groups, including an 8 year stay at Baylor St. Luke's Medical Center/The Texas Heart Institute where he was a clinical and academic instructor and served as chief perfusionist from 2012-2017. Michael completed his Doctorate in Health Administration at the University of Mississippi Medical Center in 2019. He currently serves as a Director of Perfusion in the Houston area for Comprehensive Care Services and has developed multiple nationally-scoped programs including The CCS Leadership Academy, a robust, one-year training program for young directors which helps them to develop evidence-based leadership competencies. **Abstract:** A large number of recent publications and presentations have focused on impending workforce issues surround the field of perfusion. Vacancy and turnover rates, which provide a picture of the current workforce status and serve as a benchmark for comparison to past and future equilibrium, have not been examined. The purpose of this study was to identify current staffing trends among a cohort of perfusionists in the United States, as well as the factors affecting these trends. A vacancy and turnover survey was conducted during January and February of 2019. The survey required participants to answer several questions designed to

	determine vacancy and turnover during the prior one year period. Questions related to the vacancy and turnover rates of perfusionists were reported with descriptive statistics, including the means, medians, standard deviations, and range of scores. The study collected 502 responses, of which 484 met all inclusion criteria. Vacancy and turnover rates were analyzed by state, region, employer type, group size, and salary range. In summary, the vacancy rate for all perfusion groups in this survey was 12.3%, with a turnover rate of 14.7%. This investigation explores differences in vacancy and turnover among different subgroups based on state, region, employer, practice size, and salary range. Data from this study are presented as a guide to assist stakeholders in determining the best course of action with regards to staffing of perfusion services and how to plan for future needs.
1100-1200	**Keynote Address** **Heart to Heart: The Real Effects of Addiction with Paige Coleman** Paige Coleman, Family Services Coordinator, Banyan Treatment Center  **Bio:** Paige Coleman is a recovery advocate and speaker who has dedicated her career to working with families and their loved ones struggling with substance use disorders or mental health conditions. Growing up between Chicago and South Florida, Paige Coleman knows firsthand the gravity and destruction of drug addiction. In 2017, Paige's family suffered the tremendous loss of her younger brother, Hunter Coleman. At the tender age of only 23, Hunter committed suicide while riddled with severe opiate addiction. Unfortunately, this was only one of the tragedies Paige has had to endure. The disease of addiction has taken multiple friends and family members from her. **Abstract:** Title: "Heart to Heart: The real effects of addiction with Paige Coleman" Keywords: Addiction, Substance Use Disorder, Mental Health, Health Risks, Suicide Awareness Level of difficulty: Beginner/All Levels Learning Objectives: First hand experience of Substance Use Impacts, Physical and Mental Health Statistics, Substance Use Disorder Statistics, Methods of Detection, Family Component of Disease of Addiction **Summary:** In healthcare today, there is a lot of noise about the effects of substance use disorder and mental health conditions. Over the last few years, overdose numbers have sky rocketed. Emergency rooms are seeing more and more patients suffering from the effects of illicit drugs or alcohol. Addiction is claiming the lives of individuals from all demographics, it does not discriminate. This presentation will address the physical, mental, and emotional impacts of substance use disorder and untreated psychiatric conditions. Paige Coleman is a recovery advocate and speaker who has dedicated her career to working with families and their loved ones struggling with substance use disorders or mental health conditions.

1200-1300

Coronavirus For Employers

Donna Flammang, Partner, Brennan Manna & Diamond, P.L.

Bio: Donna M. Flammang is a member/partner in the law firm of Brennan Manna & Diamond, P.L. in Bonita Springs, Florida whose practice is concentrated in the areas of business/tax law, employment and estate planning. She assists business with the formation, purchases and sales of business, contracts, employment issues, non-compete issues, tax matters, trademarks, copyrights, and license agreements, and tax issues. She was formerly the Vice President, General Counsel & Secretary of a NYSE listed Fortune 600 international manufacturing company and a shareholder/partner in the over 400 lawyer Midwest regional law firm in Ohio. She has been named as a "Best Lawyer in Florida" for 2018 and 2019. Besides being a Board member of The Bonita Springs Rotary, she is a member of the Advisory Board for the Institute of Entrepreneurship of FGCU, a member of the Advisory Board of the Lugert School of Business, Small Business Development Center, and is Chairman of the Board of The Everglades Wonder Gardens."

Abstract: Coronavirus For Employers Webinar

Donna M. Flammang, Esq. Brennan Manna & Diamond, P.L.
dmflammang@bmdpl.com 239-405-8672

What is a Pandemic?

• Heightened legal standard
• Sustained human-to-human transmission worldwide, and that the virus is no longer contained in a few geographic areas. It would not, however, automatically mean that the symptoms are severe.
• "During a pandemic, employers should rely on the latest CDC and state or local public health assessments." **- EEOC**

Where do Employers go for Reliable Information?

- Comprehensive Information from Centers of Disease Control and Prevention (Updated almost daily)
- Daily situation reports from World Health Organization
- State Public Health Agencies

What should Employers do?

• Coronavirus File
• Print out Reliable Information to support decision • Pay employees for working

What are the Legal Implications of Coronavirus on Employers?

1. Workers Compensation

- No issues.
- Must be “occupational” meaning that it arose out of and in the course and scope of employment, and it must arise out of or be caused by conditions “peculiar” to the work. o -i.e., black lung from coal mining; asbestosis from asbestos removal
- **BUT:** States are expanding coverage

2. Intentional Tort and Third-Party Negligence Claims

- Not an issue of concern.
- Fail to train properly, allowing sick customers into business, not providing adequate equipment.
- Committed the tortious act with the intent to injure; or, with the belief that the injury was substantially certain to occur.

3. **Americans with Disabilities Act (ADA**)

- Not an issue of concern.
- Temporary conditions that are minor don’t qualify as disabilities because they do not have serious, long-term consequences substantially limiting a major life activity.

  o Seasonal sickness without long-term serious consequences.

- CAUTION: ADA prohibits discrimination against those with actual and “regarded as” disabilities. Someone with COVID-19 might claim an employer regarded him or her as having a disability.

4. NLRA

- Becoming an issue
- Employees have a protected right to raise concerns about terms and conditions of work.
- Whether union or non-union
- CAUTION: A refusal to work may be deemed a concerted protected activity. See, Amazon

5. OSHA

- Ongoing issue.
- Still no specific standard for COVID-19
- General Duty Clause requires employers to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm.
- PPE Standards by industries

- Reporting standards
- Healthcare Standards - CDC

6. FMLA

- Traditional, can be a consideration.
- If FMLA eligible, incapacitated for more than 3 full consecutive days, and (consults with a doctor 2 or more times in 30 days or consults once and receives a regiment of continuing treatment)
- Applies to care for covered family members.
- CAUTION: Make sure they are not telecommuting.

7. EEOC

- Once employees return to work.
- Travel restrictions/requirements - National Origin, Religion
- ADA and GINA
- Can we send employees for testing/medical examinations?

  o Before employment, yes.

  o During employment, yes on "Direct Threat"

- Can we send employees home?

  o Yes

  o Salaried employees –workweek in which they perform no work.

- Can we ask employees about symptoms?

  o Yes, related to disease (fever, cough, shortness of breath)

- Can we take their temperature?

  o Yes

- Can we inquire about exposure (travel, intimacy, family care)?

  o Yes., and make them stay home during quarantine

- Can we enforce measures to prevent the spread?

  o Yes. Encourage distancing, permit telework, institute hand washing, coughing etiquette; require PPE

- Can we require vaccine?

o TBD

o Offer but be careful of ADA and religion issues

- Do we have to allow telework?

o No. CAUTION: employees with disabilities that put them at high risk for complications

- Can we inquire as to why employees miss work? o Yes
- Can we require a fitness for return to work? o Yes, but should you.

Do we have to give Time Off?

• Federal contractors will need to comply with paid sick leave (Executive Order 13706) • Paid Sick Leave requirements by state and local law
• Also consider School Closing provisions in state and local laws.

What about FFCRA?

• Under 500 Employees
• April through December 2020 • EPSL

o 80 hours or 2 week avg.
o Up to $511/day for 1-3 (Own COVID-19) o Up to $200/day for 4-6 (other COVID-19)

• EFMLEA (Childcare Leave) o Another FMLA reason

o 2 weeks unpaid (but see EPSL)

o 10 weeks paid at 2/3 up to $200/day • Reimbursed to IRS standards
• Health Care Provider Exceptions

o To the employee

o Judicious
• Under 50 Employee Exemption

o Only to Childcare Leave

Questions?

• What to do about employees afraid to come to work?

	• What about layoffs or furloughs? • What about return to work? • Can we modify policies? **Employee Survey** In the event that the coronavirus (COVID-19) continues as a public health concern, we will need to take measures for the business. Please answer the following survey. Directions: Answer "yes" to the whole question without specifying the factor that applies to you. Simply check "yes" or "no" at the bottom of the page. Will you be unable to come to work because of any one of the following reasons: If schools or day-care centers were closed, you would need to care for a child; If other services (hospitals, nursing homes) were unavailable, you would need to care for other dependents; If public transport were sporadic or unavailable, you would be unable to travel to work; and/or; If you or a member of your household fall into one of the categories identified by the CDC as being at high risk for serious complications from the coronavirus (COVID-19), you would be advised by public health authorities not to come to work (e.g., persons with compromised immune systems; persons less than 65 years of age with underlying chronic conditions (such as chronic lung or cardiac disease, or diabetes); or persons over 65). Answer: YES_____ , NO_____ Employee:_____ 4816-1692-9978, v. 1
1300-1315	**Break**
1315-1400	**Multifaceted Approaches in ECMO and Ventricular Support Using the Protek-Duo** Dr. Tony Shackelford MHA, DHA, CCP, CCT, Chief Perfusionist – Perfusion Medical University of South Carolina, Charleston South Carolina

Bio: I have been a perfusionist for over 28 years and have worked in a variety of healthcare settings. I am currently the Chief Perfusionist at the Medical University of South Carolina (MUSC). Received Doctorate in Health Administration in 2009.

My core interests and strengths are in Strategic Planning and Operation Management, Operating Room Design (specifically Cardiac Operating Rooms), Quality Assurance/Improvement and most importantly improving patient safety via human factor analysis. Prior to 2013, along with clinically practicing, I was an active Assistant Professor for 11 years at MUSC's Perfusion School, didactically ad clinically teaching and conducting research. While there I actively served on the College of Health Professions' various committees and served as President of Faculty Assembly in 2011-2012. I remain an adjunct assistant professor at the College Health Profession teaching the Foundations in Leadership for Doctor of Health Administration-Interprofessional Studies Program.

1400-1420

Transforming Clinical Perfusion practice into a "High Reliability Organization"

Sean M. Murtha, Chief Operating Officer at Comprehensive Care Services Inc.

Abstract: Perfusionists work in a highly complex environment with no room for error. When errors do occur, they must be identified and corrected without delay. The Agency for Healthcare Research and Quality (AHRQ) uses the term High Reliability Organizations for groups that operate in complex, high-hazard domains for extended periods without serious accidents or catastrophic failure.

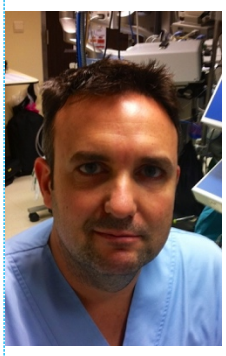
One characteristic of HROs is that they have a preoccupation with failure and errors. They analyze each event to effect system wide change in an attempt to mitigate the occurrence of similar errors. Perfusionists should adapt HRO concepts within our practice, specifically in regard to teamwork and communication. With the application of certain tools such as "checklists" and "sterile cockpit", "read back" and "verify actions", "knowing, anticipating, and preparing through a criss management program" errors can be significantly reduced.

"The Hallmark of an HRO is not that it is error-free but that errors don't disable it." - AHRQ

The Swiss Cheese Model is commonly used in risk analysis and risk management. HROs use a systematic approach to analyze errors and failures. These errors and failures are treated as a product of the system and not a reflection of individual clinician competency. HROs maintain vigilance for vulnerabilities in their layered protective barriers instead of focusing on individual failures. Once identified, they are considered high value opportunities to effect system wide change, a critical component in sustaining high reliability.

	Perfusion's commitment to excellence through statutory compliance, continuous process improvement, regulatory adherence, and implementation of best practices radically reduce system failures and effectively respond when failures occur!
1420-1440	**Perfusion Information Management Systems Quality, Safety, Compliance and Decision Support Engines** Sean M. Murtha, Chief Operating Officer, Comprehensive Care Services Inc  **Abstract:** Capturing robust, structured data for the evaluation of perfusion care has been a limitation in driving process and performance improvement within cardiac surgery. Modern perfusion information management systems (PIMS) are addressing this gap and creating solutions designed to drive best practices. PIMS leverage interoperability with enterprise-level information sources such as laboratory information management systems (LIMS), pharmacy information system (PIS) and surgery scheduling systems (SSS) to reduce duplicative efforts and errors. PIMS also communicate directly with a range of medical devices to improve data accuracy and ensure data integrity. Clinical decision support systems (CDSS) utilize all of these sources, along with established best practices from the literature, to offer contextual advice to healthcare providers. This advice can then be further evaluated by the provider's own judgement and combined for clinical decision making. By delivering relevant knowledge filter intelligently and deliver at appropriate times, more efficient and safe care can be achieved. Other PIMS tools such as remote surveillance and role based notifications provide constant vigilance over patients by all members of the care team (surgeon, anesthesiologist, perfusionist and nurses.) When deployed as a part of a broader perioperative system, this care can be extended to the ICU and play a key role in complex therapies such as ECLS and ventricular assist devices. This work is not unique in Healthcare and it is current state for many other medical professionals. Standardization of clinical workflows and the adoption of best practices has been a stated goal since the passage of the Health Information Technology for Economic and Clinical Health (HITECH) act of 2009. Unfortunately, not all experience incorporating clinical workflows into institutional electronic medical records (EMR) has been positive. Little has been reported on the adoption of perfusion specific EMRs. The challenge for perfusionists today is to use industry experience and optimize our efforts towards quality improvement and patient safety.
1440-1530	Break
1530-1610	**Do We Need A Weaning Checklist** Luc Puis, ECCP

Bio: Having a nursing and midwife education as background, I soon started to be intrigued by the functioning and responsibility of the heart-lung machine used during cardiac surgery.



First working as an ICU nurse in Brussels for 5 years, I started my theoretical education in the Perfusion School in Leuven, Belgium in 1999 and in 2000, I started my first job as a perfusion student in the University Hospitals of Leuven, Belgium.
In 2003, I passed my European Board Certification exams and was considered a senior perfusionist. Meanwhile, I got involved into the professional associations and become a regular member of the Board of Belgian Society of Extracorporeal Technologies, and also started teaching at the Perfusion School in different subjects like IABP, Myocardial Protection Strategies, Bloodsaving Techniques,…

Around 2007-2008 I went back to Brussels and started working at the University Hospitals in Brussels thereby also getting involved into the General City Hospital of Aalst.

Teaching and training students to become perfusionists has always been my passion. Meanwhile, I also got involved in international associations and have been an active member in the American Society of Extracorporeal Technologies, both as a member of the International Consortium of Evidence-Based Perfusion as a regular attendant/co-organizer of their meetings.
I have presented on a multitude of meetings and have authored and co-authored some publications in the field of perfusion and cardiac surgery.
Databases and clinical guidelines have also gained my interest, and the liaison and knowledge gained from the ICEBP have led to the co-chairing and publication of the 2019 EACTS/EACTA/EBCP Guidelines on Cardiopulmonary Bypass.
My goal is to disperse knowledge and bring people together and this has led me into organizing international conferences, starting up and maintaining the Tiny Perfusion Letter and being a reviewer for The Journal of Extracorporeal Technology and Perfusion Journal.
Participating in webinars is a natural consequence of this, embracing the newest technologies to improve knowledge and education in the field of perfusion.

Currently, I'm preparing to move permanently to the United States and as a consequence, I'm not active in clinical perfusion, but still as editor, reviewer and educator.

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Abstract: Weaning from cardiopulmonary bypass during cardiac surgery procedures is one of the most complex periods in an operating room, in which an already stressful environment can turn rapidly chaotic and overwhelming.

Preventing this stress and avoiding potential harm to the patient, can be achieved by the use of a checklist before coming off bypass.

Checklists are cognitive aids that not only can enhance non-technical skills, but also require non-technical skills to be executed in a proper manner. Checklists are powerful tools that can help cardiac surgery teams to be more effective and functional, but they also have the potential to disrupt teams, causing so-called "checklist-fatigue" and have a negative effect on patient outcome and the occurrence of adverse events.

There is a multitude of literature on checklists in general, but when it comes to weaning checklists for cardiopulmonary bypass, only a few (tutorial or review) articles mention it. There is no research done on the effect of introducing checklists to see if it enhances the weaning process; let alone the effect of it on patient outcomes.

One research article describes the effect of a weaning checklist in a simulation environment and offers us some surprising findings. (1)

There is controversy surrounding checklists and many pitfalls should be avoided and considerations made in the research, development, introduction and execution of a checklist. (2)
This presentation addresses these issues and also presents a proposed checklist, derived from many literature examples. (3)

The first question that should be asked is if a specific cardiac surgery team actually needs a weaning checklist.

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1610-1710	**Building a Safety System in Perfusion** Dr. Michael Colligan, DHA, RN, CCP  **Bio:** Michael Colligan graduated from the University of Arizona perfusion training program in 2003 under then director Doug Larson. His career has spanned several organizations in the State of Texas, working for a variety of contract and hospital perfusion groups, including an 8 year stay at Baylor St. Luke's Medical Center/The Texas Heart Institute where he was a clinical and academic instructor and served as chief perfusionist from 2012-2017. Michael completed his Doctorate in Health Administration at the University of Mississippi Medical Center in 2019. He currently serves as a Director of Perfusion in the Houston area for Comprehensive Care Services and has developed multiple nationally-scoped programs including The CCS Leadership Academy, a robust, one-year training program for young directors which helps them to develop evidence-based leadership competencies. **Abstract:** Despite advances in both technology and culture, perfusion remains a clinical practice with significant preventable errors happening. Published data put the occurrence of injury due to CPB incidents at 1:1250 procedures (Charriere et al., 2007) and mortality at about 1:4600 (Mejak et al., 2000; Stammers & Mejak, 2001; Charriere et al., 2007). One epistemological review showed a serious near miss event once every 250 cases (Colligan, 2019). Comprehensive Care Services, the largest perfusion-owned perfusion services provider in the nation, is in the process of rebuilding our variance reporting system. This talk will be a thought experiment reviewing other safety systems, hospital-based experiences, and what would be included in a "perfect" perfusion safety system. Audience participation is encouraged.

Friday, April 24th, 2020
Moderator- Susan Englert, RN, CCP, LP, CPBMT

0800-0805	**Opening Remarks**
0805-0845	**Minimally Invasive LVAD Insertions** Laura Dell'Aiera, MS, CCP, Medical University of South Carolina Clinical Instructor  **Bio:** Laura Dell'Aiera, a proud graduate of the SUNY Upstate Medical University perfusion program, has gained experiences in several different institutions throughout her career. The topic of discussion comes from her experiences at the University of Rochester Medical Center. Most recently, Laura has joined the faculty at the Medical University of South Carolina. The new challenges of clinical coordinating and working as an educator

have been extremely gratifying for her. In her personal life, Laura enjoys spending time with her family, dogs, and in the outdoors.

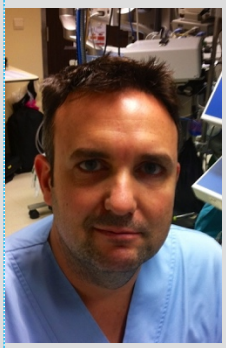
Abstract: Mechanical Circulatory Support (MCS) devices have rapidly gained success and popularity. Much of this improvement has been due to changing techniques and better understanding. In order to improve outcomes, cardiac teams have drastically changed their intra-operative and post-operative management of heart failure patients. One of the most recent and revolutionary changes has been a move toward a complete sternal sparing operative approach for Left Ventricular Assist Device (LVAD) implantation.

A left-sided thoracotomy incision allows for optimal visualization of the left ventricular apex for the inflow insertion. A right-sided anterior thoracotomy allows for visualization of the aorta for outflow attachment. Retention of the pericardium around the right ventricle is possible due to the very localized operation on the patient's right side. Maintaining the geometry of the right ventricle with the intact pericardium is theorized to assist in preventing right ventricular failure.

Perfusion techniques for the minimally invasive approach have evolved as well. Femoral arterial and femoral venous cannulation allow for decreased obstruction in the surgical field. Prior to detachment from cardiopulmonary bypass, the pCO2 levels are kept less than or equal to 30mmHg in order to cause a respiratory alkalosis and vasodilate the pulmonary vasculature. In turn, the optimal situation for preventing right ventricular failure (RVF) while weaning from bypass is realized. An additional time-out was implemented prior to weaning from bypass in order to ensure that every member of the team was prepared, and lab values were appropriate.

In the first 10 consecutive sternal sparing LVAD implants, results in every outcome measure had improved in comparison to the conventional median sternotomy group. Intensive Care Unit (ICU) Length Of Stay (LOS), hospital LOS, and intubation times were all decreased. Only 1 patient was transfused, and none returned to the operating room for complications. None of the patients in this cohort experienced post implantation RVF.

0845-0925



2019 EACTS/EACTA/EBCP Guidelines on Cardiopulmonary Bypass in Adult Cardiac Surgery

Luc Puis, ECCP

Bio: Having a nursing and midwife education as background, I soon started to be intrigued by the functioning and responsibility of the heart-lung machine used during cardiac surgery.
First working as an ICU nurse in Brussels for 5 years, I started my theoretical education in the Perfusion School in Leuven, Belgium in 1999 and in 2000, I started my first job as a perfusion student in the University Hospitals of Leuven, Belgium.
In 2003, I passed my European Board Certification exams and was considered a senior perfusionist. Meanwhile, I got involved into the professional associations and become a regular member of the Board of Belgian Society of Extracorporeal

Technologies, and also started teaching at the Perfusion School in different subjects like IABP, Myocardial Protection Strategies, Bloodsaving Techniques,…

Around 2007-2008 I went back to Brussels and started working at the University Hospitals in Brussels thereby also getting involved into the General City Hospital of Aalst.

Teaching and training students to become perfusionists has always been my passion. Meanwhile, I also got involved in international associations and have been an active member in the American Society of Extracorporeal Technologies, both as a member of the International Consortium of Evidence-Based Perfusion as a regular attendant/co-organizer of their meetings.
I have presented on a multitude of meetings and have authored and co-authored some publications in the field of perfusion and cardiac surgery.
Databases and clinical guidelines have also gained my interest, and the liaison and knowledge gained from the ICEBP have led to the co-chairing and publication of the 2019 EACTS/EACTA/EBCP Guidelines on Cardiopulmonary Bypass.
My goal is to disperse knowledge and bring people together and this has led me into organizing international conferences, starting up and maintaining the Tiny Perfusion Letter and being a reviewer for The Journal of Extracorporeal Technology and Perfusion Journal.
Participating in webinars is a natural consequence of this, embracing the newest technologies to improve knowledge and education in the field of perfusion.

Currently, I'm preparing to move permanently to the United States and as a consequence, I'm not active in clinical perfusion, but still as editor, reviewer and educator.

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Harvey B, Shann KG, Fitzgerald D, Mejak B, Likosky DS, **Puis L**, Baker RA, Groom RC; American Society of ExtraCorporeal Technology's International Consortium for Evidence-Based Perfusion and Pediatric Perfusion Committee. J Extra Corpor Technol. 2012 Dec;44(4):186-93

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Puis L, Milojevic M, Boer C, De Somer FMJJ, Gudbjartsson T, van den Goor J, Jones TJ, Lomivorotov V, Merkle F, Ranucci M, Kunst G, Wahba A; Interact Cardiovasc Thorac Surg. 2019 Oct 2. pii:ivz251. doi:10.1093/icvts/ivz251.

2019 EACTS/EACTA/EBCP guidelines on cardiopulmonary bypass in adult cardiac surgery.
Wahba A, Milojevic M, Boer C, De Somer FMJJ, Gudbjartsson T, van den Goor J, Jones TJ, Lomivorotov V, Merkle F, Ranucci M, Kunst G, **Puis L**; Eur J Cardiothorac Surg. 2019 Oct 2. pii: ezz267. doi: 10.1093/ejcts/ezz267.

Abstract:
Background: Clinical Practice Guidelines have become an inevitable part of quality improvement initiatives. In Europe, it was clear that there was a lack of evidence-based guidelines on the conduct of cardiopulmonary bypass (CPB). That's why three professional associations – European Association for Cardio-Thoracic Surgery (EACTS), European Association for Cardiothoracic Anesthesiology (EACTA) and European Board of Cardiovascular Perfusion (EBCP) joined forces to provide recommendations.

Methodology: Following the EACTS Methodology manual for clinical guidelines (1), a taskforce was established with members of the three associations; topics were chosen and clinical questions were drafted. A panel of researchers searched the scientific, English literature on adult CPB after the year 2000. The evidence was evaluated through evidence tables and recommendations were formulated. A consensus on all guidelines was found by all members through email, meetings and

conference calls. The final document was edited, peer reviewed by a panel of reviewers and finally, the published manuscript (2) was presented at the joined 2019 EACTS-EBCP Meeting in Lisbon, Portugal.

Results: Although there is scarce evidence on most techniques used (only 6,3 percent of guidelines has level A), 111 recommendations were developed. The recommendations are nevertheless strong (38,7 % is Class I) and deliver insight into which topics need more evidence. It forms strong basis to develop protocols, establish quality improvement initiatives, and for professional organizations, to establish grounds for recognition.

Conclusion: Following rigorous methodology, three professional organizations were able to establish strong, evidence-based recommendations on the conduct of CPB.

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0925-1005

American Board of Cardiovascular Perfusion 2020 Update

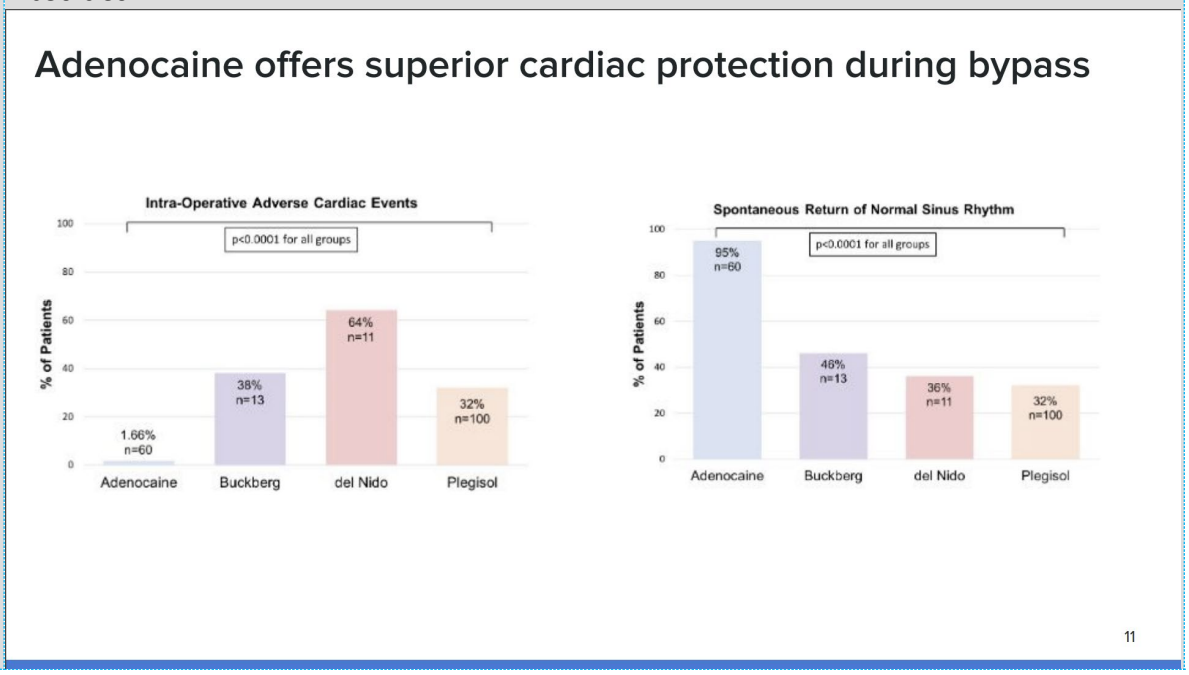
Bradley Kulat, CCP, LP, American Board of Cardiovascular Perfusion, President

Bio: Bradley Kulat has worked in the field of perfusion for over 30 years, 29 of those years as a pediatric perfusionist at Ann & Robert Lurie Children's Hospital of Chicago where he is currently the Coordinator of Perfusion Services.
Ranked #2 in the United States in pediatric cardiology and cardiac surgery by U.S. News and World Report, Ann & Robert Lurie Children's Hospital of Chicago has gained great recognition for its role in treating complex congenital heart defects from the neonate to adult congenital population. At Lurie Children's Hospital of Chicago, Bradley also serves as a clinical instructor educating perfusion students from Rush University of Chicago and Midwestern University of Arizona in their pediatric clinical rotation.
Bradley also serves on the Board of Directors for the American Board of Cardiovascular Perfusion (ABCP) and is currently on the President of the ABCP. Bradley is also a Director for the Accreditation Committee for Perfusion Education (AC-PE), and has served as a perfusion school inspector for the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Bradley has presented at numerous national and international conferences regarding his

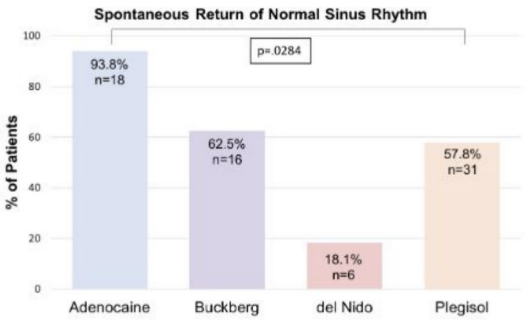
	team's published experience in circuit miniaturization, pediatric VAD applications, and in minimizing exposure to banked blood during congenital cardiac surgery. In addition to his professional responsibilities, Bradley has completed 10 marathons and over 30 triathlons and is active in a Master's swimming team. Bradley has retired from playing competitive rugby for over 25 years from but now enjoys coaching youth rugby. He and his wife, Gretchen, have three extremely active children and a big Bernese Mountain Dog that keep them very busy. **Abstract:** Update on the 2020 American Board of Cardiovascular Perfusion
1005-1045	**Global Privacy Regulatory Health Care Update** Timothy Smit, Sr. Global Cyber & Privacy Risk Consultant, Lockton Companies  **Bio:** Timothy Smit provides expertise in the areas of data protection laws, privacy liability and cyber technology best practices for protecting information and their processes. Timothy consults with clients on how best to develop strategies to manage their total cost of risk within their organizations while protecting their critical assets and information. Timothy has over 25 years of information protection experience in Insurance, Healthcare, Medical Devices, Government, Retail Merchandising, Higher Education, and Crisis Management industries. Timothy's extensive knowledge comes from the information technology and information protection roles he has held over his career. That knowledge and firsthand experiences enable him to translate similar exposures into cyber coverages for the C-Suite and Board Level Members to understand and comprehend. His approach and technical acumen are unlike any other cyber broker in the market place today, which differentiates himself on how he provides both proactive loss control services and placing the appropriate cyber coverage to the respective cyber exposures that clients have. Timothy works closely with large multi-national organizations assisting them in data mapping exercises and process review while conducting and consulting on data privacy impact assessments for any processing of PII. Timothy has a M.S. degree and currently holds both the CIPP/E and CIPP/US certification along with the following: CISSP, HCISPP, CISM, CRISC, CHP, CyRM, and CHPS. Timothy is an adjunct professor at the University of Colorado in their graduate programs along with instructing both the CISSP and HCISPP for ISC2. He also co-authored the newly released HCISPP Official Study Guide for ISC2. Timothy is also a former U.S. Army Ranger, serving from 1989-2000. **Abstract:** Statutory privacy laws and acts continue to dominate the news, both within the US and abroad. How do those laws and acts impact you and how prepared are you for them? If you are compliant to HIPAA, are you compliant or do you need to be compliant with statutory laws or GDPR, for example?

	Comparison of statutory laws, international laws, and guidance on pending legislation's that may impact you and how will you know if they do impact you? We will discuss best practices, privacy frameworks, and managing those compliance programs. Preemption and lack of preemption to HIPAA; to GDPR; to APEC Privacy, and countless other discussions. Conclusion - Statutory privacy laws and acts will continue to dominate the news, both within the US and abroad. How have you and continue to prepare for them?
1045-1130	**Win Your Next Negotiation - A Systematic Approach** David Norris MD, MBA, Consultant, David Norris, LLC  **Bio:** Dr. David Norris is a part-time anesthesiologist in Wichita, Kansas. When he's non-clinical, he works as a partner at Vista Business Group and as a consultant in his own company. He completed medical school at the University of Kansas School of Medicine and an Anesthesiology residency and fellowship in Cardiovascular anesthesia at Vanderbilt University. He was always interested in the financial and business side of health care, and medical leadership, so he has spent years studying those fields. He completed his MBA at the Wichita State University Barton School of Business and is a Certified Physician Executive. His book The Financially Intelligent Physician: What They Didn't Teach You in Medical School was published in 2016. He has been teaching, speaking, consulting and coaching for several years and is now a broker at Vista Business Group, a small and mid-cap merger and acquisition firm. **Abstract:** Having a strong and solid preparation system is critical for you to achieve a successful outcome. Just as the "Time-Out" gets all of the participants on the same page, a negotiation preparation system works to align the thoughts and actions of the negotiating team on the common goal. By using a proven and successful negotiation system, emotions can be controlled with the process and thereby allow the participants to reach good clear decisions. Being well prepared for any encounter will serve you well as you will negotiate with employees, insurance agencies, third-party payers, hospitals and other organizations. In this session, you will be introduced to a negotiation system that provides a structure with a proven track record. This program employs a solid framework so that your fear and emotions are reduced, and you are able to make sound clear decisions. Learning Objective 1 Understanding of the need for a structured approach to negotiations. Learning Objective 2 Explain how mindset will affects the negotiation encounter.

	Learning Objective 3 Articulate a solid and successful model for negotiations.
1130-1230	**Adenocaine Cardioplegia: Superior Myocardial Protection Through Hyperpolarization** Session Sponsored by QuVa Pharma Todd Meyerrose, PhD, CEO, Hibernation Therapeutics  **Bio:** Since 2016, Dr. Meyerrose has led the development of Hibernation Therapeutics, a clinical stage company delivering unique products used in the cardiovascular and critical care markets. Todd has previously been on the founding team of several startups in the biotechnology and healthcare space including Navio Theragnostics, Genome Medical, Lexent Bio, and Path Drug Discovery. Todd is an Adjunct Professor at Stanford University where he lectures on commercialization and business strategy for healthcare companies through the GSB and School of Medicine. He completed his post-doctoral work in the Jaenisch lab at the Whitehead Institute, received a Ph.D. in Molecular Cell Biology from Washington University in St. Louis, and holds a B.S. from the University of Kentucky. **Abstract:**



Adenocaine performs in long cross-clamp procedures (>90 min)



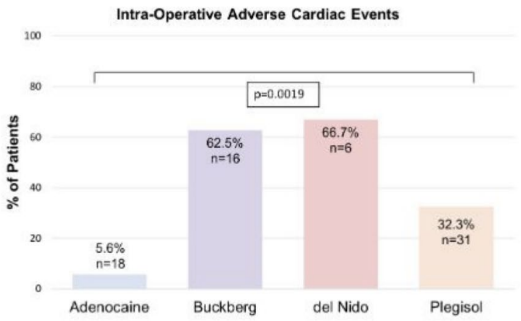


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Table 2: Only Subject Data with Cross Clamp Times >90 minutes

Total # of Subjects	Total # of Subjects with Cross Clamp Time >90 minutes	Average Age at Time of Surgery	Average Cross Clamp Time	% of Patients with Spontaneous Return Following Declamp	Sinus Rhythm Post Declamp Other	% of Patients with Intra-Operative Adverse Cardiac Event	Number of Patients with Intra-Operative Adverse Cardiac Event
Adenocaine	18	69	124.1 minutes	93.80%	1 Subject returned after defib and 2 do not have data available.	5.60%	**1/18 subjects**
Other Cardioplegia (All Solutions Combined)	53	69	121.4 minutes	54.80%	See below	45.20%	**24/53 subjects**
Buckberg	16	57	125.8 minutes	62.50%	6 Subjects returned after defib.	62.50%	**10/16 subjects**
del Nido	6	65	105.8 minutes	18.10%	4 subjects returned after defib.	66.70%	**4/6 subjects**
Plegisol	31	60	122.6 minutes	57.80%	8 Subjects returned after defib and 12 do not have data available.	32.30%	**10/31 subjects**

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1230-1245	**Break**
1245-1330	**AmSECT's Ongoing Strategic Plan and Initiatives** James Reagor, CCP, LP, Director-Department of Cardiovascular Perfusion, Cincinnati Children's Hospital

Bio: Jim graduated from The University of Iowa in 1995 with a degree in Perfusion Technology and followed that up in 2014 with a Masters in perfusion science from the University of Nebraska. He is currently employed at Cincinnati Children's

Hospital Medical Center as the Director of Cardiovascular Perfusion and is an Assistant Professor at the University of Cincinnati. Jim serves on AmSECT's Board of Directors, the Government Relations Committee, the Pediatric and Congenital Committee, the Fellow of Pediatric Perfusion selection team, and Co-Chairs the MCS Committee. He is currently AmSECT's President and his past service includes two terms as Secretary for AmSECT's Board of Directors, one term as Zone Director, and PWOB Committee Chair, President and Treasurer of the Oklahoma Association of Certified Perfusionists, and the Vice-President of the Maryland State Perfusion Society. Jim's areas of focus include the use of registry data and dedicated perfusion electronic medical records to improve perfusion practice and minimizing practice variation in the field of congenital perfusion.

Abstract: AmSECT's mission incorporates four main areas of focus; patient care, safety, education, and professional needs. On July 29th, 2019 the Strategic Planning committee convened with the purpose of evaluating AmSECT's ongoing and future strategic initiatives. AmSECT's mission was reviewed, current initiatives examined, and future goals were proposed. Each of the strategic initiatives fall into one of AmSECT's four main areas of focus. These initiatives, some of which are continuing, and some new, are supported by the mission, serve to benefit our patients and professional community, and flow within AmSECT's overarching strategic operations. The Strategic Plan update to be presented has been approved by AmSECT's Board of Directors and humbly presented to the membership.

The Strategic Plan developed under President DeBois' guidance has been very successful. As a result, AmSECT's 2020 Strategic Plan continues many initiatives developed and deployed over the last two years including webinar development and the Joint Commission Taskforce. A project from David Fitzgerald's administration, an event reporting registry, is to be reconsidered and ongoing programs spanning multiple Presidential terms including the Centers of Excellence program and the Leadership Symposium are being continued.

AmSECT's greatest resource is not educational offerings, financial means, Foundation scholarships, government relations efforts, or professional leadership. AmSECT's greatest resource is you, the volunteer. Please consider being an active part of AmSECT's future. As you learn about the 2020 Strategic Plan, please consider where you might serve. New taskforces and committees will be developed to guide new initiatives and standing committees will continue which always benefit from new ideas, perspectives, and shoulders to share the work.

1330-1415 **Anemia: Treatment Pre-Cardiac Surgery, A Tremendous Opportunity**

Bruce D. Spiess, MD, FAHA, Professor and Associate Chair for Research, Department of Anesthesiology, University of Florida School of Medicine, Gainesville, Florida, USA

Bio: Dr Bruce D. Spiess is presently the Associate Chair for anesthesiology at the University of Florida, School of Medicine in Gainesville, Florida. He was born to academic parents and grew up steeped in a research background with his father being a geneticist and his mother a biochemist. Dr Spiess attended Denison, University in Granville Ohio, and they just bestowed upon him in 2017 their highest honor- The Alumni citation for his research work in Medicine. He attended Rush Medical College in Chicago followed by The Mayo Clinic for Anesthesiology training, where he specialized in cardiothoracic anesthesiology and was chief resident. He returned to Rush for his first faculty position from 1983-1990. From there he travelled to Seattle, Washington to become the Chief of Cardiothoracic Anesthesiology at the University of Washington. Spiess left Washington State when a business opportunity for his new wife became available in Richmond, Virginia. He took the position of Vice Chairman of Anesthesiology at Virginia Commonwealth University in Richmond where he stayed for 17 years until pursuing his present position at the University of Florida. Dr Spiess has focused his research upon blood: its critical oxygen carrying capacity, oxygen therapeutic pharmaceutical development (previously known as “blood substitutes”), risks of blood transfusion, and coagulation/coagulopathies and development of monitoring technologies. His extensive work in blood transfusion risks has led him to be an outspoken proponent of patient blood management. He has authored over 200 peer reviewed academic articles, more than 40 book chapters, seven textbooks and appeared on the Discovery Channel and in many other lay media. His work has been funded mostly by the US Department of Defense and he has led major conferences for the DOD, NIH, FDA with regards to critical blood issues. As it pertains to coagulation management Dr Spiess was the first to author research studies regarding using thromboelastography for heart surgery and he has published extensively in that area calling upon clinicians to develop and utilize whole blood testing in conjunction with algorithms for coagulopathy treatment. He has been on the board of directors of international societies including the society for Cardiovascular Anesthesiologists and boards of commercial companies.

Abstract: Anemia is defined by the World Health Organization (WHO) in patients who have a circulating hemoglobin (Hgb.) level < 12.0gm/dl for women and 13.0 gm/dl for men. Most of the world’s population is anemic by definition and in the developed world, prior to elective surgery the risks of anemia are most often quoted to be between 35-40%. In general for heart surgery those numbers tend to follow through (up to 50%) but for centers with more high acuity patients and those doing a great deal of urgent/emergent surgery the numbers may climb considerably. At UF in Gainesville we have seen in certain populations our incidence of pre-operative anemia at 45% and up to 78.5%. Of course in emergent

surgery we are dealt what comes into the door, but there are still things we should, could and will do in the future.

Anemia is highly correlated with adverse outcomes in most surgeries, hospital admissions and disease states. For example, if you are more anemic with a cancer diagnosis your survival is shorter- not surprising. That is because anemia is by itself both a consequence of disease and a marker for disease. Those patients having chronic inflammation may well have more anemia than those not. Why does inflammation lead to anemia? That is highly complex but this lecture will examine some of the cytokine feedback loops, oxidative stress, bone marrow suppression and erythropoietin suppression caused by the complexities of such diseases as diabetes, hypertension and of course renal dysfunction/failure. In heart disease not only does chronic oxidative stress and inflammation lead to direct suppression of cellular red cell development but it shortens red cell circulating lifespan, and destroys the receptors for hormones driving bone marrow activity. Oxidative stress leads to erythrocyte cell membrane fragility, lack of cellular flexibility and susceptibility to shear forces. Of course, in valvular heart disease and atherosclerosis accented localized shear forces are the causes of red cell destruction. Also in high red cell turn-over situations the scavenging of Hgb. and free iron may be affected. Again this lecture will delve into some of the complexities of that biochemistry and how the heart surgery patient is set up for further oxidative stress due to red cell turn over itself. This actually becomes a self-fulfilling feedback loop with worsening downhill course. Right sided heart failure with hepatic distention, blood flow sludging, can lead to red cell destruction in the liver as well as reduced hepcidin and ferritin processing of scavenged iron with subsequent inability to recycle iron back to the bone marrow.

Recently work has looked at red cell size and population distribution. This is reported on every CBC, as RDW (red cell distribution width) a measure of average size of red cells and then the tightness or skewing of the population distribution. If the average red cell size is large, that tends to mean that these are younger, fresher and newer red cells. That indicates they have more recently been exported from the bone marrow and if the entire distribution size is skewed upwards that indicates that the entire population is turning over and that red cell life span is shortened. So what?

The so what, is that we know that those patients with higher red cell sizes and larger RDWs do worse in not only heart surgery but probably most other surgeries as well. When have you or anyone in your operating rooms ever checked that parameter? Even so what can we do about it? Probably those patients that are most severely ill have the largest RDW and the larger erythrocytes.

Those most severely ill also have poor nutrition, poor appetite and certainly gut hypo-perfusion. Iron is directly taken in by pinocytosis form the gut into the blood stream by villae cells that grab pure animal hemoglobin, if the person is eating a meat based diet. Yes you actually directly import cow, swine, goat, chicken hemoglobin directly into your blood stream and inside there is undergoes hemoglobin reductase enzymes leading to capture of free iron by ferritin. Plant

based iron is harvested in a different method but is quickly taken up also by ferritin. Free iron is simply not tolerated in the body. Folate, B-12 and other key protein building blocks of Hgb. are also gathered from the gut directly. When heart disease leads to poor villae oxygen delivery the gut at least partially shuts down and allows more undigested food to transit and exit. Undigested and under absorbed iron leads to bacterial overgrowth in the colon leading to further gut distention, lack of appetite and probably feedback to whole body severity of inflammation. No matter how our patients end up anemic they do, the majority, my belief, and the severity of anemia spans a wide range of preoperative Hgb levels. Chronic inflammation certainly affects appetite. Nobody looks at this aspect of heart disease but perhaps nutritionists could be quite helpful pre-operatively in holistic care of patients.

Anemia has simply been accepted as a part of pre-operative heart disease and what a patient brings to the operating room. It has long been the practice of anesthesiologists, surgeons and perfusionists that we can fix anemia just by giving a unit or two of blood if we need it. Indeed priming the pump with blood is a common response to the patient that presents with anemia, but increases morbidity and mortality dramatically. But, is that in our patient's best interests. Indeed it has been the practice because we, the surgical industry, are unwilling to wait and to treat the anemia. Furthermore, we have promoted over years that banked blood is safe and good. Now as the data are solid with thousands of papers and we know that the more you are transfused the more likely you are to spend longer in the hospital, longer in the ICU and more likely to have pneumonia, ARDS, lung dysfunction, stay intubated, have kidney failure, stroke and die it is clear that entering an operating room anemic is not a good thing.

Indeed anemia is one of the most prominent predictors of who will be transfused, not just in heart surgery but in all surgeries. Therefore it is not surprising that in places around the world wherein anemia has been treated prior to elective heart surgery that those patients so treated do profoundly better. Not just slightly better but profoundly better. Examples of successful anemia clinic activity and outcomes will be given in this lecture and can be found in the references. Usually successful anemia clinic activity is part of a larger PBM program and therefore it can be hard to ferret out the effect of pre-operative anemia treatment alone. Perhaps those patients most extremely anemic are the ones that can benefit the most form preoperative treatment. The blockade from such treatment prior to heart surgery has historically been based upon a focus of heart surgery being largely a CABG based surgery. This CABG based surgical thinking had focused upon a myth that the only way to treat anemia was to give exogenous erythropoietin and by doing so one might well increase platelet number, stickiness and trigger unstable angina or MIs. That also is not true.

Today we know that upwards of 80% of pre-operative anemia can be treated, at least partially with IV iron infusions and oral folate/B-12. Why IV iron? Oral iron is poorly tolerated by even healthy people. Ask pregnant women how they like oral

iron. It feeds that gut distention, bacterial overgrowth and generalized malaise feeling. Oral iron is poorly absorbed requiring weeks to months to rebuild iron stores. IV iron can be given in a number of different preparations and these will be presented. Each has some advantage and some disadvantage. Some need fairly long infusion times whereas others can be given quickly but need to be repeated. Suffice it to say that in that vast majority of patients an IV iron infusion within 7-15 days will increase reticulocyte production and raise the Hgb. level. The workups for anemia are now standardized, widely published and widely followed based upon work by the society for the Advancement of Blood Management (SABM) and the Ontario cooperative transfusion committees (OnTRAC). The use of exogenous erythrocyte stimulating hormones is thought to be in about 10-15% of patients required for erythrocytosis.

Anemia is how we routinely have assessed a "trigger" point for transfusion. The Hgb. level is by itself a poor indicator of tissue oxygen supply, demand and whole body O_2 flux. Yet physicians worship that number and transfuse based upon. It. We have long searched for that one Hgb. level at which patient's survival will worsen and therefore we must transfuse at that level or higher. Such thinking is in itself fatally flawed. In 2004 Defoe et. al discovered that at 7gm/dl Hgb. on bypass (21%Hct) that mortality doubled. They published that data and still today most surgeons, anesthesiologists and perfusionists become uncomfortable if the Hgb. drops below 7gm/dl. Several years later Surgeoneor, on the original paper, further investigated and found that the reason they found that inflection point is because 7gm/dl is where most people in the first study transfused. It was transfusion driving bad outcome not anemia. Now we know that if a patient is anemic and you put blood into the pump the patient is 3 times as likely to die as if you left them anemic to begin with. But why get to that point? Treat the anemia up front.

It is, I believe, unethical for medicine to not treat preoperative anemia prior to surgery but I suspect less than 20 places in the United States do so for heart surgery. And few would cancel/postpone a case if anemic yet it is the single number one predictor of outcome!

So, we can use IV iron for treatment. The latest work shows that IV iron, even if infused at the time of surgery, as they are anesthetized is effective and increase reticulocytes count. It improves outcome even if given prior to going onto bypass. So why not? Insurance companies do not reimburse for it. This is not the first time that insurance companies do not reimburse for therapies that improve outcome, but they simply follow thought leaders form medicine and the study of anemia is taking forever to get appreciated.

In conclusions anemia is an epidemic. It is both a disease and a marker for disease in and of itself. Transfusion is an inappropriate and deadly response to anemia, that is yet widely embraced by medicine simply because it is easy and it allows us to do surgery, not delay and to have business aspects with positive bottom lines.

Treatment of anemia is gaining traction, UF is opening a new anemia clinic and I do hope we lead Florida in both understanding, teaching and treating anemia prior to heart surgery.

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Viscoelastic Coagulation Testing: Reflections on 38 years of Experience and Sonnorheometry- The Next Generation

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Bio: Dr Bruce D. Spiess is presently the Associate Chair for anesthesiology at the University of Florida, School of Medicine in Gainesville, Florida. He was born to academic parents and grew up steeped in a research background with his father being a geneticist and his mother a biochemist. Dr Spiess attended Denison, University in Granville Ohio, and they just bestowed upon him in 2017 their highest honor- The Alumni citation for his research work in Medicine. He attended Rush Medical College in Chicago followed by The Mayo Clinic for Anesthesiology training, where he specialized in cardiothoracic anesthesiology and was chief resident. He returned to Rush for his first faculty position from 1983-1990. From there he travelled to Seattle, Washington to become the Chief of Cardiothoracic Anesthesiology at the University of Washington. Spiess left Washington State when a business opportunity for his new wife became available in Richmond, Virginia. He took the position of Vice Chairman of Anesthesiology at Virginia Commonwealth University in Richmond where he stayed for 17 years until pursuing his present position at the University of Florida. Dr Spiess has focused his research upon blood: its critical oxygen carrying

capacity, oxygen therapeutic pharmaceutical development (previously known as "blood substitutes"), risks of blood transfusion, and coagulation/coagulopathies and development of monitoring technologies. His extensive work in blood transfusion risks has led him to be an outspoken proponent of patient blood management. He has authored over 200 peer reviewed academic articles, more than 40 book chapters, seven textbooks and appeared on the Discovery Channel and in many other lay media. His work has been funded mostly by the US Department of Defense and he has led major conferences for the DOD, NIH, FDA with regards to critical blood issues. As it pertains to coagulation management Dr Spiess was the first to author research studies regarding using thromboelastography for heart surgery and he has published extensively in that area calling upon clinicians to develop and utilize whole blood testing in conjunction with algorithms for coagulopathy treatment. He has been on the board of directors of international societies including the society for Cardiovascular Anesthesiologists and boards of commercial companies.

Abstract: Lecture summary

In cardiac anesthesiology and as a researcher my almost 40 year career has seen both tremendous changes in medicine as well as stubborn adherence to biased conservative thinking. This lecture will discuss science and personal observations as we move towards embracing a new paradigm in blood transfusion. When I trained, blood transfusion was viewed as blood: cannot hurt, might help. Since the events of the HIV/hepatitis crisis we have learned that even without virus transmission patients receiving any allogeneic blood product are at risk for adverse outcomes compared to those not transfused. Therefore the paradigm blood transfusion has shifted to: Transfusion is inherently risky and should be used only when needed. For 38 years I have professed that patient blood management (PBM) is good medicine and that part of that larger effort, coagulation management must be based upon rational approaches with contemporary "best" monitoring in conjunction with algorithms. A substantial respectful knowledge of the complexity of the processes of coagulation is required. I believe: **"A little coagulation knowledge is dangerous"!**

Bleeding in surgery effects about 25-40% of heart surgery patients with approximately 40% receiving a transfusion of either red cells and or multiple coagulation products. When I ran the best PBM program of my career for one 2 year period we had an 8% transfusion rate (any blood products) for all comers for heart surgery. It can be done. That is through a team effort and zealous belief in PBM. As I have spoken at conferences around the world the chronic complaint is that "we don't have any 'good' means of assessing who will bleed and how to approach a bleeding a patient". That is far from true and I believe such statements are a product of our failure in teaching a rational approach to coagulation. When in medical school in the 1970's so many courses were focused on memorizing facts, proteins, molecules etc. We have failed at many levels of medical education to interest our physicians in one of the most beautiful and complex systems of nature-inflammation of which coagulation is only the first process. That failure is due to a

method of medical education that is focused upon a reductionist philosophy of naming/categorizing each of the building blocks of the biologic process rather than a systems biology appreciation for how all the processes interact. My career has been focused upon trying to change how at least the surgical sub-specialties think about transfusion and to a lesser degree how they approach a bleeding patient. To answer the complaint that we do not have any technologies to assess a bleeding patient, I respond, we have multiple ones, but we have an unwillingness to learn embrace and understand the biologic complexity. Furthermore, I believe that surgical specialties wish to have a single technology diagnose a complex problem and produce a prescriptive answer by "magic".

Coagulation is the first step in a continuum from injury to inflammation through eventual healing. It is highly dynamic and poorly understood by many physicians. In computer models of coagulation up to 850 near simultaneous, sequential forward and back feeding reactions have been described. Our teaching remains woefully ineffective by focusing upon a bi or tri-phasic protein set of cascades. The protein cascades exist, are important, but do not activate normally without the interactions of platelets, white, red and endothelial cells. Our teaching is inaccurate when we focus on erythrocytes having only one function-oxygen delivery, or when we conceive of platelets being only for thrombosis. Indeed the prostaglandins needed for normal platelet function undergo fatty acid metabolism and pre-formation in erythrocytes. Platelets are the first phagocytic cells to encounter and engulf bacterial invaders, passing information to neutrophils. The point of this introduction is that biology is most beautiful when one embraces its complexity, the homeostatic buffering created to limit extreme reactions. We should be humbled with the realization that we truly know fairly little of systems biology. Coagulation is a wonderful example of biologic complexity.

Therefore, to understand clinical coagulation function/dysfunction it makes sense to analyze the systems in as close to entirety as possible. Even with whole blood viscoelastic testing we do not analyze endothelial cell functions, flow and shear stress effects. Even more importantly we are fundamentally hampered in our estimations of the system biology in that we draw blood samples from vessels far remote in the circulation system from the site of injury. Coagulation is a local phenomenon and expecting whole body reflections of a local phenomenon may be flawed with artifact by its very basic concept alone.

The early days of descriptive coagulation analysis were focused upon describing inheritable bleeding diathesis such as vWF disease, Christmas disease or hemophilia. That work led to the intrinsic, extrinsic and common coagulation cascades being described. Plasma tests used for now 70 years as screening tools, the activated partial thromboplastin time and prothrombin time (international normalized ratio-INR), have become mainstays including guiding low dose heparinization and Coumadin anticoagulation. Unfortunately these tests were never designed to gauge the risk of bleeding either during surgery or for any

invasive procedure. Indeed, if you think about biologic complexity a test that hones in on one or another protein pathway can be of only very limited use in predicting such a complex series of events such as coagulation. The tests have been utilized in some algorithms for process of elimination and reductions in dependency upon transfused coagulation precursor blood products has been shown but only in comparison to "clinical judgement" (tantamount to guessing). In the protein reactions the critical amplification is thrombin generation. Thrombin serves to convert fibrinogen to fibrin, provides the most powerful activator to platelets, is a chemoattractant for white cells, triggers widespread inflammation and upregulates a number of DNA-gene expressions. It feeds back to endothelial cells leading to protein C and S activations. The thrombin burst from platelets leads to active clot formation. Platelet surface, lipids and the glycoproteins imbedded in the lipid surface control the movement of the protein cascades. Once platelets aggregate they have, through multiple mechanisms cellular cross talk. In the end enough platelets come together signaling each other that there is a thrombin burst and it is that all important "neo-tissue" of the platelet aggregates (with white cells and erythrocytes embedded) that leads to fibrin cross-linking. Wow- biologic complexity!

In 1947 Helmut Hartert, a German hematologist/lab medicine physician, in realization that coagulation is a whole blood process introduced furthered the idea of hemorheology- thromboelastography- TEG. Below are some of the terms used in Viscoelastic testing. One can argue whether the present technologies are truly capable of monitoring all these terms.

Table 1. Glossary of Terms Relating to Viscoelasticity.

Term	Definition/explanation
Elastic/elasticity	Tendency of a solid material to return to its original shape after being deformed. A material's elasticity is described by a stress–strain curve
Elastic modulus (λ)	Defined as stress divided by strain—number that describes the resistance of a material to being deformed elastically. There are several types of elastic modulus, relating to the application of different forces (eg, shear modulus [G or μ], Young modulus [E]). Young modulus, which relates to tensile or compressive stress (ie, opposing forces along one axis), is sometimes referred to as "elastic modulus."
Hysteresis	Difference between stress–strain curves as a material is being unloaded versus loaded. Consider an elastic band being first loaded then unloaded: during unloading, a given force produces a slightly longer length compared to that observed while the elastic band was being loaded. The effect becomes more pronounced if loading and unloading are done rapidly
Linear viscoelasticity	Rate of change in strain (strain rate) increases linearly with stress
Phase lag (δ)	Extent to which strain lags behind stress when the stress is oscillatory. Viscoelastic materials have a phase lag between 0° (value for a purely elastic material; stress and strain in phase) and 90° (purely viscous material).
Shear	Application of a force with direction perpendicular to the cross section of a material (eg, material with square cross section: bottom held in place, force applied to the top from left to right)
Shear complex dynamic modulus (G^*)	Complex dynamic modulus represents the ratio of stress to strain under vibratory conditions. It is calculated from the storage modulus and the loss modulus as follows: $G^* = G' + iG''$, where G' is the shear storage modulus, G'' is the shear loss modulus and i is the imaginary unit (square root of -1). As well as shear, it can be measured for tension (tensile complex dynamic modulus) or compression.
Shear loss modulus (G'')	A measure of the deformation energy used up by the sample during the shear process. This parameter represents the viscous behavior of the material. As well as shear, it can be measured for tension (tensile loss modulus) or compression
Shear modulus/modulus of rigidity (G or μ; denoted by Hartert as ε)	Defined as shear stress divided by shear strain. It is a type of elastic modulus, specifically for shear stress
Shear storage modulus (G')	A measure of the deformation energy stored by a material during the shear process. This parameter represents the elastic behaviour of the material. As well as shear, it can be measured for tension (tensile storage modulus) or compression
Strain (ε)	A measure of the extent to which a material deforms when under stress. Measured as a ratio of the measurement under stress to the measurement at baseline.
Stress (σ)	Force per unit area—to study the properties of a material, a force is applied and the extent to which the material deforms is measured
Stress–strain curve	Graph showing relationship between stress and strain
Tensile	Relating to tension or the application of opposing forces along an axis. The act of stretching an elastic band in a straight line would involve the application of tensile stress
Viscoelasticity	Term used to describe materials possessing both elasticity and viscosity. When a stress is applied to a viscoelastic material, molecular rearrangement known as creep occurs. However, when the stress is removed "back stresses" within the material cause it to return to its original form
Viscous/viscosity	A measure of resistance to gradual deformation by shear stress or tensile stress. Corresponds to the "thickness" of a fluid—water has low viscosity and honey has higher viscosity
Young's modulus (E)	Defined as tensile stress divided by tensile strain—similar to elastic modulus but specifically for tensile stress

1962 Hartert described the physical constants of clot dynamics as measured by clot strength over time. The TEG, as invented was a mechanical device that measured whole blood placed into a metal crucible heated to 37^{O}C. Into that crucible is suspended a metal (now plastic) piston and the crucible rotated through a 4o arc each way from center point over 1 second for each rotation. This rotation created a mild shear force on the blood but also stirred it slightly. Once clot began to form within the crucible mea mechanical linkage would be formed form the crucible to the piston. A light shone on a mirror attached to the piston and a pen traced out the deflection of the mirror on a smoked drum. The concept was, for its time, against the grain of standard coagulation hematology which was determined to be reductionist in that researchers wished to examine components of coagulation rather than a system biology of how all the components worked together. Harter's TEG invention was a product of its time, with no computer electronics and a dependency upon mechanical measurements. As a consequence of those limitations the TEG device was finicky, needed perfect operator pipetting and was subject to any benchtop vibration. Therefore reproducibility of TEG tracings was difficult. Hematologists shunned perhaps the "best" coagulation technology, because of its exacting requirements.

Because reproducibility was questionable many/most hematologist viewed the technology with a jaundiced eye. In 1988 my first proposed promotion to Associate

Professor was blocked by a hematologist because I had published regarding TEG and according to her: “Anyone doing TEG work was truly a charlatan”. Furthermore the United States National Institutes of Health, refused to consider any of my grant applications because they had to do with TEG, and why would anybody wish to limit blood transfusions for heart surgery- perhaps 20 years to early! It has been a long career pushing back against the standard thinking of medicine to get TEG and hemorheology now accepted.

The TEG remained on the back benches until Tom Starzl at the University of Pittsburgh undertook orthotopic hepatic transplantation. I trained to do liver transplants in Pittsburgh. We began using TEG in Chicago at Rush Medical College in 1984 and within a year I was using it for gauging bleeding in heart surgery as well as liver transplantation. In end stage liver disease the coagulation capabilities of the patient are at the start of surgery quite hypocoagulable. When the liver is completely removed patients enter into profound fibrinolytic phase and on top of that in the early days of transplantation massive blood loss was the rule, not the exception. Dr Yoo Goo Kang at Pittsburgh embraced the TEG and popularized its use to guide coagulation transfusion therapy. That led to a company in the United States- Haemoscope producing a more reliable (although still finicky) instrument. I worked closely with Eli Cohen at haemoscope, who with his family, took TEG from a finicky instrument to being reliable and accepted throughout the world. Generations later, the TEG has morphed into a mainstay of many hospital operating rooms (still only used in about 30% of heart surgery programs), emergency rooms, intensive care units, military forward hospitals and yes, a great deal of Federally funded research. The technology has been bought sold to Heamonetics Inc. and now mimicked by a European look-alike- the RoTEM or thromboelastometry.

Both TEG and RoTEM essentially measure whole blood clot strength over time. If one watches blood clot and measures the onset time to clotting, the speed of cross-talk (platelet upregulation/thrombin burst) the maximum clot strength (a direct measure of platelet GP-II_b-III_a expression, fibrin attachments, and factor XIII controlled fibrin crosslinking), and clot lysis a great deal can be learned of biologic actions. It stands to reason that if a clot forms on time, grows normally, stays intact and does not break down then most likely coagulopathic bleeding is unlikely. Indeed now in over 1600 articles form surgery it has been shown over and over again to have reasonable, not perfect, predictive value for who will bleed abnormally. **Today there are close to 5000 peer reviewed publications regarding TEG and RoTEM**. Prospective randomized trials with algorithm based coagulation treatments have actually reduced morbidity and mortality, related to side effects of coagulation transfusion products. I am proud to have created and promoted some of those algorithms based on TEG analysis. The Cochrane group has done a review of TEG technology and concluded that it does indeed reduce blood usage. So technology exists to fix the lament of surgeons and anesthesiologists.

But what Harter created is a wonderful platform wherein bioassays of activity can be made depending upon the activating and inhibiting compounds added to whole blood- a systems biology method. The RoTEM uses activators for the extrinsic and intrinsic system to give a whole blood test analogous to the PT and aPTT. By completely blocking the IIb-IIa binding site in either machine one can assess the contribution of fibrin to the clot strength. The TEG has further created a set of tests using arachidonic acid and ADP to assess the contributions of aspirin or thyanorperidine drugs to clot inhibition. The TEG has now been developed into a test no longer using a mechanical stirring device to test clot strength. Rather it now uses audible sound waves to test clot strength. What will be the future of TEG and RoTEM it is hard to say but one could imagine a number of future benchtop assays being created.

At the University of Virginia, School of Engineering a revolutionary team examined using ultrasound to evaluate clot as a tissue. Ultrasound has been utilized in solid material engineering to assess structure. In aeronautics ultrasound can examine wing and engine structures for minute cracks unable to be seen by the human eye. Jet engine blade metal fatigue, as we have seen, is a deadly crisis. In so many ultrasound applications today in medicine we use ultrasound for imaging tissues. Clearly the sound waves reflected or reverberated can give highly specific information about liquid and solid tissues. In cardia anesthesiology, 2 and 3d imaging of the heart in real time with special 3D reconstruction of valves and muscle is an everyday diagnostic tool. But in 2009 and 10 the group from UVA reported how ultrasound could be used to inosinate blood as it moved from a liquid to a gel. Furthermore they showed that the resonant frequency of the vibrating liquid “neo tissue” was highly correlated with shear modulus (supposedly what TEG and RoTEM were measuring). This use of ultrasound technology creating return force waveforms of resonant frequency is known as Sonorheometry.

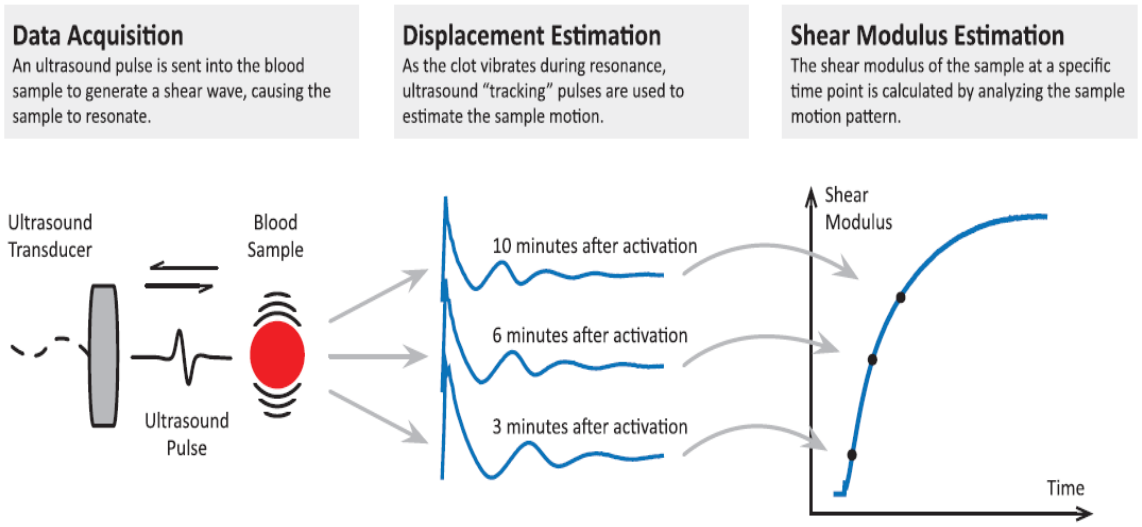
2.1. Acoustic radiation force

Sonorheometry is performed using acoustic radiation force as a means to generate small and localized displacements within a blood sample. Returned echoes are processed to measure the induced displacements and determine viscoelastic properties of the sample. Acoustic radiation force results from the transfer of momentum that occurs when a propagating acoustic wave is either absorbed or reflected [21,22]. This body force acts in the direction of the propagating wave, and can be approximated by the following expression [22],

$$F = \frac{2\alpha\langle I(t)\rangle}{c} = \frac{2\alpha PII}{c}\frac{1}{\Delta T} \quad (1)$$

where α [m^{-1}] is the attenuation coefficient of the medium, c [m/s] is the speed of sound, $I(t)$ [W/m^2] is the instantaneous intensity of the ultrasound beam, PII is the pulse intensity integral, ΔT [s] is the time interval between successive ultrasound firings, and $\langle\,\rangle$ indicates a time averaged quantity. The pulse intensity integral is defined as the instantaneous intensity of a pulse integrated over the time where the acoustic pressure is nonzero.

Acoustic radiation force has been previously described as a method to characterize mechanical properties of soft tissues, including vitreous body, thyroid, and muscle [23,24].



A characteristic curve over time for relative blood compliance or Sonorheometry can be created and it can be related to biologic events happening within the blood as it clots.

Today Hemosonics has developed a pre-clinical whole blood clot analyzer- The Quantra Hemostasis Analyzer- with four ultrasound channels and microfluidics for reagent mixing. The machine auto-pipettes and runs all four channels simultaneously. One channel runs a native whole blood activated with kaolin, another has

I am indebted to Francesco Viola and William Walker, two of the founding fathers of Sonorheometry for contacting me to consult as they attempted to take Sonorheometry from an engineering concept to a viable clinical instrument. It has been obvious to me over the years that the biologic complexity of coagulation needs 21st century and beyond computing as well as high tech instrumentation. There are summary articles available in the references below on how the technology works. Already there are published manuscripts comparing TEG, RoTEM and the Quantra Hemostasis Analyzer. The correlations are statistically significant but not indicating duplication of technology. In our study in 50 heart surgery patients we examined Demming orthagonol regression to examine concordance as well as Bland Altman analysis. Our conclusion was that all the instruments are measuring the same biologic system albeit by different methodologies. None is a "gold standard". So the Quantra is presently undergoing more testing to achieve regulatory and marketing approval.

As I look towards the future I am excited that viscoelastic testing is gaining more acceptance. It took over 25 years of my career and certainly over 65 years since TEG's invention for medicine to begin to accept it-why? But today we have, in the future, instruments that examine whole system biology. If we mate, perchance the Quantra or the others with inventive computer learning could we really probe the perturbations of the coagulation/inflammation systems. I believe the computer models of coagulation and inflammation could guide the inventors of these

technologies. If they then took what we know today and built machine learning into databanks of say advanced Quatras, could the computers learn pattern recognition of how systems biology reacts to various stimuli. For example, I believe cardiopulmonary bypass as a massive thrombin activator and inflamasome stimulus can be learned by such computer learning. The existing computer models today can predict some system responses to pharmacologic changes- such as Aprotinin or Plavix- well when these systems learn could they then be applied to highly personalized medicine. It is only through systems biology that these instruments could perform this service.

Medicine and particularly regulators are a long way away from this forward thinking. We cannot even conceive of getting there if we continue to teach our students and force wrought memorization and automatonic regurgitation of the intrinsic, extrinsic and final cascades. Maybe these thoughts are 25 years ahead of their time. But that is where I prefer to research, envision and operate!

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1500-1535 **Hematocrit or RBC Recovery in ATS: Which is More Important?**

Susan D. Roth, MLT, PBMS, Sr. Clinical Specialist, Cardiac Surgery
Perioperative Blood Management/Autotransfusion LivaNova

Bio: Susan holds an Associate Degree in Medical Technology and has expanded her expertise and passion for blood banking and patient outcomes outside the laboratory for over 20 years.

She began her career at the bench and followed a diverse path to a specialty in perioperative blood management and autotransfusion.

She has experience in blood collections, testing and distribution, apheresis, dialysis and perioperative blood management techniques with particular expertise in cardiovascular and orthopedics.

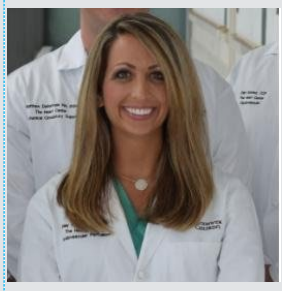
She has been with LivaNova for 18 years providing clinical support and educational programs to the surgical & laboratory community.

Abstract: RBC recovery rate is often an overlooked variable in cell salvage. We will show that it has impact on allogeneic transfusion and thus on the patient. Historically, hematocrit is the value considered most important when it comes to blood quality.
However, RBC recovery rate is a more potent variable for an efficient cell salvage process. We will highlight the concrete benefits on patient outcomes one can expect by achieving higher recovery rates.
Lastly, we will explain how autotransfusionists can maximize recovery by implementing a set of simple techniques that can result in a significant increase in red cells returned. While achieving the highest possible hematocrit is not always necessary or useful, optimizing recovery rates should come first because "Every Cell is Sacred"!

Saturday, April 25th, 2020
Moderator- Susan Englert, RN, CCP, LP, CPBMT

0900-0905 **Opening Remarks**

0905-0955



AmSECT Pediatric and Congenital Standards and Guidelines
Ashley Hodge, CCP, MBA, FPP, Associate Chief, Perfusion Services Cardiothoracic Surgery Quality and Safety Officer, Nationwide Children's Hospital
Bio: Ashley is the Associate Chief at Nationwide Children's Hospital. She also maintains the role as Cardiothoracic Surgery Quality and Safety Officer where she runs the Quality Program for the Heart Center. Ashley graduated from the Ohio State University Perfusion program and subsequently attend The Citadel, where she completed her Masters in Business Administration. She is a pediatric perfusionist and passionate about quality improvement with the use of data in perfusion.
Abstract: In 2011, the AmSECT Board of Directors (BOD) requested the International Consortium for Evidence-Based Perfusion (ICEBP) subcommittee to review and update the Essentials and Guidelines. In 2013, the revision was completed and adopted by the membership, and a report of this work published in the Journal of Extracorporeal Technology (J Extra Corporeal Technol. 2013 Sep;45(3):156-66). Since then an update was created in 2017, an additional resource for Mechanical and Circulatory Support and most recently, Congenital and Pediatric Perfusion. A taskforce was created under the AmSECT Pediatric and Congenital Committee to generate changes and additions to the adult standards and guidelines. This pediatric focused document was intended to serve as a useful guide for teams developing institution specific protocols to improve the reliability, safety and effectiveness. The final document included three additional sections for Circuitry, Priming and Fluid Management. Eleven new standards were generated within guidelines of other sections in the adult guidelines and five guidelines were elevated to standards. Since the adoption by the AmSECT membership in 2019,

	survey responses will be presented illustrating adoption, awareness and implementation.
0955-1045	**AmSECT Adult Patient Standards and Guidelines** Shahna Helmick, CCP, Associate Director at the University of Iowa Hospitals and Clinics Perfusion Education Program  **Bio:** Shahna Helmick has been a Certified Clinical Perfusionist for 18 years, earning her Certificate of Perfusion from The Cleveland Clinic in 2001. Mrs. Helmick has been an executive member of The International Consortium for Evidence-Based Perfusion (ICEBP) and an American Society of Extracorporeal Technology (AmSECT) member since 2012. Mrs. Helmick has a keen interest in the role of professional societies in improving the quality and safety of care; she has authored or co-authored manuscripts, has a standing column in AmSECT Today, and presents widely on this topic at state and national conferences. Currently, she is Associate Director at the University of Iowa Hospitals and Clinics Perfusion Education Program. **Abstract:** This presentation will be a review and update on AmSECT's Standards and Guidelines for Perfusion Practice. We will start with just a hint of background and history regarding the creation of these guidelines for our profession, moving onto why AmSECT and its volunteers continue to devote time to the updates and improvements to the document. I will discuss what the standards can provide your teams, the roadblocks to adaption, and what the future holds for the Standards and Guidelines. Participants will also learn about resources that are being developed by AmSECT. 10 Protocols: 1. Sickle Cell Anemia 2. Antiphospholipid antibody syndrome 3. Cold Agglutinins 4. Von Willebrand Disease 5. HIT 6. Jehovah's Witness 7. ANH 8. Pregnancy Patients 9. Bleomycin 10. Malignant Hyperthermia Learning Objectives:

	Adult Standards and Guidelines 1. To refresh and/or introduce AmSECT's (Adult) Standards and Guidelines for Perfusion Practice. 2. To discuss updates that have been made to the document since the last release date of 2017. 3. Discuss real life opportunities and experiences regarding the adoption of the Standards and Guidelines. 11. Baker RA, Bronson SL, Dickinson TA, et al. Report from AmSECT's International Consortium for Evidence-Based Perfusion: American Society of Extracorporeal Technology Standards and Guidelines for Perfusion Practice: 2013. *J Extra Corpor Technol*. 2013;45(3):156-66.
1045-1130	**Does Simulation Impact Clinical Readiness?** Nicole Michaud, MS, CCP, CPMBT, CDEI, Chief, Pediatric Perfusionist, Monroe Carell Jr. Children's Hospital at Vanderbilt, Vanderbilt University Medical Center  **Bio:** Nicole is a native of Wisconsin. She graduated from the Milwaukee School of Engineering with Honors in Biomedical Engineering. She earned her Masters of Science in Perfusion with High Honors from the Milwaukee School of Engineering. Nicole Michaud is the Chief Pediatric Perfusionist at Monroe Carell Jr. Children's Hospital at Vanderbilt. Prior to taking her new role in January 2019, she was the Director of the Vanderbilt University Medical Center Perfusion Program. She was inducted as a fellow of the American Academy of Cardiovascular Perfusion (AACP) in January of 2018. She is a member of the Society of Thoracic Surgery and sits on the Workforce on Multidisciplinary Care Committee. She is an active member of Society of Simulation in Healthcare and the Tennessee Simulation Alliance in addition to the American Society of Extracorporeal Technology (AmSECT), American Academy of Cardiovascular Perfusion (AACP) and the American Association of Blood Banks. Nicole has received recognition by the Wisconsin Perfusion Society in 2015 with the "Ron Nichols Award of Excellence" as well as recognition from the Medical University of South Carolina in the realm of education being awarded the College of Health Profession Teacher of the Year in 2010 and Clinical Instructor of the Year in 2012. Nicole is married to Maurice Michaud and they have two daughters and one son. She enjoys spending time with her family and cheering on the "Wisconsin Badgers". **Abstract: INTRODUCTION/BACKGROUND:** CPB is a technique utilized during lifesaving surgical procedures with potential to significantly affect the outcome of the procedure. The risk of death or serious injury during CPB is 1/2500 procedures, which is 100 times greater than the risk of death or injury from anesthesia.[1-4] Airline pilots, nuclear plant operators, nurses, and physicians use simulation to train and manage emergencies in a standardized manner.[5] Historical and contemporary medical and surgical training have used the Halstedian "hands-on"

approach. This approach, though valuable in many teaching domains, frequently does not provide the optimal controlled environment for learning and minimizes the chance for repetition, deliberate practice, and full independence. In specialties that require highly refined technical skills such as cardiac surgery, proficiency must be established prior to a trainee being immersed in their respective role in real-time. At the Vanderbilt University Medical Center, simulation curriculum was introduced into the perfusion program in the Fall of 2014. The perfusion simulation lab consists of the Califia Perfusion Simulator, hemodynamic monitors, Sarns 8000 Heart Lung Machine (Terumo Medical), a Heater-Cooler and the perfusion simulation center. The goal of simulation curriculum is for the student to develop a cause and effect relationship showing how the patient affects perfusion techniques and how different perfusion techniques can affect the patient. Through simulation, the student should exhibit more readiness, competency, and confidence in specific perfusion technique tasks. The simulation curriculum was advanced to incorporate team training of the cardiac fellow. The goal of this curriculum was to increase the cardiac fellows understanding of the mechanics of cardiopulmonary bypass while offering the ability to practice team communication.

DESCRIPTION: It was recognized that the value of simulation comes with deliberate replication of the global experience using high fidelity, comprehensive trainers. At VUMC, a novel simulator and curriculum were developed that coalesce the key personnel involved in CPB scenarios. The simulation curriculum begins with the development of fundamental skills required for the basic management of CPB, including the setup of the heart lung machine, cardiac cannulation, and full management of the heart lung machine (HLM) while on CPB. The subsequent curricular sessions include most components of cardiac surgery, including coronary artery bypass, aortic valve replacement, aortic root replacement, and complications of CPB. Throughout the course of training, all trainees are provided various clinical scenarios and are expected to provide complete care and management of the case during each session. The sessions are one to two hours in duration with each session consisting of a briefing, simulation run, and debriefing. During our cardiac fellow training, unique porcine thoracic block is fashioned with a beating, perfused heart for an actual tissue heart model integrated with the Califia perfusion simulator. All simulation scenarios are delivered in a safe, controlled environment where deliberate practice with immediate constructive feedback occur from the clinical instructors.

CONCLUSION: This simulation curriculum is introduced to the perfusion students 18 weeks prior to beginning clinical rotations and cardiac fellows have an immersive month-long boot camp. To evaluate this curriculum, a survey will be sent out to the clinical instructors with regards to the student's readiness and competency in specific task related techniques of CPB. These surveys were sent out once the students have been at the clinical rotations. The pre-simulation group was compared to the post simulation group to validate the simulation curriculum. In addition, we reviewed student clinical evaluations before and after the simulation

curriculum was introduced into the program to understand and identify the needs of the students. It was found that the simulation curriculum did prove to increase a student's fundamental CPB skills and clinical readiness.

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1130-1230

Lunch Session

Staffing for Success: Delivering Excellent Care to Your Patients and Yourself

Dr. Tony Shackelford MHA, DHA, CCP, CCT, Chief Perfusionist – Perfusion
Medical University of South Carolina, Charleston South Carolina

Bio: I have been a perfusionist for over 28 years and have worked in a variety of

healthcare settings. I am currently the Chief Perfusionist at the Medical University of South Carolina (MUSC). Received Doctorate in Health Administration in 2009. My core interests and strengths are in Strategic Planning and Operation Management, Operating Room Design (specifically Cardiac Operating Rooms), Quality Assurance/Improvement and most importantly improving patient safety via human factor analysis. Prior to 2013, along with clinically practicing, I was an active Assistant Professor for 11 years at MUSC's Perfusion School, didactically ad clinically teaching and conducting research. While there I actively served on the College of Health Professions' various committees and served as President of Faculty Assembly in 2011-2012. I remain an adjunct assistant professor at the College Health Profession teaching the Foundations in Leadership for Doctor of Health Administration-Interprofessional Studies Program.

	Abstract: Healthcare is one of the most complicated production processes. It is individualized care done on a mass production scale. In all of healthcare our patient population is increasing in age, and/or numbers or both. Thus, requiring more resources to deliver our care. Yet the customers are rightfully demanding higher outcomes with lower costs. Thus, to simply solve the equation is to reduce labor costs. The natural question is how can we do more with less?" With that approach, to deliver the desired care (product) to the patient (consumer), "reducing" consumption of all resources (costs) in the delivery of care is where to start. "According to an article in Becker's Hospital CFO Report hospital personnel are on average 54% of hospital operating revenue. And the best financially rated hospital organizations costs are 51.3%. So, reducing labor costs mean reducing the actual number of employees? However, there are many hidden (indirect) costs that that get added to labor costs. The hidden costs of labor and their impact if not "managed" could be a major problem for team. Could reducing labor costs mean adding employees? What is the correct approach? Using traditional methods to determine the size of a perfusion department, cases/yr./perfusionist, may still work for some centers. But there are other factors and methods that may reveal if your team is "right sized". There is no right metric and more often it is a combination of factors. This talk will present the hidden cost of labor and its impact and review various methods to determining/validating the size of your perfusion team. The end goal: quality of life for the perfusionist, the organization and most importantly the patient.
1230-1330	**Ken Farmer Memorial Scholarship** The Ken Farmer Scholarship is awarded to a perfusion student(s) who composes and presents an outstanding presentation for the upcoming Sanibel Perfusion Symposium meeting. This Scholarship will be in the amounts of $1500 dollars for 1st place, $1000 dollars for 2nd, $600 dollars for 3rd & $400 dollars for 4th.
1230-1245	**Direct Comparison of Four Biocompatible Circuit Coatings used in Cardiopulmonary Bypass Surgeries** Breanna Hackworth M.S, Department of Cardiovascular Science, Midwestern University, Glendale, Arizona, USA  **Bio:** Breanna Hackworth is a second year students in Midwestern University's Cardiovascular Science Program. Breanna earned a Bachelor of Science degree in Ecology and Evolutionary Biology from the University of Arizona and a Master's degree in Biomedical Science from Midwestern University before her acceptance in the Masters of Cardiovascular Science program. Breanna's previous work experience includes marine mammal training with the US Navy Marine Mammal Program.

Robin earned a Bachelor of Science degree in Mechanical Engineering from Northern Arizona University before his acceptance into the Masters of Cardiovascular Science Program. His previous work experience includes being a product design engineer for a biomedical company and a management analyst for a post-secondary institution.

Robin and Breanna are looking forward to their future careers as perfusionists and hope to continue conducting research in the field. We would like to extend a special thanks to our mentor and research advisor Dr. Darban.

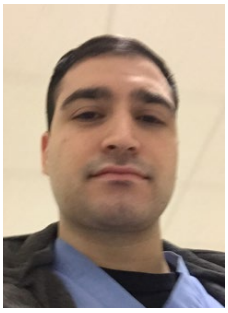
Abstract: Direct Comparison of Four Biocompatible Circuit Coatings used in Cardiopulmonary Bypass Surgeries

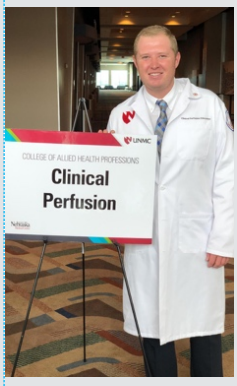
Breanna Hackworth M.S, Robin Schwartz B.S., Nathanial Darban Ph.D, CP
Department of Cardiovascular Science, Midwestern University, Glendale, Arizona, USA

Purpose: The use of biocompatible coatings on extracorporeal circuits (ECC) during open heart bypass surgery has increased over the past decade. Numerous surface coatings have been developed to improve blood compatibility of biomaterials. This study will examine the effectiveness of four ECC coatings by measuring platelet/protein adhesion to each circuit surface.

Methods: The biocompatible circuit coatings where evaluated using bovine blood; an affordable and feasible alternative to human blood. The circuits tested were Trillium by Medtronic, Balance Biosurface by Medtronic, Cortiva BioActive Surface by Medtronic, and X-Coating by Terumo. The bovine blood was circulated through each circuit for a total of 50 min; reflective of a bypass procedure. Blood samples were drawn into Monoject blood collection tubes containing EDTA. Small pieces of circuit tubing were cut out at three different time and temperature intervals (37^{O}C at 10 min, 30^{O}C at 30 min, and 37^{O}C at 50 min). The Monoject blood samples were analyzed and evaluated by a medical laboratory professional at ANTECH Diagnostics. The parameters measured included; hematocrit, hemoglobin, platelets, neutrophils, lymphocytes, monocytes, eosinophils, and basophils. Circuit tubing samples were treated for molecule fixation using varying strengths of alcohol and 4% glutaraldehyde. Tubing samples were stored within a vacuum chamber and later evaluated using a scanning electron microscope (SEM). The SEM provided a visual image of the number of molecules adhered to the circuit tubing. These images were analyzed and quantified using an image software called imageJ. Percentage of molecular coverage was calculated for each image. In total 60 pictures were taken and processed.

	Results: The SEM images revealed a layer of protein coverage on all tubing samples. Cortiva BioActive Surface had the highest percentage of protein adhesion with an average of 46.8% coverage across all temperature and time intervals. The remaining samples were observed to have coverage across all temperature and time intervals as follows; Trillium 25.8% coverage, Balance Biosurface 16.6% coverage, and X-coating 10.7% coverage. The blood samples showed that Balance Biosurface had the highest platelet count across all temperature and time intervals. Conclusion: The results demonstrated all biocompatible tubing has the potential to be coated by protein, activate an immune response, and increase the patients' platelet count. Further research investigating the activation of platelets and specific antigen/antibody complexes would help provide a more detailed representation of the immune response to the ECC. This information could be used alongside previously stated results to aid in the advancement of bioactive coating strategies, helping minimize the patient's response to the ECC.
1245-1300	**Effects of Hemodilution on Sonoclot Parameters** Mallory Gillispie, University of Nebraska Medical Center  **Bio:** My name is Mallory Gillispie and I am a second-year Clinical Perfusion student from the University of Nebraska Medical Center. I was born and raised in Iowa City, Iowa. I attended the University of Iowa where I received a Bachelor of Science degree in Human Physiology. During my undergraduate career, I was a four-year member of the University of Iowa Dance Team and I was a student ambassador for the University of Iowa College of Liberal Arts and Sciences. Currently, I am the communication ambassador for my perfusion class. I have had the privilege to rotate at the University of Minnesota, Duke University Hospital, Saint Luke's Hospital, and the University of Nebraska Medical Center. I am excited to continue to grow as a clinician as I move into the workforce! **Abstract: Background:** Clinical perfusionists impact a patient's hemodynamic status through a variety of mechanisms including hemodilution. Today during open heart surgery there are a variety of microviscometry devices used in order to analyze a patient's hemodynamic status. These devices are used to help guide the perfusionist in their clinical decisions. The Sienco Sonoclot is an ultra-sensitive viscoelastic instrument used for hemostasis monitoring and basic anticoagulation management in the perioperative setting. Using the Sonoclot, the impact of hemodilution on activating clotting time, clot rate, and platelet function can be analyzed. If the patient's blood is hemodiluted on cardiopulmonary bypass, then it will increase the ACT and clot formation time. **Methods**: 19 subjects donated 6 mL of whole blood which was then allocated to six different hemodilution ratios: normovolemia, 1:0.5, 1:1, 1:2, 1:4, and 1:5 blood:plasmalyte. Each hemodilution ratio was carefully pipetted into the Sonoclot chamber and was run twice. The results were averaged within each subject.

	Results: Using a linear fixed model to model the outcome measurements of the varying hemodilution ratios, the following results were obtained. Pairwise comparison was adjusted using the simulation method on all data collected. When looking at ACT, 1:0.5, 1:1, and 1:2 had a statistically significant relationship with 1:5 blood:plasmalyte ratio. When looking at the clot rate, normovolemia and 1:1 had a statistically significant relationship with 1:4 and 1:5 blood: plasmalyte ratio. 1:0.5 has a statistically significant relationship with 1:2, 1:4, and 1:5 blood:plasmalyte ratio. Finally, when looking at platelet function, normovolemia and 1:0.5 had statistically significant relationships with 1:1, 1:2, 1:4, and 1:5 blood:plasmalyte ratios. **Conclusion:** With the use of the Sienco Sonoclot, there was an increase in average ACT as hemodilution increased. There was also a decrease in overall clot rate and platelet function as the severity of hemodilution was increased.
1300-1315	**Evaluating the Differences in Renal Function and Coagulation Status through the Implementation of Priming Additives in Cardiopulmonary Bypass Circuits** Paul Mangine, Quinnipiac University  **Bio:** As a masters candidate in Quinnipiac's cardiovascular perfusion program I have had the privilege of being exposed to rigorous academic and clinical courses. During my final semesters, I have been introduced to the many current areas of research being conducted within the realm of extracorporeal technology, scientific principles of experimental design, analysis, and methods of reporting results to the scientific community. As a graduation requirement, it was my responsibility to design a data driven investigation and test a formulated hypothesis using empirical investigation techniques all within the confines of my clinical rotation sites. This presentation will explore the process and illustrate the results of my efforts. **Abstract:** Currently there is no standardization or optimal method agreed upon by institutions performing adult cardiac surgery in regards to the priming of cardiopulmonary bypass circuits. Many centers simply proceed by utilizing crystalloid solution alone while others apply additives to their crystalloid based primes. This clinical investigation comparatively analyzed the priming methodologies of two different institutions and their effects on patients receiving cardiopulmonary bypass by evaluating pre and post-operative kidney function and coagulation status over the course of 24 hours. Forty patients were divided into two groups based on two different institutional priming protocols. The control group (n=20) was observed at NYU Langone Hospital and received crystalloid prime alone while the treatment group (n=20) was assessed at Montefiore Medical Center and received 37.5 grams mannitol per 150mL and 37.5 grams 25% albumin per 150mL, in addition to crystalloid prime prior to the initiation of cardiopulmonary bypass. Comparison of numerical variables for mean difference in arterial blood gas electrolytes, estimated glomerular filtration rate, platelet count, BUN, urinary output, and chest tube drainage between study groups during post bypass and 24 hours post bypass was performed. Findings indicate no significant

	differences in renal functionality or post-operative bleeding between groups concerning the application of additives in crystalloid priming solutions. Although it is beneficial to utilize mannitol and albumin to minimize platelet loss and increase urine output after cardiac surgery requiring cardiopulmonary bypass, these additives do not seem to have a substantial effect in mitigating the effects of AKI and decreasing the amount of non-surgical hemorrhage in the form of chest tube drainage after surgery.
1315-1330	**Effects of Oxygenator Change-Out Simulations on Patient Safety** Jake Shore, University of Nebraska Medical Canter  **Bio:** My name is Jake Shore and I am a second year Clinical Perfusion Education student at the University of Nebraska Medical Center. I am from Yadkinville, North Carolina and completed my undergraduate education at Appalachian State University in Health Care Management and Accounting. Once established in my management career, I soon realized my heart was not pushing paper rather it was in direct patient care. Therefore, I took action and pursued a career in perfusion. I could not be happier with my decision and look forward to a lifelong career in perfusion. Currently, I am completing my third clinical rotation at the University of Alabama at Birmingham. I completed my first rotations at Virginia Commonwealth University and the Hospital of the University of Pennsylvania. My fourth rotation will be at the University Hospital of Columbia and Cornell. **Abstract: Background and Rationale:** Oxygenators have been a staple of life saving cardiac surgery procedures since the 1950s. Since then, oxygenators have improved in their oxygen transfer capacity, CO2 removal, durability, expected life, and failure rates. That being said, oxygenators have not improved to the degree where they are “fail safe” and there is no known way to test if an oxygenator is fully acceptable prior to initiating bypass. In addition, the change-out rate for oxygenators while on cardiopulmonary bypass has improved over the past 30 years; however, the change-out rate is not yet zero. When these situations arise, it causes a large deal of stress on the surgical team and causes an increase in potential harm to the patient. Due to the potential deteriorating consequences for the patient during an oxygenator change-out, we strive to determine new, safer ways of handing this situation. Through the use of simulation, learners are able to practice the relevant critical actions and concepts involved in safe changing of an oxygenator. **Methods:** 10 students from the University of Nebraska Medical Center Clinical Perfusion Education program were recruited to participate in this study. When each student arrived, they were given a brief, narrative description of the case, information on the simulated patient’s initial presentation, learning objectives to be covered during the simulation, and a summary of critical actions to be performed by the learner. Each student participated in three timed trials to change

	out an oxygenator. During the first trial, the student was asked to change-out the oxygenator without the use of a written protocol and without any directions from the facilitators. Following the first trial, the facilitators discussed areas of improvement and gave the participant a written protocol for changing out the oxygenator. Two more trials followed with another debrief period after each trial. **Results:** In the first trial, the average time to change-out an oxygenator was 229.51 seconds with a standard deviation of 64.8 seconds. The minimum time was 160.81 seconds, the maximum time was 346.26 seconds with a median of 218.81 seconds. Trial 2 had an average of 221.29 seconds with a standard deviation of 77 seconds. The maximum time was 415.22 seconds with a minimum time of 146.69 seconds and median of 194.04 seconds. Trial 3 had an average change-out time of 194.82 seconds with a standard deviation of 51.61 seconds. The maximum time was 294.33 seconds. The minimum time was 137.89 seconds with a median of 192.99 seconds. When comparing trials 1 and 2, trial 2 was shorter by an average of 8.22 seconds with a p-value of 0.49. When comparing trials 1 and 3, trial 3 was shorter by an average of 34.69 seconds to give a p-value of 0.19. In addition, the participants stated during the debrief period that they benefited from the simulation and feel more comfortable with a change-out should an oxygenator fail during bypass.

EXHIBITOR ADS