Stereotactic and Functional Neurosurgery





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AANS/CNS Section on Stereotactic and Functional Neurosurgery and American Society for Stereotactic and Functional Neurosurgery

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Message from the President



Konstantin Slavin, MD, FAANS

As my presidency term is reaching its end, I would like to thank the members for the great opportunity to lead this wonderful society during the last two years. This was an exciting time and I am happy to share with you, the society

members, some of the new developments that in one way or another concern us all.

Today, the American Society for Stereotactic and Functional Neurosurgery (ASSFN) is stronger than ever — as an independent entity we are now financially safe and secure. The membership continues to grow and so is the activity of our members in all aspects of stereotactic and functional neurosurgery, be that research, education, practice development or interdisciplinary cooperation. Among many examples of our society's success are our journal, biannual conferences, website, newsletter and our work on numerous ongoing projects that I will try to summarize below. As the matter of fact, during the last two years we have witnessed — and actively participated — in several major initiatives that will have long-lasting implications

We assumed an active position in coordinating and regulating training in our subspecialty. We are now representing your interests in development of training guidelines for both residency and fellowship. Members of ASSFN Education Committee, led by Robert Gross, MD, PhD, FAANS, are now involved in both the Committee on Residency Education (CoRE) and the Committee on Accreditation of Subspecialty Training (CAST). This is in addition to the tremendous amount of work that was invested in the Matrix and Milestones projects that were

launched over the last few years nationwide. The main goals of our involvement are to standardize the neurosurgical training and education and to prepare our trainees, residents and fellows, for increasing role and importance of functional expertise in neurosurgery of the future.

Our guidelines committee, chaired by Clement Hamani, MD, has encountered many challenges in the beginning: as most of you well know, the lack of "level 1 evidence" in most surgeries that we have been using to help our many patients made it very difficult to create credible evidencebased guidelines. Such guidelines, however, are needed to get coverage for the interventions that we suggest to our patients, particularly when these interventions may be considered "off label" by regulators and insurers. Nevertheless, the committee was able to come up with an important topic, the use of deep brain stimulation for treatment of obsessive compulsive disorder, and put together a set of guidelines that are about to be published in one of our major journals. This is a very time and effort-consuming endeavor; therefore, we will be looking for more volunteers to continue this important aspect of ASSFN work.

The socioeconomic issues in functional neurosurgery remain in the center of ASSFN attention. We have been actively involved in the work of American Association of Neurological Surgeons (AANS)/Congress of Neurological Surgeons (CNS) Washington Committee and contributed to numerous discussions, responses, appeals and resolutions. Peter Konrad, MD, Phd, FAANS, the ASSFN liaison to the Washington Committee, consistently represented our society and successfully defended our positions on multiple occasions. Among many examples where ASSFN's involvement was instrumental is the input that we provided at hearings on devices that

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we use in functional neurosurgery and at legislative determinations of coverage at state and national levels.

There are other society activities that are less noticeable — but important and worth mentioning nevertheless — these include the semi-annual newsletter that has been expertly put together by Michael Kaplitt, MD, PhD, FAANS, and the society's website that has been diligently managed by Kendall Lee, MD, PhD, FAANS. Many of you contributed to these informational resources, but I want to use this opportunity to express my appreciation to the newsletter editor (Dr. Kaplitt) and the webmaster (Dr. Lee) who kept these important ventures going. This is a team effort — and I was happy to see Dr. Hamani step in and maintain our website when our webmaster was deployed overseas to provide neurosurgical care to our wounded warriors! (Combining a busy clinical and research practice with the society work and being an active member of Navy Reserve deserves a separate note of appreciation from all of us to Dr. Lee!)

Unbeknownst to many, chairing the membership committee also requires quite a bit of commitment, and I want to thank Dr. Kaplitt for leading this direction for the last several years. The membership invitation to all American neurosurgeons who are involved in stereotactic and functional neurosurgery remains open — and I would ask you to encourage your junior colleagues, residents and fellows to become ASSFN members so we can better represent them in the future. We are also open to all specialists from neighboring disciplines — neurologists, oncologists, psychiatrists, psychologists and neurophysiologists, as well as nurses, physician assistants and nurse-practitioners — and invite them to become associate members of ASSFN! In addition to this, we invite all interested fellows, residents and medical students to become ASSFN members — the dedicated sections for young neurosurgeons, residents/fellows and medical students are now in process of formation.

Next, I want to mention our two main crown jewels: our journal and our biannual meeting. Our esteemed journal, Stereotactic and Functional Neurosurgery, maintains a very high quality for published articles — and this translates into a very respectable impact factor — mainly due to efforts of the journal's extraordinary Editor-in-Chief (and Past President of ASSFN) David Roberts, MD, FAANS, and the journal editorial board. Among other notable developments, I want to mention the continuous growth in the journal volume and steady reduction of submission-to-publication time! Inevitably, the higher quality of the journal correlates with higher rejection rates — but this does not seem to discourage the journal contributors. Due to successful negotiation with our publisher, we were able to transition to a standard subscription to "online-only" version of the journal (while keeping a hard-copy subscription as an option); this resulted in

significant cost saving for the society — and, as an example of our understanding of difficult financial situation that affects us all, reduction of annual membership dues instead of planned increase that was needed to keep up with the inflation. As a reminder, the access to the journal contents is included in your membership — by logging into "members only" area of the ASSFN website, our members immediate get access to the full-text contents of the current and previous volumes of the journal as back as 2001.

The biannual ASSFN meeting is another part of our society's work that keeps us all proud. This year, the meeting is organized by ASSFN Immediate Past President Ali Rezai, MD, FAANS, and Ashwini Sharan, MD, FAANS, the Meeting Committee Chairman, who have spent countless hours working to create the most comprehensive summary of our work in a three-day conference format. Among many highlights of the conference that is taking place at the Washington Renaissance hotel on May 31-June 3, 2014, will be lectures by ASSFN Honored guest, Andres Lozano, MD, PhD, ASSFN Past President, who will share his insight on the current state and future of our field. The pre-conference courses on epilepsy surgery, economics of functional neurosurgery and innovations in neuro-engineering deserve special attention, and I want to invite all of you to attend them as well. New at the conference this year: the accepted abstracts will be published in a special supplement to Stereotactic and Functional Neurosurgery so the work presented here will be indexed and available for citation for years to come.

Finally, I want to finish my letter on sad note — in less than a year we lost several giants in our field. Roy Bakay, MD, FAANS (ASSFN President, 1991-1993); Blaine Nashold, MD, FAANS (ASSFN President, 1973-1975); and Krishna Kumar, MD, FAANS (Founding President of the Canadian Neuromodulation Society), will be forever remembered as true enthusiasts, pioneers and educators in stereotactic and functional neurosurgery. There are not enough words to express our feeling of gratitude to these stars of our specialty, and it will only be fair if we dedicate our conference to their memory.

On behalf of the ASSFN Executive Council; ASSFN Vice-President Aviva Abosch, MD, PhD, FAANS; ASSFN Secretary-Treasurer Emad Eskandar, MD, FAANS, and myself, I want to thank all of you for your ASSFN membership and for your support of ASSFN activities that are aimed to make our profession stronger! I look forward to seeing you all at our upcoming ASSFN business meeting on June 3, 2014 where, among other things, we will be choosing our next leadership team.

Konstantin Slavin, MD, FAANS

Emory Hands-on Workshop Co-sponsored by ASSFN

The first North American Stereotactic and Functional Neurosurgery Hands-on Workshop occurred this past November at Emory University. This continuing medical education (CME) course, which was co-sponsored by the American Society for Stereotactic and Functional Neurosurgery (ASSFN), attracted 32 participants from the United States, Canada, Mexico and four South American countries. The goal of the course was to provide a truly comprehensive "hands-on" update on functional neurosurgical approaches for practicing neurosurgeons. Twenty participants were surgeons in practice, while 12 were residents in U.S. and Canadian neurosurgical programs. Faculty came from across the U.S., as well as one from Europe.

The Hands-on course focused on functional

neurosurgical procedures for movement disorders and psychiatric disorders, making use of cadaveric specimens and/or phantoms as best suited the purpose. The course began with lectures on Friday evening, but the main thrust was the hands-on experience on Saturday and Sunday in which small groups of four participants rotated through 20 different workstations, each manned by both faculty and industry technicians for support. With up to 45 minutes per station, the small groups allowed participants to actually perform with their own hands the actions necessary to become at least familiar with the capabilities of each tool or technique. Virtually every technology available for stereotactic and functional surgery was covered. Workstations included: stereotactic planning (Stealth, Medtronic; iPlan, Brainlab); classic stereotactic frames (CRW, Integra; Leksell, Elekta); miniframes (NexFrame, Medtronic; microTargeting platform, FHC; Clearpoint Smartframe, MRI Interventions); microelectrode mapping of the Vim, STN and GPi (Microguide, Alpha Omega; Guideline, FHC); making the burr hole, insertion of locking ring, insertion of DBS lead, insertion of internal pulse generator (Midas, DBS, Medtronic); radiological control with fluoroscopy (C-Arm) and intraoperative CT scan (O-Arm, Medtronic; Ceretom, Samsung Neurologica); use of the stereotactic robot (ROSA, MedTech); DBS programming (Medtronic); radiofrequency ablations (Cosman); laser ablations (Visualase); stereotactic radiosurgery (Surgiplan, Elekta); and stereotactic drug delivery (iPlan, Brainlab). Sunday afternoon concluded with a lecture on financial aspects of a functional practice and challenging cases review.



The weekend was very intense and fast-paced, but the experience was universally valued by the participants and faculty alike. It is a great understatement to say that the course could not have been carried out without the commitment of our industry sponsors, who supported the course both financially and with in-kind contributions. Every sponsor that was invited accepted and brought their equipment and technical support personnel to the course.

This Hands-on course was the first of its kind for stereotactic and functional neurosurgery in North America. There are other hands-on offerings, albeit, more limited in scope. For example, there have been one-day hands-on courses at Cleveland Clinic and Case Western for epilepsy over the years. This course was a CME offering, but residents were welcomed, at a reduced rate. However, many programs will not pay for residents to attend courses; for this reason we hope to run a resident course through the national organizations next year. Due to the popular demand of this course, it will be repeated this fall (Nov. 14-16, 2014). In addition, a similar course focusing on epilepsy is anticipated for spring 2015.

Remembrance for Blaine Nashold, MD, FAANS



Blaine Nashold, MD 1923-2014

Blaine Nashold, MD, FAANS, passed away on March 11, 2014. He was regarded as one of the founding fathers of our society and an eminent functional neurosurgeon in the United States. He has a special place in the memory of the American Society for Stereotactic and Functional Neurosurgery (ASSFN) as a brilliant innovator, and compassionate physician and teacher. Dr. Nashold was born in Lennox, S.D., grew up in Indiana, Rhode Island and New

York City, and matured in New Jersey. He received a BS from Indiana University, an MS from The Ohio State University, and his MD in 1949 from the University of Louisville Medical School. In Louisville, Drs. Spurling and Grantham sparked his interest in neurosurgery and introduced him to his future wife, Irene, Dr. Spurling's scrub nurse.

Dr. Nashold served his internship from 1949-50, followed by a residency in general surgery at the Montreal General Hospital and the Queen Mary Hospital both in Montreal. He trained in neurosurgery at McGill's Montreal Neurological Institute (1953-1955) working with Drs. Wilder Penfield and William Cone. He earned an MSc degree in the laboratory of Dr. Herbert Jasper and Dr. George Olzewski. He served for two years during the Korean War, and then completed his training in neurosurgery at Bowman Gray School of Medicine, training under Drs. Eben Alexander and Courtland Davis, whom he credits with making him "a real neurosurgeon."

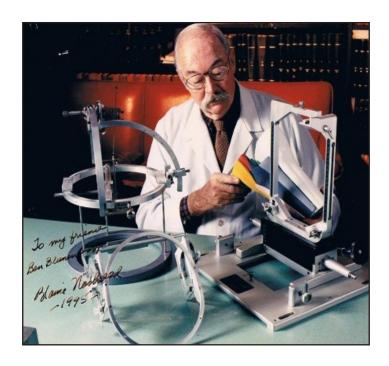
Following completion of his neurosurgical training, he joined Barnes Woodhall at Duke University. He served there for 35 years, retiring in 1994. His major interests were epilepsy surgery, stereotactic neurosurgery and the treatment of pain. He developed the DREZ operation for deafferentation pain and carried out more than 800 of these operations. The DREZ procedure was the culmination of his clinical skill as a surgeon and his scientific interest in the neurophysiology of pain; studying the spinal cord in collaboration with Professor Albe-Fessard at the University of Paris. He was one of the founders of the American Stereotactic Society and was the president of that society as well as the World Society of Stereotactic and Functional Neurosurgery. He was a member of the Congress of Neurological Surgeons (CNS), American

Association of Neurological Surgeons (AANS), American Academy of Neurological Surgery (AAcNS) and the Society of Neurological Surgery (SNS). In 1993, he was awarded the Speigel-Wycis gold medal by the World Society of Stereotactic and Functional Neurosurgery.

Since retirement, his neurological activities were concentrated in the pain research laboratory at Duke, which he established many years ago. The laboratory has been involved in the study of pain after spinal injury, the use of lasers in surgery, and the effect of pulsed radiofrequency on the spinal cord.

The American Society of Stereotactic and Functional Neurosurgery recognizes the enormous contribution Dr. Nashold has had for our field and in particular having an important hand in founding our society in 1973 and hosting the second meeting of the ASSFN in 1983 in Durham, N.C. His legacy for our field remains seminal in the field pain management and its relationship to the spinal cord as well as the application of neuromodulation and laser technology in functional neurosurgery.

Respectfully, Peter Konrad, MD, PhD, FAANS



Earlystim and Duodopa

There are numerous experimental applications of stereotactic and functional neurosurgery that have the potential to allow practitioners to intervene in diseases that have not traditionally been the purview of our field. Yet deep brain stimulation (DBS) for Parkinson's disease (PD) remains a major focus of general clinical practice in our field at the present time. Recently, two randomized prospective studies have been reported that may have substantial impact upon the nature of DBS clinical practice for Parkinson's disease.

The first study reported is a randomized, double-blind trial of intestinal infusion of a levodopa-carbidopa gel in advanced Parkinson's disease (commercially referred to as Duodopa) (Olanow, et. al. Lancet Neurol 13:141-149). The basis for this approach is the belief that better control of delivery and absorption of the gold-standard medical therapy for PD will lead to more steady blood levels and ultimately improved efficacy with fewer adverse effects in patients with more advanced disease. This is approved for use in most countries without having been subjected to large randomized, blinded-studies. Given the nature of the device, it is inserted by general surgeons with expertise in endoscopy, rather than functional neurosurgeons with expertise in Parkinson's disease and brain function. The patients chosen for this study had many features similar to standard DBS candidates, with an average offmedication baseline score on the UPDRS part III of 43 and an average disease duration prior to initiating therapy of roughly 10

The efficacy and adverse event profile from this study raise important issues regarding the ultimate positioning of this therapy in the range of options available to PD patients. There was a four-hour reduction in "off-time" in treated patients compared with sham infusion controls treated with ongoing oral therapy at 12 weeks after initiation of therapy (p=0.0015), which was the primary endpoint. This was accompanied by a similar increase in "on" time without troubling dyskinesias. While this is comparable to DBS, most DBS studies have used far longer endpoints of one to two years, so the longevity of this effect remains to be seen. However, this was in the setting of a 97-percent adverse-event rate. While many studies can have a very high rate of adverse events unrelated to therapy, there was a 90-percent rate of device-related complications, more than 50 percent of which were considered treatment emergent. Most of these occurred in the first week, and were related to jejunostomy tube dislocation or occlusion or pump malfunction. There was also an overall 17 percent wound-infection rate. These are far greater than device-related complication rates for nearly all major DBS studies to date. It is possible that these numbers would improve over time. It is important for functional neurosurgeons to understand this new therapy and the potential advantages and disadvantages to patients. While this may be an

alternative to DBS in those cases where cranial surgery is a poor option, the lack of clear benefit over cranial surgery combined with a very high device-related complication rate should be carefully considered by those DBS candidates considering this as an alternative treatment.

The other recent publication reported results of the so-called EARLYSTIM trial (Schuepbach, et. al. N Engl J Med 368:610-622). This study from a consortium of German centers randomized 251 patients with an average disease duration of seven years and early motor complications to either subthalamic nucleus (STN) DBS or best medical therapy. This on average was a relatively younger group of patients (mean age of 52 years) with shorter disease duration and more limited motor complications than those patients included in several of the large, randomized studies which previously compared DBS to best medical therapy. Two years following randomization, the DBS group improved an average of 7.8 points on the PDQ-39 questionnaire, which was the primary quality of life outcome measure, while the best medical group worsened by 0.2 points (p=0.002). Interestingly, several secondary outcome measures not generally believed to improve in traditional DBS patients seemed to respond to neurostimulation in this earlier population. This included on-medication motor function (26 percent improved in DBS vs. 11 percent worse in best medical group; p<0.001) and several patient-reported and objective measures of depression and cognition. As with the intestinal gel study, there was a roughly 98 percent overall adverse-event rate, which did not differ between groups. However, there was a 17.8-percent device-related complication rate, of which included a roughly five-percent rate of infection/wound complications and a 1.6-percent reoperation rate. While this data supports the use of DBS in patients with slightly more mild disease than prior large studies, common practice often includes patients such as those enrolled in this study. Therefore, this study may not dramatically change practice but rather may reinforce the rationale for minimizing delay in considering DBS among patients who are beginning to have motor complications.

Functional neurosurgery continues to evolve and practice patterns are likely to continue changing over time. While extracranial devices may join novel drug therapies as challenges to the role of functional neurosurgery in the treatment of PD, the established long-term benefit and low risk profile of DBS will continue to be the comparative standard for moderate to advanced patients. Ongoing studies of DBS in very early stage PD patients, combined with current results in somewhat earlier patients than previously studied, may also provide new options for patients who previously may not have considered the potential for functional neurosurgery to improve their condition.

Washington Committee Update

Coding: Sacral Neurostimulator Programming is Different than Spinal Cord Neurostimulator Programming.

During a presentation at the January 2014 RUC meeting by the American Society of Anesthesiologists (ASA), American Urological Association (AUA), American Congress of Obstetricians and Gynecologists (ACOG), and several other societies for sacral nerve stimulation primarily for incontinence, the societies proposed to change neurostimulator programing codes to time based codes. The American Association of Neurological Surgeons (AANS) and Congress of Neurological Surgeons (CNS) objected, maintaining that spinal cord stimulation programming was significantly more intense than nerve root stimulation and purely time-based codes did not account for the difference. The AANS and CNS joined seven other societies in sending a letter to the CPT Editorial Panel to ask for an editorial change to the codes for the 2015 CPT cycle and suggesting a workgroup be formed to create a new set of neurostimulator programing codes that would account for intensity differences.

Excerpted from the letter was the following request:

For CY2015, we request that CPT modify the descriptor for code 95972

From:

Electronic analysis of implanted neurostimulator pulse generator system (eg, rate, pulse amplitude, pulse duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient compliance measurements); complex spinal cord, or peripheral (ie, peripheral nerve, sacral nerve, neuromuscular) (except cranial nerve) neurostimulator pulse generator/ transmitter, with intraoperative or subsequent programming, first hour

To:

Electronic analysis of implanted neurostimulator pulse generator system (eg, rate, pulse amplitude, pulse duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient compliance measurements); complex spinal cord, or peripheral (ie, peripheral nerve, sacral nerve, neuromuscular) (except cranial nerve) neurostimulator pulse generator/ transmitter, with intraoperative or subsequent programming, first hour up to one hour.

Raising the concern of how sacral stimulator programming is not the same as spinal stimulator or DBS programming has now raised the RUC's interest in revaluing the reimbursement for the whole family of neurostimulator programming codes. The feeling of those involved in the Coding Committee is that reimbursements may actually "go up" for spinal stimulator reimbursements and that DBS programming is unlikely to change since it was recently put into practice. It is in our society's long-term interest to watch carefully for negative changes in the neurostimulator programming codes since this may impact referrals for surgical implants if those referrers who program their own patients no longer find it

worthwhile to refer for an implant if their reimbursement declined sufficiently.

Coding: New Technology Add-on Payment Town Hall Meeting

On Feb. 12, 2014, Centers for Medicare & Medicaid Services (CMS) held a Town Hall Meeting to discuss fiscal year (FY) 2015 applications for add-on payments for new medical services and technologies under the hospital inpatient prospective payment system (IPPS). Manufacturers presented comments, recommendations and data regarding their product's ability to meet the substantial clinical improvement criterion for the addon payment. Of interest to neurosurgery, NeuroPace presented a request for the RNS System implantable medical for treating individuals with epilepsy whose partial onset seizures have not been adequately controlled with antiepileptic medications. The company had applied last year but did not receive FDA approval in time to be eligible. CMS will review the comments presented and include their suggestions in the 2015 Medicare Hospital Inpatient Prospective Payment Proposed Rule to be released soon. As was the case last year, the AANS and CNS will likely support the contention that the RNS system represents a significant clinical improvement for patients who are refractory to medical and surgical treatment. More information is available at: http:// go.cms.gov/M9TDHd.

PQRS: Physicians Quality Reporting System

CMS is very committed to documenting and then paying based on a surgeon's "performance among peers." There is an enormous effort to create registries of outcomes, patient satisfaction scores, cost performance, etc., as a way to guide reimbursements. The N²QOD (National Neurosurgery Quality & Outcomes Database) continues to be pursued by organized neurosurgery at large as a way of satisfying PQRS and MOC requirements, and providing outcomes on neurosurgical care. The N²QOD is an approved CMS Registry Vendor for 2014, reporting on the Perioperative Measures Group. Discussion is ongoing with the NPA and organized neurosurgery about developing measures specifically for neurosurgery.

However, it is important for all ASSFN members to be aware of the following:

Under the ACA (Affordable Care Act), CMS is required to implement a plan by 2013 for making physician performance data (including quality, efficiency and patient experience data) available to the public. By 2015, CMS will publicly report on select 2014 PQRS individual measures collected through an EHR (Electronic Health Record), registry or claims. Physicians will have 30 days to review data before it is posted. Neurosurgery remains opposed to this rapid expansion and believes that until CMS can work out technical issues with the website and prove that the reported data is an accurate reflection of physician quality and is truly meaningful and valuable to the public, physician performance data should not be released to the public.

Care to see how you compare? Visit the federal physician database registry, Physician Compare (CMS Physician Quality Reporting Portal) by going to http://www.medicare.gov/physiciancompare/search.html.

N²QOD: A prospective clinical registry tracking outcomes and quality of care for neurosurgical procedures and practices patterns, not appropriately be captured in research settings or RCT (randomized controlled trials). While entry into this data registry costs \$13,000 for an institution, it may in the end be required as a way to garner higher payments for quality care demonstrated within a health-care payment system. N²QOD is primarily a quality improvement program and generates both quality and efficacy data to support claims made to public and private payers, and objectively demonstrate the value of care to other stakeholders. The N²QOD Spine Registry (Lumbar/Cervical) has been established and the Cerebrovascular Module is pilot phase. A Radiosurgery Patient Registry, through AANS and Brainlab, will be launched in July 2014, which will establish national benchmarks for stereotactic radiosurgery (SRS) treatments. The ASSFN membership should consider whether it is time to craft a database structure for tracking quality outcomes in the procedures performed by our specialty.

Sunshine Act Reporting Instructions Issued

On Feb. 7, 2014, CMS published updated instructions on the CMS Open Payments website, explaining that registration and reporting will take place in two phases for the first Sunshine Act reporting period. First, starting on Feb. 18, 2014, manufacturers and applicable group purchasing organizations (GPOs) may begin to register for "Phase 1" of reporting, which will run until March 31, 2014. In Phase 1, applicable manufacturers will submit corporate profile information and "aggregate 2013 payment data" to CMS's Enterprise Portal. Second, beginning in May

2014 and running for at least 30 days, manufacturers will enter "Phase 2" of the registration and reporting cycle. During this period, they will register for the Open Payments system, submit "detailed 2013 payment data" and attest to the accuracy of the data. Finally, after both phases are complete, expected by Aug. 1, 2014, manufacturers, physicians, and teaching hospitals will be able to review the reported data and correct any inaccuracies. More information is available at: http://bit.ly/1dCfMoe.

FDA Updates System for Applying to Serve on Advisory Committees

On Jan. 22, 2014, the FDA released a 10-page slide presentation defining conflicts of interest for individuals who would like to serve on agency advisory committees and launched an online portal for applications. Advisory committees have come under scrutiny because of the important influence that their decisions have on agency reviews of drugs for approval. Even though the FDA is not required to follow the panels' opinions on whether a particular drug should be approved for sale, the agency often does. Some consumer advocacy groups such as Public Citizen support disqualifying individuals with ties to any drug or device manufacturers from service. However, FDA officials have said that they are mindful of concerns about conflicts of interest, but that for certain topics, it can be difficult to find experts with sufficient knowledge who have no links at all to industry. More information and access to the online portal for applications is available on the FDA website at: http://1.usa.gov/1imXbny.

Peter Konrad, MD, PhD, FAANS Washington Committee Liaison for ASSFN

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