American Stroke Association.
A division of the American Heart Association.

International Stroke Conference 2024

American Heart Association. 100 YEARS Bold Hearts

ISC News

DAY 2
Thursday
February 8, 2024


Brown


Wu

Powerhouses open #ISC24

Nancy Brown, CEO of the American Heart Association, welcomed the standing room only crowd of #ISC24 attendees to the opening session and first official day of #ISC24. She highlighted the many accomplishments of the AHA as well as introduced the Ralph L. Sacco Scholarships in Brain Health. AHA President Joseph C. Wu, MD, PhD, FAHA, spoke about his passion for embryonic cells, adult stem cells and IPS cells, saying we must "work hard, work smart and work together." He encouraged everyone to share resources to help advance our own efforts, the health of our patients and our collective future. ISC24 Chair Tudor Jovin, MD, FAHA, and Co-Chair Lauren H. Sansing, MD, MS, FAHA, highlighted this week's exciting ISC24 events and introduced the day's Late-Breaking Science. (See related Late-Breaking Science story on page 4.) Steven J. Warach, MD, PhD, Dell Medical School, University of Texas at Austin, delivered the David G. Sherman Lecture: Improving Stroke Diagnosis and Treatment: A Journey Toward the End of Time.

See Late-Breaking Science on page 4.


Sansing


Jovin


Warach

Jumpstarting stroke recovery

New brain stimulation techniques yield positive outcomes


Paik

UPCOMING SESSION

Brain Stimulation for Stroke Recovery
7:30-9 a.m.
Thursday, Feb. 8
Main Event Hall, Halls 1-3

Newer, promising brain stimulation techniques for stroke motor recovery are bringing light to the darkness experienced by a stroke diagnosis, according to panelists for the Brain Stimulation for Stroke Recovery session.

During Thursday's morning session, experts will explore methods to address the commonalities and differences across the spectrum of care.

One notable recent achievement is the FDA approval of vagus nerve stimulation for promoting motor recovery in chronic stroke patients. That technique, as well as transcranial direct current stimulation, repetitive transcranial magnetic stimulation, deep brain stimulation and epidural spinal stimulation, will generate a robust discussion and promise.

"This session represents a significant platform for stroke neurologists to engage with the latest scientific developments in neurostimulation and their potential impact on the future of stroke rehabilitation," said Nam-Jong Paik, MD, PhD, professor of rehabilitation medicine at Seoul National University in Seoul, South Korea, who will moderate the session.

Advanced brain and nerve

see **BRAIN STIMULATION**, page 13

INSIDE

VIEW PHOTOS FROM #ISC24

See photos of your colleagues and friends at ISC 2024 in Phoenix.

Bench to bedside review

Session explores neurovascular coupling, preeclampsia and more

Bench to bedside success is reason to celebrate.

Yet, translating bench advances to bedside victories and improvement in clinical outcomes remains a challenge. That's the focus of Thursday's session, From Bench to Bedside and Beyond: Cerebral Microcirculation and Neurovascular Coupling.

The session will explore multiple bench-to-bedside topics, including cerebral microcirculation and neurovascular coupling.

"Standardization of preclinical experimental approaches should facilitate translation of bench knowledge to bedside wins, and mechanistically targeted antithrombotic approaches are emerging therapies," said Opeolu Adeoye, MD, MS, professor of emergency medicine at Washington University School of Medicine in St. Louis, Missouri and a session panelist. Marilyn J. Cipolla, PhD, FAHA, professor of Neurological Sciences at the University of Vermont Larner College of Medicine in Burlington, is also among the session panelists. She will address microvascular damage in the brain during and after preeclampsia, a serious hypertensive condition during pregnancy.

"This type of damage can lead to stroke and seizure (called eclampsia) in preeclamptic women during pregnancy," Dr. Cipolla said. "This condition is not just about during pregnancy. Women who had preeclampsia are at higher risk of cardiovascular disease later in life, including stroke and myocardial infarction. In addition, women with prior preeclampsia are at risk of early-onset cognitive decline that is likely due to brain microvascular dysfunction."

Dr. Cipolla's research uses an animal model of preeclampsia that has cognitive impairment postpartum, similar to women with prior preeclampsia.


Adeoye


Cipolla

"We have found that the arterioles that supply the hippocampus, a brain region critical for memory and cognition, are smaller and stiffer than arterioles from normal pregnant animals," she said. "In addition, the normal hyperemic response to seizure is impaired in the hippocampus in this model, likely due the arterioles that are smaller and stiffer. The lack of an increase in blood flow to the hippocampus during seizure could lead to damage and cognitive impairment after preeclampsia."

Other session topics and panelists include:

- Microvascular Structure and Function in Development and Disease | Stephanie Bonney, PhD, Seattle Children's Research Institute
- Neurovascular Coupling in Vascular Cognitive Impairment | Costantino Iadecola, MD, Weill Cornell Medical College
- Non-Invasive Monitoring of Microcirculation in Patients | Christopher G. Favilla, MD, University of Pennsylvania
- Adjunctive Thrombolysis to Treat Microcirculatory Occlusions | Angel Chamorro, MD, Hospital Clinic
- Philip M. Bath, MBBS, University of Nottingham, and Bharti Manwani, MD, UT Health Science Center, will serve as moderators. ●

UPCOMING SESSION

From Bench to Bedside and Beyond: Cerebral Microcirculation and Neurovascular Coupling
3:30-5:45 p.m.
Thursday, Feb. 8
North 122 A-C

Breakthrough stroke in atrial fibrillation

Calculating thromboembolic risk and release of atrial fibrillation guidelines

Great tools make for great care and outcomes.

As such, the American Stroke Association is providing clinicians the newest guidelines to manage and treat atrial fibrillation (AFib) with extra support from a thromboembolic risk calculator that makes its debut during ISC 2024.

Panelists on Wednesday afternoon discussed the guidelines and risk calculator during the session, Breakthrough Stroke in Atrial Fibrillation.

Statistics indicate the prevalence and incidence of AFib is increasing and projected to double between 2010 and 2030. The lifetime risk is currently 30%-40% in white people, 20% in Black people and 15% in Chinese people in the United States.

AFib accounted for $28.4 billion in health care spending in 2016 alone, with the condition responsible for a two-fold risk of death, a slightly more than two-fold risk of stroke, a one-and-a-half-time risk of dementia and a five-fold risk of heart failure.


Yaghi

"While anticoagulation lowers the risk of stroke in patients with AFib, breakthrough strokes can still occur," said Shadi Yaghi, MD, associate professor of neurology at Brown University Biology and Medicine in Providence, Rhode Island and session moderator. During this session, speakers covered the management of patients with stroke despite anticoagulation in terms of acute treatment and secondary prevention.

Much of the session was dedicated to reviewing the AHA's 2023 Guideline for the Diagnosis and Management of Atrial Fibrillation. Of note, the guideline emphasizes managing lifestyle and risk factors as a primary, preventive strategy for AFib.

"These guidelines are a very helpful and a timely tool for physicians caring for patients with AFib," Dr. Yaghi said. "It is great to see that they stress the importance of lifestyle changes, where mounting data suggests that controlling factors such as obesity and reducing alcohol risk may help lower the AFib burden — an important risk factor for stroke in patients with AFib.

"The guidelines also address several issues such as risk stratifying patients with low to moderate risk and consideration of left atrial appendage (LAA) occlusion where bleeding risk obviates anticoagulation and address the issue of device-detected occult atrial fibrillation."

Co-moderator Luciano A. Sposato, MD, MBA, FRCPC, professor of neurology at Western University in London, Ontario, Canada, also noted what he believes to be the biggest takeaways from the AHA's 2023 Guideline for the Diagnosis and Management of Atrial Fibrillation.


Sposato

"There are two additional aspects of the new guidelines that I would highlight because of their potential impact: the importance of recognizing the AFib burden as a strong risk modifier of stroke risk and the new recommendations for early rhythm control," said Dr. Sposato, noting current evidence of pathophysiological mechanisms of breakthrough strokes and how to approach these patients from a diagnostic and stroke workup perspective.

In most patients who have AFib

see **BREAKTHROUGH**, page 13

Glymphatic brain clearance

The path to reducing small vessel disease

Thursday's session, Glymphatic Brain Clearance and Small Vessel Disease, will spotlight recent developments in the field as well as the expertise of multiple researchers who have studied methodological approaches to glymphatic brain clearance in rodents and humans.


Van Nostrand

Clearing a "path" — the body's glymphatic system — may lower the risk of brain diseases, potentially including Alzheimer's disease and cerebral amyloid angiopathy.

But when the "path" is impaired by metabolic waste-filled fluid, it impedes the well-orchestrated network of perivascular compartments and their adjoining vascular and parenchymal tissue components.

"The glymphatic system has emerged as a key pathway for clearance of potentially toxic substances from the interstitial fluid of the brain and an important interface between cerebrovascular function and brain health," said Steven M. Greenberg, MD, PhD, FAHA, professor of neurology at Harvard Medical School in Boston, Massachusetts and session moderator.

"A large body of studies of the glymphatic system in rodent models is now beginning to be translated to humans with the potential for gaining insights into how diseases of the cerebral small vessels affect clearance of disease-causing molecules like β-amyloid from the brain."

Failure to clear these disease-causing molecules from the brain can worsen small vessel function, creating a pathogenic feedback loop (small vessel disease worsens clearance, which worsens small vessel disease), Dr. Greenberg said.

One emerging insight in the study of small vessel disease is the concept that slow oscillations (at frequencies around 0.1 Hz) of cerebral blood vessels termed "vasomotion" may play a key role in glymphatic clearance, said William Van Nostrand, PhD, professor of neuroscience at the George & Anne Ryan Institute for Neuroscience at the University of Rhode Island in Kingston. Vasomotion appears to be impaired by cerebral small vessel disease, creating a link between small vessel disease and brain clearance.

One tool for predicting or detecting glymphatic flow dysfunction, Dr. Van Nostrand said, is the emerging ability of MRI to detect impaired glymphatic clearance in rodent models. It provides

see **GLYMPHATIC**, page 12

UPCOMING SESSION

Glymphatic Brain Clearance and Small Vessel Disease
9:15-10:45 a.m.
Thursday, Feb. 8
North 121 A-C

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Three Late-Breaking Science abstracts presented at the #ISC24 Opening Session

Late-Breaking Science presented during the #ISC24 Opening Main Event on Wednesday revealed that:

- Ischemic stroke thrombectomy patients have less early neurologic deterioration prior to clot extraction with head down versus elevated head positioning.
- RESILIENT-Extend showed thrombectomy benefit without advanced imaging versus best medical management.
- MOST showed no benefit from adjunctive anticoagulation or antiplatelet treatment after thrombolysis.

Head down versus elevated head positioning

"Ischemic stroke patients who are candidates for thrombectomy should be positioned with the head flat, at zero degrees, to improve cerebral perfusion and reduce early neurologic deterioration (END) during transport and while waiting for thrombectomy," said Anne W. Alexandrov, PhD, AGACNP-BC, ANVP-BC, FAAN, professor of nursing and of neurology at the University of Tennessee Health Science Center.

Alexandrov

Practitioners have traditionally elevated the head of the bed by approximately 30 degrees in all types of stroke patients.

"Putting the head down at zero degrees increases the cerebral blood flow by 20%," Dr. Alexandrov continued. "The longer these patients sit up at 30 degrees with a large vessel occlusion, the worse stroke symptoms get before thrombectomy. Maintaining the head at zero degrees until thrombectomy stabilizes blood flow and minimizes neurologic deterioration compared to 30 degrees."

Dr. Alexandrov presented the initial results of Zero Degree Head Positioning in Hyperacute Large Artery Ischemic Stroke (ZODIAC), the largest randomized trial exploration of head positioning in acute ischemic stroke thrombectomy candidates to date. Researchers randomized 92 patients across 12 U.S. hospitals newly diagnosed with large vessel occlusion to zero-degree head positioning or the usual 30-degree head elevation until initiation of thrombectomy.

The primary endpoint was END based on the National Institute of Health Stroke Scale (NIHSS) measured every 10 minutes from initiation of positioning until initiation of thrombectomy, or 2 hours, whichever came first. Secondary endpoints included NIHSS at 24 hours, 7 days, and 90 days post-thrombectomy.

Head-down positioning is a method to maximize blood flow and stabilize patient condition until definitive treatment begins following a large vessel occlusion, Dr. Alexandrov said. ZODIAC showed that END can begin within minutes of head-up positioning in large vessel occlusion thrombectomy candidates and is typically seen within 20-30 minutes. Transportation time and transfer to appropriate stroke treatment centers can delay treatment by several hours, contributing to END if the head is positioned at 30 degrees before definitive treatment can begin. The trial was halted early due to efficacy at a second planned interim analysis.

Thrombectomy imparts such a tremendous effect on patient improvement that investigators expected to find no difference in their exploratory post-thrombectomy endpoints. They were surprised to find that patients in the zero-degree group had significantly improved NIHSS scores at 24 hours and again at discharge/7 days after thrombectomy compared to the 30-degree head elevation group. There was no difference in NIHSS at 90 days.

"This is a remarkable difference, less early disability and faster recovery, just from keeping the head down instead of elevated," Dr. Alexandrov said. "We expect that this may translate into less time and money spent on rehabilitation. Our work suggests that zero-degree head positioning in the pre-thrombectomy phase should become standard of care from the moment a large vessel occlusion with salvageable brain is diagnosed. While this is important for all thrombectomy candidates, it is especially important for those requiring transfer/transport to a higher level-of-care hospital."

Ouriques Martins (left), and Nogueira

Mechanical thrombectomy better than best medical therapy with NCCT/CTA assessment

Mechanical thrombectomy (MT) is more effective than medical therapy alone to treat ischemic stroke due to large vessel occlusion in limited resource settings with little or no access to MRI. Based on CT and/or CT angiography imaging to confirm large vessel occlusion, MT performed up to 24 hours after last known well has an adjusted odds ratio of 2.56 (95% CI 1.24-5.29, p=0,012) for functional independence at 90 days compared to best medical therapy.

"The lack of advanced imaging capabilities should not be a reason not to perform MT," said Raul G. Nogueira, MD, FAHA, FSVIN, director of the University of Pittsburgh Medical Center Stroke Institute, endowed professor and chief of cerebrovascular medicine, and professor of neurology and neurosurgery, University of Pittsburgh School of Medicine.

There is overwhelming evidence for the benefit of MT for the treatment of large vessel occlusion strokes up to 24 hours after an index event. Most MT studies were conducted in high-income countries using MRI assessment.

"We need to show that MT can be extended to the 80% of the global population in middle- and low-income countries that do not have access to advanced imaging," said Sheila Martins, MD, PhD, professor of neurology at the Universidad Federal do Rio Grande do Sul, and president of the World Stroke Organization.

The Randomization of Endovascular Treatment with Stent-retriever and/or Thromboaspiration versus Best Medical Therapy in Acute ischemic Stroke due to Large Vessel Occlusion Trial in the Extended Time Window (RESILIENT-Extend) trial comparted MT using non-contract CT/CT angiography selection.

The primary outcome was a shift analysis of modified Rankin Scale (mRS) scores at 90 days. Secondary endpoints included functional independence, mRS≤2, at 90 days and successful vessel recanalization. Safety endpoints included 90-day mortality and clinically significant intracerebral hemorrhage rates at 24 hours and procedural-related complications.

A total of 245 patients were randomized to MT + best medical management (126) or best medical management alone (119) 8-12 hours from time last seen well across 12 public health centers in Brazil. Patients were in their mid-60s and just under half were female. The median NIHSS score at baseline was 16 and median ASPECTS was 7-8. More than 90% of

patients had NCCT/CTA imaging at baseline.

The proportional odds assumption was violated, obscuring the primary outcome, Dr. Nogueira reported. Significantly more MT patients showed functional independence at 90 days versus medical management, 25.4% versus 14.3%. There appeared to be an interaction between treatment and age with patients >68 years showing no benefit.

The number needed to treat for one additional independent outcome was 9, and there was no significant difference in symptomatic intracranial hemorrhage between the two groups.

No benefit from adding argatroban or eptifibatide to thrombolysis

The Multi-arm Optimization of Stroke Thrombolysis (MOST) trial comparing adjunctive treatment with argatroban, eptifibatide or placebo following endovascular thrombolysis for the treatment of ischemic stroke did not improve functional outcomes at 90 days. The mean utility-weighted modified Rankin score (mRS) was 6.8 for thrombolysis + placebo, 5.2 for thrombolysis + argatroban, and 6.3 for thrombolysis + eptifibatide 90 days after treatment.

"The addition of IV eptifibatide or IV argatroban to standard thrombolytic therapy did not significantly increase symptomatic intracranial hemorrhage not did it provide added benefit following thrombolysis," said Andrew Barreto, MD, MS, FAHA, associate professor of neurology at McGovern Medical School, The University of Texas Health Science Center.

Patients in the placebo group did better numerically than the intervention patients in terms of mean utility medicine scores, but there was no statistically significant difference between the groups.

"From all indications, it does not appear as though we had increased levels of harm with these adjunct treatments," said Opeolu Adeoye, MD, MS, BJC HealthCare Distinguished Professor and chair of Emergency Medicine at Washington University School of Medicine. "But these two drugs should not be given following thrombolysis, because they don't seem to show any benefit."

The phase 3 MOST trial followed early-stage trials suggesting that both argatroban, an anticoagulant, and

Adeoye (left), and Barreto (right)

eptifibatide, an anti-platelet agent, are safe when given following intravenous thrombolysis and could improve outcomes following ischemic stroke by enhancing thrombolysis. The adaptive trial was conducted at 57 sites in the United States. A total of 514 ischemic stroke patients were randomized to argatroban (59), eptifibatide (228) or placebo (227) given within 75 minutes of thrombolysis.

All patients received IV thrombolysis, and 44% also received endovascular thrombectomy as standard of care.

The primary outcome was the mean utility-weighted mRS at 90 days, the primary safety outcome was symptomatic intracranial hemorrhage.

There was no significant difference in mean utility-weighted mRS at 90 days. The posterior probability that argatroban was better than placebo was 0.002 (utility-weighted mRS posterior mean difference -1.5, posterior SD=0.5). The posterior probability that eptifibatide was better than placebo was 0.009 (mean difference -0.5, posterior SD=0.3).

There was no significant difference in rates of symptomatic bleeding, 3.7% for argatroban, 3.3% for eptifibatide and 1.8% for placebo.

There was an unexplained number of deaths in the argatroban arm in the first 150 patients treated, Dr. Adeoye noted. The independent safety monitor did not relate any of the argatroban deaths to treatment, but the adaptive trial design favored eptifibatide and placebo in the remaining patients, accounting for the lower number of patients treated with argatroban.

"Much to our surprise, these two drugs were decisively futile," Dr. Adeoye said. "Neither argatroban nor eptifibatide, at least when given intravenously and systemically after thrombolysis, seemed to benefit patients any more than thrombolysis alone." •

Late-Breaking Science

MAIN EVENT | THURSDAY, FEB. 8
11 a.m.-12:30 p.m. MT

- Intravenous Tirofiban Reduces Early Neurological Deterioration in Acute Ischemic Stroke: The Trend Randomized Controlled Clinical Trial
- Uric Acid Supplementation Provides Cerebroprotection Across Different Animal Species, Sex, Age and Comorbidities: A Report From the Stroke Preclinical Assessment Network (SPAN)
- Rescue on Reperfusion Damage in Cerebral Infarction by Nelonemdaz: A Phase 3 Trial
- Effect of an Artificial Intelligence-Based Clinical Decision Support System on Stroke Care Quality and Outcomes in Patients With Acute Ischemic Stroke (Golden Bridge II): A Cluster-Randomized Clinical Trial

CLOSING MAIN EVENT | FRIDAY, FEB. 9
11 a.m.-1:30 p.m. MT

- The EMBOLISE Study: Embolization of the Middle Meningeal Artery With OnyxTM Liquid Embolic System in the Treatment of Subacute and Chronic Subdural Hematoma
- The MAGIC-MT Trial: Managing Non-Acute Subdural Hematoma Using Liquid Materials: A Chinese Randomized Trial of Middle Meningeal Artery Treatment
- Antithrombotic Treatment for Stroke Prevention in Cervical Artery Dissection: The STOP-CAD Study
- STEM (The Squid Trial for the Embolization of the MMA for the Treatment of CSDH)
- Delayed Therapy With Humanized Anti-Sdc2 mAb Prevents Formation of Vasogenic Edema and Promotes Neuroprotection in Non-Human Primates With Ischemic Stroke
- Tenecteplase Thrombolysis for Stroke Up to 24 Hours After Onset With Perfusion Imaging Selection: The CHABLIS-T II Randomized Clinical Trial
- Machine Learning Algorithms for Autonomous Detection of Stroke Symptoms and Bell's Palsy
- Reteplase Treating Patients With Acute Ischemic Stroke (RAISE): A Phase 3, Multicenter, Open-Label, Randomized Controlled, Non-Inferiority Trial
- Dual Antiplatelet Therapy and Immediate Intensive Statin in Mild Ischemic Stroke or Transient Ischemic Attack: The INSPIRES Randomized Clinical Trial
- Long-Term Outcomes and EVT Treatment Effect From Randomized Controlled Trial of Endovascular Thrombectomy for Large Ischemic Strokes: SELECT2

Inside the AHA's research enterprise

AHA funding opportunities are plentiful

Good ideas and solid research need not sit idle.

The American Heart Association has been seeking and funding basic and clinical research since the late 1940s. And yours could be next.

Glenn Dillon, PhD, vice president of the AHA's research and grants administration, will share a history of successes and a future for new researchers — at any career stage — during Thursday's session, Inside the AHA's Research Enterprise: Grant Funding and Other Opportunities.

The AHA is the largest nonprofit, non-governmental funder of cardiovascular and cerebrovascular research in the U.S. Since 1949, the organization has issued $5.7 billion in grants.

"The AHA's mission is to be a relentless force for a world of longer, healthier lives," Dr. Dillon said. "We have expanded our focus over the years to broaden our emphasis in health and wellness, including information science, artificial intelligence and machine learning. We're not just funding basic science, heart disease and stroke. There are a lot of topics that align with our vision."

> "We focus on diverse groups and assure opportunities are strong for everybody. In recent years, we have supported larger scale, strategic programs to enhance diversity."
>
> **–Glenn Dillon, PhD**

Many of the AHA's research programs are offered annually and others are one-time grants. Some programs require pre-proposals, with full proposals by invitation only. In its nearly 100-year history, the AHA has helped launch the careers of 15 Nobel Laureates as well as thousands of investigators.

Dillon

Over the years, the association has broadened its reach beyond academic and health professionals to include engineers, psychologists, computer scientists and more. Research grants support clinical, translational, population, behavioral and basic science.

The AHA continues to expand research in health equity, social determinants of health and structural racism as well as all research across the lifespan. The organization also encourages applications by women, those from groups under-represented in research and those with non-traditional career trajectories.

"We focus on diverse groups and assure opportunities are strong for everybody," Dr. Dillon said. "In recent years, we have supported larger scale, strategic programs to enhance diversity. One example is the Strategically Focused Research Network on diversity in clinical trials.

"There's such a lack of diversity in clinical trial participants. The medical community has not done a good job of enrolling and retaining subjects who look like their community. So, the AHA is funding this large-scale initiative that enables groups of investigators conducting multiple projects in multiple locations to test novel ideas that can improve diversity of clinical trial participants. This is desperately needed to make sure new treatments are effective across a broader segment of our communities."

Funding an annual average of 800 grants, totaling $170 million, Dr. Dillon said the association's return on investment has been strong. In recent analysis, every dollar the association invests in early career investigators translates into nearly eight times more in new funding from the National Institutes of Health and other grant sources.

Dr. Dillon also reminds hopeful participants of what can be achieved by taking a brief look at history. For example, to fully appreciate what happened four to five decades ago, he points to the first drugs to lower blood pressure via a landmark study that showed high blood pressure can decrease life expectancy.

Similarly, the first successful artificial heart valve replacement and pioneering advancements in microsurgery occurred during this time. These advances led to today's minimally invasive procedure that ends a heart attack by inserting stents to clear a blocked coronary artery and a similar procedure that ends a stroke by plucking a blood clot from inside the brain.

Regarding the types of research the AHA funds, Dr. Dillon said, "A big misperception people have is that we fund only the topics we're interested in, by issuing Requests for Applications (RFAs) for proposals in specific areas. And although the AHA does issue many topic-specific RFAs, most of what we fund is investigator-initiated.

"Whatever great idea you have, send it to us. It will get peer reviewed by a panel of experts. Those applications that are assessed to be strongest will get funding."

Dr. Dillon also emphasized that the AHA has funding opportunities for investigators regardless of their experience level.

"I encourage investigators at every career stage to submit their ideas to the AHA," he said.

Last year, the AHA received almost 4,000 applications, he said. Varying by program, on average the association funds approximately 25% of those.

Dr. Dillon also encourages investigators to look beyond research grants to service opportunities, including volunteering as peer reviewers or on one of the many committees.

"Serving as a peer reviewer, for example, is a great opportunity to network, and it can help you learn how to strengthen applications for your own grants as well," he said. •

UPCOMING SESSION

Inside the AHA's Research Enterprise: Grant Funding and Other Opportunities
4:45-5:45 p.m.
Thursday, Feb. 8
North 120 D Ballroom

12 Essential Elements for Research

The AHA Research Program is guided by 12 Essential Elements, developed by a broad group of key stakeholders, including science volunteers, and approved by the AHA Board of Directors:

1. Develop innovative research models that integrate AHA research values and fund highly meritorious or "best" research.
2. Fund both investigator-initiated and strategically focused research, including implementation research.
3. Support all areas of cardiovascular, cerebrovascular and brain health research, with a focus on overall health and well-being across the lifespan that drives to the AHA's 2024 goal and overall mission.
4. Identify key questions that, if answered, could provide extraordinary impact in science and toward mission.
5. Ensure a focus on diverse populations in both the makeup of the investigators we support and the participant populations of AHA-funded research.
6. Provide programs that support the pursuit of the research in question and facilitate the expansion of investigator skills.
7. Focus on funding outstanding individuals, not just projects.
8. Clearly define and report research and translationally oriented outcomes to all stakeholders.
9. Ensure that best practices are used for all governance and operational practice.
10. Ensure that all stakeholders — researchers, donors and other volunteers — are involved as appropriate in research activities.
11. Fund research that could provide a return on investment to be funneled back to fund additional future research.
12. Expand collaboration to leverage research dollars and outcomes.

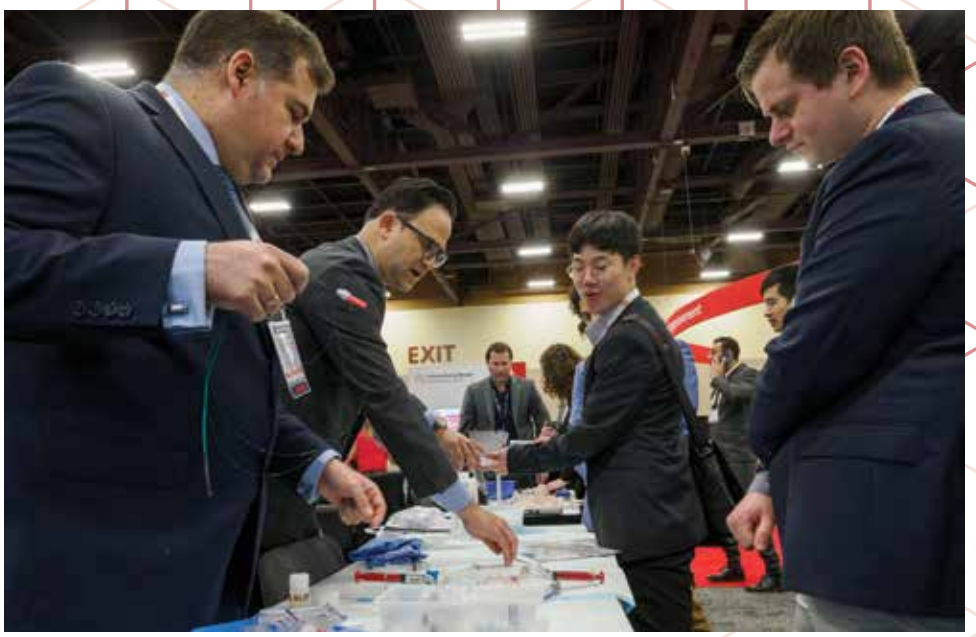
Experiential learning
in the Simulation Zone


Tjoumakaris


Zaidat

This year's Simulation Zone is bigger and better, offering hands-on, experiential learning focused on simulated procedures in ischemic and hemorrhagic stroke using anatomical models. #ISC24 teamed up with United Biologic Inc. and several industry companies to provide two days with expert faculty who are leading a skill-building "playground" where attendees perform life-saving device-based neuro-interventional procedures using anatomical models.

Special thanks to Stav Tjoumakaris, MD, FAANS, FACS, FAHA, and Sam Zaidat, MD, for their generous assistance in identifying expert faculty, champions to facilitate learning experiences for #ISC24 attendees. Be sure to check out the mobile meeting app for Simulation Zone times and participating companies.



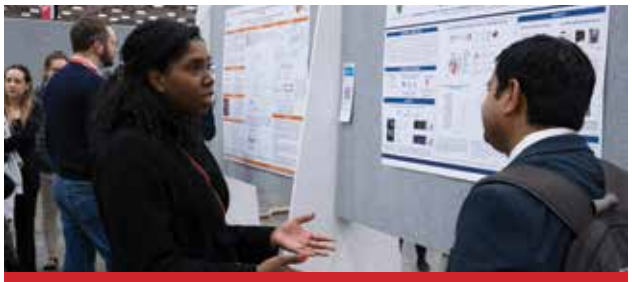
Poster Tours, Sessions continue today

ISC 2024 offers two types of poster sessions: Professor-Led Poster Tours and one-on-one Q&A Regular Poster Sessions.

Choose from **10 Professor-Led Poster Tours 6-7 p.m. today in the Poster Hall, Halls 5-6**. Expert moderators will lead these tours, which are organized by category. They will provide a short presentation and Q&A with each of the poster authors in that section. To take part, simply view the Thursday Moderated Poster Sessions in the Online Program Planner or on the Mobile Meeting Guide app. Decide which section/category of posters you would like to attend. Then, at 5:55 p.m., arrive at the correspondingly numbered "Section" sign for your selected section/category. Headsets will be available for ease of listening to the presenters.

During the **Regular Poster Sessions**, presenters will be at their posters for informal Q&As with attendees from **7-7:30 p.m. today in the Poster Hall, Halls 5-6**. These one-on-one poster sessions are not a part of the Professor-Led Poster Tours. To see the posters featured in today's Regular Poster Sessions, view the Poster Sessions in the Online Program Planner or on the Mobile Meeting Guide app.

Posters will also be available for viewing 8 a.m.-7:30 p.m. today in the Poster Hall, Halls 5-6.



Poster Hall Hours

8 a.m.-7:30 p.m. | Thursday

Halls 5-6

Professor-Led Poster Tours

6-7 p.m.
Posters TMP1–TMP120

1. Aneurysms and Vascular Malformations and Pediatric Cerebrovascular Disease Moderated Poster Tour
2. Cerebrovascular Systems of Care Moderated Poster Tour II
3. Clinical Rehabilitation and Recovery Moderated Poster Tour
4. Health Services, Quality Improvement and Patient-Centered Outcomes Moderated Poster Tour II
5. Imaging Moderated Poster Tour II
6. In-Hospital Care: From the ICU to Discharge and Large Vessel Disease From Arteries to Veins (Non-Acute Treatment) Moderated Poster Tour
7. Intracerebral Hemorrhage Moderated Poster Tour II
8. Neuroendovascular Moderated Poster Tour II
9. Risk Factors and Prevention Moderated Poster Tour II
10. Translational Basic Science Moderated Poster Tour II

Regular Poster Sessions

7-7:30 p.m.
Posters TP1–TP321

These posters are not included in the 6 p.m. Professor-Led Poster Tour sessions.

- Aneurysms and Vascular Malformations Posters
- Brain Health Posters
- Cerebrovascular Nursing Posters II
- Clinical Rehabilitation and Recovery Posters
- Health Services, Quality Improvement and Patient-Centered Outcomes Posters II
- Imaging Posters II
- Intracerebral Hemorrhage Posters II
- Large Vessel Disease from Arteries to Veins (Non-Acute Treatment) Posters
- Neuroendovascular Posters II
- Risk Factors and Prevention Posters II
- Translational Basic Science Posters II
- Ongoing Clinical Trials Posters (CTP1 – CTP41)

Abstract categories: Thursday

- Acute Treatment: Systemic Thrombolysis and Cerebroprotection
- Advanced Practice Providers and Therapists
- Aneurysms and Vascular Malformations
- Brain Health
- Cerebrovascular Nursing
- Cerebrovascular Systems of Care
- Clinical Rehabilitation and Recovery
- Health Services, Quality Improvement and Patient-Centered Outcomes
- Imaging
- In-Hospital Care: From the ICU to Discharge
- Intracerebral Hemorrhage
- Large Vessel Disease From Arteries to Veins (Non-Acute Treatment)
- Neuroendovascular
- Pediatric Cerebrovascular Disease
- Risk Factors and Prevention
- Translational Basic Science
- Ongoing Clinical Trials

International Stroke Conference 2024

American Stroke Association
A division of the American Heart Association.

Visit **HeadQuarters** in Booth 337

AHA Center for Telehealth™
Evidence suggests that telehealth can make health care more effective, accessible and efficient, particularly for those who otherwise lack access to quality health care. Our premium eLearning courses and certification programs, including upcoming Telestroke offerings, offer health care professionals standardized telehealth training and prepare them to deliver optimal virtual care. The AHA Center for Telehealth leads connected care, keeping people at the center. **Heart.org/telehealth**.

AHA Research Grants
The AHA currently funds more than 1,700 projects across the U.S. In FY 2022-23,the AHA invested $178 million to fund 868 new proposals. The AHA has invested over $5.7 billion in research since 1949. Discover funding opportunities and more at **professional.heart.org/research**.

American Stroke Association
Stroke is the No. 2 cause of death worldwide and a leading cause of disability. The American Stroke Association is a relentless force for a healthier world with fewer strokes. We team with millions of volunteers to prevent, treat and beat stroke by funding innovative research, fighting for stronger public health policies and providing lifesaving tools and information at **stroke.org**. **Pick up free resources.**

Emergency Cardiovascular Care
Learn about our new Advanced Stroke Life Support® (ASLS) Blended Learning Course co-developed with The University of Miami Gordon Center for Simulation and Innovation in Medical Education. The course educates in-hospital and prehospital health care professionals to identify, evaluate and manage patients with stroke. Stop by the ASLS kiosk to learn more today! **Heart.org/ASLS**.

Lifelong Learning
With access to world renowned researchers and clinicians, AHA Lifelong Learning is the global leader in continuing education for health care professionals. To explore our library of stroke continuing education activities and more, visit **learn.heart.org**.

Patient Health
Preview the latest educational resources for professionals and your patients in the areas of emotional support, atrial fibrillation, hypertension and more. Encourage your patients and their family members to join the Support Network at **stroke.org/supportnetwork** to connect with other patients, share experiences and help others on their health journeys.

Professional Membership
Learn how the AHA/ASA Professional Membership can advance and enhance your career. Benefit from networking with experts, journal resources, online courses, research funding, advocacy, discounts to scientific meetings and more. Membership is valuable at every stage of your career. **Join or renew at the Membership Booth in HeadQuarters and receive a thank-you gift (while supplies last).**

Scientific Journals
Immediate impact. Global influence.
When you visit **AHAjournals.org**, you'll engage in the latest content from the 14 AHA scientific journals and celebrate the AHA's Centennial with a curated collection of articles! Scan the QR code for the AHA Journals' Publishing Guide and Overview. For AHA's scientific statements and clinical practice guidelines, visit **professional.heart.org/statements**. **Giveaways while supplies last.**

SCAN ME

Global Quality Improvement

AHA International
The American Heart Association is actively working in more than 100 countries and with 200 cardiovascular societies and organizations around the world to educate and inform, implement programs, advocate for policy change and strengthen health care systems to help improve and save lives. Discover more about our international work in stroke center certification and health care quality improvement, advocacy and science advancement. **heart.org/internationalQI**.

Get With The Guidelines®-Stroke and Target: Stroke℠
Get With The Guidelines-Stroke is the American Heart Association's in-hospital quality improvement program focused on improving stroke care by providing medical teams with resources to increase adherence to the latest scientific treatment guidelines. Target: Stroke is a Get With The Guidelines-Stroke initiative that aims to improve acute ischemic stroke care by reducing door-to-treatment times for patients eligible for intravenous thrombolysis and endovascular therapy. **heart.org/gwtgstroke**.

Health Care Certification
People know and trust the American Heart Association. Our collaborative efforts with leading U.S. credentialing bodies and international societies give participating hospitals/facilities/professionals recognition of their achievement of disease specific certifications in stroke, cardiovascular care and wellness/prevention. Stop by to learn how to earn certification so that your community knows your commitment to quality and to their care. Check out our global quality programs at **heart.org/certification**.

Quality Improvement Research
The American Heart Association's suite of Quality Improvement programs promote excellence in prospective and retrospective research. Participating hospitals can enter data for their quality improvement efforts. Additionally, there is the opportunity for scientific research from our National Level Database. The Precision Medicine Platform, the association's cloud-based data analysis platform, offers secure, private workspaces equipped with tools for data analysis, machine learning and artificial intelligence. **heart.org/qualityresearch**.

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Located at the Membership Booth in HeadQuarters, for gifts and Heart items.

American Heart Association. 100 YEARS Bold Hearts

Claim your CE credits

To claim CE credit, access any computer with an internet connection and visit the AHA's Professional Education Hub at **intelligohub.org** and sign in. Click on My Library and select appropriate activity (i.e., International Stroke Conference 2024, Nursing Symposium, etc.) to complete the conference evaluation and claim CE credits. For detailed information and instructions on CE, visit the ISC conference page on Professional Heart Daily, and go to the programming/continuing education page.

For those attending the virtual conference, you will be registered to claim CE credit on the Professional Education Hub within 1-2 business days after the event concludes.

For in-person attendees, credit claim instructions are also available at the Resource Hub and the Lifelong Learning pod of HeadQuarters in the Science & Technology Hall.

All credit MUST be claimed within 6 months. We strongly encourage you to claim within the first 30 days.

All ISC CE credits must be claimed by Aug. 9, 2024. All Nursing Symposium and Pre-Conference Symposia CE credit must be claimed by Aug. 6, 2024.

International Attendees: At this time, we are unable to offer CE credit claim to participants residing outside of the United States. We apologize for this inconvenience.

Scan the QR code for more CE information.

The Science & Technology Hall

The Science & Technology Hall offers nearly 100 exhibiting companies, HeadQuarters, Learning Studios, Innovation Zone, the Simulation Zone and many more learning and networking opportunities.

EXHIBITORS

Access TeleCare 706

Accreditation Commission for Health Care 1144

Aidoc Medical Ltd. 816

Albany Med Health System. . . .1039

Alta Therapeutics 1118

American Association of Neuroscience Nurses (AANN) . . .1140

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DNV 804

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Genentech, A Member of the Roche Group 733

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Get With The Guidelines® VIP Lounge 327

Guangzhou Easycess Medical Co., Ltd 819

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Imago Rehab 609

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NeuraSignal 837

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Viz.ai 649

WallabyPhenox 555

Wellumio 716

Wolters Kluwer. 914

World Stroke Organization 451

Scan the QR code for detailed exhibitor information.

Visit the Science & Technology Hall

Lower Level, Hall 4 | 9 a.m.-5 p.m. | Thursday

Stop by a **Coffee Break** for a free coffee or tea

Exhibitor Service Desk 105

Restaurant 304

Exhibitor Lounge 318

Get With The Guidelines® VIP Lounge 327

HeadQuarters 337

Learn more about AHA/ASA initiatives, education, membership and publications.

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Business Suites

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Penumbra, Inc 415

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Siemens Healthineers 435

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Simulation Zone 455

Brainomix 505

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ENTRANCE
Welcome Moment

Learning Studio I 950

Learn about the latest advances in stroke practices, services and technologies. See today's schedule of events on page 15.

Learning Studio II 1150

Innovation Zone

Booths 605, 609, 704, 706, 708

Includes interactive displays with technologically advanced, immersive training.

Simulation Zone

Booth 455

Features hands-on learning in the categories of ischemic stroke, hemorrhagic stroke, stenting/coiling and acute stroke treatment.

Visit the Charging Lounge in Booth 523 to relax and recharge.

Sponsored by AstraZeneca

GLYMPHATIC

continued from page 3

a foundation for potential translation of MRI-based methods to human studies.

"A recent study from Dr. Benveniste's group (DOI: 10.1038/s43587-022-00181-4) used MRI scanning of rodent models to show that the small vessel disease cerebral amyloid angiopathy impaired glymphatic clearance," Dr. Van Nostrand said.

"Another important advance are large-scale computational methods to make predictions about the effects of small vessel disease on the structure and function of the vascular tree that is required to feed the brain and clear toxic waste products."

Researchers already know that successful glymphatic brain clearance is essential for brain health and the role β-amyloid accumulation plays as an accelerator of Alzheimer's disease and cerebral amyloid angiopathy. β-amyloid is only one example of a broader class of toxic molecules whose accumulation can injure the brain. Other candidate toxic proteins that can accumulate in and around brain vessels include Notch ECD, cystatin C, ABri and basement membrane proteins.

"In light of recent approval of β-amyloid immunotherapies — treatments that enhance clearance of β-amyloid from the brain parenchyma but may also promote its accumulation in cerebral small vessels — the importance of understanding glymphatic clearance and identifying approaches to maintaining its normal function continues to grow," Dr. Greenberg said. •

Photos from #ISC24

BREAKTHROUGH

continued from page 2

and stroke, it is reasonable to initiate anticoagulation as a secondary prevention, Dr. Yaghi said. If contraindicated, it is reasonable to consider LAA occlusion.

In patients with stroke despite anticoagulation, a comprehensive workup is important to look for non-AFib-related causes of stroke in addition to optimizing risk factors and lifestyle changes as an essential tool for secondary prevention, he said.

Dr. Sposato considers several clinical factors when evaluating secondary prevention.

"In my view, the most relevant and impactful, emerging concept in the last decade for stroke patients with device detected AFib after stroke occurrence is the need for a personalized approach based on the interplay of multiple factors known to influence embolic risk," Dr. Sposato said. These factors include biomarkers such as atrial natriuretic peptides, atrial size, risk factors, AFib burden and age.

The session also explored the AHA's thromboembolic risk calculator that risk-stratify patients in the low and moderate risk group as well as the use of thrombolysis in patients with acute stroke and AFib receiving direct oral anticoagulants.

"It's something not covered in the guidelines but is perhaps one of the most revolutionary concepts in the last few years," Dr. Sposato said. "Speakers also discussed current evidence based on observational studies and what to expect from ongoing clinical trials and prospective observational studies." •

Follow ISC on X (Twitter)

Use X to post your questions/ comments or talk about what is happening at ISC 2024. Use hashtag: **#ISC24**.

BRAIN STIMULATION

continued from page 1

stimulation techniques represent everything from early-stage laboratory investigations to FDA-approved methods for enhancing motor recovery post-stroke, Dr. Paik said.

Panelists will share insights into the application of non-invasive methodologies, sophisticated, surgery-requiring interventions and their role in augmenting traditional rehabilitation therapies.

"Attention is given to the optimization of stimulation parameters to maximize recovery outcomes, along with an exploration of the underlying neurophysiological mechanisms," Dr. Paik said. "Brain stimulation is a multifaceted tool for improving motor function, speech, cognition and mood post-stroke."

Current pilot studies with small sample sizes will be presented at the session, including a preview of results from larger-scale clinical trials to validate the efficacy of these techniques.

"There's a lack of conclusive data regarding the efficacy of these techniques across different patient demographics, including age, stroke severity and chronicity, while positing their potential effectiveness in patients with residual brain capacity and recovery potential," Dr. Paik said.

Brain stimulation therapies work by altering brain excitability and plasticity, and can potentially enhance recovery outcomes beyond what traditional therapies can achieve, Dr. Paik said. It's considered a revolutionary approach.

"This session emphasizes the necessity for personalized treatment approaches in stroke recovery, recognizing the heterogeneity of stroke pathophysiology and patient-specific factors," Dr. Paik said. "The critical role of ongoing research, including clinical trials, in advancing our understanding and efficacy of these therapies is underscored." •

Stroke Scientific Statements and Guidelines

Recently released stroke-related guidelines and scientific statements will be the focus of discussion during Thursday's session, 2024 Focused Review of Stroke Scientific Sessions and Guidelines. Panelists will explore these Scientific Sessions statements and guidelines, which will also be published in *Stroke*.

1. 2023 Guideline for the Management of Patients With Aneurysmal Subarachnoid Hemorrhage: A Guideline From the American Heart Association/American Stroke Association **https://www.ahajournals.org/doi/10.1161/STR.0000000000000436**
2. The Neurovasculome: Key Roles in Brain Health and Cognitive Impairment: A Scientific Statement From the American Heart Association/American Stroke | A Scientific Statement From the American Heart Association/American Stroke Association **https://www.ahajournals.org/doi/10.1161/STR.0000000000000431**
3. Cognitive Impairment After Ischemic and Hemorrhagic Stroke: A Scientific Statement From the American Heart Association/American Stroke Association **https://www.ahajournals.org/doi/10.1161/STR.0000000000000430**

UPCOMING SESSION

2024 Focused Review of Stroke Scientific Sessions and Guidelines
3:30-4:30 p.m.
Thursday, Feb. 8
Main Event Hall, Halls 1-3

4. Management of Inherited CNS Small Vessel Diseases: The CADASIL Example: A Scientific Statement From the American Heart Association **https://www.ahajournals.org/doi/10.1161/STR.0000000000000444**
5. Treatment and Outcome of Cervical Artery Dissection **https://www.ahajournals.org/doi/10.1161/STR.0000000000000457**
6. Diagnosis and Management of Cerebral Venous Thrombosis: A Scientific Statement From the American Heart Association **https://www.ahajournals.org/doi/10.1161/STR.0000000000000456**
7. Impact of Sleep Disorders and Disturbed Sleep on Brain Health: A Scientific Statement From the American Heart Association **https://www.ahajournals.org/doi/10.1161/STR.0000000000000453**

Submit ISC 2025 award nominations

AHA Members: Submit your nominations for the ISC 2025 Feinberg, Sherman, Willis, Kenton and Sacco Outstanding Stroke Mentor awards.

Nomination Period Opens: Wednesday, March 6, 2024

Nomination Period Closes: Wednesday Aug. 7, 2024

Visit **strokeconference.org/awardsandlectures** for more information.

Call For Science

Submit your science for ISC 2025, Nursing Symposium and HEADS-UP now.

Session Ideas
Suggested Session Submitter Opened: Monday, Feb. 5, 2024
Suggested Session Submitter Closes: Monday, March 11, 2024

Abstracts
Submission Opens: Wednesday, May 29, 2024
Submission Closes: Tuesday, Aug. 20, 2024

Late-Breaking Science and Ongoing Clinical Trials Abstracts

Submission Opens: Wednesday, Oct. 2, 2024
Submission Closes: Wednesday, Oct. 30, 2024

The link to submit abstracts and/or session ideas is at **strokeconference.org** on the applicable date above.

Start planning now for International Stroke Conference 2025, Feb. 5-7, in Los Angeles.

Stroke Central and Learning Studios programming

Thursday, Feb. 8

Stroke Central Programming

9:15–9:50 a.m.
Approaches to Research: Success for the Early Career Researcher
Learning Studio II

10–10:45 a.m.
Practical Approaches to Research Success: Advice on How to Get Started
Learning Studio II

2–3 p.m.
2024 Update on Advancing the Study of Stroke in Women: PROWESS
Learning Studio II

3:30–4:30 p.m.
Unspoken Bias: The Influence of Language and Culture on Stroke Care and Research
Learning Studio II

Learning Studios

9:15–9:45 a.m.
Strengthening the Neurology and Cardiology Connection to Improve Stroke Care
Learning Studio I
Supporter: Medtronic

10–10:30 a.m.
Powering the Extraordinary: Expanding Endovascular Thrombectomy in Emerging Countries
Learning Studio I
Supporter: Medtronic

12:45–1:15 p.m.
(ANDEXXA) Management of FXa Inhibitor-Related Acute Major Bleeding
Learning Studio I
Supporter: AstraZeneca

12:45–1:15 p.m.
Closing the Gap: A Review of Best Practices to Address Racial Disparities in Stroke Care
Learning Studio II
Supporter: Cerenovus

1:30–2 p.m.
Navigating the Evidence Landscape: Recent Developments in AF and Stroke
Learning Studio I
Supporter: Medtronic

2:15–2:45 p.m.
From Burnout to Nirvana: AI Documentation to Streamline Stroke Care
Learning Studio I
Supporter: Sevaro Health, Inc

3:30–5 p.m.
Third Annual NIH Innovation Showcase
Learning Studio I
Supporter: NHLBI & NINDS Showcase

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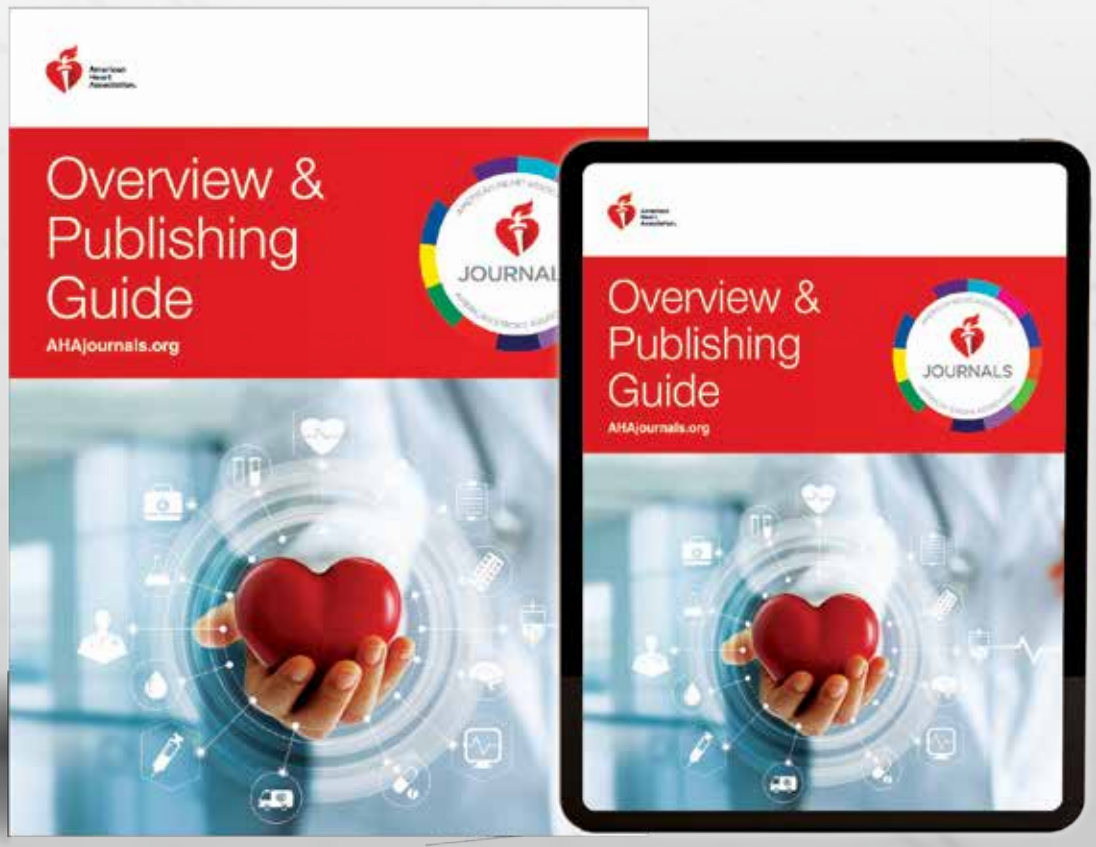

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