

# ADVANCING KNOWLEDGE

ANNUAL REPORT  
2022



EXTRACORPOREAL LIFE SUPPORT ORGANIZATION

# LETTER FROM THE BOARD

Dear ELSO Community,

2022 saw the impact of the COVID-19 pandemic begin to diminish in many parts of the world. Hope emerged that normal life might resume, and many were able to visit friends and family overseas for the first time since early 2020.

The year saw a return of some degree of normalcy for ELSO. A very successful annual conference was held in Boston, the first in three years, with regional chapter meetings in Riyadh, London, and Lima. The sixth edition of the Red Book was published, involving the greatest number and most internationally diverse group of authors that have ever contributed. The ELSO Foundations course for adult patients proved to be even more of a success than was originally anticipated and work began on a similar course for neonatal and pediatric patients.

Looking to 2023, ELSO's mission is to provide global leadership in extracorporeal life support through innovation, advocacy, and advancing knowledge. Many initiatives are planned to move our organization forward across a wide variety of domains, including education, research, publications, technology, and quality. Your work with ELSO makes a difference. There is a role for everyone here and we look forward to your help in the years ahead – contributing data, developing guidelines, research, and education.

Thank you for all your incredibly hard work on behalf of patients and their families.

With gratitude,

ELSO Board of Directors

Matthew Paden, President

Daniel Brodie, President-Elect

Mark Ogino, Past President

Peta Alexander, Treasurer

Graeme MacLaren, Global Representative

Jay Shiland, Director

Elizabeth Maringer, Director

Robert Bartlett, Founder, Emeritus Director



Matthew Paden, MD  
President (2020-2022)



Graeme MacLaren, MBBS  
President (2023-2024)

# Our Mission, Vision, Strategic Priorities

## Mission

Providing global leadership in extracorporeal life support through innovation, advocacy, and advancing knowledge.

## Vision

ELSO will be the premier organization for the advancement of extracorporeal life support throughout the world.

## Strategic Themes

- Advocate for patients, families, and centers to improve access, quality, and outcomes with ECLS.
- Promote trust and credibility in all our work.
- Provide insight and definitive data for clinical research, quality improvement, and benchmarking for centers, industry, and regulatory agencies.
- Lead as an inclusive, global, interprofessional, and collaborative organization.

## Guiding Principles

**Innovation** Seeking to identify and promote advances for the application of extracorporeal therapies.

**Expertise** Bringing together world leaders in the care of critically ill patients for collaboration to advance quality of care through education and publication.

**Clinical Support** Maintaining a comprehensive registry of data to assist in reducing morbidity and improving survival of patients requiring extracorporeal therapies.

**Community** Fostering communication and collaboration among professionals who apply advanced technologies in the treatment of refractory organ failure.

# TABLE OF CONTENTS

ADVANCING KNOWLEDGE	5
YEAR IN REVIEW	9
ELSO'S 33RD ANNUAL CONFERENCE	14
CENTERS OF EXCELLENCE	18
CHAPTER CONFERENCES HIGHLIGHTS	21
PATIENTS & FAMILIES	24
FINANCIAL HIGHLIGHTS	26
ELSO EDUCATION & TRAINING CENTER	27
ELSO BOARD OF DIRECTORS	28
GLOBAL CHAPTER LEADERSHIP	29
STEERING COMMITTEE	30
STRATEGIC ADVISORY COUNCIL	31
ELSO TEAM	32
LETTER FROM THE CEO	33

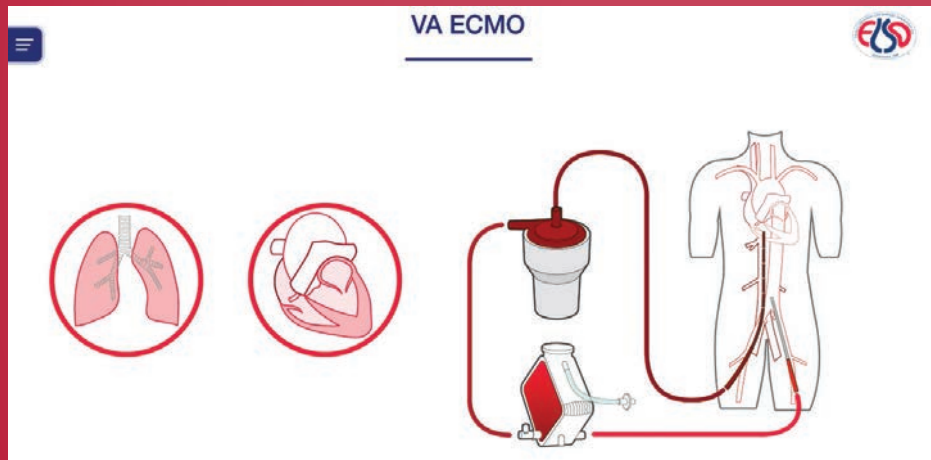


# ADVANCING KNOWLEDGE: EDUCATION

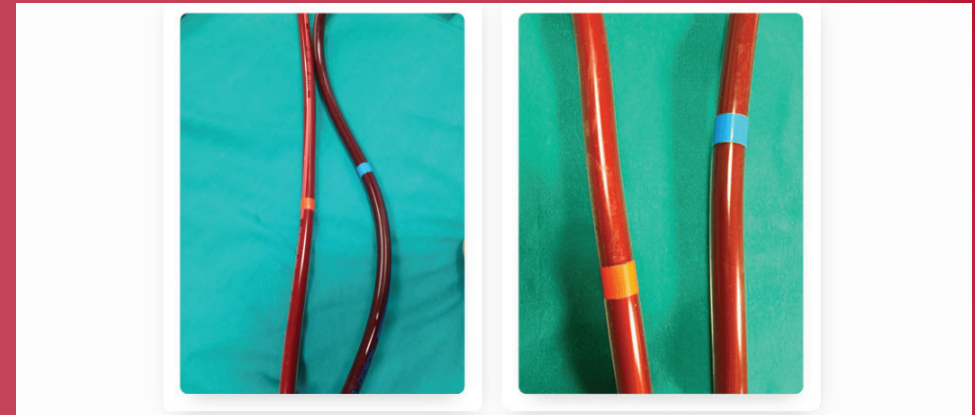
2022 was a year of opportunity and expansion for ELSO Education. A brand-new online course brought ECMO education to almost 800 learners, while a return to in-person training brought additional opportunity for cannulation and simulation training.

## ELSO FOUNDATIONS: ADULT ECMO TRAINING COURSE

Launched in the waning days of 2021, ELSO Foundations: Adult ECMO Training Course took full flight in its inaugural year. This course - developed for the online, asynchronous learner - represents a core piece of ELSO's global education strategy. Its 54 modules and roughly 8

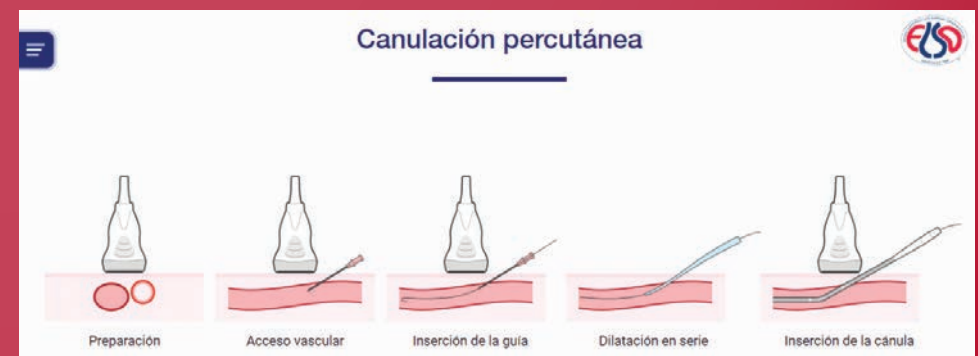


hours of learning time cover essential ECMO knowledge, from patient selection through complications and transport. Its multidisciplinary and interprofessional approach ensures that each learner - from the novice to the savvy veteran - comes away more prepared and better equipped to treat ECMO patients.



## ELSO FOUNDATIONS: ADULT EN ESPAÑOL

Building on the success of the English-language version of the course, a core team from ELSO's LATAM Chapter translated the ELSO Foundations Adult course into Spanish. Utilizing the exact same course content with translated visuals and audio voiceover, ELSO Foundations: Adult in Spanish has expanded our reach and global diversity of learners. We are proud to share this eLearning content with the world, ensuring that all ECMO providers have access to the most up-to-date learning material.



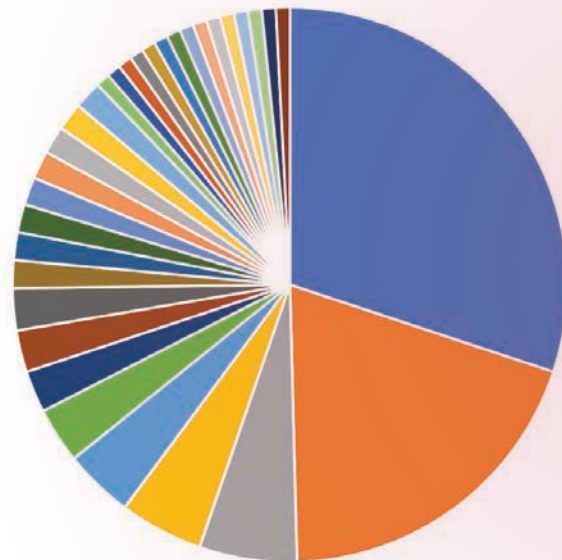
*Screenshots from ELSO Foundations: Adult ECMO Training Course (English & Spanish Versions)*

# ADVANCING KNOWLEDGE: EDUCATION

During 2022, many learners participated in ELSO Foundations - Adult course and we can see that this is a course with global appeal. We are happy to share that almost 800 learners have taken ELSO Foundations. With over 100 experts gathering to help make this course the global standard, we increasingly see that it is achieving this goal. Your participation and feedback during the development of the course made it a credible, strong course. Looking ahead, we will continue to grow on

what we have developed here. This course is now available in Spanish. A neonatal/pediatrics course is in development. All patient populations will have a foundational curriculum for practitioners everywhere in the coming year.

ELSO Foundations: Adult Learners by Country of Practice, 2022  
n = 123



Country	# of Learners	% of Non-US Learners	Country	# of Learners	% of Non-US Learners
Canada	37	30.08%	Spain	2	1.63%
Australia	24	19.51%	China	1	0.81%
Germany	7	5.69%	Denmark	1	0.81%
Ukraine	6	4.88%	Egypt	1	0.81%
Japan	5	4.07%	India	1	0.81%
Italy	4	3.25%	Ireland	1	0.81%
New Zealand	3	2.44%	Oman	1	0.81%
Norway	3	2.44%	Panama	1	0.81%
United Kingdom	3	2.44%	Philippines	1	0.81%
Belgium	2	1.63%	Poland	1	0.81%
Brazil	2	1.63%	Portugal	1	0.81%
Chile	2	1.63%	Romania	1	0.81%
Colombia	2	1.63%	Sweden	1	0.81%
Hong Kong	2	1.63%	Taiwan	1	0.81%
Mexico	2	1.63%	Thailand	1	0.81%
Saudi Arabia	2	1.63%	The Netherlands	1	0.81%

US learners n = 550; Non-US learners comprise 18% of all enrollees

# ADVANCING KNOWLEDGE: EDUCATION

## A LONG-AWAITED RETURN

In addition to our highly successful online learning, 2022 brought back one of ELSO's classic courses, albeit in a new format. In-person training has been a mainstay of ELSO Education for decades. As pandemic restrictions and pandemic waves eased, ELSO was able to provide two in-person Simulation Courses alongside two in-person Cannulation



Workshops. The Cannulation Workshops are one-day experiences designed to train and develop cannulating practitioners. These small-format, high-touch environments are ideal for intensivists, surgeons, emergency physicians, and others that cannulate ECMO patients.

Our Adult ECMO Simulation Course is a new take on an old friend. A core component of ELSO's legacy Comprehensive Simulation-Based Course (3.5 day in-person course), this 1.5 day course highlights the five essential simulations that every ECMO specialist should experience. They are full-scale simulation courses, down to the red dye and functioning ECMO pumps. A mega-sim ties together all of the learning pearls into a chaotic sequence of errors, mishaps, and pseudo-acting by our course faculty. In 2022, ELSO presented this course in Tampa, Florida and Ypsilanti, Michigan. Over 200 learners from several countries and states across the US participated.



Both the Simulation Course and Cannulation Workshop make a return in 2023. For the latest dates and information, please see our website: <https://elso.org/ecmo-education/endorsed-ecmo-courses.aspx>

*Photos: Adult ECMO Simulation Courses (April - Tampa, Florida; Novemer - Ypsilanti, Michigan), and Adult ECMO Cannulation Course (Ann Arbor, Michigan)*



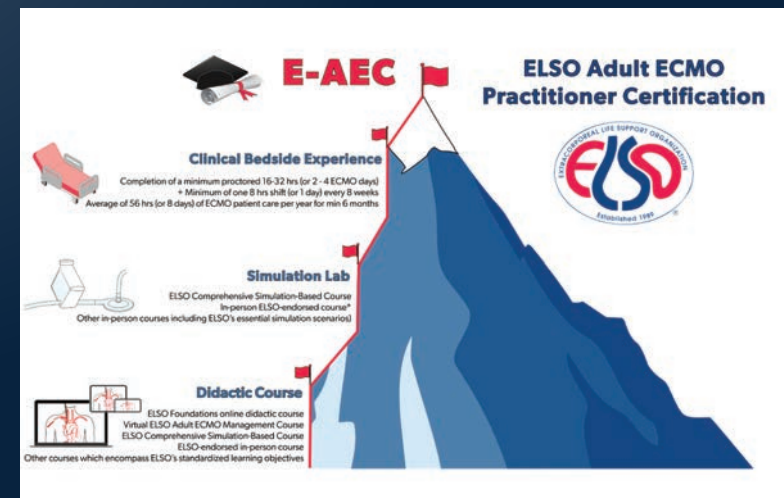
# ADVANCING KNOWLEDGE: CERTIFICATION

In 2022, ELSO launched the ELSO Adult ECMO Certification (E-AEC), a first of its kind, multidisciplinary and interprofessional ECMO certification. Eligible certified individuals include all ECMO practitioners including, but not limited to, physicians, nurses, respiratory therapists, perfusionists, and other ECMO-related professions. The E-AEC establishes a minimum standard for ECMO training at a global level. Completion of a didactic (lecture-based) and hands-on simulation training are required, as well as a minimum amount of clinical experience. These combine to establish minimum competencies for safe ECMO care.

Following a review of the applicant's credentials, approved individuals are invited to sit for the E-AEC written exam, a 3-hour multiple choice examination. Exams are conducted electronically on a monthly basis in the comfort of the applicant's home, office, or chosen exam space. Successful examinees are certified by ELSO as demonstrating a foundational knowledge of ECMO clinical care. It should be noted, however, that privileging - the right to practice ECMO in a given facility - remains in the hands of individual institutions. The E-AEC does provide a common standard to assure providers, patients, and families that E-AEC certified practitioners meet or exceed ELSO's standards for safe ECMO practice.

In 2022, over 600 applicants globally started an E-AEC application, with 150 individuals submitting a completed application. Our 2022 examinees constitute 94 E-AEC certified practitioners across the globe. Congratulations to all members of our inaugural 2022 E-AEC Certified cohort - their training and commitment to high-quality ECMO care represent the highest standards.

For more information on the E-AEC, and to see if you are eligible to sit for the Exam, please see our website: <https://www.else.org/ecmo-education/certificationexam.aspx>





# YEAR IN REVIEW: TRAINING COURSES

In 2022, ELSO turned knowledge into training for over a thousand global learners. Beginning in January with a return to our traditional Cannulation Workshop, we expanded our offerings with two Adult ECMO Simulation Courses, first in Tampa, Florida in April, and then again in Ypsilanti, Michigan in November. Our Cannulation Workshop was presented three times: first in January, then again in October and November.

Beyond our traditional training model, the ELSO Foundations: Adult ECMO Training Course completed its first full year of service in 2022. Designed for the active or novice practitioner, ELSO Foundations stretches the bounds of typical ECMO training. This interprofessional, multidisciplinary course is designed for anyone who manages an ECMO patient, from cannulating surgeons to paramedics in the field, and anywhere in between. It is the first course to meet the Step 1 (Didactic Training) requirements for the E-AEC certification. A full summary of ELSO Foundations, as well as our other training experiences, can be found on page 4.



In addition to ELSO's in-house training program, 2022 marked the re-launch of the Endorsed Course program. Designed to validate the quality of training at centers across the world, ELSO's Course Endorsement ensures that recognized courses meet or exceed ELSO's standards for ECMO training. Courses meeting ELSO endorsement standards are evaluated for meeting Step 1, Step 2, or both requirements for E-AEC certification. This effort has expanded the global reach for students to provide world-wide access to courses that meet certification requirements. The Endorsed Course process involves a one-time application & associated fee, plus an initial site visit at a course presentation. Following a thorough review of learning objectives, presentations, and on-course activities, ELSO proudly acknowledges successful applicants as endorsed, with a seal to include on participants' certificates of completion. Eight centers across Europe, Asia, Australia, and Central America were granted Endorsed Course status in 2022.



# YEAR IN REVIEW: REGISTRY

The ELSO Registry has been a source of advancing knowledge through the use of clinical data since the inception of ELSO. Over time, peer-reviewed publications have grown. During the COVID-19 pandemic, publications grew quite a bit; however, there was similar growth for some time. Thanks to the many centers sharing their information, more data is available for more in depth studies. 2022 was a record-setting year for publications using ELSO Registry data.



*Thank you to Matthew Friedman for conducting this analysis.*

## ELSO Registry Bibliography

Matthew Friedman and Marc Anders finalized ELSO’s mechanism for maintaining an updated bibliography of all citations using the ELSO registry. Each citation found in PubMed was reviewed. Those that could be confirmed as using ELSO Registry data in their study method were included in the updated bibliographic database. The results can be seen at <https://www.else.org/registry/registrypublications.aspx>. Matt and Marc also individually emailed all past approved data requests for publication that ELSO had not received follow-up information on and for those requests that were published not in the bibliography were added.

# YEAR IN REVIEW: REGISTRY

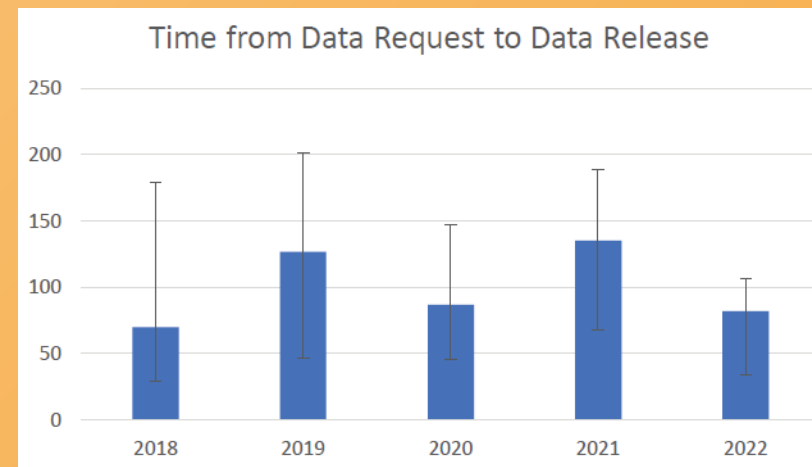
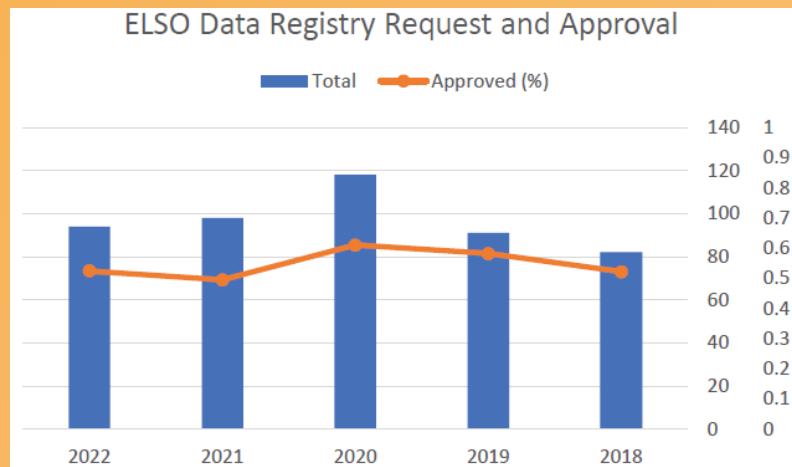


## Trauma Addendum

The Trauma Addendum in the ELSO Registry was opened for data entry in the beginning of 2022. Justyna Swol realized the need to collect additional information not previously recorded and led a group on the development and recruitment of centers to participate. Over 40 centers have agreed to participate in entering trauma patients into the optional addendum. All centers are invited to join them adding patients who suffered trauma and were supported on ECMO. ELSO’s policy on addendums can be found [here](#).

## Data Requests

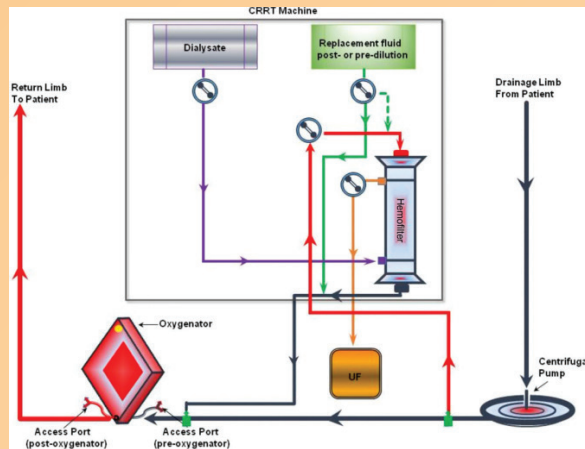
In 2022, ELSO received almost 100 data requests. Of those, near 60% were approved. This process is overseen by the Scientific Oversight Committee (SOC) of the ELSO Registry. The SOC is currently led by a team of three co-chairs from three different regions: Marc Anders (US), Aparna Hoskote (U.K.), and Ramanathan KR (Singapore). The SOC is comprised of over 30 members from all ELSO chapters. The SOC has developed methodologies and policies to review and score all data requests.



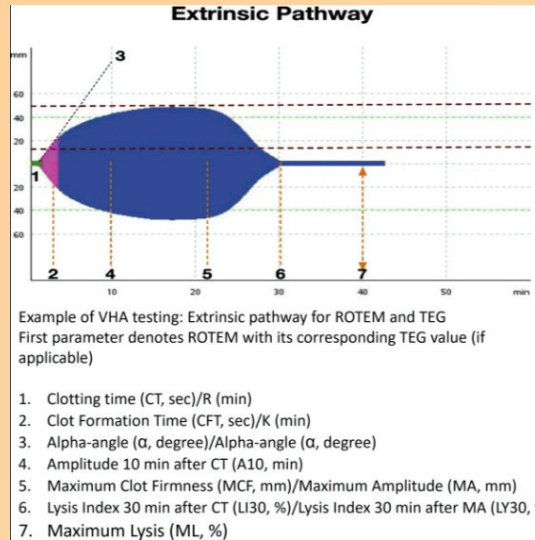
# YEAR IN REVIEW: GUIDELINES

In addition to the 6th Edition of the ELSO Red Book and publications from data requests using the ELSO Registry, several guidelines were published in 2022. Guidelines play an important role in supporting ELSO's mission. Thank you to all of you that were involved in developing guidelines. To propose a new guideline, please email: [guidelines@elso.org](mailto:guidelines@elso.org). All ELSO guidelines are available here: <https://www.elso.org/ecmo-resources/elso-ecmo-guidelines.aspx>

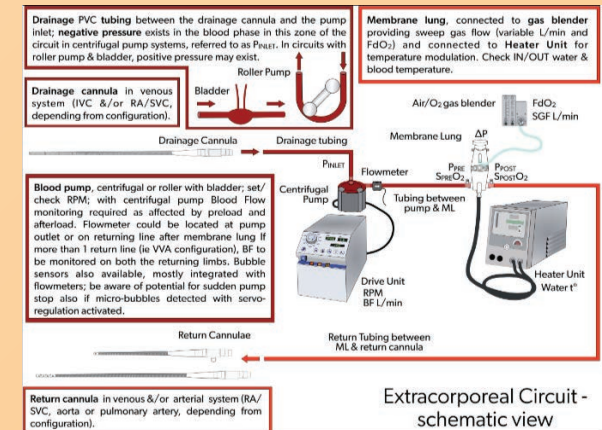
## Fluid Overload, AKI, and Electrolyte Management on ECMO Guidelines



## Anticoagulation Management



## Circuit Overview



## Nutritional Support for Neonatal and Pediatric ECMO Patients

## ECMO Transportation Guidelines



Figure 3. (A, B, and C). An example of air ambulance. Note the special mechanism for lifting patient and difficult access.

ASAIO Journal 2022

Guidelines

**Extracorporeal Life Support Organization Guidelines for the Provision and Assessment of Nutritional Support in the Neonatal and Pediatric ECMO Patient**

AMY E. LEE,\* ELIANA MUNOZ,† TALA AL DABBOUS,‡ ELISABETH HARRIS,§ MAURA O'CALLAGHAN,¶ AND LAKSHMI RAMAN||  
Reviewers: Graeme MacLaren, # Nileshe Mehta, \*\* Mark Ogino, †† and Alejandro Floh ††

Disclaimer: This guideline is intended for educational use to build the knowledge of physicians and other health professionals in assessing the conditions and managing the treatment of patients undergoing extracorporeal life support (ECLS)/extracorporeal membrane oxygenation (ECMO) and describe what are believed

Key Words: extracorporeal membrane oxygenation, neonatal, nutritional support, pediatric GROUP Guidelines

This guideline discusses nutritional support for neonatal and pediatric patients requiring extracorporeal membrane oxygenation

# YEAR IN REVIEW: INDUSTRY & TECHNOLOGY

Technology and innovation are a constant commitment to the ELSO community. Our industry partners are who bring the equipment to the bedside, which they continue to improve upon with the help of clinical, animal, and basic science innovation. Our data is an important contributor, creating an understanding of the real-world performance of technology.

With industry as our partners, we can continue to improve patient outcomes. ELSO works with industry in many ways: clinical data for device approval and improvement over time; post-market surveillance; providing opportunities to highlight innovation available to providers; and support in advancing knowledge. ELSO will begin offering prospective studies for industry partners in 2023.

We were thrilled to be able to see technology innovations in person this year. Thank you to our industry partners for your support of ELSO and its chapters.



# ELSO'S 33RD ANNUAL CONFERENCE: BOSTON

After two highly successful virtual conferences, 2022 brought the long-awaited return to ELSO's in-person Annual Meeting. This year, the dates were September 14 - 17 in the designated host city of Boston, Massachusetts, USA. The vibrant seaside city proved to be an excellent atmosphere for our annual late-summer gathering. A home rivalry series featuring the Boston Red Sox and the New York Yankees led off the week as attendees gathered from near and far to celebrate and reunite throughout the week. Culminating in the always-anticipated Awards Ceremony featuring our Award of Excellence recipients, FELSO awardees, and other distinguished contributors, the 33rd ELSO Annual Meeting brought back many moments characteristic of our global family.



In total, over 1300 attendees attended in-person, with virtual recordings available to all participants at the conference's end. The week began as it often does: with meetings of the ELSO Steering Committee and Award of Excellence. Interspersed were a variety of opportunities to gather throughout the city. Many chose to enjoy a warm, but slightly damp September evening at historic Fenway Park. Most enjoyed having the opportunity to be together again in person, as we saw throughout all ELSO conferences this year.

On Wednesday, September 14, the program began in earnest with an afternoon of Pre-Conference for over 700 attendees. This year's symposium focused on program development, aptly titled "From Pumps to Program: How to Build (and Grow) a High Quality ECMO Program." Featuring core topic areas such as access to care, program structure, policy development, and training, the Pre-Conference symposium was a unique opportunity to learn from many global experts in a structured, more intimate learning environment. These

conversations, over two half-days on Wednesday afternoon and Thursday morning, provided the ideal foundation for what would be a stimulating, and occasionally debated, main program.

Thursday, September 15 launched a provocative opening plenary session. Matthew Paden, MD provided welcoming remarks and Daniel Brodie introduced the session's keynote speaker, Derek Angus. Angus, Chair of Critical Care Medicine at UPMC and a senior editor of JAMA, gave an enthralling talk about the state and future of research in ECMO with a compelling status update on the state of evidence today. Derek's talk was a reminder of the work that remains in research for ECMO and the challenges that our community knows quite well in what is now seen as a standard of care in many programs. The role that ECMO played throughout the pandemic was evidence of its success in clinical service today; yet, the state of the evidence is an opportunity for our community. The opening plenary focused on the boundaries of ECMO, or more specifically, how far they can be pushed. Celebrating the 50th anniversary of the first ECMO case, Robert Bartlett paid homage to his dear friend J. Donald Hill, who reported the first successful ECMO case in 1972. Boundary-pushing in the way of cardiovascular medicine, pediatric trial design, and xenotransplantation captured the



innovative spirit of our ECMO community.

Over the subsequent afternoon and through the day on Friday, September 16, attendees had the opportunity to attend over 20 breakout sessions on topics from ECMO in pregnancy

# ELSO'S 33RD ANNUAL CONFERENCE: BOSTON



to ECPR to more classic ECMO topics such as neurologic injury or surgical repairs. Interspersed were a variety of opportunities to engage with our exhibitors who traveled from across the world to share their latest and greatest advancements. In addition to two lunch-and-learn opportunities, there were frequent breaks

and enticements to invite all attendees to the exhibitor hall. This conference would not be possible without the generous and long-standing support of our many sponsors. We cannot thank them often enough for making this 33rd Annual ELSO Conference as spectacular as it was.

The evening of Friday, September 16 gave our community the time to publicly acknowledge some of our most distinguished centers and individuals in the ECMO community. The Fellowship of the Extracorporeal Life Support Organization (FELSO) designation is awarded to those who, over their careers, have provided distinctive contributions to the global art and science of ECMO. It is ELSO's highest honor for an individual practitioner. In 2022, four distinguished honorees were recognized: Alois Philipp, Leen Vercaemst, Ryan Barbaro, and Vincent Pellegrino. Each has contributed, in their own significant ways, to the health, success, and growth of ECMO patient care. Also acknowledged were the over 80 centers who received, elevated, or maintained their Award of Excellence status in 2022. Each was acknowledged by name, with an opportunity to take a team photo alongside many of ELSO's leadership. The remaining awards were for Best Abstract, a designation for those whose research posters stood out in the eyes of ELSO's scientific evaluators.

Saturday, September 17 brought several more breakout sessions and one final plenary panel to resolve any remaining controversies and tie together the week's learnings.

In all, we have a great deal to celebrate from this anticipated and long-overdue in-person reunion. We also wish to especially acknowledge those who came to the ELSO Annual Meeting for the first time. As our community expands and diversifies, we strive to create a scientific program that fits everyone's needs.

We hope to see all of you in Seattle, Washington, USA for the 34th ELSO Annual Meeting from September 28 - October 1, 2023!



# ELSO'S 33RD ANNUAL CONFERENCE: BOSTON

The traditional passage of the Presidency took place at the closing ceremony, where President Matt Paden handed over the 'el Presidente' buckle and belt to incoming President, Graeme MacLaren. Based in Singapore, Graeme will be ELSO's first international President beginning January 1, 2023.

Graeme has been a Director of ELSO for some years, serving as the Global

Representative. Well known in the ELSO world, Graeme also led the 6th Edition of the ELSO Red Book in 2022. He started the AP ELSO chapter for ELSO and treats both children and adults. We look forward to his leadership in 2023 and thank Matt Paden for serving during the pandemic - where he managed to help ELSO set new standards and move forward on many initiatives.





# ELSO RED BOOK: 6TH EDITION

In September 2022, ELSO released the Sixth Edition of the ELSO Red Book. The ELSO Red Book is the definitive reference text on Extracorporeal Life Support. Written by over 230 experts from around the world, this new edition provides the latest evidence and knowledge on extracorporeal life support.

There are new chapters on topics not found in previous editions, including Emerging Infectious Diseases, Bedside Ultrasound, Cannulation, ECLS Nomenclature, Extracorporeal Therapy to Facilitate Organ Donation, Physiotherapy and Mobilization, Anesthesia, and ECMO Crisis Management. All references and guidelines have been updated to the latest expert knowledge on each topic.

Graeme MacLaren, MBBS led the effort as Senior Editor. Daniel Brodie, MD; Roberto Lorusso, MD, PhD; Giles Peek, MD; Ravi Thiagarajan, MD, MPH; and Leen Vercaemst, RN, ECCP served as the Editorial Board. 230+ global experts were invited to author specific content. The authors are leaders in the field, and the Red Book's most diverse global authors yet. This powerful combination of research prowess, knowledge, and experience make the ELSO Red Book a landmark publication for any ECMO team.

Attendees at the 33rd ELSO Annual Meeting were among the very first to receive this publication in print. The enthusiasm, marked by editor Graeme MacLaren's plenary announcement, energized an already electric reunion of our global community. We are proud to share this text with the world in the support of safe, effective, and leading edge ECMO care.

To purchase the Sixth Edition of the ELSO Red Book, please visit our website: <https://www.else.org/publications.aspx>

# Centers of Excellence

Congratulations to 2022 Center of Excellence awardees. Award periods begin in 2023. We appreciate your commitment to excellence in care, quality, and process for your patients.



## Platinum Award

Alfred Hospital | *Melbourne, Australia*  
British Columbia Children's Hospital | *Vancouver, BC, Canada*  
Children's Hospital of Atlanta at Egleston | *Atlanta, GA, USA*  
Children's Hospital of Pittsburgh of UPMC | *Pittsburgh, PA, USA*  
Children's National Medical Center | *Washington DC, USA*  
Duke University Hospital | *Durham, NC, USA*  
ECMO Centrum Karolinska | *Solna, Sweden*  
General University Hospital | *Prague, Czech Republic*

James Whitcomb Riley Hospital for Children | *Indianapolis, IN, USA*  
Legacy Emanuel Medical Center | *Portland, OR, USA*  
Mater Misericordiae University Hospital | *Dublin, Ireland*  
New York-Presbyterian Hospital/Columbia Univ Med Center | *New York, NY, USA*  
The Royal Brompton Hospital | *London, United Kingdom*  
University of Iowa Hospitals and Clinics | *Iowa City, IA, USA*  
Valley Children's Hospital | *Madera, CA, USA*  
Vancouver General Hospital | *Vancouver, BC, Canada*

## Gold Award

Abbott Northwestern Hospital | *Minneapolis, MN, USA*  
Advocate Children's Hospital - Oak Lawn | *Oak Lawn, IL, USA*  
Advocate Children's Hospital - Park Ridge | *Park Ridge, IL, USA*  
Ascension Seton Medical Center Austin | *Austin, TX, USA*  
Banner University Medical Center Tucson | *Tucson, AZ, USA*  
Baylor Scott & White - The Heart Hospital Plano | *Plano, TX, USA*  
Boston Children's Hospital | *Boston, MA, USA*  
Brigham & Women's Hospital | *Boston, MA, USA*  
Children's Hospital of Illinois | *Peoria, IL, USA*  
Children's Hospital of New Orleans | *New Orleans, LA, USA*  
Children's of Alabama | *Birmingham, AL, USA*  
Cincinnati Children's Hospital Medical Center | *Cincinnati, OH, USA*  
Cohen Children's Medical Center | *New Hyde Park, NY, USA*  
Doernbecher Children's Hospital | *Portland, OR, USA*  
ECLS Center Radboudumc | *Nijmegen, Netherlands*  
Fundacion Clinica Shaio | *Bogota, Colombia*  
Harefield Hospital | *Middlesex, United Kingdom*  
Instituto Nacional De Cardiologia Dr. Ignacico Chavez | *Mexico City, Mexico*  
Lucile Packard Children's Hospital at Stanford | *Palo Alto, CA, USA*  
Massachusetts General Hospital | *Boston, MA, USA*  
Medical City Children's Hospital | *Dallas, TX, USA*  
Memorial Regional Hospital | *Hollywood, FL, USA*

Methodist Hospital | *San Antonio, TX, USA*  
Montefiore Medical Center | *Bronx, NY, USA*  
Nationwide Children's Hospital | *Columbus, OH, USA*  
Nemours Children's Hospital, Delaware Valley | *Wilmington, DE, USA*  
Norton Children's Hospital | *Louisville, KY, USA*  
Phoenix Children's Hospital | *Phoenix, AZ, USA*  
Primary Children's Hospital | *Salt Lake City, UT, USA*  
Queen Mary Hospital | *Hong Kong, China*  
Rady Children's Hospital - San Diego | *San Diego, CA, USA*  
Randall Children's Hospital | *Portland, OR, USA*  
Riyadh Second Health Cluster - Ministry of Health | *Riyadh, Saudi Arabia*  
Rush University Medical Center | *Chicago, IL, USA*  
Stanford Hospitals and Clinics | *Stanford, CA, USA*  
The Ohio State University Wexner Medical Center | *Columus, OH, USA*  
Tufts Medical Center | *Boston, MA, USA*  
UCSF Benioff Children's Hospital Oakland | *Oakland, CA, USA*  
University Medical Center Groningen | *Groningen, Netherlands*  
University of Alabama at Birmingham Hospital | *Birmingham, AL, USA*  
University of New Mexico Hospital | *Albuquerque, NM, USA*  
University of Rochester Medical Center | *Rochester, NY, USA*  
Wellstar Kennestone Regional Medical Center | *Marietta, GA, USA*

*See next page for Pathways to Excellence Awardees*

# Centers of Excellence

Congratulations to 2022 Center of Excellence awardees. Award periods begin in 2023. We appreciate your commitment to excellence in care, quality, and process for your patients.

## Pathways to Excellence | Silver Award



Advocate Lutheran General Hospital | *Park Ridge, IL, USA*  
Augusta University Health | *Augusta, GA, USA*  
Bangkok Heart Hospital | *Bangkok, Thailand*  
Centro Cardiologico Pediatrico Del Mediterraneo | *Taormina, Italy*  
Cooper University Hospital | *Camden, NJ, USA*  
ECU Health Medical Center | *Greenville, NC, USA*  
HCA Florida Memorial Hospital | *Jacksonville, FL, USA*  
Hospital Infantil Sabara | *Sao Paulo, Brazil*  
Jefferson Abington Hospital | *Abington, PA, USA*  
Johns Hopkins Hospital Adult ECMO | *Baltimore, MD, USA*  
Keck Medical Center of USC | *Los Angeles, CA, USA*  
King Khalid Hospital, Najran, KSA | *Najran, Saudi Arabia*  
Lund University Hospital, Skane | *Lund, Sweden*  
Lutheran Hospital of Indiana | *Fort Wayne, IN, USA*  
Medical City Dallas Heart Hospital | *Dallas, TX, USA*  
Medical City Plano | *Plano, TX, USA*  
Miami Valley Hospital | *Dayton, OH, USA*  
Mount Sinai Hospital | *New York, NY, USA*  
National Jewish Health/Saint Joseph Hospital SCL Health | *Denver, CO, USA*  
North Shore University Hospital - Long Island Jewish Medical Center | *Manhasset, NY, USA*  
Peyton Manning Children's Hospital at St. Vincent | *Indianapolis, IN, USA*  
Prisma Health - Upstate | *Greenville, SC, USA*  
Providence ARDS Center | *Portland, OR, USA*  
Sidra Medicine | *Doha, Qatar*  
The Bristol-Myers Squibb Children's Hospital | *New Brunswick, NJ, USA*  
Washington University School of Medicine & Barnes Jewish Hospital | *St. Louis, MO, USA*  
Willis-Knighton Medical Center | *Shreveport, LA, USA*

# Celebrating FELSO and COE Recipients

Congratulations to 2022 Center of Excellence awardees. Award periods begin in 2023. We appreciate your commitment to excellence in care, quality, and process for your patients. FELSO Awardees were Leen Vercaemst, Vincent Pellegrino, Alois Philipp, and Ryan Barbaro.

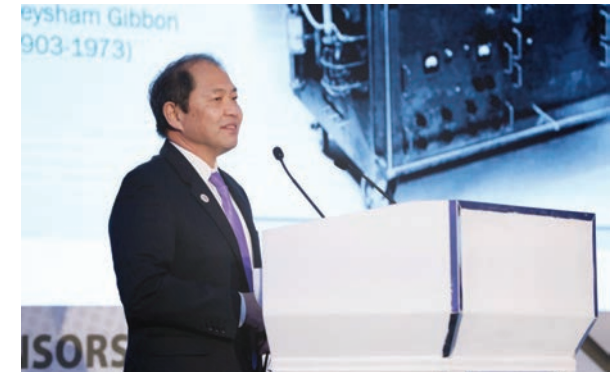
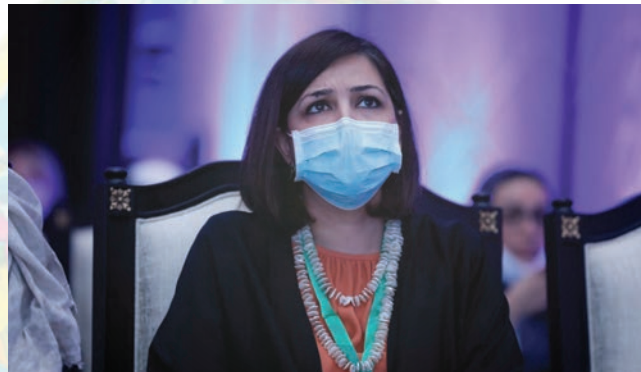


# SWAAC ELSO MEETING



## Riyadh, Saudi Arabia

In February 2022, SWAAC ELSO started off the ELSO Chapter meetings with a hybrid meeting held virtually and in Riyadh, Saudi Arabia. The in person portion was uncertain with the pandemic in various states around the world. In person attendees that made the trip were glad to have the opportunity to be together in person. The hybrid approach allowed for more participation than might otherwise have been possible at the time - a challenging feat. The conference started off the year and was the first of in person meetings after two years of virtual only for all chapters.



# EuroELSO MEETING



## London, United Kingdom

EuroELSO's Congress was the second in person gathering of 2022; their first since 2019 as well. The long-awaited gathering in London was very well attended and a big success in content, global participation, support, and networking opportunities. The scientific committee had many sessions available for all ECLS team members. Nick Barrett took the helm as Chapter Chair from Jan Belohlavek, after a longer term due to the pandemic. A big thank you to Jan for his leadership during a challenging time.



## EuroELSO 10<sup>th</sup> Congress

London, May 2022



# LATAM ELSO MEETING



## Lima, Peru

450 people gathered in Lima, Peru this year for a long-awaited opportunity to share what has been learned in the past few years. There has been enormous growth in the LATAM region, with 80 centers now providing ECLS. An international faculty provided the latest knowledge and discussions related to ECLS and each country presented their ECMO centers, including volume of cases and other noteworthy progress among centers. ELSO Foundations - Adult was translated into Spanish in time for the conference. Centers of Excellence awardees were presented at the conference to acknowledge their achievements.



A few images from the conference are to the right. Nearby, Machu Pichu was breathtaking and a wonder, settled in the mid-1400s.



# Patients & Families

## Post COVID-19 Recovery - Racing with his Physician

Rare is the photo of a formerly critically ill patient finishing a triathlon with his physician. Enter Jon Rosen, lifelong healthcare worker and his physician, Adam Green, an avid runner. And yet, here they are, completing the Atlantic City Triathlon together.

Jon has served as a healthcare worker his entire life. He contracted COVID-19 early on during the pandemic in his role as a night nursing supervisor in April of 2020. He was admitted to Cooper University Hospital, where he would spend 58 days in the ICU there; 24 of which were on ECMO.

Jon has many people to thank for making the photo below possible: the medical team at Cooper University Hospital; his wife, June and their active and never-wavering group of friends and family; and his own determination to stay positive and push for his recovery. SCCM recently recognized Jon's aptly named "Love Army" for the team at Cooper with the ICU Heroes Award. Read more about that honor here: <https://www.sccm.org/Blog/April-2022/SCCM-ICUHeroes-The-Love-Army>.

Adam Green's enthusiastic support and help during Jon's care and afterward are equally admirable. Jon is grateful for his opportunity to do more for the ECMO and critical care communities. He continues to train and work on his own health. Next up: an Ironman competition!

Photo credit and more about Jon's story:

<https://www.delmosports.com/blog/meet-delmo-athlete-jon-rosen>





# Patients & Families

## A Pediatric COVID Patient with a 73 Day ECMO Run by Kari Davidson, RN and Jenna Miller, MD.

Meet Trevor, a previously healthy, 12 now turned 13-year-old battling for his life due to severe COVID-19 illness at Children's Mercy Kansas City Hospital. Trevor is a regular, 7th grade boy with a diagnosis of phenylketonuria (PKU) managed by diet at home. Trevor's family, all vaccinated, fell ill to COVID19 last fall. All but Trevor, who had not had a chance to be vaccinated, recovered well. His journey started with over a week on oxygen therapy and noninvasive support in the Pediatric Intensive Care Unit (PICU), until it he had a sudden deterioration and was urgently intubated. With inability to oxygenate him, he then cannulated to VV ECMO. And so, began a 73-day ECMO run.

Trevor's run was challenging as many long VV runs are with balancing sedation, extubation vs ventilator management and ECMO complications. His therapeutics included steroids, remdesivir and tocilizumab. He developed Enterobacter bacterial superinfection and later pulmonary abscesses and necrosis. A tracheostomy was placed mid-run to assist with his comfort and ventilatory needs. His whited-out chest x-rays continued however and after 6 weeks on circuit, the team decided to push the boundaries and tackled pediatric proning on ECMO. This was the one therapy in adult COVID-19 literature that they had not yet tried. With brainstorming and patient-based adaptations including hand signals, the team was able to successfully prone Trevor almost daily for up to 12+ hours. Initially a skeptic, Trevor was not sure about the process but we soon realized it was exactly what his lungs needed. He showed marked improvement within the first couple days.

We timed this procedure after this rehab warrior worked diligently with PT/OT and his caregiver team to promote strength and mobility while on pump. He would do his exercises, sit up in the cardiac chair for a few hours, and then the team would work to get him proned in the late afternoon. Between the cardiac chair (with parades around the unit once isolation precautions were lifted) and proning, Trevor was exhausted. Ultimately, he would fall asleep soon after proning, as he was worn out from his activities from the day. Over time after his proning and intense physical therapy, his lungs did improve and he was able to wean. His oxygenator was capped for a couple days, while performing all of his therapies, doing a circuit change, and ensuring he would withstand the metabolic demands while off ECMO. On day 73, his Avalon cannula was removed, and Trevor was free from the circuit. It was a long-awaited day, and his care team was extremely proud of his determination.



As we have learned through experience with long respiratory ECMO runs, sometimes patience, time, and pushing the program out of its comfort zone are key interventions to success! Plus, having a kindhearted, determined patient and family to team up with helps immensely. Even those staff members that did not care for him knew who he was. Trevor is a true hero in the Children's Mercy PICU!

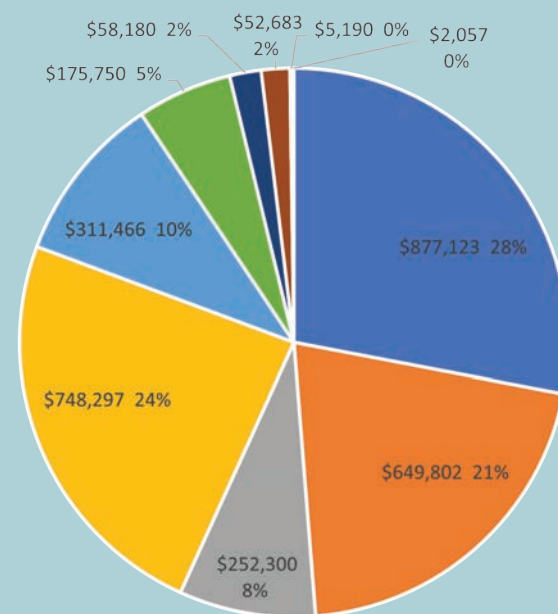


# FINANCIAL HIGHLIGHTS

ELSO Financial Highlights		
Statement of Activities		
For the Year Ended December 31, 2021		
<b>Program Revenue and Public Support</b>		
Membership dues	\$ 877,123	28%
Annual conference	\$ 649,802	21%
Data requests	\$ 252,300	8%
Educational courses	\$ 748,297	24%
Book sales	\$ 311,466	10%
Award of Excellence	\$ 175,750	6%
CME revenue	\$ 58,180	2%
ECMONet revenue	\$ 52,683	2%
Contributions	\$ 5,190	0%
In-Kind contributions	\$ 2,057	0%
<b>Total Program Revenue and Public Support</b>	<b>\$ 3,132,848</b>	<b>100%</b>
<b>Operating Expenses</b>		
Program services	\$ 2,615,431	
Management and general	\$ 368,116	
<b>Total Operating Expenses</b>	<b>\$ 2,983,547</b>	
<b>Excess (Shortfall) from Operations</b>	<b>\$ 149,301</b>	
Nonoperating Income(expenses)	\$ 247,304	
Change in net assets	\$ 396,605	
Net assets - beginning of year	\$ 4,134,974	
Net assets - end of year	\$ 4,531,579	

Source: ELSO Audited Financial Statements, Year Ending December 31, 2021

ELSO Program Revenue and Public Support FY2021



- Membership dues
- Annual conference
- Data requests
- Educational courses
- Book sales
- Award of Excellence
- CME revenue
- ECMONet revenue
- Contributions
- In-Kind contributions

**Independent Auditors' Report, Yeo & Yeo, LLC:**

**Opinion:** "In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Extracorporeal Life Support Organization as of December 31, 2020, and the changes in its net assets and its cash flows for the year then ended in accordance with accounting principles generally accepted in the United States of America." April 8, 2022

**Basis of Opinion:** "We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion."

# Coming Soon: ELSO's Education & Training Center

In 2023, ELSO will open its new education and training space at ELSO's headquarters in Ann Arbor, Michigan. This new space will accommodate simulation, cannulation, and other training that will emerge over time. This complements meeting room space, touch down space for visitors, and offices that will help improve ELSO's capacity as an organization for years to come.



We are in good hands - Peter Rycus is overseeing this expansion project!

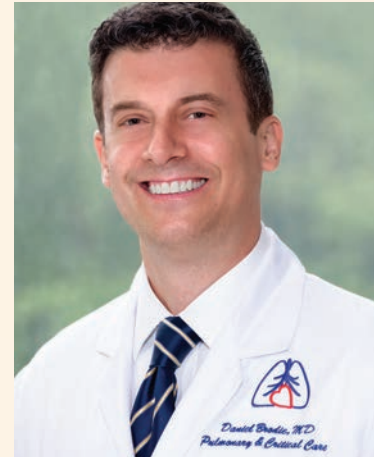
# ELSO BOARD OF DIRECTORS



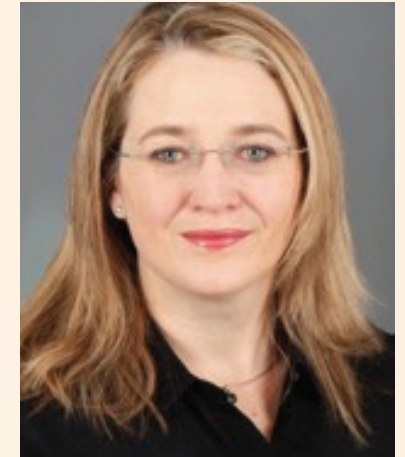
Matthew Paden, MD  
President



Mark Ogino, MD  
Past-President



Daniel Brodie, MD  
President-Elect



Peta Alexander, MBBS  
Treasurer



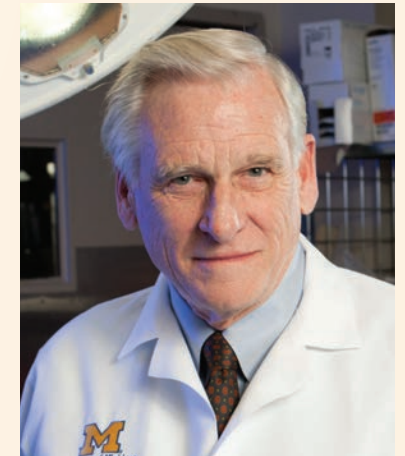
Graeme MacLaren, MBBS  
Global Representative



Elizabeth Maringer, JD  
Director



Jay Shiland, JD  
Director



Robert Bartlett, MD  
Founder, Emeritus Director

# ELSO GLOBAL CHAPTER LEADERSHIP



John Fraser, MBChB, PhD  
AP ELSO Chair



Nicholas Barrett, MD  
EURO ELSO Chair



Rene D. Gomez, MD  
LA ELSO Chair



Poonam Kapoor, MD  
SWAAC ELSO Chair



# ELSO STEERING COMMITTEE



Cara Agerstrand, MD  
Conference



Jenelle Badulak, MD  
Membership



Ryan Barbaro, MD  
Registry



Desiree Bonadonna, CCP  
Perfusion Liaison



Eddy Fan, MD  
Research



Jonathan Haft, MD  
Technology



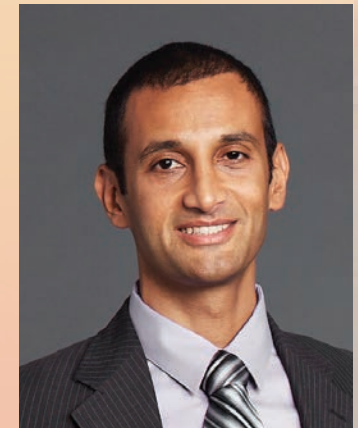
Rob Hyslop, RN  
Coordinator Liaison



Bradley Kuch, RRT  
RT Liaison



Lakshmi Raman, MD  
Publications



Bishoy Zachary, MD  
Education

Not pictured: Tracy Morison, RN, Quality

# Strategic Advisory Council



ELSO's Strategic Advisory Council met for the first time preceding the Annual Meeting in 2022. These senior ECMO leaders and industry-adjacent professionals are an advisory council to the ELSO Board of Directors. They represent an important mix of experience from clinical practice, research, regulatory environments, health systems, and global representation. Each member has been selected for their unique perspective and approach to ECMO practice and ELSO's pursuit of equitable and accessible ECMO care. They will contribute to ELSO's work at the Board's discretion and will gather annually at the ELSO Annual Meeting.

*Pictured, from left to right: Back row - Scott Merz, Steve Manoukian, Jim Fortenberry, Fernando Aguel, Dan Brodie, Matt Paden, Rodrigo Diaz, Jay Shiland; Front row - Graeme MacLaren, Thomas Mueller, Christine Stead, Robert Bartlett, Pearl O'Rourke, Jayne Sheldrake, and Gail Annich*

# ELSO TEAM



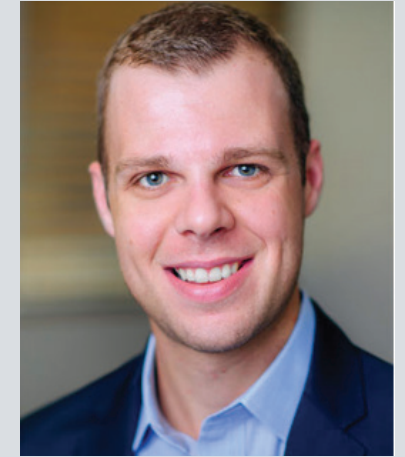
Kennethia Banks, BS  
Operations Manager



Phil Boonstra, PhD  
Biostatistician



Elaine Cooley, RN, MS  
Clinical Program Manager



Alex Fox, MHSA  
Project Manager



Velia Antonini, CCP, MS  
Social Media Lead



Elizabeth Moore, RN, MBA  
Education Director



Peter Rycus, MPH  
Executive Director



Christine Stead, MHSA  
CEO



# Letter from the CEO



Dear ELSO Community,

'Advancing Knowledge' was, indeed, much of the story of 2022. ELSO's community came together to establish a global standard in ECMO education for the first time. How we did this reflects our commitment to reaching all teams around the world. The courses and exam are available everywhere, a need inspired by the pandemic. The team that developed ELSO Foundations - Adult, and the ELSO Certification Exam for the Adult Practitioner represented every chapter, with over 100 experts contributing.

Endorsed courses are another commitment from ELSO to enable high quality ECMO education available at a center near every team, eventually.

In 2022, the ELSO Red Book 6th Edition was released. This edition is our most diverse set of authors yet and represents the very latest thinking in ECLS, with over 230 experts included.

More peer-reviewed publications from ELSO registry data and ECLS-related papers were published in 2022 than ever; perhaps a record to be broken in 2023?

We were able to share knowledge in person for the first time in two years. EuroELSO and LATAM ELSO held congresses in Lisbon and Lima, respectively. SWAAC ELSO held a hybrid event in Riyadh. ELSO was able to gather our global community in Boston, our largest gathering yet.

Together, we keep each other engaged, supported, informed, and advance knowledge so that each and every patient has the benefit of the latest thinking with a highly qualified, capable team. Thanks to all of you, this vision is more possible today than ever.

Let's continue advancing knowledge together on behalf of each and every person that could benefit from ECLS, so that they may with increasingly better outcomes.

To what is possible together,  
Christine Stead, CEO

