The AANEM Foundation has made significant steps toward funding research in neuromuscular medicine. Thanks to our partnership with the Muscular Dystrophy Association (MDA), the AANEM is currently co-funding three studies:

- **LncRNA as therapeutic target for SMA** by Constantin d’Ydewalle, PhD
- **Improving the diagnosis of NM diseases** by Monkol Lek, PhD
- **Motor system connectivity influences in ALS** by Christi Kolarcik, PhD

Read interviews with Drs. Lek and Kolarcik on pages 16-17, and detailed project summaries at www.aanemfoundation.org/Research-Grants/Currently-Funded-Projects.

In addition to the partnership with MDA, the Foundation is funding its own development grants. In 2016, the AANEM received 14 applications. The Foundation Research Committee reviewed six full proposals in December and the Foundation also recently approved a clinical research fellowship in the area of autoimmune neuromuscular disorders.

### Clinical Research Fellowships

For 2017, the AANEM is funding Lisa Williams, MD, for a clinical research fellowship in the neurological application of neurotoxins. A second research fellowship is available in this area for 2018, with Letters of Intent due September 15, 2017. “We are proud of what we have accomplished with the Foundation and want to do more in 2017,” said Shirlyn A. Adkins, AANEM Foundation’s Executive Director, “We would like to expand our clinical research fellowship offering, but right now we don’t have the funds. We hope that the membership will see the need for these and help fund these programs.”

### Funding Commitments

In order to provide long term funding for two to three projects of about $120,000 per year, the AANEM transferred $3 million to the Foundation. “The AANEM is committed to supporting research, as demonstrated by this transfer of money to the Foundation,” said William S. Pease, MD, AANEM President. “This amount, however, only begins this commitment by funding two projects with the MDA and one project through AANEM. There are many more great research ideas that we are unable to fund. Please consider donating to the AANEM Foundation to help us advance neuromuscular medicine through research that will someday lead to improved treatments for our patients.”

The AANEM Foundation is also funding a $245,000 project with the RAND Corporation, “The Value of High Quality Electrodiagnostic Study in Work-Associated Carpal Tunnel Syndrome”. This will be a 2-year project with three aims: 1) To assess the quality of EDX studies for the diagnosis of CTS in the workers’ compensation setting; 2) To examine the relationship between the quality of EDX studies and clinical outcomes for patients with CTS; and 3) To examine the relationship between the quality of EDX studies and the appropriateness and utilization of surgery, total healthcare expenditures for CTS, and duration of temporary disability.

With the focus on quality measures, the AANEM Foundation hopes this project will help establish the basis that quality EDX studies improve outcomes.

### Dr. Peter Grant Appointed to National Physician’s Council for Healthcare Policy

In November of 2016, AANEM member Peter A. Grant, MD, was appointed as a Vice Chair, Physical Medicine, to the National Physician’s Council for Healthcare Policy (NPCHCP).

The NPCHCP is a multispecialty physician group representing a majority of states. Established in 2014, under the leadership of Marcy Zwelling-Aamot, MD, FACEP, and John Gill, MD, and facilitated by Congressman Pete Sessions (R-TX), it was created to be a national voice for the physician engaged in private practice.

The NPCHCP is creating a vision to restore physician autonomy and create a framework where physicians can do their job better in a competitive, transparent marketplace, by focusing each year on two-three very specific opportunities that will enhance productivity in private practice. With the help of Congressman Sessions, the Council works with legislators on legislation or works more directly with regulatory agencies in order to accomplish its goals. (Read more about the NPCHP at http://npchcp.org.)

According to Dr. Grant, the current focus is two-fold:

1) Work to address MACRA/MIPS concerns and other mandates that threaten solo/smaller/rural medical practices; and 2) Promote

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Selected Highlights

ZACHARY SIMMONS, MD, MUSCLE & NERVE EDITOR, PROVIDES AN OVERVIEW OF ARTICLES IN THE FEBRUARY ISSUE.

Safety and Pain in Electrodiagnostic Studies

This review provides a concise and clinically relevant discussion of the literature on pain that may not be well-known to those who perform electrodiagnostic studies. It also provides a comprehensive overview of the key safety issues of infection, bleeding, and electrical complications with which electrodiagnostic physicians should be familiar.

Repetitive Nerve Stimulation Cutoff Values for the Diagnosis of Myasthenia Gravis

The traditional teaching is that a decrement of 10% or more on repetitive stimulation should be used to identify patients with a defect of neuromuscular transmission. This study provides evidence that a cutoff value of 7% to 8% when recording from facial muscles may increase sensitivity without sacrificing specificity.

Peripheral Nerve High-Resolution Ultrasound in Diabetes

Ultrasound is rapidly becoming a standard part of the diagnostic toolbox of neuromuscular physicians. This article adds important information by finding that peripheral nerve cross-sectional area is larger in diabetic than nondiabetic individuals, and that the number of enlarged nerve sites by ultrasound appears to be a good predictor of diabetic polyneuropathy.

Diagnostic Accuracy of Concentric Needle Jitter in Myasthenia: Prospective Study

Concentric needle electrodes are increasingly being used in place of single-fiber electrodes for assessment of jitter in patients with myasthenia gravis. In this study of the orbicularis oculi muscle, the authors found very high sensitivity and specificity for concentric needle jitter analysis in patients with both ocular and generalized myasthenia gravis.

One Clinic’s Experience with Carbon Fiber Orthoses in Neuromuscular Disease

Many neuromuscular physicians have traditionally prescribed custom-molded posterior plastic ankle-foot orthoses (AFOs) for patients with ankle dorsiflexor weakness. Anterior shell carbon-fiber AFOs represent an alternative. This study found that the carbon-fiber devices were associated with a high rate of patient satisfaction for fit, comfort, and performance.

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The protein PIEZO2 functions as a mechanosensory ion channel, and is found in sensory ganglia, sensory endings of the skin (Merkel cells), and muscle spindles where it helps to mediate specific aspects of human touch and proprioception including spatial awareness.

The first study reports on two patients with similar phenotype including fetal movement, hip dysplasia, foot deformities, finger contractures, scoliosis, and delay in gross and fine motor skills. Examination showed marked pseudoathetosis, ataxic gait, profound loss of position and vibration sense, absent reflexes. Both patients had normal strength and were able to walk and write despite their mechanosensory deficits. Mutations in the PIEZO2 gene were identified.

In the second study, 10 patients from four consanguineous families, with homozygous mutations in the PIEZO2 gene were described. Their phenotype included neonatal hypotonia, respiratory insufficiency at birth, delayed motor milestones, short stature, hand and feet deformities, scoliosis, and mild distal sensory involvement.

Comment: These two studies highlight the importance of PIEZO2 in intrauterine and post-natal development. The scoliosis and joint problems of the patients in these studies suggest that PIEZO2 is either directly required for growth and alignment of the skeletal system or that touch and proprioception guide skeletal development.

Evaluation of Freehand High-Resolution 3-Dimensional Ultrasound of the Median Nerve

Conventional 2-dimensional ultrasound is widely used in assessment of the median nerve in patients with suspected carpal tunnel syndrome. The authors of this study found that freehand high-resolution 3-dimensional ultrasound of the median nerve over a distance of 20 cm is feasible and appears to warrant further study.

Repetitive Nerve Stimulation Often Fails to Detect Abnormal Decrement in Acute Severe Generalized Myasthenia Gravis

Repetitive nerve stimulation (RNS) is an easily performed test in the evaluation of patients with possible myasthenia gravis (MG). This study was designed to determine the sensitivity of RNS depending on the time from onset of the symptoms of generalized MG. The researchers evaluated 41 consecutive patients with a new diagnosis of MG over a 3-year period. The patients were divided into two groups depending on the onset of the symptoms and the time at evaluation; the groups were “acute onset” if symptoms were present for fewer than 4 weeks and “slow onset” if symptoms were present for more than 4 weeks. Nine patients were in the acute onset (1 to 3 weeks) group and 32 in the slow onset group (4 weeks to 3 years). Acetylcholine receptor antibodies were present in 78% of the acute-onset group and 84% of the slow-onset group. Abnormal decrement was observed in one (11%) patient of the acute onset group compared to 26 (81%) of the slow onset group (p= 0.002). There was no difference in the mean consecutive difference (MCD) of the jitter between the two groups.

Comment: Though the acute onset group had a very small number of patients, this study suggests that RNS may be relatively insensitive to acute-onset generalized MG, and that a negative test in patients in this group should not exclude the diagnosis of MG.
Inspire the Next Generation of Neuromuscular Medicine Physicians

In order for AANEM and the study of neuromuscular medicine to thrive, it’s important we continue to attract new physicians to the field.

Leading the way in these efforts is Raghav Govindarajan, MD, an assistant professor of neurology at the University of Missouri School of Medicine.

“Neurology and neuromuscular medicine is entering an exciting new phase of innovation and treatment,” says Dr. Govindarajan. “With the discovery of new genes for ALS and development of antisense oligonucleotide therapy, approval of eteplisen for Duchenne Muscular Dystrophy [specifically indicated for patients who have a confirmed mutation of the dystrophin gene amenable to exon 51 skipping, which affects about 13% of the population with DMD], and success of nusinersen for spinal muscular atrophy (SMA); diseases that were once thought to be incurable and untreatable are being treated. Yet, there is a lack of awareness about all the advances among medical students and even neurology residents.”

Why the Lack of Awareness?
“This is partly due to the fact that neurology in most medical schools is taught by non-neurologists and at times by non-clinicians especially in the pre-medical years, where there is general feeling that neurology is all about localization. Further, neurology residents are busy with managing inpatient service, which is predominantly stroke and epilepsy, and thus remain unaware of the advances.”

When Dr. Govindarajan became the Neurology Clerkship Program Director, “I decided to revitalize the Student Interest Group in Neurology (SIGN chapter) with addition of outreach activities so as to raise the awareness of disease and the advances we have done, in addition to raising funds for research.”

Sparking Interest
One successful venture: education and activities about ALS, including organizing an ALS Walk. “I held a workshop on EMG for students and residents, as well as had a presentation on ALS and recent advances in treatments, in addition to completing the ice bucket challenge and even a bake sale. Mind you, the students organized all these despite their busy schedule - stayed late in the evening to attend this session, and did the walk on a weekend! The enthusiasm and participation was greater than I had expected. We have done similar MDA walks, and are organizing ones for other neurological conditions.”

“We need to encourage the younger generation to be more involved in neuromuscular medicine, physiatry and neurology. While these advances are promising, more work needs to be done, and we need the best and brightest minds to be involved and engaged early on. Thus, guidance and mentorship is critical in getting medical students and residents involved.”

Encouraging Research and Development
At the University of Missouri, “We have created a database of all research opportunities available within the department and students have access to this so they can contact the researcher of their choice and get involved in research in neurology early on,” says Dr. Govindarajan. “We have first year and second year medical students involved in research within our department and learning about neurology/neuromuscular medicine early on. Further, we have also created a database of all presenting opportunities for students where they can showcase their research in addition to award and scholarship opportunities both within the medical school as well as nationally. It is through this that we had students presenting at the AANEM meeting and even being awarded the residency and fellowship member recognition award.”

Career Development and AANEM
Dr. Govindarajan encourages involvement with AANEM. “The AANEM provides an excellent opportunity for students to showcase their research, attend sessions on the latest in neuromuscular medicine and network with senior neuromuscular physicians and physiatrists. The friendly and mentoring nature of the faculty and members of AANEM is an added bonus.”

Join the Effort
“I encourage AANEM members to get residents and students involved in AANEM though committee activities, presentations at the annual meeting, and publishing. In addition, I would also encourage them to revitalize the neurology, physiatry interest groups so students can be engaged and involved early on.”
SIMMONS NAMED MUSCLE & NERVE EDITOR-IN-CHIEF

Zachary Simmons, MD, was selected to serve as the new Editor-in-Chief of Muscle & Nerve, beginning with the January 2017 issue. Dr. Simmons served as Muscle & Nerve Senior Associate Editor since 2012.

A Professor of Neurology and Humanities at Penn State College of Medicine, Dr. Simmons founded and directs the Neuromuscular Program & ALS Center at Penn State Hershey Medical Center, and also serves as Research Professor in the Department of Psychology at Philadelphia College of Osteopathic Medicine. He has researched and written extensively on many aspects of ALS, particularly quality of life, optimizing multidisciplinary care, psychological morbidity, cognitive and behavioral dysfunction, and ethics. He is involved in collaborative research on telemedicine, brain-computer interfaces, and molecular genetics, and has participated in many ALS clinical trials. His CV includes more than 110 peer-reviewed publications, 150+ abstracts, and 12 book chapters. He is a member of the Ethics, Law, and Humanities Committee of the American Academy of Neurology. He has served on the AANEM Board of Directors, and has served on or chaired a number of AANEM committees, including the Examination, Workshop, Program, Maintenance of Certification, and Research Committees.

AANEM Executive Director, Shirlyn A. Adkins, JD, noted, “I look forward to working with Zach to further meet the growing needs of the AANEM’s membership.”

Texas Medical Board Approves Advertising of ABEM Certification

In response to efforts of the AANEM Board, the Texas Medical Board (TMB) has granted approval for Texas physicians, certified by the American Board of Electrodiagnostic Medicine (ABEM), to advertise their ABEM certification.

Texas law states that physicians can only advertise themselves as Board certified if the specialty board that conferred the certification and the certifying organization is 1) a member board of the American Board of Medical Specialties (ABMS), the American Osteopathic Association Bureau of Osteopathic Specialists (BOS), or the American Board of Oral and Maxillofacial Surgery; 2) grandfathered from 2010, or 3) if the TMB determines that the physician-based certifying organization that conferred the certification has certification requirements that are substantially equivalent to the requirements of the ABMS or the BOS existing at the time of application to the medical board.

The AANEM Board applied to the TMB stating that the ABEM follows rules that are substantially equivalent to ABMS Boards. The TMB approved ABEM on December 2, 2016. A list of the approved Boards can be found at www.tmb.state.tx.us/idl/1BAD46DF-2679-1C9E-5A54-6263B781ED22.

We are happy that the Texas Medical Board approved ABEM and that ABEM Board certified physicians in Texas may now advertise their certification,” stated ABEM Chair Kathryn A. Stolp. “This displays the commitment and hard work of the AANEM and Kane Hall Barry Neurology, that the Texas Medical Board has approved the recognition of ABEM board certifications across the state, said Sharirique Ansari, MD. “Our team here at Kane Hall Barry Neurology are absolutely elated to display our ABEM credentials to our patients and fellow colleagues. We greatly appreciate the opportunity given to us and are thankful that we can provide added confidence to our patients that the testing they are receiving is being conducted by a board certified physician. Congratulations to the AANEM!”

Texas has the 6th highest number of ABEM certified physicians in the state behind California, New York, Ohio, Pennsylvania, and Michigan. Several other states, including Florida and California, have laws limiting advertising of specialty certification. Physicians certified by the ABEM should check their state laws to be sure they are in compliance in regards to advertising of their certification.

Dr. Peter Grant Appointed to National Physician’s Council for Healthcare Policy

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adoption of a healthcare model that is beneficial and appropriate for all parties (patients, physicians, hospitals, and payers).

“A new healthcare plan model has been introduced by Rep. Pete Sessions (R-TX), who, as Chairman of the Rules Committee, is thought to be the second most powerful member of the House of Representatives, and Sen. Bill Cassidy (R-LA), who is probably the most knowledgeable person on health policy in the Senate,” says Dr. Grant. The NPCHCP has been a sounding board for Congressman Sessions and lengthy discussions have taken place regarding what this healthcare plan should contain and how it should be adopted.

As for his involvement with the NPCHCP, Dr. Grant says, “Personally, I have felt threatened by CMS and others as more extensive mandates and limitations are aimed at physicians in solo or smaller practices, but working with CMS to address these concerns will have benefits for all physicians and other healthcare providers in the US no matter what style, type or size of medical practice. This new role as vice-chair of the NPCHCP is a fitting extension of my position as Advocacy Advisor to the AANEM.”

Looking to the future, “I am hopeful that my work and experience gained with the NCPHCP will help all physicians and that what is learned can further assist the AANEM and its members in addressing our concerns and attaining our goals.”
Training Program Partnership News

Of the 432 new AANEM members in 2016, 85 are new members under the Training Program Partnership (TPP). The TPP is a membership category for departments at academic institutions. For one fee, all residents and fellows become members of AANEM. In addition, AANEM has bundled existing benefits with new educational resources that are specifically geared towards training programs.

TPP Resources

The new Training Program Partnership web pages are a one-stop shop for educational resource materials for training programs, including links to Muscle & Nerve Editor’s Choice Articles and Noteworthy Cases, AANEM Case Studies, Career Center Articles, and dozens of Knowledge Assessment Questions for both NM and EDX. A convenient link to the new Online Resource Library features over 180 free products for members.

Sneak Peak: During the month of February, the TPP webpages will be accessible outside of the member portal. During this limited time, non-members may preview the educational resources available.

Muscle & Nerve Top 10 Articles

In early 2017, all renewing AANEM members were emailed the Top 10 Articles from Muscle & Nerve for 2016 as a thank you for renewing their membership. Muscle & Nerve is devoted to publishing new clinical and research studies on neuromuscular disorders and treatment options, and is essential reading for neuromuscular, musculoskeletal, and electrodiagnostic physicians. AANEM is happy to be able to offer you a subscription to Muscle & Nerve as part of your membership. The cost for individuals to purchase the journal separate from a membership is $537.

Welcome, New Members!

The AANEM extends a warm welcome to the 432 new members who joined us in 2016! A complete online directory of all members can be found in the “Membership” section of www.aanem.org.

All physician members agree to uphold the principles and guidelines described in the AANEM’s Guidelines for Ethical Behavior Relating to Clinical Practice Issues in Neuromuscular and Electrodiagnostic Medicine and the American Medical Association’s Principles of Medical Ethics. All nonphysician members agree to abide by the AANEM’s position statement, Who is Qualified to Practice Electrodiagnostic Medicine?, stating that only properly trained physicians perform and interpret needle electromyography (EMG) and interpret nerve conduction studies.

NEW Member Benefit: FREE Online Resource Library

AANEM members looking for free educational material now have access to the AANEM Online Resource Library. This virtual library offers valuable educational materials which no longer carry CME/CEU including Case Reports, Course books, Ethics Vignettes, Guidelines, Journal Reviews, Lecture Series, Monographs, Podcasts, Webinars, and Workshop Handouts.

The Online Resource Library is searchable by topic or category. Check out the Online Library at www.aanem.org under the Education tab.

Retiring in 2017? Transition to Emeritus Membership.

If you’re planning to retire, transitioning to an emeritus membership allows you to continue to enjoy benefits of membership at no charge. Emeritus member benefits include: AANEM News (print newsletter), e-news electronic newsletter, discounts on annual meeting registration, and discounted education products.

Emeritus members are also encouraged to continue being active members of AANEM by serving on committees, volunteering at our annual meetings, and engaging in advocacy for health care providers.

To qualify for Emeritus membership you must meet the following criteria:

- Must have been an AANEM member for a minimum of 5 years prior to the request for transfer.
- Retiring from paid medicine-related activities or working less than 20 hours per week in a paid medicine-related activity.
- If not completely retired from paid medicine-related activities, agree to abide by the AANEM practice guidelines.

Emeritus members have the option to continue their subscription to Muscle & Nerve at a cost of $90 per year (if residing in US, Canada, or Mexico), or cost of $150 per year (if residing overseas, for print and online access), or $90 per year (if residing overseas, online only access).

If you retire in 2017, please visit the AANEM membership page at www.aanem.org/Membership/Member-Portal and click on the link to complete the Emeritus Application.
Preview of 2017 Annual Meeting: Plenary Speakers

**Plenary Topic:** Enhancing the Understanding, Diagnosis and Management of Painful Neuromuscular Conditions

**Chad M. Brummett, MD**  
University of Michigan Medical School,  
Ann Arbor, MI  
**Topic:** The Impact of Centralized Pain on Acute and Chronic Post-surgical Outcomes

**Robert C. Coghill, PhD**  
Cincinnati Children’s Hospital,  
Cincinnati, OH  
**Topic:** Brain Mechanisms Supporting the Subjective Experience of Pain

**Andrew J. Haig, MD**  
Vice President for Accountable Care and Medical Informatics  
Mary Free Bed Rehabilitation Hospital  
Active Emeritus Professor, University of Michigan, Ann Arbor, MI  
**Topic:** Diagnosing Pain with EMG? You’ve Got a Lot of Nerve!

**Francis O. Walker, MD**  
Wake Forest University School of Medicine  
Winston Salem, NC  
**Topic:** Pain--From the Carpal Tunnel to the Cortex

**Donna Bloodworth, MD**  
Baylor College of Medicine,  
Baylor St. Luke’s Medical Center  
Houston, TX  
**Topic:** Beyond the Poppy: Calcium Channel Blockers and SNRIs in the Garden Grow

**Erik R. Ensrud, MD**  
St. Luke’s Rehabilitation Institute  
Spokane, WA  
**Topic:** Neuropathic Pain: What is Evidence-Based and its Future Direction

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**Mark your calendars for the AANEM 2017 Annual Meeting in Phoenix, AZ, September 13-16. Join us at the beautiful JW Marriott Phoenix Desert Ridge Resort & Spa for the premier meeting for neuromuscular medicine, featuring opportunities to connect, interact, and expand your learning opportunities.**

The Plenary objectives set by 2017 AANEM President, William S. Pease, MD, include:

- Gain insight to the central nervous system’s processing of pain signals.
- Understand the impact of electrodiagnostic testing on the proper diagnosis of pain problems.
- Use ultrasound imaging to better assess and treat pain problems in the limbs.
- Improve treatment of neuropathic pain with evidence-based medical care options.

In response to your feedback, we’re continuing to expand the offerings you find most valuable, including 13 courses, 22 Ask the Expert Sessions, 11 Symposia, and 7 Special Interest Groups. We’ll also introduce new sessions on evidence-based medicine, a challenging cases roundtable, and an evening program featuring experts in the field. The popular Mobile Meeting App will be back to help you get the most out of your meeting experience. First-time attendees have the option of attending a first evening orientation, and an opportunity to meet and greet other newcomers and AANEM representatives.

Look for registration brochures in your mailbox in late May, with online registration opening June 1, 2017.
2017 Annual Meeting: Meet a New Course Chair: Ruple S. Laughlin, MD.

I grew up in Chicago, IL, and came to the Mayo Clinic in Rochester for neurology residency and fellowship training in Clinical Neurophysiology (CNP)-EMG. I joined the Mayo staff in 2007, and since then my career has evolved but continues to be one supporting my passions of education, neuromuscular medicine and EMG.

Currently, I am the Program Director for CNP at Mayo Clinic, allowing me to work with our CNP and neuromuscular fellows, as well as our neurology and physiatry residents. Last year, I assumed the directorship of the EMG lab at Mayo Clinic Rochester. These roles have shed light on the importance of working together to reach common understanding, encourage collaboration, and push the fields of neuromuscular and electrodiagnostic medicine field forward. This served as a strong motivation for me to become more involved in the AANEM.

Why Chair a Course?

My specific interest in chairing a course at the AANEM is to not only teach others, but also to educate myself. I believe that knowledge comes not only from making sure we present the most up-to-date material and strive to elevate the field, but also to meet and learn about the concerns and interests of the individuals that constitute neuromuscular, musculoskeletal, & electrodiagnostic medicine.

The course I am directing is Systemic Manifestations and Complications of Neuromuscular Disease. This role has already afforded me the opportunity to meet a wide range of providers from across the country in different practices, all with the singular motivation to increase knowledge and develop skills to help patients. The greatest challenge I have found so far in developing this course has been to formulate clear and definable objectives for the attendee as well as the presenter. Although difficult, this process is of utmost importance as these objectives serve as the foundation from which every subsequent decision regarding the course is made.

What Can Course Participants Expect?

With regards to this course, the participant can look forward to understanding how neuromuscular conditions may compromise organs outside nerve and muscle both in initial presentation as well as eventual involvement. The focus will be on respiratory, cardiac, and hematologic systems and their relationship to neuromuscular disease. Another important component of the course will be a discussion of systemic complications of neuromuscular pharmacologic therapies themselves. We will also review appropriate strategies for therapy and rehabilitative measures in neuromuscular patients as deficits often remain, despite intervention.

I am excited to be part of this process and eager to meet new colleagues across the field both as speakers and in the audience. I am honored to have this opportunity and increase my involvement with the AANEM.

Submit Your Abstract for the 2017 Annual Meeting

The AANEM Annual Meeting is a major venue for presentation of the latest research in neuromuscular and electrodiagnostic medicine. Plan your abstract submission now for the annual meeting in Phoenix, AZ, September 13-16, 2017. Abstract submission opened online January 1, 2017. Abstract submission deadline: March 15, 2017.

Abstracts are blinded for review and judged based on originality, methodology, and significance of findings. Abstracts containing single case reports usually will not be accepted, unless the report is of outstanding interest because of the uniqueness of the findings or the sophistication of the investigations. All accepted abstracts will be published in Muscle & Nerve.

Questions? Contact AANEM at (507) 288-0100 or email to abstracts@aanem.org. Abstract submission details and information is available on the AANEM website at www.aanem.org/abstract.
Foundation Offers Grant Awards for Research Excellence

The AANEM Foundation for Research & Education funds research awards in conjunction with the AANEM Annual Meeting. The awards were established to encourage research in neuromuscular (NM) and electrodiagnostic (EDX) medicine, reward research excellence, and provide physicians the opportunity to be recognized among their peers for their work. All award recipients will present their research at the AANEM Annual Meeting, set for September 13-16, 2017, in Phoenix, AZ.

Five award categories for scientific abstracts are defined as follows, with award details described. Submissions may include previously presented research that has not been published in full manuscript form before the annual meeting. Each submission will be judged according to scientific merit, methodology, manuscript form, and the candidate’s contribution to the project.

All accepted abstracts will be published in Muscle & Nerve and recipients receive recognition in the meeting guide and on their poster. To be eligible for an award, researchers must indicate award interests during the online abstract submission process. Abstracts must be submitted online at www.aanem.org/abstract. The abstract submission deadline is March 15, 2017.

Resident and Fellow Member Recognition Award
To receive the AANEM Resident and Fellow Recognition Award, the first author of the abstract must be a current AANEM member in a residency or fellowship program at the time of submission and must present the abstract at the annual meeting. Award recipients receive $200.

Technologist Member Recognition Award
Technologist members may apply for the Technologist Recognition Award. To be eligible for the award, the technologist must be an AANEM member at the time of submission, be the first author of the abstract, and must present the abstract at the annual meeting. Award recipients receive $200.

President’s Research Initiative Award
The President’s Research Initiative Award was created to support the AANEM Foundation's research goals and to encourage research on a particular topic. This year the topic for the President’s Award is “Enhancing the Understanding, Diagnosis, and Management of Painful Neuromuscular Conditions.” Up to 10 abstracts judged to be the most innovative and/or of the highest quality will be awarded $500. Members and nonmembers are encouraged to submit abstracts in this category.

Best Abstract Award
All abstracts submitted to the AANEM are considered for the Best Abstract Award unless the authors indicate they do not wish to be considered. No additional manuscript or expanded abstract is needed in order to be considered. The criteria for this award includes: an abstract of excellent scientific merit that is well written with excellent discussion, exhibits important research, and/or is a fascinating case. Both AANEM members and nonmembers are welcome to participate. The winner receives a $500 award, roundtrip coach air transportation (up to $500 domestic/Canada or $1000 international) to the annual meeting, 3 nights’ hotel accommodations, waiver of the annual meeting registration fee, and is allowed a 20-minute presentation at the annual meeting.

Golseth Young Investigator Award
The Golseth Young Investigator Award is presented for original research in NM and EDX medicine. Candidates must be students in an MD, DO, DVM, or foreign equivalent program; residents; or fellows in-training. In addition, physicians in their first 3 years following the completion of training may apply. A manuscript of no more than 2,500 words must be received in the AANEM office no later than March 15. The manuscript must be accompanied by a letter of eligibility from the candidate's Program Director and a letter from the candidate stating the candidate’s percentage of contribution to the research. The winner receives a $1000 award, plus round-trip coach air transportation (up to $500 domestic/Canada or $1000 international) to the annual meeting, 4 nights’ hotel accommodations, waiver of the annual meeting registration fee, and is allowed a 20-minute presentation at the annual meeting.

Funds Available For Physicians From Economically Developing Countries To Attend AANEM Annual Meeting
The AANEM Foundation offers International Fellowship Award opportunities for up to five physicians from economically developing countries to attend the AANEM Annual Meeting. Additionally, applicants who submit an application but do not receive a Foundation Fellowship Award are automatically considered for awards offered through the North American Chapter of the International Federation of Clinical Neurophysiology (IFCN).

“The AANEM Foundation makes it possible for physicians from economically developing countries to receive quality medical education at the AANEM Annual Meeting that will help them diagnose and treat patients in their country with neuromuscular disorders,” stated AANEM Foundation Executive Director Shirlyn Adkins.

The award eligibility criteria, application process, and awards are the same for both the Foundation's International Fellowship Award and the IFCN awards. Physicians who submit an abstract to present at the AANEM Annual Meeting will be given priority.

Award Eligibility Criteria:
• Must have a medical degree or foreign equivalent
• Must reside and/or practice in an economically developing country
• Must have an interest in neuromuscular and/or electrodiagnostic medicine

The AANEM Foundation's International Fellowship and IFCN Award winners receive:
• $1000 cash
• Free annual meeting registration

Applicants for the AANEM Foundation Fellowship Award and IFCN Awards must complete the online application form found at www.aanemfoundation.org/Awards/International before March 15.

Applicants who submit abstracts must submit them online by the March 15 deadline at www.aanem.org/abstract. Selected applicants will be notified in the summer of 2017.
AANEM offers online and print self-assessment examinations (SAEs) for use in neuromuscular (NM) and Electrodiagnostic (EDX) training programs. Registrants can access the institutional-proctored SAEs May 1-8, 2017. New for 2017, AANEM is offering two different levels of the NM SAE: resident level, and fellow level. Separating the NM SAE into two separate levels will allow Training Program Directors to better match the examination level to the student stage in learning the material.

Institutions use SAEs to check resident and fellow understanding of key information and concepts. The exams also can be used to measure Accreditation Council for Graduate Medical Education (ACGME) milestones. In 2016, 185 training programs used the NM and EDX SAEs to test more than 850 physicians-in-training.

If your institution is interested in becoming a host site for AANEM SAEs, please contact the Education Department at education@aanem.org. Visit the Education SAE Training Programs page at www.aanem.org/Education/ Self-Assessment-Examinations/Training-Programs for registration details and FAQs.

Enroll Now For Wake Forest/AANEM Regional Ultrasound Workshop

In collaboration with the Wake Forest School of Medicine, the AANEM invites you to attend a comprehensive Neuromuscular Ultrasound course on June 1-2, 2017.

Directed by Francis O. Walker, MD, and coordinated by Michael Cartwright, MD, topics will focus on applications in muscle disease, peripheral and cranial nerve imaging, and introduction to the use of ultrasound in evaluating musculoskeletal disorders. Lectures will be integrated with hands-on demonstrations of technique and case interpretation. A small group format facilitates questions and answers and tailors the educational experience to meet the specific needs of individual participants. Participants can apply this knowledge to troubleshoot difficult imaging cases, identify artifacts, and improve resolution at the bedside.

For more information visit www.wakehealth.edu/ultrasound

Neuromuscular Ultrasound Workshop
• June 1-2, 2017
• Presented by Wake Forest School of Medicine and AANEM
• Francis Walker, MD, Director, Michael Cartwright, MD, Coordinator
• Cost: $1000

Coding With Carrie
2017 CPT Code Changes

Carrie Says: In the fall of 2016, the American Medical Association (AMA) released the 2017 CPT code changes that went into effect January 1, 2017. There were some minor changes and additions relevant to electrodiagnostic and neuromuscular medicine. AANEM’s Online Coding Guide (available for purchase online) has been updated to reflect these changes, additional coding tips, and frequently asked questions.

• Spine and Spinal Cord Injection, Drainage, or Aspiration: This section was revised with the removal of CPT codes 62310, 62311, 62318, and 62319 and the replacement of the renumbered series (62320, 62322, 62324, and 62326) and the new bundled codes with imaging (62321, 62323, 62325, and 62327). The guidelines now specify that computed tomography and any injection of contrast are inclusive components of the codes that include imaging guidance (62321, 62323, 62325, and 62327). In addition, the transforaminal epidural injection cross-reference parenthetical note has been relocated to appear closer to the subsection guides. The guidelines in this subsection have been revised to align with the new definitions and key terms that have been added to describe spinal procedures throughout the CPT code set.

• Fluoroscopic Guidance: Fluoroscopic guidance codes 77002 and 77003 have been revised as add-on codes to include the CPT add-on symbol (+). Inclusionary parenthetical notes have been added to direct users to the appropriate codes to use in conjunction with these services.

For questions about upcoming code changes, please contact the AANEM policy department at policy@aanem.org.
Exemplary Status Being Phased Out Starting in 2017

The AANEM EDX Laboratory Accreditation program will be phasing out Exemplary Status for laboratories beginning June 2017. One of the main goals of the EDX Laboratory Accreditation program is to create a method for payers to differentiate between good and poor quality EDX studies. In order for payers to adopt EDX Laboratory Accreditation as a standard, it is key that there be a significant number of accredited laboratories in each state to address the needs of patient access. The AANEM Board believes that by removing the Exemplary Status tier, the program will be easier to understand, helping advance our efforts to improve the adoption of the laboratory accreditation program.

One of the key issues with Exemplary Status has been that it favored smaller laboratories over larger institutions. It was far easier for a solo practice to achieve Exemplary Status; creating an unfair system in which smaller laboratories received exemplary Status and larger ones did not, which did not accurately reflect quality. “My own lab is accredited with Exemplary Status and I realize some laboratories will be disappointed to lose that status,” said Dr. Peter Warinner, Chair of the EDX Laboratory Accreditation Committee. “Our concern, however, is that the tiered system adds complexity and detracts from the ultimate goal of having enough labs accredited. We want to remove any barriers from payers fully adopting the program, enabling them to identify quality studies. By eliminating low quality studies we believe payers will save money, avoid fraud, and ultimately offer better reimbursement for higher quality studies.”

The process will be phased in to have less impact on those laboratories with Exemplary Status. Any laboratories currently accredited with Exemplary Status will keep their Exemplary Status until their next reaccreditation date. This could range between one to five years depending upon when the laboratory was accredited. Laboratories who are due for reaccreditation prior to June 1, 2017, will need to submit their application prior to June 1 in order to retain their Exemplary Status (as long as they still qualify) for the next five years. Any laboratories not yet accredited who are interested in being accredited and receiving Exemplary Status must submit their accreditation applications by June 1 to still receive Exemplary Status and hold Exemplary Status for the five years of their accreditation cycle.

The AANEM website will explain that all laboratories listed with Exemplary Status were grandfathered, and that Exemplary Status is no longer offered. “We hope this simplifies the process for all laboratories considering accreditation and improves the overall number applying,” stated Shirlyn Adkins, AANEM Executive Director, “We continue to speak with CMS urging them to adopt all or part of the AANEM’s standards. The more laboratories we have, the greater our chance of success. Please help us by accrediting your laboratory.”

Laboratories Newly Accredited by AANEM in 2016

*Designates laboratories accredited with Exemplary Status

University Spine Institute
EMG Laboratory *
Murrietta, California

UT Erlanger Neuromuscular Medicine*
Chattanooga, Tennessee

St. Luke's Hospital Neurodiagnostic Lab
Chesterfield, Missouri

LAGS Medical Centers
Fresno, California

Oklahoma Physical Medicine & Rehabilitation, PC*
Tulsa, Oklahoma

Central Nebraska Neurology
Hastings, Nebraska

Northern Arizona Orthopaedics*
Flagstaff, Arizona

University of Alabama at Birmingham Hospital
Electrodiagnostic Laboratory
Birmingham, Alabama

David J. Oliveri, MD*
Las Vegas, NV

Robert Lillo, MD*
Muncie, Indiana

Electrodiagnostic Medicine*
Shreveport, Louisiana

California Sports and Rehab*
Beverly Hills, California

USF Department of Neurological Surgery and Brain Repair
Tampa, Florida

Summit Neurology Consulting, PC.*
Westfield, New Jersey

Premier Neurology and Wellness Center*
Stuart, Florida

Armen T. Babigian, MD*
Torrington, Connecticut

University of Missouri PM&R Electrodiagnostics
Columbia, Missouri

Electromyography Laboratory/ Clinic
Phoenix, Arizona

EMG Laboratory- Drasko Simovic, MD*
Lawrence, Massachusetts

2017 Certification Exam dates

CNCT: June 7 (Wednesday) and June 10 (Saturday)
Registration will open in March 2017.

ABEM: March 1-4
(Registration now closed)

MOCP: November 29 (Wednesday) and December 2 (Saturday)
Registration will open August 2017.

*Dates are subject to change and will be noted online and communicated through various media to appropriate audiences.
Advocacy

Lab Accreditation Helps Establish EDX Standards Nationwide

In response to the continued growth of fraud, abuse, and the number of unqualified providers performing EDX studies, the AANEM Board voted to move forward with an ambitious plan of working to establish mandatory standards for EDX medicine nationwide based upon AANEM’s EDX Laboratory Accreditation Program. The goal of this effort is to ensure patients receive only quality EDX care from qualified providers.

Some AANEM members have asked - why did AANEM choose to use the EDX Laboratory Accreditation Program instead of requiring ABEM certification (or other board certification) to perform EDX testing? Isn’t requiring both redundant?

While it is certainly true that ABEM certification demonstrates that the physician is competent and trained to perform EDX studies, unfortunately, most private payers, and certainly government payers, are not willing to limit medical treatments/procedures to those with specific board certifications due to concerns of encroaching upon scope of practice issues. It is seen as a restraint of trade issue.

Using board certification to define what types of testing can be performed is complicated by the fact that physicians with different board certifications often perform testing that could be seen as part of another group’s certification. For example, AANEM members would not want ultrasound to be limited to board certified radiologists. Another example of testing performed by physicians of different board certifications is spine injections. AANEM is not aware of any instances in which board certification is used by government entities or private payers to restrict the ability to perform a procedure in an area of medicine.

Our discussions with representatives from other specialty societies who faced similar quality issues, including radiology (with mammography) and sleep medicine, revealed that they successfully used laboratory accreditation to raise the level of patient care when working with the government and private payers. These are the set of standards AANEM is working to mandate through CMS.

The laboratory accreditation program, unlike board certifications, looks beyond physician training and qualifications. EDX laboratory accreditation also ensures that NCS technologists are adequately trained and supervised, certifies that only proper EDX equipment is used, confirms that appropriate safety protocols are in place, and reviews several other aspects of the delivery of EDX medicine. The laboratory accreditation program requires that individuals performing EDX studies undergo sufficient training (which is generally only included in neurology fellowships or PMR residencies), but does NOT require specific board certifications.

Regardless of whether or not a mandate is enacted, you should get your EDX lab accredited because it:

- Demonstrates clinical excellence in EDX medicine
- Proves a laboratory’s commitment to providing the highest quality health care and a safe environment for patients
- Provides patients, referral sources, and payers with a credible measure to differentiate the laboratory’s quality of care

For more information on the EDX Accreditation Program, visit AANEM’s website: www.aanem.org/Practice/EDX-Laboratory-Accreditation. If you have questions about the advocacy effort, you can email the policy department at policy@aanem.org.

Use the AANEM Career Center for your job search

Use the AANEM Career Center when you’re thinking of looking for your next job. Our online portal offers an easy way to search for new neurology, physiatry, and electrodiagnostic technologist positions throughout the country.

Browse hundreds of listings, submit your resume, and automatically receive updates when new jobs become available. Explore the Career Center website to access up-to-date resources including helpful information about health care trends, resume and interviewing tips, salary negotiations, and more, available to you for free at www.healthecareers.com/aanem.
MACRA and the Quality Payment Program: What It Means For Your Practice

In October 2016, the Centers for Medicare and Medicaid Services (CMS) issued its final rule implementing key provisions, in the form of the Quality Payment Program (QPP), of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). The MACRA legislation was passed by Congress in 2015 and permanently repealed the flawed Sustainable Growth Rate (SGR) physician payment formula. MACRA represents the biggest change to the Medicare payment system since the program’s inception in the 1960s. While there is some overlap with the Affordable Care Act (ACA), MACRA is separate and distinct. As a result, any changes the new administration may make to the ACA is unlikely to significantly impact MACRA.

What is the Quality Payment Program (QPP)?

The QPP is a new payment system in which physician and other eligible clinicians’ payments are based on participation in one of two pathways: Merit-based Incentive Payment System (MIPS) or Advanced Alternative Payment Models (APMs). MIPS is a modified fee-for-service model; it is expected that most physicians will use this pathway, at least for the first year or two. Alternatively, Advanced APMs are new payment models, approved by CMS, which reduce costs of care and/or support high-value services not typically covered under the Medicare fee schedule. There are only eight approved Advanced APMs for 2017.

The Merit-based Incentive Payment System (MIPS)

MIPS is a new program that combines parts of the Physician Quality Reporting System (PQRS), the Value-based Payment Modifier (VM), and the Medicare Electronic Health Record (EHR) incentive program (a/k/a “Meaningful Use”) into a single program, and adds a fourth category called “Improvement Activities.” Similar to the previous Medicare quality programs, physicians are able to choose from various measures and activities.

Are you eligible to participate in MIPS? In order to be eligible for MIPS, you must bill more than $30,000 a year in Medicare Part B charges and provide care for more than 100 Medicare patients a year. If you do not meet both thresholds, you cannot participate in MIPS. CMS predicts that over 32% of clinicians will be excluded under this threshold. CMS will send out notifications to physicians exempt under the low volume threshold in early 2017. Additionally, physicians who enroll in Medicare for the first time during a performance period are exempt from MIPS until the next year. Physicians who significantly participate in Advanced APMs are also exempt.

For those participating, MIPS consists of four categories:

1. **Quality**: 60% of the 2017 score. This category replaces the Physician Quality Reporting System (PQRS) and has many of the same measures to choose from. Full participation requires most physicians to report on at least six measures for at least 90 days.

2. **Advancing Care Information (ACI)**: 25% of the 2017 score. This category replaces the “Meaningful Use” of EHRs. Clinicians will be required to report on four or five measures, depending on the year of their EHR. They can report up to nine additional measures for a minimum of 90 days for additional credit.

3. **Clinical Practice Improvement Activities (CPIA)**: 15% of the 2017 score. There are over 90 activities in this category that clinicians can choose from. They are focused on care coordination, beneficiary engagement, and patient safety. Most clinicians will need to complete two “high-weighted” activities or four “medium-weighted” activities for a

Pick Your Pace: 2017 Transitional Performance Reporting Options

| MIPS Testing       | • Report some data at any point in CY 2017 to demonstrate capability  
|                   |   • 1 quality measure, OR 1 improvement activity, OR 4/5 required ACI measures  
|                   |   • No minimum reporting period  
|                   |   • No negative adjustment in 2019  |
| Partial MIPS Reporting | • Submit partial MIPS data for at least 90 consecutive days  
|                    |   • 1+ quality measure, OR 1+ improvement activities, OR 4/5 required ACI measures  
|                    |   • No negative adjustment in 2019  
|                    |   • Potential for some positive adjustment (<4%) in 2019  |
| Full MIPS Reporting | • Meet all reporting requirements for at least 90 consecutive days  
|                    |   • No Negative adjustment in 2019  
|                    |   • Maximum opportunity for positive 2019 adjustment (≤4%) in 2019  
|                    |   • Exceptional performers eligible for additional positive adjustment (up to 10%)  |
| Advanced APM Participation | • No MIPS reporting requirements (APMs have their own reporting requirements)  
|                        |   • Eligible for 5% advanced APM participation incentive in 2019  |

The only physicians who will experience negative payment adjustments (-4%) in 2019 are those who report NO data in 2017.

CONTINUED ON NEXT PAGE
minimum of 90 days. Small practices (15 or fewer clinicians), nonpatient facing clinicians, and rural practices or HPSAs are only required to complete two “medium-weighted” activities or one “high-weighted” activity.

4. Cost: 0% of the 2017 score. This category replaces the Value-based Modifier program. Clinicians will receive feedback on this category in 2017 but it will not count towards their MIPS score until 2018.

Advanced Alternative Payment Models (APMs)

The second pathway for eligible clinicians to participate in the QPP is an “Advanced APM.” These are payment models that meet certain criteria established by CMS:

- 50% of participants must use certified EHR technology
- Must report and at least partially base clinician payments on quality measures comparable to MIPS
- Bear “more than nominal risk” for monetary losses

Very few models qualify under these standards for 2017. Physicians may be Qualified Participants (QPs) or Partially Qualified Participants (PQPs) based on revenue and patient thresholds, with differing rewards.

2017 “Pick Your Pace” Transition Period

In order to ease the transition into the new program and encourage participation, clinicians have four participation options. If eligible clinicians do not participate at all in 2017, they will see a 4% cut in all Medicare Part B payments in the 2019 reporting year.

AANEM policy staff have created several member-specific resources, including lists of measures and activities that are most relevant to EDX or NM physicians, which are available on our website: www.aanem.org/Practice/Medicare/MACRA. For more information on the QPP generally, visit CMS’s Quality Payment Program website (https://qpp.cms.gov/). Please contact policy@aanem.org with any questions or concerns.
November 2, 2016, marked the release of Medicare’s Final Rule of the 2017 Physician Fee Schedule. If you haven’t had the opportunity to read the 1400+ page document plus addendum, here is a brief summary of some of the items that could affect you and your practice:

- **Work Relative Value Units (RVU’s)** for all electrodiagnostic and neuromuscular codes monitored by AANEM remain **unchanged**.
- **Practice Expense RVU’s and Malpractice RVU’s**—minor adjustments were made to the practice expense and malpractice RVU’s which resulted in minor reimbursement changes.
- **Conversion Factor**—CMS finalized the conversion factor for Calendar Year (CY) 2017 at $35.8887. This is an increase of $0.0844 from 2016.
- **Expanding eligible telehealth services**—CMS finalized payment through two new G-codes (G0508 and G0509) that describe initial and subsequent encounters for critical care consultations furnished via telehealth.
- **Gathering data on activities and resources involved in 10- and 90-day global surgical procedures.** CMS finalized a reduced data collection strategy that will gather data on the activities and resources involved in furnishing the 10- and 90-day global surgical services. Required reporting will be limited to a sample of practitioners for selected services and will be required only for services related to codes reported annually by more than 100 practitioners that are reported more than 10,000 times or have allowed charges in excess of $10 million annually.
- **Expansion of the Diabetes Prevention Program Model.** CMS finalized its proposal to expand the duration and scope of the Medicare Diabetes Prevention Program (MDPP). Through its expansion, more Medicare beneficiaries will be able to access the benefits of the MDPP, which could lead to prevention of diabetes, improved health, and reduced costs.
- **Medicare Shared Savings Program (MSSP).** CMS updated ACO quality reporting which included changes to the quality measure set and updates to align with the Physician Quality Reporting System (PQRS) and the Quality Payment Program (QPP).

For a more detailed summary of the changes to Relative Value Units (RVU) for codes specific to electrodiagnostic and neuromuscular medicine, members may log into the Member-Only Coding Resources found on the AANEM website under Practice. For questions, please contact the AANEM policy department at policy@aanem.org.
Improving the Diagnosis of Neuromuscular Diseases

Monkol Lek, PhD
Massachusetts General Hospital, Boston, MA

A development grant jointly funded by the AANEM Foundation and the Muscular Dystrophy Association (MDA) was awarded to Monkol Lek, a postdoctoral fellow at Massachusetts General Hospital in Boston. Dr. Lek was awarded $119,746 over two years to improve the diagnosis rate of rare muscle diseases.

Dr. Lek recently shared his thoughts on his research and this award:

Summarize your research:

The main goal of my research project is to improve the diagnosis rate of rare muscle diseases. Currently the diagnosis rate using exome sequencing is approximately 40%. In this research project, we take two approaches to improve the diagnosis rate. Firstly, whole genome sequencing allows us to detect variants in regions outside of the protein coding regions (i.e. exome). The other approach is sequencing RNA extracted from muscle biopsy, which allows us to observe the consequences of difficult to interpret variants on gene expression and splicing. Both approaches have improved our ability to detect potential disease-causing variation but the challenge also remains in the interpretation. The last aim of this project is to provide resources to the community to improve the interpretation of rare variants discovered in our patients.

What spurred your interest in this type of research?

I was diagnosed with limb girdle muscular dystrophy in my early 20s. At the time there was very limited information on my disease, why it was so hard to find the disease-causing gene and if there was any treatment. I went back to University and then research to contribute to all three of these areas. It took over a decade to find my disease causing gene, TCAP/Telethonin, and I didn't want other patients to wait that long as I can empathize with the frustration of not knowing.

You were first author on a research paper in Nature last summer – “Analysis of protein-coding genetic variation in 60,706 humans” – how does this work relate to this project?

The Nature paper details a resource called the Exome Aggregation Consortium (ExAC) data set, which summarizes the genetic variation from over 60,000 individuals including Europeans, Africans, East Asians, Latinos, and South Asians. The resource was a major collaborative effort of analysts and computation biologists at the Broad Institute and senior scientists around the world, which took approximately two years to develop. The mutations we discover in muscle disease patients should be rare, as the muscle diseases are rare themselves. This comprehensive and diverse resource has allowed us to better determine the frequency of potential disease causing mutations discovered in our muscle disease patients. We have used this resource to aid in the diagnosis of all our rare muscle disease patients that have been exome sequenced. The resource can be accessed via the ExAC browser (http://exac.broadinstitute.org), which since its release in October, 2014, has been visited over 7 million times by the research community.

How will this award help you in your research?

This award allows me to dedicate my research efforts to the genetic diagnosis of the most difficult muscle disease cases. It will also allow me to explore novel approaches and technologies, while building strategic collaborations necessary for the next stage of my career as an independent investigator. I’m very grateful for the support of AANEM/MDA and their investment in young scientists.

What else would you like to share with AANEM members?

For neurologists, never to be satisfied to tell patients each year that there is no treatment available for their disease. For researchers, to know patients are extremely grateful for your dedication and hard work. Lastly, for patients and their families, to contribute to the efforts the best way they know how. I was told when I was diagnosed to leave the research to the experts and was glad I never listened!

Motor System Connectivity Influences in Amyotrophic Lateral Sclerosis

Christi L. Kolarcik, PhD
University of Pittsburgh, Pittsburgh, PA

A development grant jointly funded by the AANEM Foundation and the MDA was awarded to Christi L. Kolarcik, a postdoctoral fellow at the University of Pittsburgh in Pittsburgh, PA. Dr. Kolarcik was awarded $180,000 over three years.
Dr. Kolarcik shared her thoughts on her research and this award:

**Summarize your research:**
Although ALS is regarded as a disorder of the motor system, we rarely consider the entire neuroanatomical system in our studies of the neurodegeneration that occurs in ALS. The results from our proposed studies will provide a unique and innovative perspective on the motor neuron degeneration that occurs with ALS and represent a fundamental shift in our understanding of how and when the motor system is affected in disease. First, the neuroanatomical findings will provide a basis for establishing the motor circuitry in the mouse and delineate the connectivity changes that occur with ALS. By identifying the most vulnerable parts of the motor system, targets for delivery of genes/drugs/neurotrophic factors could be accomplished. Perhaps more importantly, our studies offer significant opportunities to better understand the underlying causes of motor neuron and motor system degeneration. Axonal transport, synaptic integrity, prion-like spreading and muscle-fiber type relate to a number of proposed disease mechanisms; a clearer understanding of the contribution of each will promote the development of therapeutics for ALS and positively impact clinical care/disease management.

**What spurred your interest in this type of research?**
As a graduate student, I was fortunate to have kept a clinical focus to my basic research having had both Robert Bowser, PhD, and David Lacomis, MD, as mentors. In addition, I began volunteering in the local ALS community as a graduate student and continue to do so today. Working directly with patients and families affected by ALS is a constant source of inspiration and motivation, and I feel a genuine connection to every member of this community.

**How will this award help you in your research?**
This award is extremely important. Not only does it allow me to pursue a novel avenue of scientific discovery but it represents my pathway to an independent research career. I have been working in this field for about 10 years, building a solid yet unique foundation, and this award is facilitating my transition to independence.

**What else would you like to share with AANEM members?**
I am grateful for the support of the AANEM and look forward to meeting more of the membership in the near future.

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**TEST YOUR KNOWLEDGE**

A patient with metastatic melanoma develops proximal arm and leg weakness with a creatine kinase of 3000 and a needle EMG demonstrating fibrillation potentials and small amplitude, short duration motor units while receiving chemotherapy. This patient should discontinue which of the following?

A. Trametinib.
B. Ipilimumab.
C. Brentuximab.
D. Cobimetinib.

Answer on Page 20

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**TEST YOUR KNOWLEDGE**

Which of the following are needed to define recruitment on needle EMG?

A. Motor unit action potential (MUAP) firing rate.
B. Number of MUAP firing.
C. Ratio of the firing rate to number of MUAP firing.
D. All of the above.

Answer on Page 20

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**TEST YOUR KNOWLEDGE**

Check out the Test Your Knowledge question that is posted every other week on the AANEM Facebook page. Share your answer in the comments, then check back in at the end of the week to see AANEM’s posted answer.
Mutations in GLDN, Encoding Gliomedin, a Critical Component of the Nodes of Nanvier, are Responsible for Lethal Arthrogryposis

This group of researchers sought to determine if there was common mutation in a group of families with offspring with genetically undiagnosed arthrogryposis multiplex congenita. Both fetuses in this study demonstrated akinesia, polyhydramnios, and postmortem had arthrogryposis of the lower limbs and wrists. Karyotype, SMN1, and DMPK testing were normal. Whole-exome sequencing was performed and a compound heterozygous mutation of the gliomedin (GLDN) gene was found in both. Targeted exome sequencing was performed in DNA samples of 106 affected individuals with similar phenotype of unknown etiology. Four more cases from three families were identified. The cases from two families were born to consanguineous parents and had homozygous mutations of the GLDN gene. The other family was of unrelated parents with two fetuses carrying compound heterozygous mutations.

Comment: GLDN is a component of the nodes of Ranvier and forms a complex with neurofascin-186 (NF-186) that is important for the initial clustering of voltage gated Na+ channels at the nodes. Antibodies to gliomedin have been identified in adult patients with demyelinating polyneuropathies including chronic inflammatory demyelinating polyradiculoneuropathy and Guillain Barré syndrome. These results indicate a major role for GLDN in node formation and the development of the peripheral nervous system in humans.

Durability of the Rituximab Response in Acetylcholine Receptor Autoantibody–Positive Myasthenia Gravis

Robeson and colleagues retrospectively report on the durability of treatment response to rituximab in 16 patients with acetylcholine receptor autoantibody (AChRAb)–positive myasthenia gravis (MG). Refractory MG was defined by the inability to lower immunotherapy doses without clinical relapse, poor control with existing immunotherapy, or severe adverse effects of that therapy. Patients received two to four cycles of rituximab at a dose of 375 mg/m² weekly for four weeks. The number of cycles was determined by the presence of symptom-free state and ability to taper or withdraw other immunotherapies.

The investigators found that after the first rituximab cycle, 63% of patients entered a state of complete stable remission, 19% achieved pharmacological remission, and the remaining 19% achieved minimal manifestation not requiring treatment for at least one year. The 13 patients who were able to discontinue all other forms of immunotherapy did so at a mean of 8.3 (range, 1-13) months after the last rituximab cycle. Nine of 16 patients (56%) had a relapse at a mean of 36 months after the last cycle, but all improved with further immunosuppressive therapy. Levels of AChR antibody declined significantly (P < .05) and remained low in patients without relapse. There was no correlation between antibody level and treatment responsiveness. Rituximab was well tolerated with no infusion reactions.

Comment: The use of rituximab for refractory MG is of great interest, as anecdotal evidence suggests that it is effective. Zebardast and colleagues had previously published two retrospective series totaling 20 patients with refractory MG, each of whom responded favorably to rituximab. The present study by Robeson and colleagues provides further clarity on the need for repeated treatment cycles and their effect, with half of the patients with AChR antibody–positive MG only needing two cycles to achieve disease remission. Unlike earlier observations in AChR antibody–positive MG, titers declined in accordance with favorable treatment responses. Nevertheless, other investigators provide caution in using AChR antibody levels as a biomarker of improvement in MG. Whereas other options for refractory MG such as maintenance intravenous immunoglobulin or plasma exchange provide benefits that last only a few weeks per cycle and mandate repeated administration that can stretch for years, rituximab appears to produce persistent improvement lasting months or years. Based on existing data, the benefit-cost ratio for rituximab in AChR and muscle specific kinase antibody–positive refractory MG is favorable.

About the News Science Editorial Board

The board helps to highlight significant, timely science news items for AANEM members. It reviews articles in journals and websites, identifies newsworthy items in the field, and writes article summaries.

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Checkpoints Available for Technologist MOC Program

The first five Checkpoints for the new Technologist Maintenance of Certification Program (TMOCP) are available for certified technologists looking to work on their requirements for recertification.

In early 2016, the new Checkpoint program was initiated as a way to ensure that the education the technologists were receiving was relevant and focused on EMG and NCS. Three options are available for those who were certified from 2012-2015 as a way to transition them to the new program. Starting in 2016, any technologists who certify or recertify will be required to complete five Checkpoints within their 5-year recertification cycle. After completion of the five Checkpoints, the diplomate will be automatically enrolled in a new 5-year cycle starting January 1 after their previous cycle ends.

As more Checkpoints are designed and developed, AANEM hopes to be able to provide more variety on topics as well as types of Checkpoints. Diplomates are encouraged to visit the ABEM website at www.abemexam.org and the “MyTMOCP” page for more details on their specific requirements.

To view your My TMOCP page, go to www.abemexam.org and hover over Technologists in the gold header. Select “My TMOCP” and log in to see your progress toward recertification.

Clinical Pearl: Presymptomatic ALS Genetic Counseling and Testing

An important question asked in the neuromuscular medicine community is whether presymptomatic genetic testing should be offered to those who may be at risk for developing ALS. Standing guidelines for presymptomatic counseling and testing are mainly based on a small number of individuals, clinical judgment, and experience from other neurodegenerative disorders. Advancements in understanding of how genetic contribution to ALS have created dialogue and debate about whether clinical genetic testing should routinely be offered to patients with ALS.

In a recent AANEM Podcast, Dr. Ted Burns interviewed Dr. Michael Benatar to discuss this topic. For the last eight years, Dr. Benatar and his colleagues have been providing testing and genetic counseling sessions (including prediscovery, pretest, posttest, and ad hoc counseling) to over 150 first-degree family members participating in the Pre-symptomatic Familial ALS Study.

“I very much appreciate the work Michael and his colleagues are doing in ALS research. From my discussion with Michael, I learned that the issues surrounding presymptomatic genetic testing differ significantly from those for symptomatic genetic testing,” said Dr. Burns. “Testing in both clinical scenarios requires thoughtfulness and an appropriate discussion with the patient, but a genetic counselor’s participation must be front and center for presymptomatic testing. I also learned from Michael that we really need to be circumspect about putting genetic research results in the medical records of any person who happened to have presymptomatic testing, as this information could potentially impact that person’s ability to receive long-term care, disability, and life insurance.”

To listen to the full podcast Presymptomatic ALS Genetic Counseling and Testing and many more, check out www.aanem.org/Education/All-Education-Products/Physician-Podcasts.
Answer: B
Source: Neuropathy Associated With Systemic Disease; AANEM Annual Meeting Coursebook; 2016; Zachary N. London, MD, Sarah E. Berini, MD, Ryan D. Jacobson, MD, Raymond S. Price, MD, David M. Simpson, MD, and Michael D. Stubblefield, MD

Answer: D
Source: EMG Recruitment Trainer; AANEM EMG Interactive Training Tools by Devon I. Rubin, MD

PHOENIX, ARIZONA
2017 ANNUAL MEETING
SEPT. 13 - 16, 2017

AANEM